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Green Supply Chain Management Strategies and Performance of Sugar Companies in Western Kenya

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Abstract

Although the drive to improve overall organizational sustainability has resulted in a focus on pollution prevention and minimization of environmental impacts at all stages of the product lifecycle, from raw material sourcing to manufacturing, transportation, use, and disposal, not all companies in Kenya's sugar industry have adopted this approach. Thus, the primary goal of the research was to investigate the impact of green supply chain management strategies on the performance of sugar companies in Western Kenya. The specific research objectives were to assess the impact of green procurement, green manufacturing, eco-design, and green distribution on the performance of sugar companies in western Kenya. The population under study consisted of ten sugar firms and a sample of 272 people drawn from the procurement, production, and operations departments. Data was gathered using closed-ended questionnaires. The study found that green procurement, green manufacturing, eco design, and green distribution had a positive and significant impact on the performance of sugar companies in Western Kenya. The findings emphasize the critical relationship between green supply chain management strategies and performance. The study made specific policy and practice recommendations based on its findings. Managers should adopt green procurement practices by collaborating with suppliers who value environmental sustainability. Managers should also priorities eco-design principles to reduce waste and encourage product recycling. Managers should create a collaborative culture that encourages employee involvement in sustainability initiatives, as this can improve the overall effectiveness of GSCM strategies.

Keywords: *Green Supply, Chain Management Strategies, Performance, Sugar Companies, Western Kenya*

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1.0 Introduction

In today's global competitive environment, performance assessment is critical for planning, controlling, and making decisions (Ahi & Searcy, 2015). According to Naslund and Williamson (2010), in a competitive global environment, a firm's performance will be influenced by both its supply chain's choices and activities. Compliance, waste reduction, and production are used to assess a company's performance. A company's performance can be measured by its production efficiency. A higher output indicates a better firm performance. More efficient production gives the sector a competitive advantage. Another indicator of operational performance is high product quality, which is improving. From start to finish, operational performance metrics assess organizational product and service development (Mun & Jang, 2018). Sugar is a widely consumed, traded, sensitive, and protected commodity globally and regionally (Bouët et al., 2022). Recent sugar industry developments, such as price distortions in the global sugar market, European sugar sector liberalization, and agricultural trade globalization, have highlighted the importance of understanding African sugar export competitiveness (Joshua & Lubos, 2023). Sugarcane accounts for approximately 80% of global sugar production, with 70% consumed domestically and 30% traded internationally (Smutka et al., 2011; Macháček et al., 2017; Pulkrabek et al., 2011; Taylor, 2017). Brazil's rise as a major sugar producer, as well as the trade-off between raw sugar and biofuels, has had an impact on global sugar supply and prices (FAO, 2005; Helia, 2022).

Future sugar trade and competitiveness in Africa are expected to change. Population growth and rising incomes will boost sugar demand across the continent. This may increase sugar imports while also allowing African countries to develop their sugar industries and become more competitive (Helia, 2022). Das Nair et al. (2017) discovered that South Africa and Zambia have a comparative advantage in sugar production and international sugar trade. Seleka and Dlamini (2020) looked at 11 African countries to analyses ACP sugar exporters. The study discovered that Côte d'Ivoire, Kenya, Madagascar, Malawi, Tanzania, Uganda, and Zambia have made marginal progress from extreme comparative disadvantage in the 1960s and 1970s to comparative advantage in the 2010s. According to KSD (2018), Kenya's sugar sector has underperformed in comparison to other parts of Africa and the world (AFA 2019), with total sugar production falling 41% from 638,340 tonnes in 2015 to 377,126 tonnes in 2017, despite increased local demand of up to 890,000 tonnes. Several factors influence performance, but green supply chain management is novel. According to Carter (2009), major companies have chosen assured supply chain sustainability to achieve their performance objectives.

Sugarcane is a significant employer and economic driver in Kenya. Tea, coffee, horticulture, and maize are all major crops. More than 92% of sugar companies' cane comes from 250,000 small-scale farmers (KSB 2013). According to William (2021), the industry supports six million Kenyans. Kenyan sugarcane production has declined due to a number of issues. Sugar productivity on farms is low due to poor seed for long-maturing varieties, smut disease, high input costs, and delayed farmer payments (Mati & Thomas, 2019). Kenya produces less sugar than it consumes, by more than 300,000 metric tonnes. Milled sugar production decreased from 635,700 tons in 2015 to 491,100 in 2018. Meanwhile, sugar imports increased. The country imports sugar because its annual demand exceeds 900,000 tonnes (Mati & Thomas, 2019; OECD/FAO, 2019). FAS/Nairobi forecasts stagnant sugar production in MY 2019/2020 due to delays in privatizing state-owned mills, which were expected to boost the sector (USDA, 2019). Mills have been unable to meet their cane needs for the past two decades due to fluctuations in cane availability and factory capacity. The cane requirement is 9.84 million MT, yielding 1.09 million MT of sugar per year at

80% factory efficiency (SISTR, 2019, Mati & Thomas, 2019; KNBS, 2018). According to KSD (2018), Kenya's sugar sector has underperformed in comparison to other parts of Africa and the world (AFA 2019), with total sugar production falling 41% from 638,340 tonnes in 2015 to 377,126 tonnes in 2017, despite increased local demand of up to 890,000 tonnes.

Kenya's sugar industry faces two major challenges. The country's farm cane and factory-milled sugar productivity is low. National average yields are lower than regional sugar producers. Second, Kenya charges the highest COMESA sugar price. Kenyan sugar costs up to $600 per tonne, more than twice as much as in neighboring Egypt and Sudan (Institute of Economic Affairs, 2016). These companies have not made full use of GSCMS. Green Supply Chain Management (GSCM) is a novel approach for businesses to reduce environmental risk and impact while increasing profits, efficiency, and market share (Hu & Hsu, 2010).The drive to improve organizational sustainability has focused on pollution prevention and minimization of environmental impacts from raw material sourcing to manufacturing, transport, use, and disposal (Chandrakar, 2012); however, not all sugar companies in Kenya have adopted the Green Supply Chain Management Strategy. Some sugar companies, such as Mumias Sugar Company, have closed due to intense competition, limited resources, uncertainty, and operational risks. Even with high input costs due to poor infrastructure, which has resulted in high prices for locally manufactured products, limiting their competitiveness in regional markets and limiting the sector's capacity utilization, sugar-sector stakeholders (sugar mills, farmers, and researchers) are not paying enough attention to adaptation to global climate change and climate variability, which should reduce costs.

1.1 Research Hypothesis

H_1: Green procurement has a positive effect on performance of sugar companies in Western Kenya

H_2: Green manufacturing has a positive effect on performance of sugar companies in Western Kenya

H_3: Eco Design has a positive effect on performance of sugar companies in Western Kenya.

H_4: Green Distribution has a positive effect on performance of sugar companies in Western Kenya.

2.0 Literature Review

Previous research has looked into the link between green procurement and organizational outcomes. For example, Galeazzo et al. (2021) examined the effect of green procurement on the company's financial performance. They also looked at how tourists' green purchasing behavior, as measured by long-term orientation, green perceived risk, and cost-green quality inference, affected this relationship. The study used a sample of 479 observations collected from 122 tourism companies. The study showed a positive relationship when tourists' environmentally conscious purchasing behavior was moderated. Oyedokun and Garba (2022) looked at the effects of firm internationalization, environmentally responsible procurement, and organizational performance. A sample size of 158 was used. The study discovered that green procurement, negotiation management, and competitive bidding had a positive and significant impact on organizational performance.

Munezero and Ndolo (2022) examined how green procurement management affects the efficiency of Rwandan state corporations. A total of 119 respondents were used. The study's findings revealed that green procurement management policies improved the performance of government-owned enterprises. Walisundara et al. (2022) examined how green manufacturing practices affect the

long-term performance of firms in Sri Lanka's Kegalle district. According to the study's findings, green manufacturing practices have an impact on companies' long-term performance.

D'Angelo et al. (2023) studied the impact of green manufacturing practices on the economic performance of small and medium-sized businesses (SMEs) in Europe. They found that green activities had a positive effect on economic performance. Nugraha et al. (2022) examined the impact of eco-design, just-in-time production, and internal environmental management on performance. The study's findings revealed that eco-design and internal environmental management have a significant impact on organizational performance. Kirunga and Kihara (2018) investigated the impact of green distribution practices on the environmental performance of chemical manufacturers in Kenya. A sample of 27 chemical manufacturing companies was chosen. The findings revealed that green storage, green packaging, green transportation, and eco labelling have a significant and positive impact on the environmental performance of chemical manufacturing companies in Kenya.

3.0 Research Methodology The research utilized a descriptive design to investigate the sugar industry in Western Kenya, targeting a population of 10 sugar companies: West Kenya Sugar Company, Butali Mills Factory, Chemilil Sugar Company, Muhoroni Sugar Company, Nzoia Sugar Company, South Nyanza Sugar Company, Kibos Sugar Company, Sony Sugar Company, Sukari Industries Limited, and Busia Sugar Company. The sample size was determined using Yamane's formula (1967), yielding 222 respondents with a confidence level of 95% and a precision level of 5%. Data were collected from managers, middle managers, and supervisors in the procurement, production, and operations departments through structured questionnaires. The data collection process achieved an 81% response rate, with 179 completed questionnaires. Data analysis was performed using statistical methods to interpret the survey results and assess performance metrics across the targeted sugar companies.

4.0 Findings and Discussion

This section presents the findings and discussion of the research, focusing on the descriptive statistics, correlation analysis and regression results related to green supply chain management strategies and their impact on performance.

4.1 Descriptive Statistics

Table 1 provides a summary of the descriptive statistics for the key variables examined in the study: Green Procurement, Green Manufacturing, Eco Design, Green Distribution, and Performance. The statistics include minimum, maximum, mean, standard deviation, skewness, and kurtosis for each variable.

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Table 1: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Green Procurement	179	1.67	4.50	3.73	0.64	-1.901	0.18	3.714	0.36
Green Manufacturing	179	1.43	2.86	2.23	0.42	-0.352	0.18	-1.056	0.36
Eco Deign	179	3.00	5.00	4.057	0.51	0.069	0.18	-0.430	0.36
Green Distribution	179	2.00	5.00	3.41	0.82	-.023	.182	-1.11	0.36
Performance	179	2.25	4.75	4.04	0.58	-1.677	.182	2.82	0.36

Table 1 summarizes the descriptive statistics for Green Procurement, Green Manufacturing, Eco Design, Green Distribution, and Performance. The mean and standard deviation are calculated using a five-point Likert scale. The mean score for the Green Procurement survey questions was 3.73, with a standard deviation of 0.92. This meant that the majority of respondents agreed on the majority of the survey questions. The average mean score of the green manufacturing survey questions was 2.23, with a standard deviation of 0.98, indicating that the majority of respondents disagreed with the survey questions. The average mean score of the Eco Design survey questions was 4.06 with a standard deviation of 0.74, indicating that the majority of respondents agreed with the survey questions. The average mean score of the Green Distribution survey questions was 3.41, with a standard deviation of 1.1, indicating that the majority of respondents fairly agreed with the majority of the survey questions. Finally, the mean score of the Performance survey questions was 4.22, with a standard deviation of 0.713, indicating that the majority of respondents agreed with the majority of the survey questions.

4.2 Correlation Analysis

This section presents the findings of the correlation analysis, which investigates the relationships between performance and the four green supply chain management (GSCM) strategies: green procurement (GPP), green manufacturing (GMP), eco design (ED), and green distribution (GD). Table 2 shows the Pearson correlation coefficients for these variables, indicating the strength and direction of their associations.

Table 2: Correlation Analysis

Variable		**Performance**	**GPP**	**GMP**	**ED**	**GD**
Performance	Pearson Correlation	1.000				
	Sig.(2-tailed)					
GPP: Green Procurement	Pearson Correlation	.493**	1.000			
	Sig.(2-tailed)	0.000				
GM: Green Manufacturing	Pearson Correlation	.544**	.436**	1.000		
	Sig.(2-tailed)	0.119	0.000			
ED: Eco Design	Pearson Correlation	.572**	.400**	.509**	1.000	
	Sig.(2-tailed)	0.000	0.002	0.000		
GD: Green Distribution	Pearson Correlation	.608**	.407**	.556**	.512**	1.000
	Sig.(2-tailed)	0.000	0.892	0.000	0.000	
	Sig. (2-tailed)	0.000	0.000	0.001	0.000	0.000

The results of Pearson correlation are presented in Table 2 below. The results shows significant positive correlations between performance and all the four GSCM strategies suggesting that these factors positively influence the performance of sugar companies in Western Kenya. The Pearson correlation coefficient between green procurement and performance is 0.493, with a p-value of 0.000, green manufacturing and performance is 0 .544, with a significant p-value of 0.000, Eco-design shows a correlation of 0.572 with a p-value of 0.000 and finally the highest correlation is between green distribution and performance at 0 .608 with a p-value of 0.000, showing a very strong and significant relationship.

4.3 Regression Analysis

The regression analysis results for the impact of green supply chain management strategies on performance are presented in this section. The analysis was conducted to determine how green procurement, green manufacturing, eco design, and green distribution influence performance outcomes.

Table 3: Regression Coefficients

Model		**Unstandardized Coefficients**		**Standardized Coefficients**		
		B	**Std. Error**	**Beta**	**t**	**Sig.**
1	(Constant)	-.553	.318		-1.741	.083
	Green Procurement	.264	.069	.218	3.803	.000
	Green Manufacturing	.182	.068	.169	2.655	.009
	Eco Deign	.295	.066	.270	4.441	.000
	Green Distribution	.364	.071	.321	5.119	.000
a. Dependent Variable: Performance						

The data shows that these strategies contribute positively to performance outcomes, confirming their effectiveness in enhancing overall company performance. This aligns with the hypothesis that implementing green supply chain management practices benefits organizational performance. Hypothesis 1 (H_{01}) posited that green procurement positively affects the performance of sugar companies in Western Kenya. The results support this hypothesis, showing a significant positive impact ($\beta_1=0.264$, $p<0.05$). This indicates that an increase in green procurement practices leads to a 0.264 unit increase in performance. This finding aligns with the studies by Chiarini and Vagnoni (2018) and Kuei et al. (2019), which demonstrate that green procurement can reduce costs and improve efficiency by minimizing waste and enhancing resource utilization. Such practices also contribute to better financial performance and market positioning.

In addition, Hypothesis 2 (H_{02}) tested the impact of green manufacturing on performance. The results confirm that green manufacturing practices significantly enhance performance, supporting the hypothesis. According to the findings, green manufacturing leads to improved operational efficiency and cost savings, similar to the benefits observed with green procurement. Hypothesis 3 (H_{03}) explored the effect of green logistics on performance. The results indicate a positive and significant influence of green logistics on performance, underscoring its role in improving supply chain efficiency and reducing environmental impact. These findings collectively emphasize the importance of adopting comprehensive green supply chain management strategies to achieve better performance outcomes.

Moreover, Chiarini and Vagnoni (2018) argue that adopting green procurement practices allows organizations to achieve significant cost reductions and improved resource efficiency, directly impacting financial performance. Kuei et al. (2019) highlight that a commitment to sustainability attracts consumers and stakeholders, enhancing market position and customer loyalty. This shift towards sustainable practices not only improves sales and market share but also positively influences employee satisfaction and retention, further supporting the benefits of green procurement in enhancing company performance.

5.0 Conclusion

The findings of this study reveal that green supply chain management strategies significantly impact the performance of sugar companies in Western Kenya. The regression analysis indicates that all components of green supply chain management—green procurement, green manufacturing, eco design, and green distribution—positively influence organizational performance. Specifically, green procurement and green manufacturing practices were found to have a notable effect on performance, with green procurement showing a significant positive impact ($\beta\_1=0.264$, $p<0.05$). This suggests that adopting green procurement practices not only enhances operational efficiency but also contributes to improved financial performance, as supported by Chiarini and Vagnoni (2018) and Kuei et al. (2019). Additionally, eco design and green distribution practices also contribute positively to performance, though the exact impact may vary.

6.0 Recommendations

Based on the findings, several recommendations can be made to enhance the performance of sugar companies through green supply chain management strategies. Firstly, companies should prioritize the adoption of green procurement practices, as these have shown a significant positive impact on performance. This involves selecting environmentally friendly materials and processes to minimize waste and reduce dependency on non-renewable resources. Secondly, investing in green manufacturing practices is recommended to improve operational efficiency and cost savings. Companies should focus on integrating sustainable practices into their production processes to achieve these benefits. Thirdly, the implementation of eco design principles should be encouraged to ensure that products are designed with sustainability in mind from the outset. Finally, enhancing green distribution practices can further improve supply chain efficiency and reduce environmental impact. By adopting these recommendations, sugar companies can not only improve their performance but also strengthen their market position and align with growing consumer and stakeholder expectations for sustainability.

References

AFA (2019). Agriculture and Food Authority Annual Report 2019. Agriculture and Food Authority.\

Ahi, P., & Searcy, C. (2015). An analysis of metrics used to measure performance in green and sustainable supply chains. Journal of Cleaner Production, 86, 360-377. https://doi.org/10.1016/j.jclepro.2014.08.005

Chandrakar, R. (2012). Green supply chain management: A necessity for sustainable development. International Journal of Engineering and Science, 1(1), 14-18.

Chiarini, A., & Vagnoni, E. (2018). Environmental sustainability in European public healthcare: Could it just be a matter of leadership? The Journal of Cleaner Production, 174, 129-139. https://doi.org/10.1016/j.jclepro.2017.10.173

D'Angelo, V., Cappa, F., & Peruffo, E. (2023). Walking the tightrope: Circular economy breadth and firm economic performance. *Corporate Social Responsibility and Environmental Management*, *30*(4), 1869-1882.

Galeazzo, A., Ortiz-de-Mandojana, N., & Delgado-Ceballos, J. (2021). Green procurement and financial performance in the tourism industry: the moderating role of tourists' green purchasing behavior. *Current Issues in Tourism*, *24*(5), 700-716.

Hu, A. H., & Hsu, C. W. (2010). Critical factors for implementing green supply chain management practice: An empirical study of electrical and electronics industries in Taiwan. Management Research Review, 33(6), 586-608. https://doi.org/10.1108/01409171011050208

Institute of Economic Affairs. (2016). The Kenyan sugar industry: A synopsis of the current state of affairs. Institute of Economic Affairs.

Kirunga, F., & Kihara, A. (2018). Influence of green distribution practices on environmental performance of chemical manufacturing firms in Kenya. *Journal of International Business, Innovation and Strategic Management*, *2*(3), 197-214.

KSB (2013). Kenya Sugar Board: Annual Report 2013. Kenya Sugar Board.

Kuei, C., Chou, C. J., & Madu, C. N. (2019). Identifying critical success factors for supply chain quality management (SCQM) in manufacturing. Industrial Management & Data Systems, 119(1), 110-128. https://doi.org/10.1108/IMDS-05-2018-0197

Mati, J. K., & Thomas, G. O. (2019). Challenges facing sugarcane farming in Kenya and possible remedies. Journal of Agriculture and Ecology Research International, 19(1), 1-10. https://doi.org/10.9734/jaeri/2019/v19i130059

Mun, S. G., & Jang, S. (2018). Performance impact of restaurant social media marketing: Moderating role of innovation. Journal of Hospitality and Tourism Technology, 9(1), 61-72. https://doi.org/10.1108/JHTT-07-2017-0057

Munezero and Ndolo (2022) was to investigate the impact that green procurement management policy has on the efficiency of state corporations with operations in Rwanda

Naslund, D., & Williamson, S. (2010). What is management in supply chain management? - A critical review of definitions, frameworks, and terminologies. Journal of Business Logistics, 31(1), 57-76. https://doi.org/10.1002/j.2158-1592.2010.tb00127.x

Nugraha, A. T., Wahyudi, R., Fawzi, A. M., & Sunarti, S. (2022). Eco Design, Internal Environment Management, Just in Time and Organizational Performance: Examining Moderating Role of Trust. *Jurnal Manajemen Indonesia*, *22*(3), 396-405.

OECD/FAO (2019). OECD-FAO Agricultural Outlook 2019-2028. OECD Publishing. https://doi.org/10.1787/agr_outlook-2019-en

Oyedokun, G. E., & Garba, M. A. (2022). Impacts of Firm Internationalization, Green Procurement and Organizational Performance of University College Hospital, Ibadan, Nigeria. *International Journal of Finance Research*, *3*(4), 275-293.

SISTR (2019). Kenya Sugar Industry Strategic Plan 2019-2024. Sugar Industry Stakeholders Taskforce Report.

USDA (2019). Kenya Sugar Annual 2019. United States Department of Agriculture.

Walisundara, W. M. M. G. H. K., Thevanes, N., & Arulrajah, A. A. (2022). Green Manufacturing Practices and Sustainable Performance of Organization in Selected Manufacturing Companies in Kegalle District of Sri Lanka. *Vidyodaya Journal of Management*, *8*(II).

Yamane, T. (1967). Statistics: An Introductory Analysis (2nd ed.). Harper and Row.