

# **INFLUENCE OF GREEN SUPPLY CHAIN MANAGEMENT STRATEGY ON PROCUREMENT PERFORMANCE OF SUGAR INDUSTRY IN KENYA**

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## **Abstract**

*In its attempt to establish the influence of Green supply chain management strategy on procurement performance in the Sugar Industry in Kenya, the study aimed at ascertaining the influence of green purchasing on procurement performance, exploring the influence of green manufacturing on procurement performance. Using a cross sectional survey research design on 11 sugar factories in Kenya consisting of 4 Parastatal Companies and 7 Private Companies, the study sampled stores department, purchasing department and finance department of the selected sugar factories through a sample of 132 respondents for representativeness. The gathered data was analyzed using Statistical Package for Social Sciences (SPSS) both descriptively and inferentially using regression and factor analyses. The study findings showed that Green purchasing and Green manufacturing, all had direct as shown by the R Square value of .627 implying that the independent variables account for 62.7% of procurement performance. The findings also showed that professional experience, supply knowledge training, green purchasing, technical knowledge, quality and reliability, innovation, delivery, morale, customer relations and productivity all influences procurement performance and add environmental*

*aspects to price and performance criteria in companies within the sugar industry as attested to by the factor analysis results. The findings formed the basis for the recommendations. This study concludes that GSCS have a strong positive effect on procurement performance within the sugar industry.*

*Keywords: Green supply chain Management, Green Purchasing, Green Manufacturing, Procurement Performance*

## **INTRODUCTION**

Globally, Wang (2009) posits that as the effects of environmental problems on the living conditions of the world's population become more apparent, an emphasis on environmental awareness has become more prominent. The general public has started to pay more attention to the potential consequences of this global environmental problem. Some of the most pressing environmental issues include ozone layer depletion, global warming, and hazardous wastes. In an effort to mitigate the negative impacts of such environmental problems, many nations have passed laws and regulations and have set environmental standards aimed at reducing industry carbon and greenhouse gas emissions to the atmosphere. Some of these standards include End-of-Life Vehicle (ELV); Restriction of Hazardous Substances (RoHS); Waste electrical and Electronic Equipment (WEEE); eco-design of Energy-Using Products (EuP); and Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH) (Wang, 2009).

Green supply chain management is defined as green procurement, green manufacturing, green distribution, and reverse logistics. The idea of GSCM is to eliminate or minimize waste (energy, emissions, and chemical/hazardous, solid wastes) along supply chain (Hervani, Helms & Sarkis, 2005). Green Supply Chain Management (GSCM) has emerged as an important new approach for enterprises to achieve profit, efficiency and market share objectives by reducing environmental risk and impact (Hu & Hsu, 2010). Wisner (2005) states that Green Supply Chain strategy involves collecting and analyzing environmental regulations and customer surveys from each of the supply chain firm locations; discussing the relevant environmental issues with procurement, engineering, and quality control departments at each firm; developing green supply chain policies; communicating them to customers and suppliers along the supply chain; and then managing the program to assure compliance with policies (Wisner, 2005).

## **Sugar Industry in Kenya**

Kenya has a large manufacturing sector serving both the local market and exports to the East African region. Kenya's manufacturing sector is among the key productive sectors identified for economic growth and development because of its immense potential for wealth, employment creation and poverty alleviation. The sector is dominated by subsidiaries of multi-national corporations, contributing to the Gross Domestic Product (GDP) (PWC, 2006). The sector is also characterized by improved power supply, increased supply of agricultural products for agro processing, favorable tax reforms and tax incentives, more vigorous export promotion and liberal trade incentives to take advantage of the expanded market outlets through AGOA, COMESA and East African Community (EAC) arrangements resulting to expansion in the sector (PWC, 2006).

The sugar industry is a major contributor to the agricultural sector which is the mainstay of the economy and supports livelihoods of at least 25% of the Kenyan population. The subsector accounts for about 15% of the agricultural GDP, is the dominant employer and source of livelihoods for most households in Western Kenya comprising Nyanza, Rift Valley and Western Provinces. In 2008/2009, the industry produced close to 520,000 tons of sugar operating at 56 percent of the installed capacity. In such environment, the industry will have to enhance its competitiveness along the entire value chain and reduce production costs by at least 39% to be in line with EAC partner states and COMESA sugar producing countries (Kenya Sugar Industry Strategic Plan, 2010-2014). Before independence, the sugar industry in Kenya was dominated by the private sector.

Large-scale production and processing started with the establishment of Miwani Sugar Company in 1922, and expanded with the addition of Ramisi Sugar Company in 1927. After independence, the Kenya Government started playing a central role in the ownership and management of the sugar industry. Five more factories were established, namely Muhoroni (in 1966), Chemelil (1968), Mumias (1973), Nzoia (1978) and South Nyanza (1979).

### **Statement of the problem**

The problem in this study is that although the drive to enhance overall sustainability in procurement performance has resulted to focus on pollution prevention and minimization of environmental impacts at all stages of the product lifecycle from sourcing of raw materials, through manufacturing, transport, use and disposal (Chandrakar, 2012), this has not been embraced by all companies in the sugar industry in Kenya while those that have embraced the Green Supply Chain Management Strategies are still under-utilizing them. This has diverse ramifications on climate change and global warming resulting from unrestricted emission of

greenhouse gases by countries with consequent climatic degradation. This may require going beyond mere corporate responsibility to take care of the environment (Clarkson Consulting, 2009). The sugar industry in Kenya is facing two major weaknesses. Firstly, the productivity of both the country's cane from farms and the milled sugar from factories is low. The national average yields are lower than those in other sugar producing countries in the region. Secondly, Kenya has the highest sugar production cost in the Eastern and Southern Africa (COMESA) region. It's estimated that it costs up to US\$600 to produce a tone of Kenyan sugar, which is approximately twice what it costs in many of the neighboring countries.

These companies have done little to take advantage of GSCMS. Even with the high cost of inputs as a result of poor infrastructure has led to high prices of locally manufactured products thereby limiting their competitiveness in the regional markets and hampering the sector's capacity utilization, the sugar-sector stakeholders (sugar mills, farmers, researchers) are paying insufficient attention to adaptation to climate change and climate variability which should be key in cost reduction. With the focus on installing irrigation systems to help increase yields and productivity, but also to mitigate climate change and climate variability, its increasingly important to climate-proof the sugar- sub sector (The Scoping Report, 2012). Despite the fact that a tradeoff between social benefits (increase of welfare by reduction of environmental problems) and private costs (of the company) is observed, there is an increasing number of companies that reduce their environmental impact even more than is required. This phenomenon of "over-compliance" or "corporate environmentalism" helps companies to reduce the sources of possible conflicts between them and society (pollution of the environment).

The study therefore aims to explore the influence of green supply chain strategy on procurement performance in the sugar industry where their inbound and outbound logistics activities are potential polluters to the environment. Increasing pressures from a variety of directions have caused the supply chain members to consider the green supply chain management (GSCM) practices to improve both their economic, competitive and environmental performance.

### **General objective**

To explore the influence of green supply chain management strategy on procurement performance of the Sugar Industry in Kenya

## **THEORETICAL REVIEW OF LITERATURE**

A theory includes a set of basic assumptions and axioms as the foundation and the body of the theory is composed of logically interrelated, empirically verifiable prepositions. Theoretical frameworks are explanations about the phenomena (Camp, 2001). Theoretical framework provides the research the lens to view the world clearly (Marriam, 2001). Even though this study is based on sustainability theory, it integrates information from Resource based theory and Ethics theory discussed below.

### **Resource Dependency Theory**

According to resource dependence theory (RDT), firms seek to reduce uncertainty and manage dependence by purposely structuring their exchange relationships, establishing formal and semiformal linkages with other firms. Through interdependence, firms can synergistically combine their own resource sets with the complementary resources of their partners and thus develop a resource bundle that is unique and hard to imitate (Harrison *et al.*, 2001). By cultivating such relationship-specific capabilities that become superior to what the organizations may possess on their own firms can obtain sustainable competitive advantage and improved procurement performance (Sambharya & Banerji, 2006; Paulraj & Chen, 2007). In this aspect, RDT is a relevant theory to SCM because it can help elaborate organization-environment boundary spanning activities, implying that a single firm can hardly achieve sustainable growth. Therefore, firms need to depend on the buyer-supplier relationship which helps improve cooperation and coordination among supply chain members (Dyer, 2000).

For SCM to be strategic in nature, it is imperative that buyer firms adopt strategic initiatives, that is, implementation of GSCM practices that foster an effective relationship to provide mutual benefits (Paulraj & Chen, 2007). In the context of GSCM, inter-organizational collaboration is even more important for managing the internal and external coordination and cooperation to have the system successfully implemented throughout the whole supply chains (Zhu *et al.*, 2010). Handfield *et al.* (2002) developed a decision model to measure environmental practice of suppliers using a multi-attribute utility theory approach. Kainuma and Tawara (2006) proposed the multiple attribute utility theory method for assessing a supply chain including re-use and recycling throughout the life cycle of products and services.

### **Sustainability Theory**

Sustainability means meeting the needs of the current generations without compromising the ability of future generations to meet theirs. It seeks to promote appropriate development in order to alleviate poverty while still preserving the ecological health of the landscape. Sustainability

works to understand the connections between environment, economy and the society. In 2000, the World Bank published *The Quality of Growth*, advocating a broadening of the growth framework to a complementary agenda involves key quality aspects in the structural, human, social, and environmental dimensions of sustained growth, emphasizing a more equitable investment in people, and the need to sustain natural capital, dealing with global financial risks, improving governance and controlling corruption. The World Business Council for Sustainable Development Report, WBCSD, (2005), *Creating Business Value and Accountability*, restates the need to increase accountability and change the business approach to sustainable development. Accountability and value creation must be made mutually reinforcing throughout any enterprise, integrating sustainable development amongst all areas of business practice, rather than creating a 'specialist silo.' Although not specific policy responses, the two reports suggest a change in the policy outlook of international institutions (WBCSD, 2005).

According to a research report from the Economist Intelligence Unit by ExxonMobil (2011), there is growing importance of corporate sustainability in enabling companies to compete and to attract customers. Business both impacts and relies on the availability and health of our natural resources. In recognizing this connection and protecting wildlife habitat and biodiversity in and around their operations the survey claims that the adoption of sustainable practices does not cause companies' share prices to rise. It could be that companies with a strong financial performance simply have more resources to devote to sustainability. What the findings do show, however, is that it is possible to take a proactive position on social and environmental issues while still delivering robust financial growth. Understanding the full life cycle of their operations is important to operating in an environmentally sustainable manner and involves four key steps: Assessing the surroundings; Designing the facilities and operations; Operating with integrity and Restoring the environment.

### **Ethics Theory**

Ethics is a branch of philosophy that seeks to define what is right and what is wrong. It helps us understand what actions are wrong and why they are wrong. Across the world, not all cultures share the same ethical commitments, and cultural relativism acknowledges that (Desjardin, 2008).

It is ideal that laws of a particular nation match their ethical commitment; even though some laws are changed to meet the ethical commitments, in most cases one may find that what is ethically right, sometime lacks legal backing. But in such cases, it is only strong personal ethical commitment that can help guide behavior. Even where there is strong personal ethical commitment, there are also cases of conflicting ethical positions (Desjardin, 2008). There are

various philosophical approaches to environmental ethics, but only three will be discussed here; anthropocentrism, biocentrism and egocentrism. Anthropocentrism or human centered ethics is the view that all environmental responsibility is derived from human interests alone. It assumes that only human beings are morally significant and have direct moral standing. Since the environment is crucial to human well-being and survival, there is a duty towards the environment; a duty derived from human interest (Desjardin, 2008). Biocentrism is a life centered moral responsibility. According to the broadest version of biocentrism theory, all forms of life have an inherent right to exist (Desjardin, 2008). Egocentrism maintains that the environment deserves direct moral consideration and not consideration that is merely derived from human or animal interests. It suggests that the environment has a moral worth (Desjardin, 2008). According to Kaplan (2009), there are three main sources of rules that regulate behavior of individuals and businesses; the law, non – legal rules and regulations and ethics. If a business is breaking the law, by not complying with one of the many environmental laws requirements. The business would want to move from that point of counter compliance.

### **Procurement Performance**

Procurement performance is the quantitative assessment of the degree to which the procurement function and those employed therein achieve the general or the specific objectives assigned to them (Lyson, 2000). Procurement performance is the extent to which the procurement process is achieving its objectives. Process performance measurement focuses on the concept of process capability and maturity. Organizations have used capability maturity models to assess measure and improve their organizational critical core process such as software development and project management (Garret & Rendon, 2005). Process capability in these models is defined as inherent ability of a process to produce planned results (Ahern *et al.*, 2001). Procurement performance is also indicated by how well a system supports procurement needs of the organization .Quality of the procurement process can be one of the key performance indicators which can be measured by the proportion of business orders ejected or returned by the user (Subramaniam & Shaw, 2002). Similarly, the quality of systems is measured by looking at system availability or responsiveness and resolution of the technical issues.

### **Green Purchasing**

Firms have only recently begun to engage in green procurement that spans the upstream supply chain and have recognized that a concerted effort is necessary to face the sustainability challenge (Awasthi, Chauhan & Goyal, 2010). Green purchasing is the affirmative selection and



acquisition of products and services that most effectively minimize negative environmental impacts over their life cycle of manufacturing, transportation, use and recycling or disposal. Green purchasing is adding environmental aspects to price and performance criteria when making purchasing decisions. Ultimate goal is to reduce environmental impacts of sourcing and to increase resource efficiency (Shah, 1998).

Green purchasing is the practice of applying environmental criteria to the selection of products or services. It takes a number of forms, from relatively simple to relatively complex. Despite the fact that green purchasing is an established concept within the purchasing field, common definitions do not exist. One common definition referred to is the practice of companies taking supplier environmental product and process performance into account when purchasing products and service. Zhu Qinghua *et al.* (2002) considered green purchasing as: every department in the enterprise consults decision-making to improve business performance by decreasing the using materials cost and end treatment cost, protecting resources and enhancing the enterprise reputation. Martha and Houston (2010) pointed out the potential aim of green procurement is to eliminate waste, and purchasing department will focus on value by comprehensive considering the total cost in the process of eliminating waste ,which should focus on the business of waste disposal activities.

Usually, it can save more cost in the source of supply chain to prevent waste than at the end of supply chain. Purchasing activity is the key starting point of eliminating waste, so a key factor of the successful green purchasing is the condition of company recycling and reusing waste. Green purchasing practice is comprised of environment-based initiatives, such as supplier environmental audit and assessments and supplier's environmental certification (Hsu & Hu, 2008), so that the buyer firms can receive safe materials. From the inbound perspective of the supply chain it is argued that greening the supply chain has numerous benefits for an organization, ranging from cost reduction, to integrating suppliers in a participative decision making process that promotes environmental innovation. A large part of the in- bound function essentially comprises of green purchasing strategies adopted by organizations in response to increasing global concerns of environmental sustainability. Walton *et al.* (1998) examine the integration of suppliers into environmental management processes, and observe two evolving trends and suggests that environmental issues are becoming an intrinsic part of strategic planning in organizations due to stricter regulations and the demands of environmental accountability. The second trend is that organizations are integrating their supply chains to reduce operating costs and improve their customer service. Green purchasing strategies arguably resolve around two key components, the evaluation of suppliers' environmental performance and mentoring to assist suppliers to improve their performance. Min and Galle



(2001) find that the two most highly rated obstacles to effectively implementing green purchasing was cost and revenue. In the process of implementing green procurement, the enterprise is bound to increase investment, training staff costs and the communication costs with suppliers, which hence causes the loss of other investment opportunities (Liu & Zhu, 2009).

### **Green Manufacturing**

Green manufacturing is defined as production processes which use inputs with relatively low environmental impacts, which are highly efficient, and which generate little or no waste or pollution. Green manufacturing can lead to lower raw material costs, production efficiency gains, reduced environmental and occupational safety expenses, and improved corporate image (Ninlawan *et al.*, 2010). To adopt more proactive strategic SCM, it is essential for manufacturers make collaborative efforts with both the first- and the second-tier suppliers to establish green systems and comply with environmental regulations in producing parts and components.

Also a vast majority of business community recognizes that climate change is the reality with potential risk and opportunities. A most recent report of the carbon disclosure project revealed that 79 percent of the responding companies consider climate change to present a commercial risk while 82 percent regard it is a commercial opportunity for both existing and future products (MOEF, 2010). It shows that green manufacturing is becoming increasingly more important for an enterprise to be able to manage its operations in a way that minimizes the negative environmental impact they might result in, directly or indirectly. At the same time, it is a fact that you cannot manage what you cannot measure. Thus, performance measurement is a key element in enabling performance management, performance improvement, and performance documentation (Adams & Neely, 2000; Digalwar & Sangwan, 2011a; Taticchi *et al.*, 2012). When combining the pivotal importance of environmental friendliness with the need for performance measurement, it is evident that this can be done, first, by understanding thoroughly the green manufacturing systems and their critical success factors or performance measures. The traditional performance measures are invalid for the measurement of green manufacturing practices as they are based on outdated traditional cost management systems.

Researchers also developed some non-traditional performance measures and conceptual performance measurement frameworks where they have integrated the traditional and non-traditional performance measures. It is observed that, all conceptual frameworks have their relative benefits and limitations, with the most common limitation being that little guidance is given for the actual selection and implementation of the performance measures (Adams & Neely, 2000; Digalwar & Sangwan, 2011a; Taticchi *et al.*, 2012). Performance measures,

derived from corporate strategies and capabilities, are a prerequisite for the implementation of green manufacturing systems to survive in today's competitive environment.

## **EMPIRICAL REVIEW OF LITERATURE**

Gunasekaran *et al.* (2004) provide insights into current practice and future requirements in supply chain performance measurement including issues relevant to green supply chain management. Included among these issues are: successful implementation requires organization-wide coordination; to monitor performance each metric must take a supply chain perspective; each entity in the supply chain should be measured and improved with common goals; non-financial metrics are gaining more attention than financial ones; and additional and creative efforts are needed to design new measures. Previous research has made predictions for supply, but not specifically for sustainable SCM. For example, a five-year forecast for supply shows academics have been making some effort to try to look ahead (Carter & Smeltzer, 2003). Previous research has explored the relationships between GSCM practices and performance including environmental, economic and operational performance. Literature has offered insight on potential patterns of supply-chain relations for improving environmental performance (Handfield *et al.*, 2002). The literature for supporting such positive relationships is relatively strong. For example, Frosch (1994) argued that an inter-firm linkage facilitated by proximity could lead to improvement in environmental performance. Dodgson (2000), Dyer and others argued that inter-firm relations provide formal and informal mechanisms that promote trust, reduce risk and in turn increase innovation and profitability.

However, through examination, Bowen *et al.* (2001) suggested economic performance is not being reaped in short-term profitability and sales performance. Handfield *et al.* (2002) developed a decision model to measure environmental practice of suppliers using a multi-attribute utility theory approach. The study by Rao (2003) does identify that organizations in South East Asia believe that greening the inbound logistics function has led to using environmentally-friendly raw materials, greening of production to cleaner production, prevention of pollution as well as waste at the source; whereas greening outbound logistics led to environmentally-friendly waste disposal and mitigation of the effects of pollution through waste water treatment and abatement of emissions (Rao, 2003). Such initiatives lead to improvements in environmental performance, and reduce the risk of non-compliance, penalty and threat of closure. Another research was conducted on a sample of 400 respondents in Pakistan. It was concluded that Green purchasing intention of consumers exerted strong positive influence over the actual purchasing behavior of green products by the consumers.

Florida and Davison (2001) surveyed 580 manufacturing plants in the US adopting cleaner production techniques. Their research reveals that green corporations are innovative in their environmental practices, and these strategies emerge from a real commitment towards reducing waste and pollution. Lean production/manufacturing is also an important consideration in reducing the environmental impact of the production phase. Sanches and Ferez (2001) also investigated the link between lean production practices in manufacturing organizations and resultant enhanced competitiveness. Lean production is also expected to improve environmental performance of the firms through good housekeeping practices, such as general waste reduction and minimizing hazardous wastes. King and Lenox (2001) conclude that lean production is complementary to improvements in environmental performance and it often lowers the marginal cost of pollution reduction thus enhancing competitiveness.

### **Critique of Existing Literature**

Organizations face barriers and enablers to GSCM and these can be either 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 implementation of the 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 and procurement performance in the sugar industry in Kenya.

### **Research Gaps**

Today firms are starting to realize that global supply chains are exposed to varying levels of environmental regulations and compliance issues. Customers are increasingly demanding to know more about the products and what impact future environmental legislation will have on the products they buy. There is therefore need to discuss the relevant environmental issues that are

emerging in procurement, and developing green supply chain policies as well as communicating them to the stakeholders along the supply chain. Environmentally preferable products are sometimes more expensive to purchase than alternative products. This circumstance can discourage green purchasing by consumers seeking lower costing products without significant environmental benefits. Nevertheless, buying greener products doesn't necessarily mean paying more, especially when other cost factors are considered. Firms collaborate with their suppliers and customers to function properly in their business environment. There is need to understand and define the essence of GSCM issues in a much wider context and should conceptualize how GSCM systems interact with the nature in the short as well as the long term since GSC can save resources, eliminate or reduce waste and improve efficiency and effectiveness and eventually attain competitive advantage.

## **RESEARCH METHODOLOGY**

The study adopted descriptive survey research design to explore the influence of GSCM strategy on procurement performance in the sugar industry in Kenya. A survey is an attempt to collect data from members of a population in order to determine the current status of that population with respect to one or more variables (Mugenda *et al.*, 2003). Creswell (2003) observes that a descriptive research design is used when data is collected to describe persons, organizations, settings or phenomena. This is because the method was useful in describing and interpreting wider analysis of data which employs various survey instruments for data collection such as interviews and questionnaires. The design also has enough provision for protection of bias and maximized reliability (Kothari, 2008).

### **Target Population**

The target population of this study included all the 11 sugar companies licensed by the KSB as at March 2012. The sugar factories in Kenya are composed of 4 Parastatal Companies and 7 Private Companies.

Table 1 shows sugar industry factories in Kenya composed of Parastatal Companies and Private Companies.

Table 1. Target Population for the Study

No	Sugar Factories	Other Attributes
1	Mumias Sugar company	Private
2	Nzoia Sugar Company	Parastatal
3	Butali Sugar Company	Private
4	Sony sugar company	Parastatal
5	Kibos Sugar Company	Private
6	Chemelil Sugar Company	Parastatal
7	Muhoroni Sugar Company	Parastatal
8	Sukari Sugar company	Private
9	Soin	Private
10	Transmara	Private
11	Western Kenya sugar Company	Private

Source: The Scoping Report, 2012

### Sample and Sampling Techniques

The procedure involved the identification of the population, establishing the sample frame, determining the sample size and the sample method which was specified (Quee, 2001). According to Kenya Sugar Industry Strategic Plan (2010-2014) the total employment in the factories amounts to around 40,000 workers with an estimated number of 3,000 permanent employees. Stratified random sampling and Purposive sampling was used to select the sample because the population is heterogeneous. This ensured expert judgment to select cases that would best enable to answer the research question and meet the research objective.

The study involved the stores department, purchasing department and finance department of the selected sugar factories. According to Kenya sugar board, the selected departments have approximately 500 employees in all the sugar factories. Therefore 10% of the target population was large enough so long as it allows for reliable data analysis and allows testing for significance of differences between estimates. The number of respondents was twelve; 4 in stores department, 4 in purchasing and 4 in the finance department of each sugar factory. Therefore the study constituted 132 respondents.

### Research Instruments

The study employed a self-administered questionnaire with both structured and semi-structured questions in relation to the study objectives as a key instrument for primary data collection. Questionnaires are preferred since they are effective data collection instruments that allow respondents to give much of their opinions relating to the researched problem(Dempsey, 2003).

According to Kothari (2006), the information obtained from questionnaires is free from bias and researchers influence and thus accurate and valid data was gathered. Secondary data was collected through e-resources, published scholarly articles, journals, newspapers, magazines, books and other relevant literature.

### **Data Collection Procedure**

Data collection involved a self-administered questionnaire. A self-administered questionnaire was desirable because of low cost, adequacy of time for respondents to give responses, it was free of interviewer's biases and was capable of reaching a large number of respondents in line with Kothari (2004). The questionnaires were delivered to the respondents' place of work and picked later at an agreed day after they had been filled.

### **Pilot Study**

Pilot Study refers to feasibility studies which are small scale versions or trial runs done in preparation for the major study. A pretest prior to the actual study was carried out to enable the researcher to assess the clarity of the instrument and its ease of use. According to Mugenda and Mugenda (2003), pre-testing allows errors to be discovered before the actual collection of data begins and 10% of the sample size was considered adequate pilot study. The researcher selected a pilot group of 12 individuals from the target population to test the reliability of the research instrument. The pilot data was not included in the actual study. The pilot study allowed for pre-testing of the research instrument.

Validity is the accuracy and meaningfulness of inferences, which are based on the research results (Mugenda & Mugenda, 2008). A questionnaire is said to be valid when it actually measures what it claims to measure. Reliability is the extent to which any measuring procedure yields the same results on repeated trials (Neuman, 2000; Mugenda, 2008). A test is reliable to the extent that it measures what it is measuring consistently (Patton, 2002). According to Mugenda and Mugenda (2008), the number of cases in the pre-test should be 10% for small samples and 1% for large samples. 30 questionnaires were administered to the respondents for the pre-test. The study found that the instrument had an overall Cronbach alpha score of 0.831 with various scores for the individual variables in the study.

### **Data Processing and Analysis**

Quantitative data from the questionnaires was checked for completeness, errors, and coded for analysis using Statistical Package for Social Science (SPSS). Quantitative analysis was analyzed through calculating the frequencies, means and Standard deviations was appropriate

statistical tools as they showed the distribution against each of the variable under investigation. Inferential statistics using correlation analysis was also carried out to establish the nature of the relationship that existed between variables. Multiple regression was used to obtain an equation which describes the dependent variable in terms of the independent variables based on the regression model; regression is used to determine the type of relationship (Patton, 2002). The regression had a correlation coefficient (R) of about 0.69 and an adjusted  $R^2$  of 0.62. This means that the independent variables in this study, that is, green purchasing, green manufacturing, account for 62.7 percent of the variations in procurement performance. The F statistic test value of 13.174 and a small significance value of 0.000 that is  $P = 0.000 > \alpha = 0.05$ , indicates that there is a regression relationship between the dependent variable (procurement performance) and the predictor variables (green purchasing, green manufacturing).

## **ANALYSIS AND FINDINGS**

Out of the 132 questionnaires that were issued to the sampled employees of the Kenya Sugar Companies in this study that included all the 11 sugar companies licensed by the KSB as at March 2012, only 105 were returned in time for analysis thereby constituting a questionnaire return rate of 74.5%. The respondents' gender distribution male 38 (36%), female 67 (64%). The respondents' age distribution, the study found that respondents aged 23-32 years were 7 (6.7%), 33-37 years were 76 (72.4%), 38-42 years were 17 (16.2%), and those aged over 42 years were 5 (4.7%). The sample was all-inclusive. The respondents had varying years of working experience such as 1-2 years 33 (31.8%), 3-7 years 60 (56.8%), Over 8 years 12 (11.4%). The study found that 38 respondents were working under purchasing department (36.4%), 26 were working under finance department (25%), and 41 stores department (38.6%). The study indicated the outcome of the level of education of respondents. KCSE 5 (4.5%), diploma 26 (25%), degree 64 (61.4%) and masters 9 (9.1%). This means that many of the respondents were well educated to fully comprehend the sugar company procurement performance. The respondent's areas of specialization included finance, procurement and accounting. These areas of specialization were represented by 22 (20.5%) in finance, 76 (72.7%) in procurement and 7 (6.8%) in accounting.

### **Green Purchasing**

The researcher studied if the respondents find that professional experience is relevant to procurement performance in firms, multiple correlations among aspects of training competence and participant in procurement process. Majority (98%) of the respondents indicated that professional experience is relevant in procurement performance in firms. Majority 91 (86%) of



the respondents indicated that level of education influences performance of procurement. A majority 91 (86%) of the respondents indicated that procurement and supply knowledge training influences procurement performance. A majority 88 (84%) of the respondents indicated that technical knowledge influences the performance of procurement.

In the process of implementing green procurement, the enterprise is bound to increase investment, training staff costs and the communication costs with suppliers, which hence causes the loss of other investment opportunities (Liu & Zhu, 2009). Respondents' answers to deciding on the choice of suppliers were almost equal; yes 50(52.3%), No 55(47.7%). Procurement, a key boundary-spanning function, and the upstream supply partners together influence the environmental impact of the focal firm in several ways: inbound logistics' environmental pollution, environmental impact of supplied material, energy consumption and emissions in the production process and eco-efficiency of the product through its life cycle (Lee & Klassen, 2008; Ross & Jayaraman, 2009).

### **Green Manufacturing**

This study investigated the influence of green manufacturing by finding out if the green/environmentally conscious strategy, the certification system employed in the organizations, Waste regulation in the organizations and competitive priorities. The respondents' response to whether their companies follow an environmentally conscious strategy indicated that 88 respondents constituting 84.1% admitted that their companies were following environmentally conscious strategies leaving only 17 respondents (15.9%) denying the involvement of their companies in such strategies. It was observed that all conceptual frameworks have their relative benefits and limitations, with the most common limitation being that little guidance is given for the actual selection and implementation of the performance measures (Adams & Neely, 2000; Neely *et al.*, 2001; Kennerley *et al.*, 2003; Digalwar & Sangwan, 2011a, Taticchi *et al.* 2012). Performance measures, derived from corporate strategies and capabilities, are a prerequisite for the implementation of green manufacturing systems to survive in today's competitive environment. The respondent companies' certification systems included ISO 36(34.1%), KEBS 22(20.5%), NEMA 19(18.2%), auditing 29(27.3%). Majority of the companies subscribe to certified bodies hence they were a good target-audience. The certification in the sampled companies is key to quality assurance and standardization as a way of global benchmarking. Most of the respondents totaling to 91 constituting (86%) of the respondents indicated that cost included one of the competitive priorities taken by their firms. A majority 87 (82%) indicated flexibility to be a competitive priority while 84 (79%) indicated that

environmental consciousness is a competitive priority for their firms. Quality and reliability was indicated by 91 (86%) respondents to be a competitive priority done by their organization.

Majority of respondents also indicated innovation, delivery, morale, customer relations and productivity as competitive priorities done by their firms. Green manufacturing can lead to lower raw material costs, production efficiency gains, reduced environmental and occupational safety expenses, and improved corporate image (Ninlawan *et al.*, 2010). To adopt more proactive strategic SCM, it is essential for manufacturers make collaborative efforts with both the first- and the second-tier suppliers to establish green systems and comply with environmental regulations in producing parts and components.

### **Procurement Performance**

The system of procurement in use in respondents' companies was as in the graph below and as follows; manual (paper based) 17(15.9%), computer based, 19 (18.2%), combination of both 69 (65.9%) as can be confirmed from figure 4.12 below. The procurement systems in place in the organizations as enlisted above rightly fit into the understanding of procurement performance as the quantitative assessment of the degree to which the procurement function and those employed therein achieve the general or the specific objectives assigned to them (Lyson, 2000). It also concurs with the views of Garret and Rendon (2005) that procurement performance is the extent to which the procurement process is achieving its objectives. Process performance measurement focuses on the concept of process capability and maturity. Organizations have used capability maturity models to assess measure and improve their organizational critical core process such as software development and project management. The mixed approach could be attributed to the fluctuating power supply in Kenya which could highly tamper with the procurement systems if they were to be wholly electronic/computerized, thus the need for some paper based system. The use of manual process by some organizations called for urgent measures towards automation. 65.9% of the respondents' accepted that the supply chain strategies used in their organizations were adequate with only 34.1% asserting the contrary. This suggested their complacency and thus their satisfaction. The contract management process is defined as the process of awarding and administering contracts generally referred to as purchasing in private companies and as procurement or acquisition in the government. Measuring contract management should focus on process effectiveness, which can be described in terms of maturity levels reflecting the organizations contract management process capability. Procurement performance is also indicated by how well a system supports procurement needs of the organization. Quality of the procurement process can be one of the key performance indicators which can be measured by the proportion of business orders

ejected or returned by the user (Subramaniam & Shaw, 2002). The fact that the respondents perceived the supply chain strategies as adequate to a high extent shows that the systems in place within the various organizations supported the needs of their organizations. Innovation and proactive approaches are highly on demand within the Green Supply Chain Management as a way of enhancing high performance in an environmentally friendly setting. The respondents choice of new strategies was as in the figure 4.13 below and as follows; procurement 28 (27%), policy 60 (57%), training 17 (16%). Policy as entailing choice of new strategies was the most preferred hence lending credence to the notion of poor policy making. There was a positive significant relationship between reduced costs which was indicated by a majority 91 (86%) of the respondents. A majority 91 (86%) of the respondents indicated that they improve brand image, 93 (84%) of the respondents indicated that they help in staff recruitment. Majority of the respondents also indicated the effect of sustainable supply chains on procurement performance also included retention and morale, maintain supplier loyalty, enhance due diligence, help manage risks, satisfy end user requirements and drive product innovation as pertains their extent of effect on procurement performance. In this aspect, RDT is a relevant theory to SCM because it can help elaborate organization-environment boundary spanning activities, implying that a single firm can hardly achieve sustainable growth. Therefore, firms need to depend on the buyer-supplier relationship which helps improve cooperation and coordination among supply chain members (Dyer, 2000). This implies that sustainable supply chains variable correlates with procurement performance of the sugar industry in Kenya.

## **SUMMARY OF FINDINGS**

### **Green Purchasing**

In line with the first objective, the study found that green purchasing contributes 0.521 of procurement performance in the sugar industry showing how critical this factor is in influencing the dependent variable procurement performance. Other findings showed that most of the respondents (98%) indicated that professional experience is relevant in procurement performance in firms, Green purchasing is adding environmental aspects to price and performance criteria when making purchasing decisions, 86%, 86%, 84% and 52.3% indicated that level of education, supply knowledge training, technical knowledge influences and choice of suppliers influences the performance of procurement respectively.

### **Green Manufacturing**

Green manufacturing was established as the highest contributor to procurement performance as it contributed 0.713 on procurement performance. This was confirmed by 84% of the

respondents' acceptance that their companies had certification systems and follow environmentally conscious strategies such as ISO (34.1%), KEBS (20.5%), NEMA (18.2%), and auditing (27.3%). Their systems in place for tracking reporting and reducing waste and emission were as follows; technology (34.1%), recycle (13.6%), policy (52.3%), Quality and reliability (86%), through innovation, delivery, morale, customer relations and productivity as competitive priorities done by their firms and taking of appropriate strategies such as cost, flexibility, competitive priority and environmentally conscious competitive priority

## **CONCLUSION**

From the findings of this study, the study concludes that there is a direct strong positive relationship between Green Supply Chain Management and procurement performance within the sugar industry in Kenya as measured by the various items under each of the independent variables in this study. There are a myriad of benefits associated with Green Supply Chain Management and the knowledge of these benefits seems to have penetrated the sugar industry stakeholders. This was the basis of embracing various GSCM strategies such as green purchasing, green manufacturing, green marketing and reverse logistics. The embracing of GSCM by the companies sampled in this study is a step in the right direction as a way of moving in line with the green revolution. This is an achievement that is critical in retarding and controlling the persistent global warming with its consequent diverse effects such as earthquakes, lowering sea levels among others.

## **RECOMMENDATIONS**

Based on the findings, the study made the following recommendations:

- (i) The study recommends that the staff of the companies within the sugar industry should undergo professional experience to increase their technical knowledge since it's relevant in Green Supply Chain Management and procurement performance in firms.
- (ii) The study recommends that there should be awareness creation on how to engage in GSCM, its effects on procurement and create legally binding policies and framework within the sugar industry and even outside (in other industries) as a way of embracing environmentally friendly measures as a mitigation to climate change and improved health.
- (iii) The study recommends that the companies within the industry come up with strategic mix or standardized company certification systems within the industry as the use of various certification systems such as ISO, KEBS, NEMA and auditing make it

challenging to measure the levels of utilization of GSCM in the companies within the industry.

- (iv) Majority of the companies subscribe to certified bodies hence they were a good target-audience. Systems in place for tracking reporting and reducing waste and emission were as follows; technology, recycle and policy. Quality and reliability was indicated to be a competitive priority done by their organization. The organizations should enhance flexibility since it was found to be a competitive priority while environmental consciousness was found to be a competitive priority for firms.

## IMPLICATIONS FOR FURTHER STUDY

There is need for further research to be undertaken to determine the other factors that influence procurement performance GSCM is not the only factor affecting procurement performance within the sugar industry. The study recommends that this study be replicated in other industries that engage in procurement especially the manufacturing industries as a way of strategic positioning against the menace of climatic change

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