Green Supply Chain Management and Economic Performance: A Review of Tea Processing Firms in Kericho and Bomet Counties, Kenya

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Abstract: *Sustainability in the business operations stills remains a subject of interest especially in Kenya. This is because most organizations especially, manufacturing firms are in the initial stages of adopting sustainable practices. A few study already conducted in this area have revealed that there is still a knowledge gap that needs to be filled through research. For instance, a study conducted by Muma et al. (2014) on green supply chain management and environmental performance identified research gaps on the relationship between green supply chain management and other aspects of organizational performance. The study suggested further studies on the relationship between green supply chain management and economic performance. This study was therefore conducted to establish the relationship between green supply chain management and economic performance. The study adopted a correlational research design. The study concentrated on green procurement, green design and manufacturing, green distribution and reverse logistics aspects of green supply chain management and their relationship with economic performance. The study was conducted in all the 32 tea processing firms in Kericho and Bomet Counties-Kenya. To test the relationship between green supply chain management and economic performance, a correlation analysis was conducted. The findings of this study revealed a positive relationship between green supply chain management and economic performance. The study revealed that research gaps still exist on the relationship between green supply chain management and social performance and recommended further studies to be conducted to relate the two variables.*

Keywords: Green Supply Chain Management, Economic Performance, Tea Processing Firms

1. Introduction

Sustainability is an emerging concept in literally all business activities and functions. Due to increased concern on sustainability concept, most organizations are adopting green initiatives in all business functions (Muma et al., 2014). Among the popular green initiatives is green supply chain management. While traditional Supply Chain Management involves planning, implementation and control of supply chain operations with an aim of satisfying customer requirements (Chang, Kenzhekhanuly and Park, 2013), green supply chain management is the integration of environmental consciousness in the management of all supply chain activities; material sourcing, product design, manufacturing, and distribution all the way to delivery of the final products (Hazen, Cegielski and Hanna, 2011). Green supply chain management activities include; green procurement, green manufacturing, green distribution and reverse logistics (Amemba et al., 2013).

1.1 Research Objectives

The study will be based on the following objectives:
1) To determine the relationship between green Procurement and economic performance
2) To establish the relationship between green design and manufacturing and economic performance
3) To investigate the relationship between green distribution and economic performance
4) To examine the relationship between reverse logistics and economic performance

1.2 Research Hypothesis

The following hypotheses will be tested for this study;
Ho1: There is a negative relationship between green procurement and economic performance
Ho2: There is a negative relationship between green design and manufacturing economic performance
Ho3: There is negative relationship between green distribution and economic performance
Ho4: There is a negative relationship between reverse logistics and economic performance

2. Literature Review

2.1 Green Supply Chain Management Practices

Organizations are adopting sustainable practices in all their functional areas to achieve competitive advantage (Hazen, Cegielski and Hanna, 2011). According to Kangangi (2009), green supply chain management can be implemented through alignment of green supply chain goals with the organizational goals, evaluation of supply chain as a single life cycle system, use green supply chain analysis as a catalyst for innovation and focus on source reduction to reduce waste within the production system.

Amemba et al. (2013) associates green supply chain management with reduced operational costs. Amemba et al. (2013) argues that green supply chain management activities include; green procurement, green manufacturing, green distribution and reverse logistics. On the other hand, Chang, Kenzhekhanuly and Park (2013) associate green supply chain management with green design, green purchasing,

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green logistics and green packaging. Similarly, Muma et al. (2014) discussed green purchasing, green manufacturing, green distribution, green marketing and reverse logistics as green supply chain management practices.

Green supply chain management offers an ideal management mode for the harmonious development of economic benefits and social benefits in enterprises (Zhou, 2009). In this study, green supply chain management will be discussed in tremens of green procurement, green design and manufacturing and green distribution.

2.1.1 Green Procurement
Amemba et al. (2013) defines green procurement as an environmental purchasing aimed at reducing procurement costs, enhancing use, re-use and recycling of materials in the purchasing process. Zheng and Zhang (2010) defines green procurement as a management practice aimed at pursuing customer satisfaction and social development by connecting green supply and demand and enhancing efficiency through quick movement of products.

2.1.2 Green Logistics

Hung Lai and Wong (2012) discussed attributes of implementing green logistics management. These practices include: procedure based practices including policies and guidelines guiding the implementation process, evaluation based practices including periodic performance evaluation and review procedures aimed at improving performance, partner based practices outlining the need for support and knowledge of the internal stakeholder and general environmental management practices to take care of the environmental concerns within the system. According to Zheng and Zhang (2010), green logistics is the basic tie of circulatory system of green economy and the development for circular economy. According to them, green logistics include activities such as: use of green packaging, green transport and green storage.

Rodrigue et al. (2001) discussed paradoxes of green logistics: They identified costs, time, network, reliability, warehousing and e-commerce as the major paradoxes of green logistics. Table 1 shows the paradoxes of green logistics.

Table 1: Paradoxes of Green Logistic

Dimension	Outcome	Paradox
Costs	Costs reduction through improved packaging and reduced wastes with most of the benefits to the distributors.	Environmental costs are often externalized.
Time/ Flexibility	Flexible and efficient distribution achieved through Integrated supply chains.	More space and energy consumption and hence more emission due to extended production, distribution and retailing structures.
Network	Improved efficiency of the distribution system through network changes.	Concentration of adverse environmental impacts next to major hubs and along corridors and Pressure on local communities.
Reliability	Reliable and timely distribution of materials and people	Transportation modes used are the least environmentally efficient.
Warehousing	Reduction of the needs for private warehousing facilities.	Inventory contributing to congestion and space consumption.
E-commerce	Better business opportunities and diversification of the supply chain systems.	Adoption of physical distribution systems with higher levels of energy consumption.

Source: Rodrigue, Slack and Comtois (2001)

2.1.3 Green Design and Manufacturing
Green design is design concept associated with environment safety and health throughout the life of a product (Amemba et al., 2013). Green manufacturing on the other hand is concerned with production efficient and energy saving production system. A green manufacturing system is associated with reduced production cost, reduced wastages and reduced environmental pollution.

2.1.4 Reverse Logistics
Zheng and Zhang (2010) associates reverse logistics with recycling and waste management. According to them, reverse logistics include activities like repair of faulty and failed items, turnover of packaging materials using biodegradable packaging materials, recycling and reuse of materials and packaging materials. According to Brito et al. (2002), reverse logistics is about collection of and redistribution processed goods already supplied to the market either as return inwards or faulty products.

2.3 Economic Performance

Economic performance is generally concerned with reduced cost and increased profitability (Green et al., 2012). It is focused on elimination or reductions of costs related to the environment like cost of acquiring materials and energy. According to Ninlawan et al. (2010), an economically performing organization is an organization that is able to achieve decreased cost for materials purchasing, decreased cost for energy consumption, decreased costs for waste treatment, decreased cost for waste discharge and decreased costs associated with environmental accidents in their operations. Laosirihongthong et al. (2013) associated improved economic performance with improved operations, what Green et al. (2012) called operational performance. He appreciates that improved operations leads to increase in the amount of goods delivered on time, decrease in inventory levels, decrease in scrap rate, increase in product quality, increase in product line, improved capacity utilization. Wan Mahmood et al. (2013) points out that that economic performance is closely linked with manufacturing performance. Manufacturing performance is concerned with

work-in-progress reduction, throughput time reduction, and flexibility management.

2.4 Empirical Literature

Amemba et al. (2013) found out that implementation of Green Supply Chain Management leads to enhanced sustainability in the supply chain processes. They found out that green procurement leads to efficiency and synergy that may give an organization a competitive advantage. It reduces wastes and costs associated with procurement process thereby leading to enhance operational performance. Rodrigue, Slack and Comtois (2001) conducted a study on green logistics and found out that green logistics positively affect efficiency of transport systems. Kangangi (2009) conducted a study on green supply chain implementation: best practices and challenges. The study revealed that successful implementation of green supply chain management requires transparency collaboration and integration of systems between all stakeholders led by the management, playing a leading role. It also requires alignment of customer needs with the company operations.

Amemba et al. (2013) conducted a study on elements of green supply chain management and established that green manufacturing involves production using energy efficient and environmentally friendly production methods. Adoption of green manufacturing leads to enhanced production efficiency and reduced wastage leading to better economic performance of the organization.

Otago (2009) argued in his findings on green supply management that GSCM helps improve organizational performance. The findings of the study showed that green supply chain practices have positive contribution to economic performance. These findings were similar to the findings of a study conducted by Choi & Zhang (2011) on green logistics and business performance in China. Choi & Zhang (2011) established a positive relationship between green strategy and business performance. They associated green practices with improved competitiveness of an organization. As discussed by Saman et al. (2012), Liu et al. (2011) in their study of green supply chain management in China found out a positive relationship between GSCM practices and economic and environmental performances in all the three cases they studied.

Chang, Kenzhekhanuly and Park (2013) found out that the relationship between green supply chain management and operational performance is moderated by external pressure like awareness on environment management and policies and regulations from the government and mediated by internal factors like top management commitment and employee support.

Toke et al. (2012) discussed some tradeoffs facing logistics. While waiting for freight to become a full load may lead to longer lead times, it is sometimes associated with cost savings and reduction of emission to the environment. Selection of transportation mode is another factor. Different transport modes utilize different levels of energy and vary in efficiency. Others are also considered to be more flexible than others. Timing, speed and flexibility are therefore very important factors to consider in choosing a transportation option. Another important tradeoff is the 'carrier', the choice for career will depend on factors such as the nature of the products, whether they require special conditions, whether they have uniform shape, their size etc.

2.5 Conceptual Framework
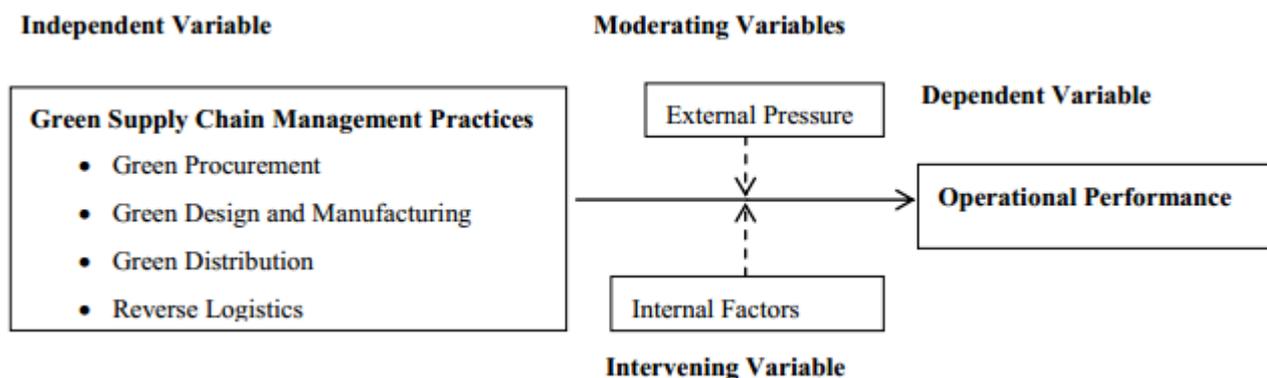
3. Methodology

This study adopted a correlational research design. The target population for the study was the 32 tea processing firms in Kericho and Bomet Counties. Because of the small number of the firms, data was collected in all the 32 firms. Research data was collected using structured questionnaires that were administered by the researcher. The data questionnaire items were tested for validity before data collection. The research instruments were tested for reliability to ensure the research findings are reliable. A correlation analysis was conducted to determine the relationship between green supply chain management practices and economic performance. One tailed significance test was conducted to test the statistical significance of the relationship. The results were presented using tables.

4. Correlation Analysis

A correlation analysis was conducted to determine the relationship between green supply chain management practices and economic performance. Tables 2, 3, 4 and 5 below show the results of the analysis.

Table 2: Green Purchasing and Economic Performance

		Green Purchasing	Economic Performance
Green Purchasing	Pearson Correlation	1	.263[*]
	Sig. (1-tailed)		.044
	N	43	43
Economic Performance	Pearson Correlation	.263[*]	1
	Sig. (1-tailed)	.044	
	N	43	43

*. Correlation is significant at the 0.05 level (1-tailed).

From table 2 above, Pearson's correlation value of 0.263 indicates a positive relationship between green purchasing and economic performance. The first hypothesis was therefore rejected. The significance level of 0.044 showed that the relationship between green purchasing and economic procurement is statistically significant. These findings were similar to the findings of Kafa et al. (2013) and Saman et al. (2011) that adoption of green purchasing initiatives is associated with enhanced economic performance.

Table 3: Green Design and Manufacturing and Economic Performance

		Green Design and Manufacturing	Economic Performance
Green Design and Manufacturing	Pearson Correlation	1	.380[**]
	Sig. (1-tailed)		.006
	N	43	43
Economic Performance	Pearson Correlation	.380[**]	1
	Sig. (1-tailed)	.006	
	N	43	43

**. Correlation is significant at the 0.05 level (1-tailed).

Table 3 reveals a positive relationship between green design and manufacturing and economic performance as shown by the Pearson's correlation value of 0.380. The second hypothesis was thus rejected. Further, the significant value of 0.006 revealed that the relationship between green design and manufacturing is statistically significant.

Table 4: Green Distribution and Economic Performance

		Green Distribution	Economic Performance
Green Distribution	Pearson Correlation	1	.271[*]
	Sig. (1-tailed)		.040
	N	43	43
Economic Performance	Pearson Correlation	.271[*]	1
	Sig. (1-tailed)	.040	
	N	43	43

*. Correlation is significant at the 0.05 level (1-tailed).

According to table 4, the Pearson's correlation value of 0.271 indicates a positive relationship between green distribution and economic performance. The third hypothesis was thus rejected. The significance value of 0.040 indicates a statistically significant relationship between green distribution and economic performance.

Table 5: Reverse Logistics and Economic Performance

		Reverse Logistics	Economic Performance
Reverse Logistics	Pearson Correlation	1	.262[*]
	Sig. (1-tailed)		.045
	N	43	43
Economic Performance	Pearson Correlation	.262[*]	1
	Sig. (1-tailed)	.045	
	N	43	43

*. Correlation is significant at the 0.05 level (1-tailed).

Table 5 indicates a Pearson's correlation value of 0.262 indicates a positive relationship between reverse logistics and economic performance. The last hypothesis was thus rejected. Further, the significant value of 0.045 shows that the relationship between reverse logistics and economic performance if statistically significant.

5. Conclusions

The first conclusion was made that there is a statistically significant positive relationship between green procurement and economic performance. This implies that organizations that adopt green procurement activities are likely to enjoy improved economic performance. Secondly, it was concluded that there is a statistically significant positive relationship between green design and manufacturing and economic performance. Incorporating green activities in the manufacturing operations leads to reduced costs and increased productivity enhancing economic performance. Thirdly it was concluded that there is a statistically significant positive relationship between green distribution and economic performance. Green strategies such as green packaging and green transportation lead to reduced cost and wastages improving economic performance. Lastly, it was concluded that there is statistically significant positive relationship between reverse logistics and economic performance. An overall conclusion was made that there is statistically significant relationship between green supply chain management practices and economic performance.

6. Recommendations

This study recommends that manufacturing organizations as well as non-manufacturing organizations adopt green supply chain strategies in all their operations and processes. This is because green supply chain management is associated with economic benefits including; reduced costs, enhance efficiency, increased productivity and reduced wastages. The study recommends that Kenyan Government, through Kenya Environmental Authority (NEMA) should develop policies that make it a requirement for all manufacturing firms to adopt environmentally friendly strategies in the entire supply chain.

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