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Green Supply Chain Management Practices and Performance of Fast-Moving Consumer Goods Manufacturing Firms in Machakos County, Kenya

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Abstract

The study investigated the relationship between green supply chain management (GSCM) practices and the performance of Fast-Moving Consumer Goods (FMCG) manufacturing firms in Kenya. Recognizing that FMCG firms account for approximately 13% of global carbon emissions, the research examined how green manufacturing, green packaging, green marketing, and green procurement contribute to firm performance. Grounded in the resource-based view, triple bottom line theory, and resource dependence theory, the study adopted a descriptive design targeting seven FMCG firms in Machakos County, with data collected from 150 respondents across procurement, operations, marketing, and production departments. Structured questionnaires and statistical techniques, including correlation and regression analysis, were employed to assess relationships. Findings revealed significant positive correlations between GSCM practices and firm performance. Green procurement exhibited a moderate but meaningful impact ($r = 0.473$; $p < 0.05$), indicating that sustainable sourcing improved efficiency and cost management. Green packaging demonstrated a stronger association ($r = 0.541$; $p < 0.05$), enhancing brand image, cost savings, and compliance. Green manufacturing showed an even higher effect ($r = 0.641$; $p < 0.05$), highlighting the importance of energy-efficient and environmentally responsible production processes. Green marketing recorded the strongest influence ($r = 0.741$; $p < 0.05$), demonstrating that eco-conscious branding and promotional strategies boosted customer loyalty and financial outcomes. The study concluded that integrating green procurement, packaging, manufacturing, and marketing is critical for competitiveness, sustainability, and compliance. It recommended reinforcing green practices and proposed further research on their role in operational efficiency, risk mitigation, and supply chain resilience.

Keywords: *Green supply chain management, firm performance, green procurement, green packaging, green manufacturing, green marketing, sustainability*

1.1 Introduction

The Fast-Moving Consumer Goods (FMCG) sector plays a pivotal role in modern economies by providing affordable and essential products such as food, beverages, toiletries, and cleaning supplies. These goods are characterized by short shelf lives and consistently high consumer demand, making efficiency and innovation crucial to sustaining competitiveness. In recent years, growing environmental concerns have underscored the need to integrate sustainability into this sector. Consequently, Green Supply Chain Management (GSCM) has emerged as a critical approach, involving practices such as waste reduction, energy efficiency, eco-friendly procurement, sustainable packaging, and responsible marketing. These practices simultaneously enhance operational efficiency and reduce ecological footprints, thereby aligning business performance with global sustainability imperatives (Hanna & Abdou, 2021; Kaur & Dash, 2022).

At the global level, heightened environmental awareness and strict regulatory frameworks have accelerated the adoption of GSCM. Practices such as green procurement, green manufacturing, sustainable packaging, and green marketing help firms reduce waste, conserve energy, and mitigate carbon emissions. Organizations adopting these strategies often realize enhanced competitiveness, improved reputational standing, cost reductions, and better compliance with environmental standards (Laguir & Baz, 2020). Countries including India and Australia provide illustrative cases, where eco-friendly innovations have enhanced resilience, fostered long-term profitability, and improved stakeholder trust (Sahoo & Vijayvargy, 2021; Wahab et al., 2021).

Regionally, across Africa, the need for GSCM has become increasingly urgent as industrial growth intensifies pressure on natural resources. Weak supply chain oversight has contributed to environmental degradation, emissions, and resource depletion. Yet, firms that adopt sustainable practices have reported significant benefits such as cost savings, improved compliance, enhanced customer satisfaction, and competitiveness (Musau & Rucha, 2021). Rwanda stands out as a leader in this regard, having instituted policies for low-carbon industrial development as early as 2005 (Government of Rwanda, 2011).

In Kenya, both government and private sector actors are progressively recognizing the necessity of sustainable supply chain practices. Manufacturing firms consume substantial energy and produce considerable waste and emissions, creating both environmental and economic risks. Stakeholders ranging from regulators to consumers are increasingly demanding that firms embrace environmentally sound practices balancing profitability and sustainability. Despite these pressures, challenges remain. High initial costs, limited awareness, and weak enforcement of environmental regulations constrain the widespread implementation of GSCM (Choudhary & Sangwan, 2022).

The situation is particularly relevant in Machakos County, a rapidly industrializing region hosting numerous FMCG manufacturing firms. These firms contribute significantly to carbon emissions, inefficient energy consumption, and waste generation. While some have embraced eco-friendly initiatives, debates persist regarding the trade-off between short-term costs and long-term gains of adopting GSCM. Critics caution that high upfront investments may reduce immediate competitiveness, whereas proponents highlight the benefits of innovation, brand loyalty, compliance, and long-term sustainability (Kalpande & Toke, 2021; Odei & Novak, 2020). Against this backdrop, this study focuses on four dimensions of GSCM green procurement, green manufacturing, green packaging, and green marketing to examine their influence on the performance of FMCG firms in Machakos County.

Green Supply Chain Management aims to integrate environmental considerations across all stages of supply chain activities from procurement and manufacturing to distribution, waste management, and post-consumer services. It promotes resource efficiency, waste minimization, and closed-loop systems designed to enhance both environmental and economic outcomes (Ahmad et al., 2022; Hanna & Abdou, 2021). Definitions of GSCM vary but commonly emphasize eco-innovation, reverse logistics, sustainable product design, environmental auditing, and partnerships with environmentally responsible suppliers (Han & Huo, 2020; Borazon et al., 2022).

Green procurement is a central practice, involving the purchase of environmentally friendly goods and services and the integration of ecological criteria in supplier selection and contracting. It emphasizes balancing cost, quality, innovation, and environmental impact (Makinde & Akinlabi, 2023). Green manufacturing, on the other hand, seeks to design and produce goods with minimal environmental harm, improving efficiency while reducing waste and emissions (Okunuga et al., 2021). Green packaging involves the use of biodegradable or recyclable materials, designed to reduce waste and align packaging processes with sustainability objectives (Wahab et al., 2021; Jain & Hudn, 2022). Finally, green marketing seeks to harmonize promotional strategies with environmental and societal demands, emphasizing responsible communication and eco-friendly product positioning (Baah et al., 2021).

Collectively, these practices foster innovation, compliance, and customer loyalty while mitigating environmental risks. They also enable firms to meet increasingly strict international and domestic standards, thereby strengthening both corporate image and long-term competitiveness. Despite varying definitions and scopes in empirical literature, GSCM practices are consistently associated with enhanced resilience, improved operational outcomes, and stronger alignment between business goals and sustainability imperatives (Abdallah & Al-Ghwayeen, 2020; Odaya & Nyagol, 2024). As FMCG firms in Machakos County grapple with rising environmental pressures and stakeholder demands, adopting GSCM practices becomes both a necessity and an opportunity. By examining the effects of green procurement, green manufacturing, green packaging, and green marketing on firm performance, this study seeks to provide empirical insights into how sustainability initiatives can deliver not only ecological benefits but also long-term competitive advantage (Gamboa & Orjuela, 2020).

The performance of Fast-Moving Consumer Goods (FMCG) manufacturing firms is evaluated through both financial and non-financial indicators, including profitability, market share, sales growth, production capacity, customer satisfaction, operational efficiency, and competitiveness. These measures collectively reflect how firms achieve strategic objectives while adapting to rapidly changing market dynamics. FMCGs comprise relatively inexpensive products that sell quickly and are frequently purchased, ranging from food and beverages to personal hygiene and cleaning supplies (Mwangi, 2023). Many FMCGs are perishable and require efficient distribution networks to ensure accessibility and competitiveness.

In Kenya, the FMCG sector has experienced rapid expansion, attracting both local and multinational firms. The industry produces diverse goods for domestic and international markets, with oil and fat products representing approximately 24% of national sales, of which Kapa Oil Refineries holds about 12% (Ravindr & Sachin, 2020). However, technological advancements and intensified competition have rendered adaptability and innovation critical for firm survival. Firm performance is increasingly linked to sustainability, customer trust, and operational efficiency (Tariq & Haq, 2022).

Adoption of Green Supply Chain Management (GSCM) practices has emerged as a key driver of performance. Evidence shows that green procurement, manufacturing, packaging, and marketing not only reduce costs and environmental risks but also strengthen corporate reputation and customer loyalty, fostering long-term competitiveness (Soomro & Marvi, 2020; Rop et al., 2021). In response to rising consumer awareness, Kenyan FMCG firms have prioritized eco-friendly packaging using biodegradable and recyclable materials (Munezero & Ndolo, 2023). Plastic waste management remains a pressing concern, with global recycling rates at only 14%. Industry stakeholders advocate raising recycling levels to 70% while addressing the 30% of plastics deemed non-recyclable.

Kenya's FMCG sector plays a pivotal role in economic growth and employment creation, with leading firms such as Unilever Kenya, Bidco Africa, Brookside Dairy, Pwani Oil, and those located in Machakos County, including Golden Africa Kenya, Propack Kenya, and Eastern Flour Mills (Makinde & Akinlabi, 2023). By integrating eco-conscious manufacturing and sustainable supply chain practices, these firms are not only aligning with global environmental standards but also enhancing resource efficiency, financial performance, and brand reputation in an increasingly competitive marketplace.

1.2 Study Problem

The relationship between Green Supply Chain Management (GSCM) practices and organizational performance remains contested, with prior studies reporting mixed results. While some evidence indicates positive outcomes, others highlight financial and operational challenges that undermine the anticipated benefits. Globally, the Fast-Moving Consumer Goods (FMCG) sector contributes significantly to environmental degradation, with manufacturing processes estimated to account for 13% of global carbon emissions. In Kenya, particularly in Machakos County, FMCG firms grapple with inefficient resource utilization, excessive energy consumption, and poor waste management. These inefficiencies threaten both environmental sustainability and financial performance. Although GSCM has been promoted as a strategic solution for enhancing competitiveness and reducing ecological footprints, its influence on firm profitability and operational efficiency in developing economies remains unclear. Existing literature is largely concentrated in developed contexts, leaving conceptual, contextual, and methodological gaps. Therefore, examining GSCM practices green procurement, packaging, manufacturing, and marketing within Machakos County's FMCG sector is essential for generating context-specific insights to inform policy and managerial strategies**.**

1.3 Research Objectives

i. To examine the relationship between green procurement and the performance of fast-moving consumer goods manufacturing firms in Kenya.
ii. To examine the relationship between green packaging and the performance of fast-moving goods manufacturing firms in Kenya.
iii. To examine the relationship between green manufacturing and the performance of fast-moving consumer goods manufacturing firms in Kenya.
iv. To examine the relationship between green marketing and the performance of fast-moving goods manufacturing firms in Kenya.

2.1 Literature Review

Theoretical Review

The study draws on five theories Resource-Based Theory (RBT), Triple Bottom Line (TBL), Resource Dependence Theory (RDT), Institutional Theory, and the Theory of Reasoned Action (TRA) to frame the relationship between green supply chain management (GSCM) practices and the performance of fast-moving consumer goods (FMCG) firms. Resource-Based Theory (Penrose, 1959; Barney, 1991) argues that firms gain competitive advantage from unique, valuable, rare, inimitable, and non-substitutable resources. In this study, green manufacturing is conceptualized as such a strategic resource, enhancing both firm performance and environmental sustainability.

The Triple Bottom Line (Elkington, 2001) highlights the integration of environmental, social, and economic objectives for long-term competitiveness. In FMCG firms, green packaging exemplifies this approach by linking financial performance with social responsibility and ecological stewardship, despite challenges in measuring and implementing TBL dimensions (Acquah & Afum, 2021). Resource Dependence Theory (Pfeffer & Salancik, 1978) emphasizes inter-organizational relationships and the role of power in resource acquisition. Larger firms may pressure smaller suppliers to adopt sustainable practices, aligning procurement with environmental goals but also exposing firms to risks of dependency (Odei & Novak, 2020).

Institutional Theory (Scott & Christensen, 1995; Lee et al., 2013) explains how external pressures such as regulations, customer expectations, and industry norms shape organizational strategies. In the context of GSCM, FMCG firms adopt eco-conscious practices to align with regulatory demands and societal expectations, thereby enhancing legitimacy and competitiveness.

Finally, the Theory of Reasoned Action (Fishbein & Ajzen, 1975; Ajzen, 1991) links attitudes and subjective norms to behavioral intentions. Applied here, it underscores how consumer perceptions of green value influence purchasing decisions and, consequently, firms' commitment to sustainable procurement and marketing. Collectively, these theories provide a comprehensive lens to analyze how GSCM practices influence FMCG firm performance through resource utilization, sustainability integration, power dynamics, institutional pressures, and consumer behavior.

3.1 Material and Methods

The study adopted a positivist research philosophy, which emphasizes the objective evaluation of empirical evidence This study employed a descriptive research design, which was appropriate for systematically examining the relationship between green supply chain management (GSCM) practices namely procurement, packaging, manufacturing, and marketing and the performance of fast-moving consumer goods (FMCG) manufacturing enterprises in Machakos County, Kenya. The design facilitated the empirical collection and analysis of data to interpret associations between GSCM components and operational outcomes (Trochim & Donnelly, 2008). The target population consisted of seven FMCG manufacturing firms operating in Machakos County, including Golden Africa Kenya Ltd, Kapa Oil Refineries, Propack Kenya, Pwani Oil Refineries, Brava Food Industries Ltd, Max Care Products Ltd, and Eastern Flour Mills Ltd. A census approach was adopted due to the small population size, targeting all 150 employees engaged in supply chain or operations functions. The sampling frame was derived from the Machakos County Trade and Industrialization Department registry (2024), ensuring comprehensive coverage of the study population (Neuman, 2014).

Primary data was collected through a structured questionnaire, which offered standardized questions to minimize bias, ensure clarity, and facilitate comparability of responses (Burns & Grove, 2003). The instrument comprised close-ended questions to promote ease of analysis. Questionnaires were distributed using both drop-and-collect and online methods, accompanied by introductory letters. Follow-ups were conducted to enhance response rates. A pilot study was conducted in Mombasa County to evaluate the clarity and applicability of the questionnaire. Validity was established through expert review and pre-testing, ensuring content relevance, clarity, and comprehensiveness (Kothari, 2004). Reliability was assessed using Cronbach's alpha, with coefficients of 0.7 and above considered acceptable and values of 0.8 or higher denoting strong reliability (Mugenda & Mugenda, 2012; Cooper & Schindler, 2007). The pilot confirmed that the instrument consistently measured the intended constructs.

Data were prepared through coding, cleaning, and editing before analysis using SPSS version 29. Both descriptive and inferential statistics were applied. Multiple regression analysis was conducted to assess the relationship between GSCM practices and firm performance, following the model:

$$Y=\alpha+\beta 1X1+\beta 2X2+\beta 3X3+\beta 4X4+\varepsilon$$

Where,

Y represents firm performance,

$X1$, X2, X3, and X4 denote green procurement, green packaging, green manufacturing, and green marketing respectively. Diagnostic tests, including normality, multicollinearity, and autocorrelation, were undertaken to validate regression assumptions.

Finally, ethical considerations were observed throughout the study. Approval was obtained from St. Paul's University, followed by a research permit from NACOSTI and ethical clearance. Informed consent, confidentiality, and voluntary participation were emphasized, ensuring adherence to research ethics.

4.1 Result

The study achieved 120 valid responses from 150 questionnaires, representing an 80% response rate, exceeding acceptable thresholds and ensuring sufficient sample representativeness (Baruch & Holtom, 2018).

Table 1: Response Rate

No of Issued Questionnaires	Returned	%
150	120	80%

Source: Researcher (2025)

Pilot Test Results

A pilot study in Mombasa County involved 10 supply chain officers to test the instrument's clarity and reliability. Results demonstrated strong internal consistency across constructs, with Cronbach's alpha values ranging from 0.799 to 0.889 for environmentally responsible purchasing, sustainable packaging, eco-efficient manufacturing, ecological marketing, and firm performance. All exceeded the 0.7 benchmark, confirming the robustness and reliability of the measurement tool.

Table 2: Reliability Test Results

Variable	No. of Items	Cronbach's Alpha Value
Green Procurement	6	.874
Green Packaging	6	.865
Green Manufacturing	7	.889
Green Marketing	6	.878
Performance of fast-moving consumer goods	5	.799

Source: Researcher (2025)

Descriptive Statistics

The study examined how green supply chain management (GSCM) practices including green procurement, packaging, manufacturing, and marketing affect the performance of fast-moving consumer goods (FMCG) manufacturing firms in Machakos County, Kenya. Green procurement practices demonstrated a strong positive effect on firm performance. Most respondents confirmed that working with eco-conscious suppliers, purchasing environmentally friendly materials, and restricting non-degradable items enhanced operational efficiency and competitiveness. Notably, e-procurement and order consolidation were reported to reduce waste and transportation costs. The aggregate mean score of 4.267 (SD = 0.769) highlighted widespread adoption of sustainable sourcing as a strategic tool for efficiency and cost reduction.

Green packaging was similarly influential, with firms emphasizing reusable, recyclable, biodegradable, and renewable packaging materials. Respondents largely agreed that non-hazardous and renewable-source packaging improved brand reputation, cost-effectiveness, and compliance with environmental standards. However, minimizing packaging and recycling practices recorded slightly lower mean values, suggesting inconsistent implementation. The overall aggregate mean of 3.980 (SD = 1.008) confirmed packaging as a critical yet evolving sustainability driver.

Green manufacturing practices recorded the highest positive responses. Firms reported strong compliance with environmental regulations, adoption of energy-efficient technologies, and active reduction of greenhouse gas emissions. Respondents also noted that environmentally safe product design and regular environmental impact assessments (EIAs) supported sustainability goals, though waste minimization practices showed moderate uptake. The aggregate mean of 4.046 (SD = 0.878) indicated consistent alignment with ecological standards and efficiency improvements.

Green marketing practices also yielded favorable outcomes, with firms engaging in green branding, advertising, electronic marketing, and environmental partnerships. Compliance with environmental marketing regulations received the strongest support, reflecting firms' commitment to ethical standards. Participation in clean-up initiatives and promotion of eco-partnerships further enhanced brand credibility. The aggregate mean of 4.199 (SD = 0.858) demonstrated that sustainable marketing significantly contributes to competitiveness and customer trust.

Overall, firm performance indicators showed substantial improvements across customer satisfaction, market competitiveness, and financial outcomes. Respondents confirmed that green practices enhanced product quality, competitive pricing, sales growth, return on investment, and customer loyalty. The aggregate mean score of 4.313 (SD = 0.780) affirmed that adoption of

GSCM practices positively and consistently influenced firm performance, underscoring their strategic importance for FMCG manufacturers in Machakos County.

Diagnostic Test

Diagnostic Tests

To ascertain the appropriateness of the data for regression analysis, diagnostic tests were conducted. These included multicollinearity, normality, and autocorrelation assessments, which are fundamental for ensuring the robustness and reliability of inferential statistics.

Multicollinearity Test

A multicollinearity test was undertaken to examine the degree of correlation among independent variables within the green supply chain management (GSCM) practices framework. Multicollinearity occurs when predictor variables are highly correlated, potentially distorting panel regression estimates by obscuring the unique effect of each predictor on firm performance. The findings revealed tolerance and variance inflation factor (VIF) values for green procurement (0.162; 6.172), green packaging (0.363; 2.755), green manufacturing (0.889; 1.125), green marketing (0.775; 1.290), and firm performance (0.592; 1.689). All tolerance values exceeded the minimum threshold of 0.10, while VIF values remained below 10. This confirmed the absence of multicollinearity, consistent with Fox (2015), who emphasized these thresholds for valid regression analysis

Table 3: Multicollinearity Assumption Test Results

Variables	Tolerance	VIF
Green Procurement	0.162	6.172
Green Packaging	0.363	2.755
Green Manufacturing	0.889	1.125
Green Marketing	0.775	1.290
Performance of FMCG	0.592	1.689

Source: Survey Data (2025)

Normality Test

Normality testing was conducted to verify whether GSCM and performance variables followed a normal distribution. As shown in Table 14, Kolmogorov–Smirnov significance values exceeded 0.05 for all variables (green procurement $p = 0.282$; green packaging $p = 0.228$; green manufacturing $p = 0.236$; green marketing $p = 0.174$; performance $p = 0.236$). This confirmed normality, enabling valid panel regression analysis, aligning with Freeman (2017), who notes that significance values greater than 0.05 indicate normally distributed data.

Table 4: Normality Test Results

Variables	Kolmogorov–Smirnov	Sig
Green Procurement	0.282	0.667
Green Packaging	0.228	0.877
Green Manufacturing	0.236	0.912
Green Marketing	0.174	0.871
Performance of FMCG	0.236	0.877

Source: Survey Data (2025)

Autocorrelation Test

The Durbin–Watson test was employed to assess autocorrelation. Results indicated values of 1.342 (green procurement), 2.145 (green packaging), 2.234 (green manufacturing), 1.345 (green marketing), and 1.987 (performance). As these values clustered around 2, the absence of autocorrelation was confirmed, in line with Stock and Watson (2017). This further validated the reliability of regression estimates.

Table 5: Autocorrelation Test Results

Variables	Durbin–Watson
Green Procurement	1.342
Green Packaging	2.145
Green Manufacturing	2.234
Green Marketing	1.345
Performance of FMCG	1.987

Source: Survey Data (2025)

Correlation Analysis

The study employed Pearson's correlation to examine associations between green practices and firm performance among fast-moving consumer goods producers in Machakos County. Results revealed a moderate, positive, and significant relationship between environmentally responsible sourcing and performance ($r = 0.473$; $p < 0.05$). Strong positive correlations were also found between firm performance and green packaging ($r = 0.541$; $p < 0.05$), green manufacturing ($r = 0.641$; $p < 0.05$), and green marketing ($r = 0.741$; $p < 0.05$). These findings, consistent with Mutuku (2020), Ochola et al. (2022), and Magulu and Owiti (2021), demonstrate that adopting sustainable strategies significantly improves competitiveness, operational efficiency, and organizational resilience**.**

Table 6: Correlation Analysis

		Green Procurement	Green Packaging	Green Manufacturing	Green Marketing
Green Procurement	Pearson Correlation	1			
	Sig.(2-tailed)	056	1		
	N	120			
Green Packaging	Pearson Correlation	.416	.541	1	
	Sig.(2-tailed)	.076	089		
	N	120	120		
Green Manufacturing	Pearson Correlation	.981	.987	.641	1
	Sig.(2-tailed)	.059	.089	098	
	N	120	120	120	
Green Marketing	Pearson Correlation	.974	.987	.976	.977
	Sig.(2-tailed)	.078	.098	067	098
	N	120	120	120	120
Performance of fast-moving consumer goods	Pearson Correlation	.473**	.541**	.641**	.741**
	Sig.(2-tailed)	.000	.000	.000	.000
	N	120	120	120	120

Regression Analysis

The regression analysis revealed that green procurement, packaging, manufacturing, and marketing explained 75.2% of performance variation in FMCG firms in Machakos County, with 24.8% influenced by other factors. These results underscore the strong predictive power of green supply chain practices, confirming their significant contribution to enhancing firm performance.

Table 7: Regression Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.867[a]	.752	.730	.36261

a. Predictors: (Constant), Green Procurement, Green Packaging, Green Manufacturing and Green Marketing
b. Dependent Variable: Performance of fast-moving consumer goods

Source: Survey Data (2025)

ANOVA of the Regression Model

The ANOVA results (F = 87.247) confirm the regression model's high statistical significance and robustness. The findings demonstrate reliable estimates with minimal deviation, affirming stability across populations. Consequently, sustainable supply chain initiatives eco-friendly procurement, green packaging, environmentally responsible production, and green promotion significantly explain the performance of FMCG manufacturers in Machakos County.

Table 8: ANOVA of the Regression Model

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17.930	4	4.483	87.247	.000[b]
	Residual	5.917	115	.0515		
	Total	23.847	119			

a. Predictors: (Constant), Green Procurement, Green Packaging, Green Manufacturing and Green Marketing

b. Dependent Variable: Performance of fast-moving consumer goods

Source: Survey Data (2025)

Summary

The study established that the manufacturing sector, particularly Fast-Moving Consumer Goods (FMCG) firms, is central to Kenya's economic growth, employment creation, and consumer satisfaction. Findings demonstrated that the adoption of Green Supply Chain Management (GSCM) practices significantly enhances sustainability and competitiveness across procurement, packaging, manufacturing, and marketing. Green procurement was found to improve cost efficiency through sustainable sourcing, competitive supplier selection, and environmentally conscious policies that reduce risks while strengthening compliance. Green packaging practices, including re-usable, non-hazardous, and biodegradable materials, improved operational efficiency, enhanced reputation, and attracted environmentally conscious consumers. Similarly, green manufacturing practices such as waste recycling, safe disposal, and energy efficiency promoted resource optimization, cost savings, and financial performance. Finally, green marketing initiatives, including eco-branding, green advertising, and cause-related campaigns, were shown to foster consumer trust, brand loyalty, and stronger market positioning. Collectively, these findings underscore the strategic importance of GSCM practices in enhancing sustainability, financial performance, and competitiveness of FMCG firms within Kenya's manufacturing sector.

5.1 Conclusion

This study examined the influence of eco-friendly procurement, packaging, manufacturing, and marketing on organizational performance among fast-moving consumer goods firms in Machakos County. Findings revealed that sustainability-oriented procurement enhances process efficiency, financial control, and compliance with environmental regulations, while eco-design inputs improve resource utilization and product lifecycle sustainability. Correlation analysis established a moderate, positive, and significant relationship between green procurement and firm performance ($r = 0.603$; $p < 0.05$). Regarding packaging, reusable and biodegradable materials were found to reduce costs, minimize waste, and strengthen brand reputation, with a strong positive correlation observed between green packaging and performance ($r = 0.753$; $p < 0.05$). In manufacturing, waste recycling, safe disposal, and energy efficiency initiatives significantly lowered production costs and enhanced compliance, showing a strong correlation with firm performance ($r = 0.690$; $p < 0.05$). Finally, green marketing practices branding, advertising, and cause-related campaigns were shown to improve competitiveness, customer trust, and financial outcomes, supported by a strong positive correlation ($r = 0.729$; $p < 0.05$). Collectively, eco-friendly practices enhance sustainability, efficiency, and profitability.

6.1 Recommendations

The study recommended that producers of fast-moving consumer goods (FMCGs) in Machakos County strengthen eco-conscious supply chain strategies to enhance financial performance, expand market reach, and improve customer satisfaction. Firms should adopt green procurement by prioritizing suppliers who meet sustainability standards and integrating eco-design into sourcing to improve resource efficiency. Green packaging should emphasize reusable, biodegradable, and non-hazardous materials to reduce waste, improve cost-effectiveness, and align with consumer preferences and regulatory requirements. In manufacturing, firms are encouraged to invest in recycling, waste management, and energy-efficient technologies to reduce emissions, minimize inefficiencies, and improve operational outcomes. Furthermore, green marketing initiatives, including branding, advertising, and cause-related campaigns, should be leveraged to attract environmentally conscious consumers and strengthen corporate social responsibility.

For future research, the study proposed examining how sustainable supply chain strategies influence operational efficiency, including production optimization and resource utilization. Additionally, exploring the role of green practices in enhancing organizational resilience, risk mitigation, and long-term supply chain sustainability would provide valuable insights for building robust, competitive, and environmentally responsible FMCG enterprises.

REFERENCES

Abdallah, A.B. & Al-Ghwayeen, W.S. (2020). Green supply chain management and business performance: the mediating roles of environmental and operational performances. Business Process Management Journal, 26(2), 489-512.

Agyabeng-Mensah, Y., Afum, E., & Ahenkorah, E. (2020). Exploring financial performance and green logistics management practices: examining the mediating influences of market, environmental and social performances. Journal of Cleaner Production, 258(1) 1-13.

Aldmour H,Hadad H & AL-dmour R(2023) The impact of the adoption of green marketing on corporate performance of non-profitable organizations: empirical study.

Ali, S., Amjad, H., Nisar, A.Q., Tariq, I., & Ul Haq, A. (2022). Impact of green supply chain management practices and environmental management system on corporate performances and the Moderating role of institutional pressures. Journal of Public Value and Administrative Insight, 5(1), 12-23.

Appiah, M.K., Odei, B.T., Kuni-Amoah, N., & Yeboah, N.A. (2022). Do industry forces affect small and medium enterprise's investment in downstream oil and gas sector? Empirical evidence from Ghana. Journal of African Business, 22(1), 42-60.

Aslam, H., Waseem, M. and Khurram, M. (2019). Impact of green supply chain management practices on corporate image: mediating role of green communications. Pakistan Journal of Commerce and Social Sciences, 13(3), 581-598.

Barney, J.B. (2001). Firms resources and sustained competitive advantage. Journal of Management, 17(1), 99-120.

Borazon, E.Q., Huang, Y.C., & Liu, J.M. (2022). Green market orientation and organizational performance in Taiwan's electric and electronic industry: the mediating role of green supply chain management capability. Journal of Business and Industrial Marketing, 37(3), 1475-1496.

Çankaya, S.Y., & Sezen, B. (2019). Effects of green supply chain management practices on sustainability performance. Journal of Manufacturing Technology Management, 30(1), 98-121.

Cees J. Gelderman, Schijns J, Lambrechts W& Vijgen S. (2020).Green marketing as an environmental practice: The impact on green satisfaction and green loyalty in a business-to-business context

Choudhary, K., & Sangwan, K.S. (2022). Multiple case study analysis and development of an interpretive structural model for greening of supply chains in Indian ceramic enterprises. Management of Environmental Quality, 30(6), 1279-1296.

Chrisostom, A. & Monari,F (2018), Influence of green procurement practices on performance of registered automotive in Kenya

Cousins, P.D., Lawson, B., Petersen, K.J., & Fugate, B. (2019). Investigating green supply chain management practices and performance: the moderating roles of supply chain supply chain

ecocentricity and traceability. International Journal of Operations and Production Management, 39(5), 767-786.

Data, P., & Diffee, N. (2020). Measuring sustainability performance: a green supply chain index. Transportation Journal, 59(1), 73-96.

Elkington, J. (2001). Cannibals with fork and knife, Makron Books, São Paulo.

Fernando, Y. (2017). An empirical analysis of eco-design of electronic products on operational performance: does environmental performance play role as a mediator. International Journal of Business Innovation and Research, 14(20,188-205.

Gamboa-Bernal, J.P., & Orjuela-Castro, J.A. (2020). Sustainable supply chains: concepts, optimization and simulation models, and trends", Journal of Social Studies, 25(3),. 355-377.

Han, Z. & Huo, B. (2020). The impact of green supply chain integration on sustainable performance. Industrial Management and Data Systems, 120(4), 657-674.

Hanna, R.A., & Abdou, H.S. (2021). Developing a sustainable supply chain management practices framework: a case study on the Egyptian Wheat Sector. Journal of Alexandria University for Administrative Sciences, 58(2), 243-260.

Ikram, A., Rehan, M. F., & Ahmad, A. (2022). Going green: Impact of green supply chain management practices on sustainability performance. Frontiers in Psychology, 1(3), 21-36

Jain, .P, Hudnurkar, B (2022). Sustainable packaging in the FMCG industry

Jepherson, M., Ngugi,. P., & Moronge, M. (2021). Logistics management systems and performance of fast-moving consumer goods manufacturers in Nairobi, Kenya. International Journal of Supply Chain Management, 6(1), 29 – 63. https://doi.org/10.47604/ijscm.1232

Jiang, S., Han, Z. & Huo, B. (2020). Patterns of IT use: the impact on green supply chain management and firm performance. Industrial Management and Data Systems, 120(5), 825-843.

Kalpande, S.D., & Toke, L.K. (2021). Assessment of green supply chain management practices, performance, pressure and barriers amongst Indian manufacturer to achieve sustainable development. International Journal of Productivity and Performance Management, 70(8), 2237-2257.

Kaur B,Veer P.,& Dash G(2022). Green Marketing Strategies, Environmental Attitude, and Green Buying Intention: A Multi-Group Analysis in an Emerging Economy Context

Kimario, H. F. , Ernest, E. , Festo, D. K. , Nicodemus, A. M., and Shilemba, S.(2023).Green procurement nexus performance of manufacturing firms: empirical reflections

Kumar, G., & Goswami, M. (2019). Sustainable supply chain performance, its practice and impact on barriers to collaboration. International Journal of Productivity and Performance Management, 6(8), 1434-1456.

Laguir, I., Stekelorum, R., & Baz, J. (2020): Going green? Investigating the relationships between proactive environmental strategy, green supply chain practices and performances of third-party logistics providers. Journal of Business Management, 3(2), 37-43.

Maccioni, L., & Pigosso, A.C.D. (2019). Can the choice of eco-design principles affect products' success? Design Science, 5(1), 1-31.

Mafini, C., & Loury-Okoumba, W.V. (2018). Extending green supply chain management activities to manufacturing small and medium enterprises in a developing economy. South African Journal of Economic and Management Sciences, 21(1), 1-12.

Moraa,L, Odaya, A& Nyagol ,M(2024).The Role of Green Distribution Practices on Competitiveness of Soft Drinks Manufacturing Firms: A Kenyan Perspective

Munezero, H., & Ndolo , J. (2023). The influence of green procurement management policy on performance of state corporations in Rwanda. Journal of Interdisciplinary Research in Accounting and Finance (JIRAF), 9(2), 35–40. Retrieved from https://sadijournals.org/index.php/JIRAF/article/view/209

Musau E.M. & Rucha K. (2021). Effect of Green Manufacturing on Operational Performance of Manufacturing Firms in Mombasa County, Kenya. European Scientific Journal, ESJ, 17(23), 323. https://doi.org/10.19044/esj.2021.v17n23p323

Mutangili, S. K. (2019). Influence of Green Procurement Practices in Supply Chain Management and Leadership on Performance of Parastatals in Kenya; A case of Kenya Airways and Kenya Pipeline, Journal of Procurement and Supply Chain, 3(2), 64-78

Mwangi S. (2023). Effects of sustainable procurement on organizational performance a case study of kenpoly manufacturers limited

Nkrumah, K.S., & Asamoah, S. (2020). Examining green capabilities as drivers of green supply chain management adoption. Management Research Review, 44(10, 110-127.

Odei, M.A., & Novak, P. (2020). Demystifying the factors contributing to successful process innovations in the Czech. Economic Studies 29(1), 136-150.

Odei, S.A., Stejskal, J., & Prokop, V. (2021). Revisiting the factors driving firms' innovation performances: the case of Visegrad countries. Journal of the Knowledge Economy, 12(3), 1331-1344.

Okunuga, A. M.,Amos, Fidelis, N. B., & Dogo, E B. (2022) .Green Manufacturing and Operational Cost of Selected Fast Moving Consumer Goods Companies in Lagos State, Nigeria, European Journal of Business and Innovation Research, Vol.10, No.5, pp.,7-24

Penrose, E. (1959). The theory of the growth of the firm. New York: Wiley.

Pfeffer, J., & Salancik, G. R. (2003). The external control of organizations: A resource dependence perspective. Stanford University Press.

Porta, D. D. (2014). Methodological practices in social business research. New York: Oxford Press.

Ravindra, B., Raut, R.D., & Sachin, S. (2020). Sustainable supply chain management practices and performance: an integrated perspective from a developing economy. Management of Environmental Quality: An International Journal, 31(5), 1147-1182.

Rop, V.J., Shalle, N., & Nteere, K.K (2021). Effects of green logistics adoption on the performance of commercial state corporations in Kenya. Journal of Business and Economic Development. 6(3), 170-175.

Sahoo, S. and Vijayvargy, L. (2021). "Green supply chain management practices and its impact on organizational performance: evidence from Indian manufacturers", Journal of Manufacturing Technology Management, Vol. 32 No. 4, pp. 862-886. https://doi.org/10.1108/JMTM-04-2020-0173

Setyadi, A. (2019). Does green supply chain integration contribute towards sustainable performance? Uncertain Supply Chain Management Journal, 7(2), 121-132.

Setyawati, H., Suroso, A., Adi, P & Helmy, I. (2020). Linking green marketing strategy, religiosity, and firm performance: Evidence form Indonesian SMEs.Management Science Letters, 10(11), 2617-2624.

Setyawati, H., Suroso, A., Adi, P & Helmy, I. (2020). Linking green marketing strategy, religiosity, and firm performance: Evidence form Indonesian SMEs.Management Science Letters , 10(11), 2617-2624.

Soomro, B.R., & Marvi, S. (2020). Exploring the green purchasing behavior of young generation in Pakistan: opportunities for green entrepreneurship. Asia Pacific Journal of Innovation and Entrepreneurship, 14(3), 289-302.

Soyege, O. O., Makinde, G. O., & Akinlabi, B. H. (2023). Green Supply Chain Management and Organizational Performance of Fast-Moving Consumer Goods Firms in Lagos Nigeria. International Journal of Entrepreneurship, 6(2), 1 - 20. https://doi.org/10.47672/ije.1517

Wahab S,N, Lokhman Hakim Osman , Seh Boon Koay & Kai Ting Long (2021). Exploring green packaging acceptance in fast moving consumer goods in emerging economy: the case of Malaysia.

Wernerfelt, B. (1984). A resource-based view of the firm. Journal of Strategic Management 5(2), 171-180.

Zikmund, W.G. (2012). Business research methods. (8th ed.) South-Western: Cengage Learning.