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Original Article

Green Product Practices and Performance of Food and Beverage Manufacturing Firms in Kenya

Lydia Khakasa Mandila[1], Dr. Evans Ojiambo Onditi, PhD[2] & Prof. Charles Ombuki, PhD[1]*

[1] Machakos University, P. O. Box 136 – 90100, Machakos, Kenya.
[2] Murang'a University of Technology, P. O. Box 75-10200, Murang'a, Kenya.
*Author for Correspondence ORCID ID; https://orcid.org/0009-0000-1972-4349; Email: lkhakasa85@gmail.com

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Environmental Sustainability, Financial Performance, Food and Beverage Manufacturing Firms, Green Product Practices, Kenya, Natural Resource-Based View, Non-financial Performance.

ABSTRACT

This study examines the effect of green product practices on the performance of food and beverage manufacturing firms in Kenya. The study was anchored on the Natural Resource-Based View and the Stakeholder Theory. The theoretical framework explains the relationship between green product practices and firm performance. The target population was 192 food and beverage manufacturing firms registered by the Kenya Association of Manufacturers. A census was conducted since the target population was relatively small. A cross-sectional survey design was adopted, and data were collected using structured questionnaires from heads of marketing as the respondents in the respective firms. The study response rate was 164 food and beverage manufacturing firms in Kenya, representing 85.4%. Data were analysed using descriptive and inferential statistical techniques. The null hypotheses tested were rejected since the p-value was less than the 5% significance level. The findings showed that green product practices had a positive and significant effect on the financial and non-financial performance of the firms. The study concluded that green product practices are a significant determinant of financial and non-financial performance. This signifies green product practices as eco-friendly initiatives with economic gains. The study provides new empirical findings that can add value to the body of knowledge. The study recommendations urge marketing managers of listed firms to build a strong case for sustainability, where the green products strategy is incorporated into the main business strategy of the firms for financial and non-financial benefits associated with the green product strategy. Further, the study recommends that policymakers provide incentives to support the implementation of green product practices across the manufacturing sector.

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INTRODUCTION

Environmental sustainability has become a strategic priority for businesses worldwide due to increasing environmental degradation, heightened consumer environmental awareness, and growing regulatory pressure. Consequently, firms are increasingly integrating green product practices into their marketing strategies to demonstrate commitment to environmental sustainability while enhancing organisational competitiveness. Green product practices, including the use of clean eco-designs, recyclable materials, and biodegradable packaging, have emerged as important strategic initiatives that reduce environmental impacts throughout a product's life cycle while responding to the growing demand for environmentally responsible products (Maziriri, 2020). The adoption of recyclable materials and biodegradable packaging minimises waste generation and environmental pollution, making them among the most effective approaches to sustainable production (Larashati *et al.,* 2023). Beyond environmental conservation, these practices have become valuable strategic resources capable of generating both financial and non-financial benefits for firms (Eyasu *et al.,* 2026).

Globally, empirical evidence suggests that green product practices contribute to improved firm performance, although the magnitude of their effect varies across industries and institutional contexts. In the Southeast region of the United States, firms that integrated green product practices into their marketing strategies experienced enhanced consumer trust, stronger brand recognition, and improved competitive positioning, although financial gains such as profitability and revenue growth depended on industry characteristics and market maturity (Babu *et al.,* 2026; Fok *et al.,* 2022). Similarly, European firms increasingly use green product practices as differentiation strategies to strengthen market competitiveness. Businesses that effectively communicate their commitment to environmental sustainability through eco-friendly products and packaging report improvements in sales growth, profitability, and customer acquisition while simultaneously strengthening stakeholder relationships (Fontoura & Coelho, 2022; Tzanidis *et al.,* 2024). Comparable findings have been reported in Indonesia, where green product practices significantly enhance firms' non-financial performance, particularly customer satisfaction and organisational reputation (Harini *et al.,* 2020). Likewise, firms in South Asia have realised competitive advantages and improved business performance by incorporating environmentally sustainable product strategies into their operations (Braik *et al.,* 2023). Collectively, these studies demonstrate that although green product practices are increasingly recognised as valuable organisational resources, their contribution to firm performance remains context-dependent and is influenced by customer preferences, organisational capabilities, firm size, and resource availability (Islam *et al.,* 2024).

Evidence from Africa presents a similarly growing but less consistent body of knowledge. In Nigeria, firms adopting green product practices have reported improvements in both organisational performance and environmental sustainability (Orji *et al.,* 2025). Egyptian manufacturing firms are increasingly implementing green product strategies in line with

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national sustainability initiatives such as Egypt Vision 2030, reflecting the growing integration of environmental considerations into industrial development policies (Abdel-Rahman, 2022). Likewise, studies in Ethiopia demonstrate that the adoption of green product initiatives contributes positively to firm performance (Adela *et al.,* 2024). In Uganda, government-supported initiatives, including the Uganda Green Growth Project and sustainable manufacturing program, continue to encourage green marketing practices, although empirical evidence linking these practices to financial and non-financial firm performance remains limited (Kintu, 2023; Namagembe & Mbago, 2023). These findings suggest that while environmental sustainability is increasingly embedded within African business strategies, empirical conclusions regarding the performance effects of green product practices remain inconclusive across different national and industrial contexts.

In the Kenyan context, environmental sustainability has become increasingly important among food and beverage manufacturing firms due to growing consumer demand for environmentally responsible products, regulatory requirements, and increasing market competition. Green product practices, including clean eco-design, the use of recyclable or reusable materials, biodegradable packaging, and environmental branding, are progressively being recognised as strategic resources capable of improving both organisational competitiveness and long-term sustainability. Green product practices integrate environmental considerations throughout product design, manufacturing, packaging, and disposal, enabling firms to minimise environmental impacts while responding to the preferences of environmentally conscious consumers (Kwarto *et al.,* 2022). As the global green economy expands, businesses increasingly leverage clean eco-design, recyclable materials, and biodegradable packaging to enhance their environmental commitment while creating competitive advantage (Kwarto *et al.*, 2022; Kumar *et al.,* 2021; Maziriri, 2020). Besides contributing to environmental conservation, green product practices are associated with financial benefits such as increased profitability and sales growth, as well as non-financial outcomes including improved corporate reputation, stakeholder trust, customer loyalty, and new customer acquisition (Fernandes *et al.,* 2022; Leonidou *et al.,* 2020; Rotman & Polonsky, 2024; Lee & Huang, 2021).

The food and beverage manufacturing subsector is one of Kenya's most important manufacturing industries, accounting for 22.13% of the Kenya Association of Manufacturers (KAM) registered membership, making it the country's largest manufacturing subsector (KAM, 2025). The manufacturing sector contributes approximately 70% of Kenya's industrial GDP, underscoring its strategic role in employment creation, industrialisation, and value addition (Kenya Institute for Public Policy Research and Analysis, 2024). Despite this contribution, food and beverage manufacturing firms continue to experience considerable financial and operational challenges that undermine competitiveness and long-term growth. According to the Kenya National Bureau of Statistics (KNBS, 2025), many firms struggle to achieve sustainable profitability and effectively compete with multinational corporations. The adoption of green marketing initiatives has largely emphasised environmental compliance and operational efficiency while placing relatively less emphasis on improving profitability, sales revenue, and market share (KAM, 2025; Mwove *et al.,* 2024). High production costs, intense competition, and substantial investment requirements further constrain firms' ability to invest in innovation and sustainability initiatives necessary for improved organisational performance (Wanjohi, 2022).

Beyond financial performance, non-financial indicators such as customer loyalty, stakeholder engagement, corporate image, and new customer acquisition have become increasingly important measures of business competitiveness and long-term sustainability. Nevertheless, many food and beverage manufacturing firms have yet to fully exploit these strategic outcomes because of limited technological capabilities, inadequate

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organisational resources, and slow adoption of sustainable innovations (Al-Matari *et al.,* 2024). Existing evidence indicates that many firms continue to experience difficulties implementing green product initiatives capable of improving sales growth and attracting new customers (Anwar *et al.,* 2024; Odhowa & Mutswenje, 2023). Although Kenyan studies generally suggest that green product practices positively influence customer loyalty, stakeholder trust, market positioning, and competitiveness (Nyoro, 2023; Nzomo *et al.,* 2023; Chepkoech *et al.,* 2024), the available evidence remains fragmented and largely concentrates on individual marketing outcomes rather than simultaneously examining financial and non-financial dimensions of firm performance.

Despite increasing scholarly attention to green marketing, important empirical and contextual gaps remain. Most studies conducted in Kenya have investigated green product practices at a broad level or focused primarily on consumer purchase intentions, environmental awareness, or brand performance, with limited attention to food and beverage manufacturing firms (Chepkoech *et al.,* 2024; Mutai, 2025; Mahugu, 2026; Mwai, 2024). Furthermore, limited empirical evidence simultaneously examines the influence of green product practices on both financial performance, including profitability and sales revenue, and non-financial performance, such as customer loyalty, stakeholder trust, and new customer acquisition, despite the growing recognition that these dimensions jointly determine long-term organisational success (Odhiambo, 2023; Kimanthi, 2024). This knowledge gap constrains managers' ability to make evidence-based decisions regarding investments in environmentally sustainable product strategies while limiting policymakers' capacity to formulate policies that effectively support green manufacturing practices. Addressing this gap is therefore essential for strengthening both organisational competitiveness and environmental sustainability within Kenya's food and beverage manufacturing sector.

Consequently, this study aimed to examine the effect of green product practices on the financial and non-financial performance of food and beverage manufacturing firms in Kenya, with the following objectives;

- To establish the effect of green product practices on the financial performance of food and beverage manufacturing firms in Kenya.
- To assess the effect of green product practices on the non-financial performance of food and beverage manufacturing firms in Kenya.

The study hypotheses were;

H_{01}: Green Product Practices have no significant effect on the financial performance of food and beverage manufacturing firms in Kenya.

H_{02}: Green Product Practices have no significant effect on non-financial performance of food and beverage manufacturing firms in Kenya.

LITERATURE REVIEW

Theoretical Foundation

This study is anchored on the Natural Resource-Based View (NRBV) and complemented by Stakeholder Theory (ST) to explain the relationship between green product practices and the performance of food and beverage manufacturing firms in Kenya. The NRBV posits that environmentally oriented capabilities, including clean eco-design, recyclable materials, and biodegradable packaging, create sustainable competitive advantage by enhancing cost efficiency, reputation, and stakeholder relationships (Hart, 1995; Hart & Dowell, 2011). Complementarily, Stakeholder Theory emphasises that creating value for customers, regulators, suppliers, and society through environmentally responsible practices strengthens customer loyalty, corporate reputation, and stakeholder trust, thereby improving financial and non-financial performance (Freeman, 1984; Freeman *et al.,* 2010).

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Empirical Review

Green product practices are recognised as a key dimension of green marketing that enhances firm performance by improving environmental sustainability, customer satisfaction, and operational efficiency (Sarfraz *et al.,* 2022). Green product development contributes to environmental sustainability while enhancing financial and non-financial performance through cost reduction, improved profitability, customer acquisition, and efficient resource utilisation (Song *et al.,* 2020; Ma *et al.,* 2019; Larbi-Siaw *et al.,* 2022). Consequently, manufacturing firms increasingly leverage green products to strengthen customer perceptions, stakeholder relationships, and competitive advantage (Lee & Huang, 2021).

Empirical evidence generally supports the positive influence of green product practices on firm performance, although findings remain inconsistent across contexts. In the United States, Fok *et al.* (2022) found a significant positive relationship between green product innovation and firm performance among healthcare, retail, and manufacturing firms. Similarly, Fontoura and Coelho (2022) reported that green product development significantly enhanced the long-term performance of logistics firms in Portugal, while Ma *et al.* (2019) established that green product innovation improved eco-performance, customer acquisition, profitability, and resource efficiency in Pakistan. Comparable findings were reported by Afum *et al*. (2023), who found that green product strategy positively influenced the sustainability performance of SMEs in Ghana. However, Cao *et al.* (2022) observed that green product innovation positively affected economic performance only during the initial and mature stages of the product life cycle in Chinese microenterprises. In contrast, Lewandowska *et al.* (2022) reported a negative relationship between green innovation practices and firm performance in European Union enterprises. Likewise, Andersén (2021) found no direct relationship between green product initiatives and firm performance among Swedish manufacturing firms. These mixed findings suggest that the relationship between green product practices and firm performance is context-specific and cannot be generalised across industries and countries.

In Kenya, empirical evidence linking green product practices to firm performance remains limited and fragmented. Existing studies have largely focused on green marketing strategies in retail and supermarket settings (Onditi, 2024), customer satisfaction in the soft drink industry (Macharia *et al.,* 2019), or green supply chain management in manufacturing firms (Ngatia *et al.,* 2025). Although these studies report positive outcomes associated with green practices, they do not directly examine the effect of green product practices on both financial and non-financial performance, particularly within the food and beverage manufacturing sector. This contextual and empirical gap justified the present study, which sought to examine the effect of green product practices on the performance of food and beverage manufacturing firms in Kenya.

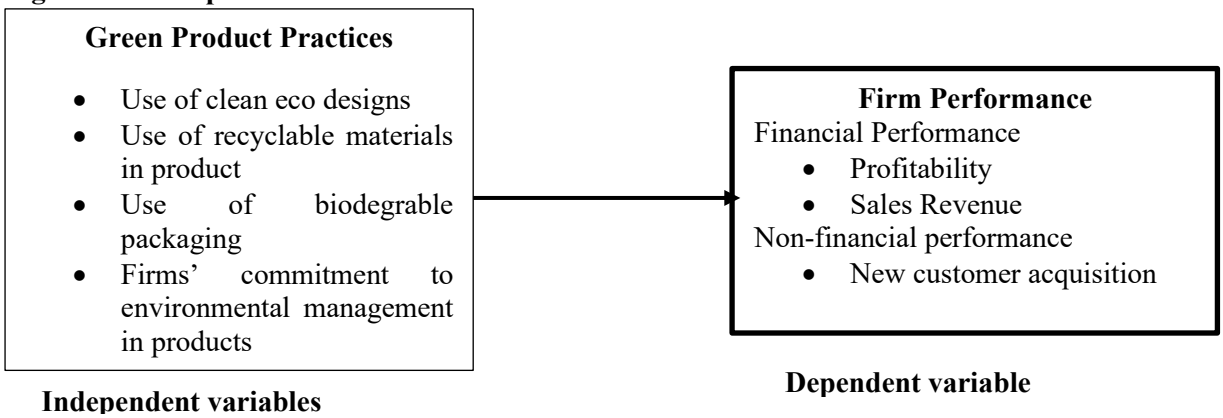
Conceptual Framework

The conceptual framework of the study is illustrated in Figure 1.

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Figure 1: Conceptual Framework



Source: *Authors (2026)*

MATERIALS AND METHODS

This study adopted a cross-sectional research design because data were collected at a single point in time. Cross-sectional studies are appropriate for examining relationships among variables without requiring longitudinal observation (Hunziker & Blankenagel, 2024). The target population comprised all 192 registered food and beverage manufacturing firms in Kenya (KAM, 2025). Owing to the relatively small population, a census approach was adopted. The unit of analysis was the food and beverage manufacturing firms, while the unit of observation comprised marketing managers or heads of marketing departments, who were selected because of their responsibility for implementing and evaluating green product practices and their influence on firm performance.

Data were collected using a structured questionnaire administered via the drop-and-pick-later method, with assistance from three trained research assistants. Green product practices were measured using scale items adapted from Kwarto *et al*. (2022), Wandosell *et al.* (2021), and Fok *et al*. (2022), while financial and non-financial performance were measured using items adopted from Kilic *et al.* (2022) and Mittal *et al.* (2023), respectively. All constructs were measured on a five-point Likert scale (1 = *Not at all* to 5 = *To a very great extent*), which is appropriate for assessing the degree of implementation of organisational practices and performance outcomes (Chang *et al.,* 2022; Lee *et al.,* 2022; Jaiswal *et al.,* 2022; Kılıç *et al.,* 2022). Data were analysed using regression analysis after testing the assumptions of linearity, normality, and autocorrelation. Reliability was assessed using Cronbach's alpha (Hair *et al*., 2019), while construct validity was established through Exploratory Factor Analysis (EFA) based on Principal Component Analysis (PCA) with varimax rotation after confirming data suitability using the Kaiser–Meyer–Olkin (KMO) measure and Bartlett's test of sphericity.

FINDINGS AND DISCUSSIONS

Response Rate

A total of 164 out of the 192 targeted food and beverage manufacturing firms participated in the study, yielding a response rate of 85.4%. According to Creswell (2021), response rates above 70% are considered excellent as they minimise non-response bias and enhance the validity and representativeness of survey findings. The gender distribution of respondents and firm characteristics are presented in Table 1.

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Table 1: Respondent and Firm Characteristics

Description	Frequency	Percentage
Gender of the respondents	Male = 77	Male = 47%
	Female = 87	Female = 53%
	Total = 164	**Total = 100%**
Firm Age	Less than 5 years = 13	Less than 5 years = 7.9%
	5 to 10 years = 34	5 to 10 years = 20.7%
	11 to 15 years = 31	11 to 15 years = 18.9%
	16 to 20 years = 19	16 to 20 years = 11.6%
	Over 20 years = 67	Over 20 years = 40.9%
	Total = 164	**Total = 100%**
Distribution of firms based on product category	Alcoholic beverages = 7	Alcoholic beverages = 2%
	Packed foodstuffs = 19	Packed foodstuffs = 53%
	Bakers and millers = 11	Bakers and millers = 14%
	Non-alcoholic beverages = 19	Non-alcoholic beverages = 12%
	Dairy and meat products = 11	Dairy and meat products = 7%
	Grains and Dried foods = 9	Grains and Dried foods = 5%
	Others = 12	Others = 7%
	Total = 164	**Total = 100%**
Extent to which the firms engage in green marketing practices	To a small extent = 33	To a small extent = 20.1%
	To a moderate extent = 62	To a moderate extent = 37.85
	To a large extent = 52	To a large extent = 31.7%
	To a very large extent = 17	To a very large extent = 10.4%
	Total = 164	**Total = 100%**

Source: *Research Data (2026)*

The demographic profile in Table 1 indicates a balanced and mature sample, supporting the credibility of the study. Female respondents slightly outnumbered males (53% vs. 47%), reflecting increasing female participation in managerial positions, which has been associated with improved firm performance and sustainability (Wairimu, 2024). Additionally, 40.9% of the firms had operated for over 20 years, indicating mature organisations with greater capacity to adopt strategic initiatives such as green marketing (Masila *et al.,* 2024). Packaged foodstuffs constituted the largest product category, and most firms reported moderate to high engagement in green marketing practices, suggesting growing adoption of sustainability initiatives despite opportunities for further integration.

Descriptive Analysis of Green Product practices and Firm performance

Green Product Practices

To assess the extent of green product practices, respondents rated five statements on a 5-point Likert scale ranging from 1 (*Not at all*) to 5 (*To a very great extent*). The statements assessed the use of clean eco-design, recyclable or reusable materials, biodegradable packaging, green product differentiation, and product features that reflect the firm's commitment to environmental sustainability. The mean scores and standard deviations for each item are presented.

Table 2: Descriptive Statistics on Green Product Practices

Statement	Mean	SD
Green marketing at this firm begins with clean product eco design	3.05	.845
The Firm manufactures products using recyclable or reusable materials	3.02	.876
The product packages are biodegradable and not harmful to the environment	3.10	.918
Green products provide the firm with an opportunity for differentiation	3.05	.849
The firm’s product features reflect its focus on environmental sustainability	3.05	.871

Grand Mean = 3.05

Source: *Research Data (2026)*

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The results in Table 2 indicate a moderate adoption of green product practices, with all mean scores slightly above 3 and a grand mean of 3.05. Biodegradable packaging recorded the highest mean (M = 3.10, SD = 0.918), followed by green product differentiation and clean eco-design (M = 3.05), while the use of recyclable or reusable materials had the lowest mean (M = 3.02, SD = 0.876). Standard deviations ranging from 0.845 to 0.918 indicate moderate variability in adoption across firms. Overall, the findings suggest that although food and beverage manufacturing firms have embraced green product practices, their integration into core production strategies remains moderate, highlighting opportunities to strengthen environmental sustainability and competitive advantage.

Firm Performance

Table 3 presents the descriptive statistics on firm performance

Table 3: Descriptive Statistics on Firm Performance

Statement	Mean	SD
This firm's overall profitability has increased over the past three years	3.10	.904
This firm has consistently achieved increased net profit margins in the past three years.	3.38	1.230
This firm's profitability has met or exceeded its business targets in the past three years.	3.07	.969
This firm's profitability has shown stable and sustainable growth in the past three years.	3.07	.967
This firm's total sales revenue has increased over the last three years.	3.35	1.271
This firm has consistently achieved its sales revenue targets.	3.48	1.255
This firm has experienced growth in sales revenue across its product portfolio.	3.04	.899
This firm's sales revenue performance has been strong relative to expectations.	3.01	.988
This firm has seen a steady increase in the number of new customers in the last three years	3.05	.899
This firm's customer acquisition rate has improved in the last three years.	3.06	.938
This firm's overall brand reputation helps to attract new customer segments.	3.11	.953
New customer acquisition has met or exceeded the firm's target in the last three years	3.10	.992

Source: *Research Data (2026)*

The descriptive statistics in Table 4 indicate that food and beverage manufacturing firms experienced moderate improvements in both financial and non-financial performance over the past three years. Profitability indicators recorded mean scores ranging from 3.07 to 3.38, with the relatively higher mean for consistent increases in net profit margins (M = 3.38) suggesting improvements in cost management and operational efficiency, although the higher standard deviation reflects variations across firms. Similarly, sales revenue indicators recorded mean values slightly above the scale midpoint, with the highest mean for consistent achievement of sales revenue targets (M = 3.48), indicating that most firms moderately achieved their revenue objectives despite variations in market positioning and competition.

Non-financial performance also improved moderately, with mean scores above 3.0 indicating gradual growth in new customer acquisition, customer loyalty, and brand reputation. However, the modest mean values suggest that these gains remain incremental, while the relatively consistent standard deviations indicate that firms are at different stages of strengthening intangible performance outcomes.

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Reliability and Validity of the Research Instrument

The reliability of the measurement scales was assessed using Cronbach's alpha, with coefficients of 0.70 and above considered acceptable and values above 0.80 indicating good reliability. Content validity was established through a pilot study involving marketing managers from firms not included in the main study, whose feedback was used to refine the questionnaire. Construct validity was assessed using Exploratory Factor Analysis (EFA) based on Principal Component Analysis (PCA) with varimax rotation. Before conducting EFA, the suitability of the data for factor analysis was confirmed using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity. The results are presented in Table 4.

Table 4: KMO and Bartlett's Test

Variable	KMO Test	Approx. X^2	df	Sig
Green product practices	0.894	545.635	10	.000
Firm Performance	0.942	1302.723	66	.000

Source: *Research Data (2026)*

Results from Table 4 indicate that KMO measures of sampling adequacy were 0.894 for green product practices and 0.942 for firm performance. This exceeded the threshold of 0.5 and above that was proposed by Kaiser (1974), and this confirmed that the data were suitable for factor analysis. The P-values from Bartlett's test of sphericity were found to be less than the alpha value of 0.05, which implies that the variables are fit for inclusion in further tests as proposed by Bartlett (1954). The component matrix for green product practices is shown in Table 5.

Table 5: Component Matrix for Green Product Practices and Firm Performance

	Component
	1
Green marketing at this firm begins with clean product eco design	.859
The Firm manufactures products using recyclable or reusable materials	.885
The product packages are biodegradable and not harmful to the environment	.870
The firm's product features reflect its focus on environmental sustainability	.841
Green products provide the firm with an opportunity for differentiation	.876

Extraction Method: Principal Component Analysis.
Source: *Research data (2026)*

The component matrix for green product practices showed strong loadings for all five items, ranging from 0.841 to 0.885. These are above the threshold of 0.4 for retaining items proposed by Hair *et al.* (2019). Rotation was not possible since only one factor was extracted. In the case of firm performance, Table 6 presents factor analysis results on firm performance as shown.

Table 6: Rotated Component Matrix on Firm Performance

	Component	
	1	2
The firm's overall profitability has increased over the past three years	.850	
The firm has consistently achieved increased net profit margins in the past three years.	.859	
The firm's profitability has met or exceeded its business targets in the past three years.	.886	
The firm's profitability shows stable and sustainable growth in the past three years.	.854	
The firm's total sales revenue has increased over the last three years.	.873	
This firm has consistently achieved its sales revenue targets.	.882	
The firm has experienced growth in sales revenue across its product portfolio.	.689	
The firm's sales revenue performance has been strong relative to expectations.	.859	
The firm has a steady increase in the number of new customers in the last three years	.856	

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	Component	
	1	2
The firm's customer acquisition rate has improved in the last three years.		.587
The firm's overall brand reputation helps to attract new customer segments.		.785
New customer acquisition has met or exceeded the firm's target in the last three years.		.691

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalisation.
a. Rotation converged in 3 iterations.
Source: *Research data (2026)*

Factor analysis results on firm performance extracted 2 factors, and this indicates that firm performance is bidimensional. Factor one had 9 items relating to firm profitability and sales revenue, and this was categorised as financial performance, while factor 2 had 3 items relating to new customer acquisition, and this was categorised as non-financial performance. All 12 factors under firm performance had factor loadings above the 0.4 threshold proposed by Hair *et al.* (2019), and this supported the retention of all items and confirmed the validity of the scale items.

Tests of the Assumptions of Regression Analysis

Testing the Effect of Green Product Practices on Financial Performance

The effect of green product practices on the financial performance of food and beverage manufacturing firms was tested using simple linear regression analysis. Table 7 provides the results of the model summary, ANOVA[a,] and Coefficients

Table 7: Linear Regression Results on the Effect of Green Product Practices on Financial Performance

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.533[a]	.284	.279	.58155

a. Predictors: (Constant), Green Product Practices

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	21.688	1	21.688	64.127	.000[b]
	Residual	54.788	162	.338		
	Total	76.476	163			

a. Dependent Variable: Financial Performance
b. Predictors: (Constant), Green Product Practices

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta(β)		
1	(Constant)	1.799	.203		8.845	.000
	Green Product Practices	.487	.061	.533	8.008	.000

a. Dependent Variable: Financial Performance

Source: *Research Data (2026)*

The results in Table 7 indicate a strong positive relationship between green product practices and financial performance (R = 0.533), with green product practices explaining 28.4% of the variation in financial performance ($R^2 = 0.284$). In comparison, 71.6% is attributable to other factors.

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The regression model was statistically significant ($F = 64.127$, $p < 0.001$), indicating that green product practices, including environmentally friendly product design, sustainable inputs, and eco-friendly packaging, significantly improve financial outcomes such as profitability and sales revenue. The regression coefficients further show a positive and significant effect ($\beta = 0.533$, $B = 0.487$, $t = 8.008$, $p < 0.001$), implying that a one-unit increase in green product practices increases financial performance by 0.487 units.

Consequently, the null hypothesis ($\mathbf{H_{01}}$) was rejected. These findings are consistent with Eneizan *et al.* (2019), who reported a positive effect of green product strategies on the financial performance of car dealers in Jordan, Muthoka and Mutuku (2020), who found that green product design significantly improved the performance of manufacturing firms in Kenya's export processing zones, and Akude *et al.* (2025), who established that green product initiatives positively influenced firms' profitability across different regions. Together, these findings confirm that strengthening green product practices enhances financial performance.

Testing the Effect of Green Product Practices on Non-financial Performance

The effect of green product practices on the non-financial performance of food and beverage manufacturing firms was tested using simple linear regression analysis. Table 8 provides the results of the model summary, ANOVA[a] and Coefficients.

Table 8: Linear Regression Results on the Effect of Green Product Practices on Firms' Non-financial Performance

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.437[a]	.191	.186	.74647

a. Predictors: (Constant), Green Product Practices

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	21.360	1	21.360	38.333	.000b
	Residual	90.268	162	.557		
	Total	111.628	163			

a. Dependent Variable: Non-financial Performance
b. Predictors: (Constant), Green Product Practices

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta(β)		
1	(Constant)	1.766	.261		6.762	.000
	Green Product Practices	.484	.078	.437	6.191	.000

a. Dependent Variable: Non-financial Performance
Source: *Research Data (2026)*

The results in Table 8 indicate that green product practices have a positive and moderate effect on non-financial performance ($R = 0.437$), explaining 19.1% of its variation ($R^2 = 0.191$), while the remaining 80.9% is attributable to other factors. The regression model was statistically significant ($F = 38.333$, $p < 0.001$), indicating that green product practices, including environmentally friendly product design, sustainable inputs, and eco-friendly packaging, significantly improve non-financial outcomes such as new customer acquisition. The regression coefficients further show a positive and significant effect ($\beta = 0.437$, $B = 0.484$, $t = 6.191$, $p < 0.001$), implying that a one-unit increase in green product practices increases non-financial

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performance by 0.484 units. Consequently, the null hypothesis (H_{02}) was rejected. These findings are consistent with Harini *et al*. (2020), who reported a positive effect of green product practices on SMEs' non-financial performance in Indonesia, and Adela *et al.* (2024), who found that green products significantly enhanced business performance among manufacturing firms in Ethiopia, confirming the role of green product practices as a key driver of non-financial performance. The summary of the outcomes of the hypothesis tests is presented in Table 9.

Table 9: Summary of outcomes of Hypothesis Tests

Hypotheses and Sub-Hypotheses	Test Criteria	Test Results	Interpretation
H_{01}: Green product practices have no significant effect on financial performance of food and beverage manufacturing firms in Kenya	Hypothesis rejected if the p-value of the t-test was less than 0.05	p-value=0.000	**H_{01}** was rejected
H_{02}: Green product practices have no significant effect on nonfinancial performance of food and beverage manufacturing firms in Kenya	Hypothesis rejected if the p-value of the t-test was less than 0.05	p-value=0.000	**H_{02}** was rejected

Source: *Researcher (2026)*

Therefore, the significant positive effect of green product practices on performance observed in the study is consistent with a growing body of research demonstrating that environmentally oriented product strategies contribute to enhanced firm competitiveness, stakeholder satisfaction, and institutional legitimacy. These pathways are conceptually grounded in Stakeholder Theory, Institutional Theory, and the NRBV, which collectively explain how green product innovation becomes both a strategic resource and a responsive mechanism to evolving market and environmental pressures, ultimately improving both financial and non-financial outcomes.

CONCLUSION AND RECOMMENDATIONS

The study concludes that green product practices have a positive and significant effect on the financial and non-financial performance of food and beverage manufacturing firms in Kenya. Firms that adopt clean eco-design, recyclable materials, biodegradable packaging, and green product differentiation improve profitability, sales revenue, corporate image, customer acquisition, and stakeholder relationships. These findings demonstrate that green product practices are strategic capabilities that enhance competitiveness, environmental sustainability, and overall firm performance. Based on the findings and conclusions, the study recommends the following;

Managerial Recommendations

The positive and significant effect between green product practices and firm performance of the food and beverage manufacturing firms in Kenya and recommends that the sales and marketing manager put more emphasis on the implementation of all strategies linked to green product practices, as found to have a positive effect on both financial and non-financial performance. Presently, green product practices are being implemented to a moderate extent as per the study findings. Additionally, marketing managers could focus on ensuring the firm incorporates all the green product practices as part of their business strategy.

Policy Recommendations

The study recommends that government agencies, regulators, industry associates, and other policymakers use the findings of the study to formulate clear and credible policy documents that will promote the effective implementation of green product practices across the manufacturing

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sector in Kenya and in other developing economies.

Implications for Practice

To embed environmentally sustainable product development into the business model, food and beverage manufacturers' managers must incorporate eco-friendly raw materials, recyclable and biodegradable packaging, resource efficiency in the product design, and environmentally friendly manufacturing processes. These can help to build customer satisfaction, build corporate reputation, boost competitiveness in the market, and benefit financial performance over time.

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