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Effects of Green Sourcing On the Performance of Sugar Factories in Western Kenya Sugar ZoneMachio Jack¹; Pauline Keitany²¹Jomo Kenyatta University of Agriculture and Technology, Kenya²University of Kabianga, Kenya

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Abstract: Green procurement is becoming one of the most discussed topics among enterprises in recent times. This is due to the environmental, sustainability and climatic concerns and the fact that businesses contribute significantly to the pollution of the environment. The objective of the study was to examine effects of green sourcing on the performance of sugar factories in western Kenya sugar zone. The study adopted the descriptive research design. The population targeted was the employees in the purchasing department of Butali Sugar Company (BSC), West Kenya Sugar Company Limited (WESCOL), Nzoia Sugar Company (NSC) and Mumias Sugar Company (MSC). The target population was 173 workers; this is according to the IUF Global Sugar Program and the Kenya Union of Sugar Plantation and Allied Workers and the Kenya Sugar Strategic Industry Plan. A sample of 121 employees was used in the study. The simple random sampling technique was used in the study. The primary data collection instrument was a structured questionnaire. The data was analysed using the statistical package for social sciences (SPSS) version 23 software. The study findings show that green sourcing has a direct influence on the performance of the sugar firms in the Western Kenya Sugar Zone. This was shown by the R-square value of 0.806 implying that the independent variables studied account for 80.6% of the variation on organization performance. The study therefore concludes that green procurement practices studied have a strong positive influence on firm performance on sugar factories within the western Kenya sugar zone. The study recommends the western Kenya sugar zone to embrace green practices since they have a significant on their performance.

Keywords: Effects, Green Sourcing, Performance, Sugar Factories

INTRODUCTION

Green Public Procurement (GPP) is a process whereby public authorities seek to procure goods, services and works with a reduced environmental impact throughout their life-cycle (European Commission, 2016). Green procurement is adding environmental aspects to price and performance criteria when making purchasing decisions. The ultimate goal of GP is reducing environmental impact of sourcing to increase resource efficiency (Malaba, 2014; Ramakrishnan, 2015). According to Eltayeb (2010) GP is an environmental conscious purchasing. It is the initiative that tries to ensure that purchased products meet environmental objectives set by organizations.

GPP can be a major driver for innovation, providing industry with real incentives for developing green products and services (European Commission, 2016). The awareness on the role of GP in supporting sustainable consumption and production patterns has strongly increased. It is spreading through the public authorities (PAs) both as a policy instrument and as a

technical tool (Namusonge, 2016; Testa, 2012). Thus GP is becoming a cornerstone of environmental policies both at European Union and Member State levels (Tucker, 2008).

The sugar processing industry in Kenya faces the challenge of environmental sustainability and resource scarcity. The challenge of high prices of sugar and the ban on the use of plastic bags persists. The raw material scarcity problem got worse with the establishment of the companies in close proximity. Butali Sugar Company (BSC) is located close to West Kenya Sugar Company Limited (WESCOL). This has led to an increase in pressure on the already decreasing cane, cane supply interruption and cane poaching (Bushuru, 2014). WESCOL and Nzoia Sugar Company (NSC) rivalry for resources has led to bitter legal battles and violence. Kenya's sugar production is expensive compared to the costs in the region and internationally. In 2004, Sugar prices needed to be dropped by 39% to be in line with Common Market for Eastern and Southern Africa (COMESA) levels (Kenya Sugar

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Industry Strategic Plan 2010-2014). The wastes and by-products from the sugar processing pose serious concerns to the health of individuals and the environment. Air pollution occurs from the bagasse-fired boilers, sugar drying and packing. The filter mud from the production process is also dumped in the open air endangering the health of the surrounding communities. The disposal of non-bio-degradable matter is also of concern. Kipkorir (2015) and Nderitu (2014) suggest that most organizations in Kenya have not fully adopted green procurement. The sugar industry faces pollution, increased operating costs, resource scarcity and increased competition. This research will be conducted to ascertain the effects of green procurement practices in the Western Sugar Zone Performance.

The Influence of Green Sourcing on performance of a Firm

According to Rao & Holt (2005) green sourcing revolves around evaluating the environmental behavior of suppliers to improve their performance. It implies the practice of environmentally preferable purchasing and involves adoption of sourcing practices such as analyzing environmental footprint, green track record and inclusion of social concerns in procurement decisions (Molla, 2009). Generally, the involvement of supplier is a critical green sourcing practice. Sirisawat, (2016) carried out a study on green procurement activities in the computer parts in Thailand and pointed out that proper green supplier selection leads to green objectives attainment. Furthermore, a supplier selection criterion depends on the requirements of a company and considers quality, price time of delivery and environmental awareness.

According to Sarhaye (2017), supplier assessment improves the organization performance. The process leads to timely delivery of goods, improved quality and reduced product costs. In a study to determine the effects of green procurement practices in East African Breweries Limited, Nderitu (2014) finds out that staff competence on GP, ICT infrastructure, supplier participation and capital expenditure have a positive impact on the organizational performance. However, ICT infrastructure ranked the lowest with the least impact on the performance of East African Breweries Limited. Supplier selection based on green practices reduces cost and increase the competitiveness of a firm (Kimira, 2016). Collaboration efforts between a focal company and suppliers are the main ingredient to facilitate supply-side environmentally and socially responsible activities. It enables economic and environmental growth (Chin, 2015).

A study conducted by Chien (2007) finds out that effective management of suppliers can reduce firms' costs like the transport cost and also promote recycling and the use of raw materials. Also, suppliers contribute to the overall performance of a firms supply chain and a poor supplier performance affects the performance of a firm. Therefore, supplier manufacturer relationships are important in developing a sustainable competitive advantage. The purchasing function is a strategic resource for reaching high quality levels, fast delivery and cost savings. According to Carr (2002), a strategic purchasing function provides value in the area of cost management. Moreover, it provides the firm with valuable information concerning supply trends that will enable the firm to make better decisions and achieve its goals.

A study conducted by Monczka (1993) found out that when suppliers are involved in innovative ways and they are motivated, their performance increases. This then is reflected on the business of the buying organization through meeting their targets, increased sales and a larger market share. According to Jean (2013), suppliers play a key role in innovation generation. Supplier involvement has benefits such as reduced lead times and risks. Supplier involvement enhances flexibility and product quality for manufacturers. This is a two-way traffic as the suppliers' innovation, product quality and financial performance also improves. Lukhoba, (2015) asserts that suppliers play an important role and they lead to a competitive advantage. Their actions have a positive impact on organizations performance. According to Alshura (2016) green supplier selection leads to improved product quality, price reduction, green image cooperation with customers and green performance.

The supplier involvement can also facilitate knowledge sharing and learning. Sun, (2010) finds out those suppliers usually have greater expertise and knowledge regarding the specifications and parts and components that may be essential. Supplier collaboration therefore helps firms incorporate the expertise and different perspective of a supplier therefore improving solutions and creating new methods that bring about better organizational performance. Kumar (2017) asserts that supplier involvement reduces development cost, development time and the cost of the product to the customer. Rao (2005) concluded that greening the supply base results in competitiveness and greater economic performance of firms.

The Influence of Green Tendering on performance of a Firm

According to Brendan (2004), green tendering are the office functions such as ICT procurement. Weeks (2016) found out that emerging information communication technology plays an important role in public finance management. The study reveals that technology promotes greater comprehensiveness and transparency of information across government institutions. Information technology increases efficiency and enables easy retrieval of records. The study found out that ICT in procurement is a significant contributor to organization performance in improving service delivery, efficiency, effectiveness, continuous quality improvement, reduction in purchase price and transparency. Similarly, Hong (2012) concurs that technology in procurement simplifies procurement processes, achieves cost efficiency and reduces waste of time and resources.

A study carried out by Mutinga (2013) found out that e-procurement reduced time used to source commodities lowers the administration costs. It also reduced the tendering price. Nyoike, (2017) carried a study on the effects of sustainable procurement practices on manufacturing sector in Kenya. The study concluded that automated systems as a result of new technologies result to improved operations. The automated systems also enhance buyer-supplier relationships and communication. Therefore, to improve transparent procurement, the management of manufacturing sector needs to emphasize on ICT adoption and embrace e-procurement systems that are conversant to both employees and suppliers.

A research conducted by Gebauer (1998) found out that benefits can be reaped by automating operations but maybe even more from developing an infrastructure of e-procurement for end users. It establishes close relationship with suppliers and business partners leading to streamlined processes and leveraged buying power. Carr (2005) study finds out that internet connectivity provides an opportunity to make procurement and services more transparent and efficient. It enables suppliers to make searches, set up business profiles and obtains automatic e-mail alerts. Wong (2004) established that e-procurement offers opportunities for the business to communicate more efficiently. This was in particular with suppliers to improve the efficiency of the tender process. The research concluded that ICT helps firms to gain competitive advantage, reduce procurement costs and bring about profitability. It also offers exciting new

opportunities to widen market places while saving substantial operational costs.

Mongare (2014) established that ICT has simplified and speeded up the buying process and made it more efficient. ICT reduced the operational costs of purchasing activities like ordering expediting and requisitioning. The study furthermore found out that ICT is handy in formulating specifications, selecting suppliers, negotiating with suppliers, contracting and disposals. ICT leads to better access to information and transparency in markets through simplified, standardized purchasing process. The study showed that ICT led to reduced paper work and enabled online reporting. A study by Dixit (2009) reveals that through programmes like e-sourcing, e-tendering, e-reverse logistics and e-informing, ICT plays a role in organisations to get the right supplier at the right price, and right product quantity and quality. ICT provides real time information, reduces costs, and saves paper and the environment at large. ICT also automates the whole work flows. Similarly, Ruzindana (2016) found out that e-procurement as a positive effect on the performance on the employees. This was through time saving, simplicity of technology, easy understanding. ICT, according to the study has a positive impact on the organizations performance.

The findings by Karungani (2017) established that ICT infrastructure plays an instrumental role in enhancing an organizations performance in respect to procurement. ICT infrastructure enhances efficiency, improves monitoring and control, makes easier communication and enhances delivery of services. Accordingly, ICT plays a role in improving coordination between members of the supply chain network. It ensures timely delivery of goods and services between supply chain partners. The study recommended utilization of ICT to enhance efficiency and effectiveness. It enhances value for money for all procurement related transaction.

Methodology

This study adopted a descriptive research design. Behavior (Kipkorir, 2015). The target population of this study was the employees working in the purchasing department of WESCOL, Mumias Sugar Company (MSC), Butali Sugar Company (BSC) and Nzoia Sugar Company (NSC). This study targeted 173 employees in the Sugar Companies in Western Kenya.

Table 1: Target Population

Company	Mumias	Nzoia	Butali	West Kenya	Total
Procurement staff	64	59	18	20	161
Procurement managers	5	3	2	2	12
Total	69	62	20	22	173

The study sample frame consisted of 161 procurement officers and 12 procurement managers from the Mumias Sugar Company, Nzoia Sugar Company, West Kenya Company and Butali Sugar Company. A representative 121 officers from the four companies were selected using probability proportional size randomly sampled to participate in the study. These were the staff in the purchasing department, stores department and finance departments of the sugar factories in western Kenya.

Yamane (1967:886) gives a formula for the sample size as:

$$n = \frac{N}{1 + N(e)^2}$$

n=sample size

N=population

e=confidence level (.05)

Thus, the sample is $173 / 1 + 173(0.05)^2$

Sample size = 121

The researcher used the proportions used in the target population to determine the representative in each stratum.

Table 2: Sample size distribution

Stratum	Target population	Formula	Sample size	%
Procurement staff	161	121/173(161)	113	93.4
Procurement managers	12	121/173(12)	8	6.6
Total	173		121	100

The researcher used questionnaires as the primary data collection method. The data was obtained from employees in the purchasing department, stores department and finance departments at WESCOL, NSC, BSC and MSC. Permission was sought from the above mentioned companies and an introduction letter from JKUAT to the management of the companies for permission to carry out the study. A likert scale is based upon the assumption that each statement on the scale has equal attitudinal value, importance or weight (Kumar, 2011). Data collected was analyzed using statistical package for social sciences (SPSS) software version 23 where selected variables were subjected to statistical analysis. Data from the filled questionnaires was checked, cleaned, and examined for comprehensibility and completeness. It was then be coded, summarized and tabulated. Correlation analysis was used to determine the degree of relationships between the independent variables and the dependent variables. The analysis consisted of descriptive statistics, and inferential statistics. The descriptive statistics included mean and standard deviation while the inferential statistics included various Pearson product moment correlations and multiple regression

analysis. Correlation and regression are statistical techniques based on the concepts of sampling to know how and if the statistical variables are or are not related to each other (Beltame, 2016).

The data was analysed using the regression model

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon$$

Where

Y = Organization performance

X₁ = Green sourcing

X₂ = Green tendering

X₃ = Organization green awareness

X₄ = Reverse logistics

B₀ = Constant of Regression which is the value of the dependent variable when the Independent variable is 0.

ε = Error Term of prediction

Results/ Findings

Green Sourcing

The study analysed the views of the respondents in respect to effects of Green sourcing on green procurement practices. Table 4.5 shows the results of the analysis.

Table 3: Descriptive Statistics for Green Sourcing

Green Sourcing Statement	1 SD	2 D	3 U	4 A	5 SA	N	Min	Max	Mean	Std Dev
Our company provides specifications to suppliers that include environmental requirements for purchased items	0.9	1.8	18.0	47.8	31.5	111	1	5	4.07	.806
Our company cooperates with suppliers for environmental objectives	0	1.8	8.1	36.9	53.2	111	1	5	4.41	.719
Our company performs environmental audit for suppliers	0	3.6	8.1	46.0	42.3	111	1	5	4.27	.762
The company ensures that suppliers have ISO 14000 certification (for environment) and or its derivatives.	0	0.9	6.3	37.8	55.0	111	1	5	4.47	.658
Our company requires suppliers to limit packaging to the minimum necessary to protect the items supplied and the environment	0	0.9	7.3	45.9	45.9	111	1	5	4.37	.660
The company uses green criteria in technical specification of contract	0	0	7.3	47.7	45.0	111	1	5	4.38	.619
We purchase materials or parts from suppliers who are compliant with environmentally related legislation	1.8	0	14.4	43.3	40.5	111	1	5	4.21	.821
The inclusion of green supplier sourcing has helped in cost reduction of the sugar manufacturing process	0.9	2.7	4.5	50.5	41.4	111	1	5	4.29	.755
Green sourcing of suppliers in purchasing resulted to reliable delivery of inputs	0	2.7	5.4	48.7	43.2	111	1	5	4.32	.703
Green sourcing of suppliers resulted in improved quality of production	0.9	0.9	6.3	42.4	49.5	111	1	5	4.39	.728
Grand Mean = 4.318										
Valid N (Listwise) = 111										

The findings indicates that the respondents agreed (Mean = 4.07; Std Dev = 0.806) with the statement that our company provides specifications to suppliers that include environmental requirements for purchased items. Respondents also agreed (Mean = 4.41; Std Dev = 0.719) with the statement that our company cooperates with suppliers for environmental objectives. The findings of this study further indicate that the companies perform environmental audit for suppliers with a (Mean = 4.27; Std Dev =0.762). In addition, respondents also concurred with a (Mean = 4.47; Std Dev =0.658) that the company ensures that suppliers have ISO 14000 certification (for environment) and or its derivatives. The study further indicates that the respondents agreed (Mean = 4.37; Std Dev =0.660) that their company requires suppliers to limit packaging to the minimum necessary to protect the items supplied and the environment. Respondents also agreed (Mean = 4.38; Std Dev =0.619) that the company uses green criteria in technical specification of contract. The findings further showed that respondents

were in agreement (Mean = 4.21; Std Dev =0.821) that they purchase materials or parts from suppliers who are compliant with environmentally related legislation. The findings also agreed with (Mean=4.29; Std Dev=0.755) that the inclusion of green supplier sourcing has helped in cost reduction of the sugar manufacturing process. Again, the findings indicated (Mean=4.32; Std Dev=0.703) that green sourcing of suppliers in purchasing resulted to reliable delivery of inputs. The findings further showed with (Mean=4.39; Std Dev=0.728) the green sourcing of suppliers resulted in improved quality of production.

The respondents here agree to other studies that green sourcing leads to timely delivery of goods, improved quality, reduced costs, increases the firms competitiveness and promote recycling of materials (Alshura, 2016; Chien, 2007; Kimira, 2016 & Sarhaye, 2017). The findings also concur with Jean (2013), where suppliers play a key role in innovation generation. Supplier involvement has benefits such as

reduced lead times and risks. Supplier involvement enhances flexibility and product quality for manufacturers. This is a two-way traffic as the suppliers' innovation, product quality and financial performance also improves.

Green Tendering

The study sought to determine the effects of green tendering on the factory's performance of sugar companies. The results are presented in Table 4.6

Table 4; Descriptive Statistics for Green tendering

Green Tendering Statement	1 SD	2 D	3 U	4 A	5 SA	N	Min	Max	Mean	Std Dev
Our company has an established internet connection that is reliable	0.0	3.6	20.7	39.7	36.0	111	2	5	4.08	.844
The introduction and installation of internet- based infrastructure has enabled the firm to communicate with suppliers more easily and react where need be faster in solving challenges in transactions	0.0	3.6	10.9	40.9	44.6	111	2	5	4.26	.798
Ordering is done via e-mail (paperless)	0.9	1.8	12.6	37.9	46.8	111	1	5	4.28	.822
Internet installation has improved the quality of information sharing	0.0	3.6	6.3	44.2	45.9	111	2	5	4.32	.753
All communications to suppliers is done via e-mail	0.9	3.6	11.7	38.8	45.0	111	1	5	4.23	.863
Adoption and use of internet has reduced overall cost for the company	0.0	0.0	7.2	47.8	45.0	111	3	5	4.38	.619
The use of internet in purchasing has helped the sugar factory to get accurate information of the inputs as well as outputs from the firm	0.0	0.9	9.9	58.6	30.6	111	2	5	4.56	3.926
The installation of the of internet connection has helped the sugar factory to reduce losses	0.0	0.9	8.1	46.9	44.1	111	2	5	4.34	.667
Use of internet related practices in procurement resulted to reliable delivery of inputs	0.0	1.8	4.5	56.8	36.9	111	2	5	4.29	.638
Use of the internet in procurement resulted to improved quality of products	0.9	0.9	4.5	37.8	55.9	111	1	5	4.47	.711
Grand Mean = 4.321										
Valid N (Listwise) = 111										

The findings reveal that the respondents admitted by (Mean =4.08; Std Dev =0.844) that their Our company has an established internet connection that is reliable. The respondents were also in agreement with (Mean =4.26; Std Dev =0.798) that the introduction and installation of internet- based infrastructure has enabled the firm to communicate with suppliers more easily and react where need be faster in solving challenges in transactions. These findings further indicated with (Mean =4.28; Std Dev =0.822) that ordering is done via e-mail (paperless). The respondents also concurred at (Mean =4.32; Std Dev =0.753) with the statement that Internet installation has improved the quality of information sharing.

Findings on green tendering also revealed that respondents were in agreement with a (Mean =4.23; Std Dev =0.863) that all communications to suppliers is

done via e-mail. Further findings of the study revealed with (Mean=4.38; Std Dev=0.619) that adoption and use of internet has reduced overall cost for the company; further findings of the study revealed with (Mean=4.56; Std Dev=0.926) that the use of internet in purchasing has helped the sugar factory to get accurate information of the inputs as well as outputs from the firm. The study findings also revealed with (Mean=4.34; Std Dev=0.667) that the installation of the of internet connection has helped the sugar factory to reduce losses. Again, findings of the study revealed with (Mean=4.29; Std Dev=0.638) that the use of internet related practices in procurement resulted to reliable delivery of inputs. Finally, the findings on green tendering revealed with (Mean=4.47; Std Dev=0.711) that the use of the internet in procurement resulted to improved quality of products.

The respondents generally agreed on the statements pertaining to Green tendering. These findings are supported by previous works by Gebauer (1998) which found out that benefits can be reaped by automating operations but maybe even more from developing an infrastructure of e-procurement for end users. Similarly green tendering leads to continuous quality improvement, reduction in purchasing price, transparency, cost efficiency, reduction of time for purchasing, ordering and expediting (Hong, 2012; Mong'are, 2017 & Weeks, 2016). It establishes close relationship with suppliers and business partners leading to streamlined processes and leveraged buying power. Carr (2005) study finds out that internet connectivity provides an opportunity to make procurement and services more transparent and efficient. It enables suppliers to make searches, set up business profiles and obtains automatic e-mail alerts.

Conclusion

There are a lot of organizational benefits associated with the adoption of green procurement practices which have been gained by sugar companies in Western Kenya Sugar Zone. The practices like green sourcing, green tendering, organization green awareness and reverse logistics have been embraced and have a significant positive influence in the performance of the sugar companies in Western Kenya Sugar Zone. The use of such green procurement practices is a move in the right direction in greening organisations operations. This is critical in controlling environmental issues associated with the companies and at the same time improvement in the companies' performance.

Recommendations

That sugar companies should embrace and green sourcing in order to improve the quality of supplies since the higher the level of adoption of green sourcing leads to high firm performance.

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