

# Effects of Green Supply Chain Management Practices on Competitiveness of Firms in the Food and Beverage Sector in Kenya

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## Abstract

Green Supply Chain Management practices have become a policy tool for many organizations due to concerns of environmental sustainability, climate change and its effects. Many firms are consciously including environmental and social considerations in their procurement processes. The main objective of this study was to investigate the effects of green supply chain management practices on the competitiveness of firms in the food and beverage sector in Kenya. The study was also guided by specific objectives which include establishing the influence of green procurement, green production, green distribution and reversing logistics on the competitiveness of manufacturing firms in the food and beverage sector in Kenya. The study was built upon the Sustainability Theory, Resource Based Theory, Exchange Relationships Theory and the Supply Chain Operation Reference Theory. The study adopted a descriptive research design which involved distribution of questionnaire to the food and beverage firms in Kenya. A good response rate of 81% was realized. The study also established a regression and correlation analysis between the dependent variable and the independent variables. The findings of the study was on the effects of green supply chain management practices on competitiveness, firms in the food and beverage sectors adopt different green supply chain practices depending on the activities that they are engaged in and also which green supply chain practice will yield better competitiveness to the firm. It also established that most of the firms' green supply chain practices involved environmental collaboration, monitoring, purchasing and the greening of the production phase. It was also found out that the competitiveness to the food and beverage firms resulting from the green supply chain practices includes improved operational efficiency, increased customer base, offering superior services, reduction in waste level and all these leads to improved financial performance. The study concluded that green supply chain management practices has a positive effect on the food and beverage firms and should form part of long term strategy of the food and beverage firms in order to gain competitive advantage over its competitors. It has therefore been recommended that organizations should consider adopting green supply chain fully as the potential benefits to be realized are enormous compared to the initial and operation cost of implementing the practice.

**Keywords:** Green supply chain management practices, food and beverage firms, competitiveness

## 1. Introduction

The development of supply chain networks in the 21st century is pegged not only on stiff competition in the market but also globalization trends and challenges which centrally relate to environmental sustainability (Vachon, 2007). The concern in the business and industrial sector is on how to balance productivity, profit margins, and competitiveness alongside maintaining the integrity of the environment. These have led to the evolution of business processes through the restructuring of supply chain networks to achieve the threshold of environment sustainability through managing and 'greening' the entire chain from upstream suppliers to the end downstream consumer (Azevedo *et al.*, 2011). The concept under greening is to sustainably extract resources from the environment, either in mining or in agricultural production while reducing pollution by managing the byproducts, e-packaging, and recycling (Zhu *et al.*, 2007). The environmental concerns which include over-extraction or over-exploitation of natural resources, environmental pollutions through emissions during transportation and manufacturing, by-products, packaging and the final waste produced after consumption have become important factors in designing business strategies. The procedures entail the whole chain which involves creating and adopting practices known as Green Supply Chain Management. Srivastva (2007) states that green supply chain management is integrating environmental thinking into supply-chain management, including product design, material sourcing, and selection, manufacturing processes, delivery of the final product to the consumers as well as end-of-life management of the product's useful life. The strategy of GSCM entails reverse logistics, green procurement, green operations, green designs, waste management and green manufacturing (Azevedo *et al.*, 2011).

## 1.1 Statement of the problem

The Kenyan food-processing sector, including food and beverages, remains the largest contributor to the GDP (Gok, 2013). In terms of structure, economic contributions, and performance within the manufacturing sector, this sector is the most important and largest comprising over 1,200 businesses, encompassing everything from small family organizations to large multinational companies (KNBS, 2013). According to the Kenya National Bureau of Statistics (KNBS) 2013, the sector contracted by 3.9 percent from 2007, but still generated over a third (33.4 percent) of the total manufacturing production, and provided 89,319 jobs.

Competitiveness of firms in the food and beverage sector in Kenya faces green supply management challenges. The underlying concept of GSCM encompasses environmental initiatives in inbound logistics which includes green purchasing, eco-design, and production as outbound logistics which includes reverse logistics (Srivastava, 2008; Zhu et al., 2007; Lee, 2008). The undertaken initiatives involve the relevant stakeholders such as materials suppliers, service contractors, vendors, distributors and end users who work cohesively to reduce or eliminate adverse environmental impacts due to their activities (Beamon, 1999; Vachon & Klassen, 2006; Hanim, 2012). Several studies have been done on GSCM to consider the need for a green design to reduce the impact of product waste where issues such as green production, green planning and manufacturing (Darnall et al., 2008; Sarkis & Cordeiro, 2008; Kannan & Devvika, 2009) and product recovery (Gupta & Dessai, 2011; Linton & Jayaramann, 2007) are discussed. Beamon & Fernandes (2004) discussed recycling in the supply chain and critiqued GSCM by saying that Environmental Management Systems (EMS) are making less progress in reducing environmental harms. These studies, however, are of limited focus with a paucity of scholarly investigation on the effectiveness of GSCM in enhancing the competitive edge of the firms in food and beverage sector. Most studies have focused on GSCM innovations (Mattos & Hall, 2007); drivers of GSCM (Closs & Meacham, 2011) and green supply chain performance in manufacturing firms (Vashta, 2012). This study aims at bridging this gap by investigating the effects of GSCM on the competitiveness of firms in the food and beverage sector in Kenya.

### 1.1.1 Literature review

Balancing economic and environmental performance has become increasingly important for organizations facing competitive, regulatory, and community pressures (Vaccaro, 2009). The present day competition characterizing business environments coupled with increased demands for environmental sustainability has required that enterprises need to implement strategies to reduce the environmental impacts of their products and services and thus to establish their environmental image which demands that companies have to re-examine the purpose of their business (Li & Green, 2012). However, it is not just about being environment-friendly; it is about good business sense and higher profits. In fact, it is a business value driver and not a cost center (Liu & Motzer, 2012). This “green” approach requires that manufacturers, suppliers, and customers within the supply chain work together to develop environmental solutions and monitor the implementation of those solutions (Ahi & Searcy, 2013). According to Vachon and Klassen, (2007) organizational competitive advantage can be gained through the adoption of an environmental strategy and implementation of environmental collaboration and monitoring practices. According to Zelibst *et al.*, (2012), business processes that must be integrated and coordinated include those in pursuit of green supply chain practices such as purchasing, manufacturing, marketing, logistics, and information systems.

Adoption of such practices has been found to be a source of competitive advantage more so in such environments characterized by stiff competition and enlightened customers (Lam *et al.*, 2010). Therefore, one of the ways that firms can use to maintain their relevance and competitiveness is the adoption of green supply chain practices. The competitiveness of an organization will lead to sustainability which refers to the development that meets the needs of the present generation without compromising the ability of the future generation to meet their needs (Vaccaro & Echevarri, 2010). The implementation of an ERP system like any large project is fraught with danger. The Standish Group surveyed approximately 8000 applications and found that only 16% were successful. The significant risks attaching to technology investments discourage many firms from committing resources to enhance their performance into the future (Bowersox et al., 2000). This is understandable as most organizations fail to realize or to appreciate the value of investments in ICT (Nelson and Coopridge, 1996). Despite this, ERP systems are the system of choice in the complex environment of globalization and they currently represent a firm’s largest IT investment (Chung and Snyder, 2000). The estimated annual expenditure on ERP systems is \$50 billion (Jessup and Valacich, 2003). Such investments are more likely to result in competitive advantage if they result in the transformation of business processes rather than just in the automation of such processes (McFarlan, 1984; Bjornsson and Lundegard, 1992). With the increasing awareness of environmental sustainability issues, manufacturing firms have now begun to think and act green. In addition, firms need to implement wise strategies to compromise with green issues without neglecting their business objectives. In addition, three main approaches are involved in the creation of “green” supply chains; environment, strategy and logistics (Hwa, 2001). This is a problem for all firms and governments the world over given the fact that environment degradation does not occur in isolation to the regions causing the pollution with the effects being

felt miles and miles away from its source. For instance, in Malaysia, environmental issues have become a priority for the government and public (Eltayeb *et al.*, 2010). The Manufacturing industry in the country is one of the main contributors to environmental deterioration, with the Department of Environment Annual Report 2010 showing that pollution from the manufacturing industry has increased from 85% to 97% between 2005 and 2009 respectively (Seman, 2012). South Africa's logistics sector has much to contribute as the country internally focuses on issues of sustainability. Supply chains hold a substantial potential to contribute to the achievement of Vision 2025 which aims to improve South Africa's energy mix by having 30 percentage of clean energy by 2025. This is according to the Annual Performance Plan 2012/2013 of the Republic of South Africa (Chien & Shih, 2007). The case study on Green Supply Chains is highly attractive, by addressing the problem of Carbon emission and environmental pollution; companies not only limit their carbon footprint and waste but strive to optimize supply chain performance. As a developing country, Kenya has to balance both operational and environmental performance. Nasiche and Ngugi (2014) studies the extent of GSCM practices adoption in the food manufacturing industry and found out that GSCM practice adoption is still low as most manufacturing firms in the food sector are still considering adoption, except for eco-friendly design practices which are currently under consideration (Chao & Heijungs, 2013). In addition, internationally incorporated companies are currently considering adoption compared to the local companies who were still planning to consider its adoption. A little bit of improvement on both environmental and operational performance is being realized as a result of adopting GSCM practices (Obiso, 2011).

### **1.1.2 Critique of existing literature**

Empirical studies have clearly presented the status of the implementation of GSCM as well as the importance of green supply management in ensuring sustainable management of the environment. Specifically, the literature has brought out critical insights on the potential patterns of supply-chain relations for improving environmental performance through exploring how GSCM practices relate to performance of environmental operations and economic variables across service and manufacturing sectors (Vachon & Klassen, 2007; Vasileou & Morris, 2006; Vachon, 2007).

The studies have shown that the immediate aim of 'greening' the supply chain process which primarily entails environmental sustainability and ecological protection is adequately achieved in manufacturing firms across the world (Zhu & Sarkos, 2004; Rao, 2002; Obiso, 2011). Studies carried out in the United States, Asia and Africa found out that GSCM initiatives have led to improvements in environmental performance, and reduce the risk of non-compliance penalties alongside threat of closure. In general, besides environmental concerns; cost, efficiency, customer response and policy compliance are also cited as the most important drivers for adopting GSCM in most organizations. Additionally, empirical studies have elaborated the requirements; financial, management and infrastructural, for the implementation of GSCM. However, the conclusion of most studies (Sanchez & Ferez, 2001; Florida & Davison, 2001) on the market positioning of GSCM firms is still speculative without a clear role of the 'greening' process on the competitiveness of the firms. Indeed, Nasiche and Ngugi (2014) only show cost implications and supply capacity of GSCM in Kenya Pipeline Company but leave out the aspect of competitiveness as the company is a monopoly in its market.

In an era of increased market liberalization (borderless world/globalization) and tight competition, it is imperative that organizational focus on process and strategic restructuring should be geared towards, not only internal efficiency and external compliance, but also enhancing its competitive positioning. The arguments postulated in empirical literature are founded on the view that firms pursuing cost effectiveness have higher probability for improving their market share and profitability. This is a general view which does not alienate cost effectiveness and market penetration as a result of GSCM adoption against cost effectiveness arising from other organizational restructuring such as staff training. This leaves a critical gap in establishing the direct causal relationship between the adoption of GSCM and firm competitiveness.

### **1.1.3 Research Gap**

Organizations face barriers and enablers to GSCM and these can either be internal or external to the organization. What is less clear from previous research is whether certain types of organizations are more internally or externally motivated to engage in GSCM. Many organizations are struggling with the implementation of green supply chain management objectives due to unfamiliarity, uncertainty and inexperience. Examples of the dilemmas include; is green supply chain management part of corporate strategy? What are the measurable selection criteria for the procurement performance? Consumers express increasing confusion about the veracity of green terminologies and the large number of symbols currently used, new descriptive terms such as sustainable and low-carbon footprint and the questionable validity of some green claims can only add to consumer skepticism. Many stakeholders are involved in the GSCM hence a precise framework of policies, common constraints and preconditions governing the area has to be developed to ensure performance measurement in the procurement sector. Majority of existing literature shows how GSCM has been implemented in developed countries but not in developing countries in Africa hence this study aims to find out the relationship between GSCM practices and organizational competitiveness in the manufacturing industry in Kenya.

### 1.1.4 Summary

GSCM practices has been expounded in detail both in the literature review as well as in the empirical studies done on the subject area. A business entity operating in the current business context characterized by increased competition and a consumer base that is enlightened on the need for environmentally friendly products has been identified as the major drivers to organizations at present adopting green supply chain practices. The literature also showed that the common practices of green supply chain employed by firms include environmental collaboration by both up-stream and downstream partners, environmental monitoring and also the sharing of management control and environmental risk with both governmental and non-governmental agencies. However, it was noted that at present there lacks a comprehensive framework on the GSCM practices and as a result different organization adopt different practices that they deem suitable to their business context. As a result, there is no green supply chain practice that can be said to be universally accepted.

### 2.0 Research methodology

A descriptive research design was used in this study. The target population of this study comprised all the food and beverage firms that are registered by the Kenya Association of Manufacturers (KAM). The population and target population of this study comprised of all the 71 firms registered under the Kenya Association of Manufacturers. Once the questionnaires are received they were coded and edited for completeness and consistency. Quantitative data was analyzed by employing descriptive statistics and inferential analysis using statistical package for social science (SPSS).

### 3.0 Results and Findings

#### 3.1 Regression analysis

From the below model it can be concluded that competitiveness in food and beverage firms in Kenya has a relationship with the green supply chain management practiced by the firms. Green supply chain management practices have significantly improved the performance of food and beverage firms in Kenya. The R<sup>2</sup>, also called the coefficient of multiple determinations, is the percentage of the variance in the dependent variable explained uniquely or jointly by the independent variables and is 52.7 %. This means that 52.7 % of the changes in the firm's competitiveness is explained by the changes in the independent variables in the model. The remaining 47.3% of the changes in the Y is explained by other factors not in the model. The C is the constant, where the regression line intercepts the y axis, representing the amount the dependent y will be when all the independent variables are 0. Here C is 1.887; the probability of the coefficient is significant. The F statistic is used to test the significance of R. Overall; the model is significant as F-statistics is 49.4

#### Model Summary: table 1

Model	R	R square	Adjusted R square	Std. Error of estimated	F-statistic
1	.726	.527	.439	.2296886	49.4

Source: researchers' computation (2016)

**Table 2: Green Supply Chain Management and Competitiveness**

Model	Un-standardized Coefficients		Standardized Coefficients	T
	B	Std. Error	Beta	
1 (constant)	1.887	.128		1.236
X <sub>1</sub>	1.02	.026	-.349	-1.049
X <sub>2</sub>	0.039	.012	-.585	0.266
X <sub>3</sub>	0.24	.5	-.017	-.061
X <sub>4</sub>	1.008	.006	.568	1.349
X <sub>5</sub>	0.876	0.127	0.035	0.457

Source: Researchers' computation (2016)

The determinants of a firm competitiveness from the green supply chain practices were investigated from the results of the respondents. From Table above, the established multiple linear regression equation becomes:  $Y = 1.887 + 1.02X_1 + 0.039X_2 + 0.24X_3 + 1.008X_4 + 0.876X_5$

Where;

Y = Firms competitiveness

X<sub>1</sub> = Environmental collaboration

X<sub>2</sub> =Green purchasing

X<sub>3</sub> =Environmental monitoring

X<sub>4</sub> =Green production

X<sub>5</sub> =Greening the outbound function

The coefficient of intercept C has a value (1.887) and is significant with a p-value of 1.236 at the 95%



significance level. The environmental collaboration coefficient has a positive coefficient of 1.02 and is also significant at the 5% level of significance with a p-value of 1.049. Indeed the coefficient of all the independent variables are positive at  $\alpha = 5\%$ , and implies that the increase in the independent variables results in an increase in the firm degree of competitiveness. However, the least significant independent variable that is found to lead to competitiveness is the green purchasing with a coefficient of 0.039 and a p-value of 0.266. Adoption of the green production in food and beverage firms service delivery process was found also to be critical with a coefficient of 1.004 and a p-value of 1.349. In addition, from the coefficients, it can be deduced that the most critical factor which affects an organizations supply chain performance is the increased service quality that results from outsourcing of services.

#### 4.0 Summary of the findings

It was also found out that with the study found out that Kenyan food and beverages firms are practicing several forms of green supply chain in order to gain competitiveness in their operations. Different firms adopt different green supply chain practices depending on the activities that they are engaged in and also which green supply chain practice will yield better competitiveness to the firm. These firms set up their processes based on knowledge of existing environmental collaboration, environmental monitoring, purchasing and in-bound logistics, need of greening the production phase and also the need for greening the outbound function and reverse logistics functions. At the same time, it was found out that organizational green supply chain environmental sustainability must first be adopted as a strategic objective of the firm. This requires that top-level management work to incorporate environmental sustainability as a key part of the organization's mission statement and that the necessity to develop processes and deliver products and services that are environmentally friendly be communicated throughout all levels of the organization.

In the majority of the firms, green supply chain management forms part of the company's long-term strategy to gain competitive advantage over its competitors and thus the activity is seen as a unique capability that adds value to the product. The green supply chain practices employed by the food and beverage firms are integrated and coordinated and included in process such as purchasing, marketing, information systems and in the firms operation will cover environmental collaboration, monitoring and greening of the production phase. competition at the supply chain level and a focus on the changing demands of final consumers, it is necessary for a firm to identify and adopt practices that yield competitiveness.

The competitiveness to the firms was found to arise in different forms and include reduction in the operating cost borne by the firm, increase in the customer loyalty which in most cases will led to the increase in the firms customer base and market share. The study also found out that with the firm initiating green supply chain practices in its operation, the firm profitability was found to increase due to the favourable customer perspective on the organization. Further, it was found out that adoption of green supply chain by the food and beverage firms will lead to improved corporate image of the organization with all other stakeholders, promote longer term inter-firm relationship, increased sales, improved customer satisfaction, improved management of threats from competitors, improved stock performance, sharing of information with suppliers has enhanced operational efficiency with customers, and sustainable production and consumption of products. The practice in a firm will be affected by the capacity of the firm to initiate a returns process, collaboration with suppliers and customers, selecting disposition procedure, analyzing the performance of the reverse supply chain process and crediting the customer process for adopting the process.

##### Green Procurement

The study revealed that the formal introduction of environmental issues into purchasing process, the use of environmentally friendly process, the designing of products that minimize material and energy consumption, the use of alternative fuels, treatment and control of post combustion emissions and waste reduction were introduced into the firms to a moderate extent while the firms have formally integrated environmental concerns into to supplier assessment process and also used of recyclable and reusable material and parts to a small extent.

##### Green Production

The study also revealed that the firms have implemented waste reduction measures in its production processes to a great extent. The firms have also formally introduced the use of alternative fuels, treatment and control of post combustion emissions together with the use of biodegradable materials to a moderate extent in addition to introducing the designing of products that minimize material and energy consumption to a moderate extent.

##### Green Distribution

The study revealed that the firms have formally introduced freight consolidation aimed at transporting more goods efficiently to a great extent. Similarly the firms have formally implemented route planning and scheduling to avoid rush hour traffic, route planning that avoids congested town centers by use of alternative routes and invested in modern infrastructure to reduce delivery time to a great extent.

##### Reverse Logistics

The study also revealed that the firms have green logistics as an important element in their supply chain, they

incorporate 'greenness' as a key factor in its environmental impact assessment, they take into account the effect of its production activities to the environment and society, they have formally introduced freight consolidation practices and implemented planning and controlling efficient cost effective flow of raw materials from point of consumption to origin to a great extent. The study also revealed that the firms accept previously shipped products or parts for the purpose of recycling and disposal to a moderate extent. Similarly the firms practice route mapping and planning, they have formally introduced reverse logistics into their processes, they invest in advocacy for green processes aimed at eliminating waste, pollution and conserving the environment and they employ environmentally friendly logistic systems as a way of reducing energy consumption and pollution to a moderate extent.

#### Competitiveness of Firms

The study revealed that the firms have significantly increased their customer portfolio over the last five years, have won industry performance awards over the past five years and their turnover and profit have been increasing significantly over the past five years to a great extent while firms rank favorably against their competitors and the firms have significantly increased market share in the last five years to a moderate extent.

### 4.1 Conclusions

The potential benefits for integrating green supply chains in the operations of a firm are compelling to any organization in the present day competitive environment. The globalized nature of the businesses requires that organization management understand the increasing influence of consumers and lobby groups on matters of environmental conservation. There is need therefore for organizations to incorporate greening process in its operations be it a service or manufacturing organizations in order to gain in the competitiveness that results. Cooperation with customers directly impacts environmental performance but does not directly impact economic performance. Instead, cooperation with customers indirectly impacts economic performance through environmental performance. Of the four green constructs linked to environmental performance, cooperation has the largest impact followed by investment recovery and eco-design. The study revealed that internal environment management, investment recovery and green distribution emerged the major, GSCM practices being considered currently and being adapted to some degree by food and beverage firms in Kenya. This result indicates that the adoption of GSCM practices had a positive relationship with the environmental performance of food and beverage firms.

From the findings of the study, it can also be concluded that the organizational competitiveness is no longer be found on the products and services an organization is offering alone but instead it is those inimitable characteristics of a firm such as policies and green supply chain practices that will differentiate and give an organization the required competitiveness. The benefits accruing to the companies as a result of the adoption of green supply chain have been found to include competitive advantage, reduction in operational cost and also increasing the customer loyalty and customer base. They should however be wary of the challenges which inhibit them from obtaining economies of scale and significantly reduces the economic value from the adoption of the green supply chain concepts

#### 4.1.2 Recommendations

The study found out that not all food and beverage firms practice green supply chain and at the same time those which practice it have not embraced it fully due to the initial cost incurred in setting up the green supply chain concept. It is therefore recommended that the companies should consider adopting green supply chain fully as the potential benefits to be realized are enormous compared to the initial and operational cost of implementing the practice.

The government has a role to play in ensuring successful implementation of the green supply chain in organizations by coming up with appropriate measures that will encourage the firms and other organization to adopt the green supply chain practice. The realization of the green supply chain can only be possible with the consumers having sufficient knowledge about it and it is recommended that public awareness of product recovery activities be undertaken by the companies and also awareness of the benefits. At the same time legislative regulations should be enacted urgently if reverse supply chain management is to be fully and successfully implemented by all the firms

#### Recommendations for Further Research

The results of this study can be further utilized to suggest several directions for future research. A field study can focus on investigating what consumers' demand and whether there is any preference in consumer demand of services from companies that practice green supply chain in comparison to the other organizations that do not practice the same. In addition, managers need to develop GSCM knowledge and skills in addition to the knowledge and skills necessary to manage at the organizational level. Managers must now focus on improving the supply chain in order to improve organizational performance. They need to understand the importance that organizations adopting GSCM strategies achieve and work to improve the processes that extend throughout the supply chain. From the study findings the study revealed that formal introduction of environmental issues into

purchasing process, the use of environmentally friendly process, the designing of products that minimize material and energy consumption, the use of alternative fuels, treatment and control of post combustion emissions and waste reduction were introduced into the firms to a moderate extent while the firms have formally integrated environmental concerns into to supplier assessment process and also used of recyclable and reusable material and parts to a small extent. Thus the study concludes that green procurement has been introduced into the firms in the food and beverage sector in Kenya and therefore influences the competitiveness of firms

The study revealed that the firms have implemented waste reduction measures in its production processes to a great extent. The firms have also formally introduced the use of alternative fuels, treatment and control of post combustion emissions together with the use of biodegradable materials to a moderate extent in addition to introducing the designing of products that minimize material and energy consumption to a moderate extent. The study also revealed that the firms have formally introduced the usage of material and parts that are reusable and recyclable to a small extent. Thus the study concludes that green production has been introduced into the firms in the food and beverage sector in Kenya and therefore influences the competitiveness of firms

The study revealed that the firms have formally introduced freight consolidation aimed at transporting more goods efficiently to a great extent. Similarly the firms have formally implemented route planning and scheduling to avoid rush hour traffic, route planning that avoids congested town centers by use of alternative routes and invested in modern infrastructure to reduce delivery time to a great extent. Thus the study concludes that green distribution has been introduced into the firms in the food and beverage sector in Kenya and therefore influences the competitiveness of firms

The study also revealed that the firms have green logistics as an important element in their supply chain, they incorporate 'greenness' as a key factor in its environmental impact assessment. .

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