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Influence of Green Manufacturing Practices on Organization Performance of Multinational Tea Processing Companies in Kericho, Kenya

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Abstract: **The purpose of the study was to establish the Influence of green manufacturing practices on organization performance of multinational tea processing companies in Kericho, Kenya. The study has reviewed literature related to the study as well as Value Chain Model, RBV, System theory and Stakeholder's theory. The study adopted descriptive survey research design whose target population consisted of 62 procurement officers, senior procurement officers and factory unit managers and their assistants from Uniliver tea, James Finlay and Williamson tea Kenya Limited firms in Kericho County. Closed ended questionnaires were used to collect relevant data and whereby the instruments used seven questionnaires for pilot-tested at Sotik tea selected Kenya Limited in Bomet County so as to ascertain its validity and reliability. Descriptive statistics analysis was given by data frequencies, percentages, means and standard deviations were used. In inferential statistics, multiple regression and ANOVA was used in order to test the relationship between the influence of supply chain practices and organizational performance.**

Keywords: **green manufacturing practices, organization performance.**

I. INTRODUCTION

The supply chain consists of all parties that are involved in fulfilling a customer request, including the suppliers, transporters, warehouses, retailers and customers themselves (Cox, 1999). Green supply chain (GSC) practices involve organizations assessing the environmental performance of their suppliers, requiring suppliers to undertake measures that ensure the environmental quality of their products, and evaluating the cost of waste in their operating systems (Handfield, Walton, Sroufe, & Melnyk, 2002). GSC definition has ranged from green purchasing to integrated supply chain flowing from supplier, to manufacturer, to customer and reverse logistics (Zhu & Sarkis, 2004).Hervani and Helms (2005) explore GSCM activities including green design, purchasing, manufacturing/processing, production, marketing, recycling and material source. Srivastava describes GSCM as combining environmental thinking and SCM and defines it as including product design, material sourcing and selection, manufacturing processes, delivery of the final product to the consumer, and end-of-life management of the product after its useful life.In recent times, sustaining green supply chain management (GSCM), defined as a maintenance system for helping the supply chain to manage a flow of materials in protecting environments, has emerged as a very significant issue in manufacturing industries. Moreover, over the past few decades, environmental issues have created social, economic, and political pressure on organizations to implement green practices in manufacturing activities. The average temperature of the earth has been rising and greenhouse effects have led to an increase in the occurrence of natural disasters. Consequently, the importance of green practices has received a lot of attention from both academic researchers and operations management personnel. Further, stakeholders have influenced firms to adopt environmental practices that control their impact on the natural environment (Hofer, Cantor &Dai, 2012). Environmental sustainability occurs when processes, systems and activities reduce the environmental impact of organizations facilities, products and operations. Economic sustainability is used to define strategies that promote the utilization of socio-economic resources to their best advantage. A green economic model proposes an equitable distribution and efficient allocation of resources. The idea is to promote the use of those resources in an efficient and responsible way that provides long-term benefits and establishes profitability (UNGC-Accenture, 2013).

Kovacs (2014) opines that Supply chain sustainability is a holistic perspective of supply chain processes and technologies that go beyond the focus of delivery, inventory and traditional views of cost. This emerging philosophy is based on the principle that socially responsible products and practices are not only good for the environment, but are important for long-term profitability. Sustainability therefore is a business strategy that drives long-term corporate growth and profitability by mandating the inclusion of environmental and social issues into the business model. It is intended to generate a maximum increase in company, consumer and employee value by embracing opportunities and managing risks derived from environmental and social developments.

1. Statement of the Problem

Green supply chain management is a growing concern to major countries and especially the development country. This because of the green print on the environmental effect. Majority of the discussion and concern is how to improve production without affecting the environment. This has been heightened by the climate change due to global warming and melting of the polar ice. This concern is how to regulate companies to reduce the emission of carbon through green based processes. Green supply chain management (GSCM) practices are gaining increasing interest among researchers and practitioners of operations and supply chain management. The increasing importance of GSCM and its practices is driven majorly by the sustained deterioration of the environment, such as diminishing raw material resources, overflowing waste sites and increasing levels of pollution. Rather than being just about environment friendly; it is incorporating good business sense and higher profits. This, therefore, requires that organizations integrate their economic and the environment. Different studies concerning green supply chain management practices have been done by different authors. Rao and Holt (2005) pointed out that organizations adopting GSCM in the South East Asian region ultimately enhanced both competitiveness and economic performance. A study by Klassen and Mclaughlin (1996) indicated that environmental performance positively affected financial performance of the firms through both increasing the market share and decreasing cost. Mohamed (2012) found out that GSCM has a positive impact on manufacturing firms in Mombasa. Despite different studies showing positive relationship between GSCM and GSCM practices, there are organizations that have not embraced it as yet. Furthermore, the studies done before were done long in the past and many of them were done outside Kenya. This study, therefore, seeks to assess the relationship between the influence of supply chain practices through green manufacturing, reverse logistics, green purchasing and green distribution on organization performance of multinational tea processing companies in Kericho, Kenya.

2. Objective of the Study

To establish the influence of green manufacturing practices on organization performance of multinational tea processing companies in Kericho, Kenya.

3. Research Hypotheses

In conducting the study the following hypothesis was tested

Ho: There is no significant influence of green manufacturing practises on organization performance of multinational tea processing companies in Kericho, Kenya.

II. LITERATURE REVIEW

1. Theoretical Review

Value Chain Model:Green supply chain is anchored on the value chain model as postulate and developed by Dr. Porter as cited in (Bett, 2013). Any organization deals with numerous activities that has an input and output in between are processing as system theory depicts. In multinational tea processing industry activities can be primary or support activities. According to Porter cited by Bett (2013) the primary activities are: Inbound Logistics, Operations, Outbound Logistics, Marketing and Sales, and Service. Global value chain (GVC) are adopted based by most organization based its integration framework value chains globally through networking and interconnection between organization to enable supply of good through in international framework. It was developed in order to enable flow of goods and service through globalization and obtain codes and standards that govern global industries. Some of the internal requirement is to control the effect of processing to the environment (Dolan & Humphrey, 2004). According to Bett (2013) integrated model indicated that it is important to align the value chain model with appropriate strategies for sustainable growth of the organization. Procurement is one the important section of adding value and through green supply chain sustainable development and high performance of procurement is attained. Environmentalist have raised many alarm to all processing

manufacturing companies to cut carbon emission in there supply chain and ensure green supply chain model to be practiced in their organization.

System Theory: The system theory is based on scientific model that use an analogy of an organism with system that network with other subsystem (Bertalanffy, 1969). As postulate by Bertalanffy in 1969 implies that a system contains several interdependent subsystems that are heterogeneous that work together as one integrated complex self-organization that forms internal network structure of connectedness among system elements to allow input and output done in efficient and effective way. Procurement is one of the important part of system of production in a tea processing industry. According to Bertalanffy the subsystem should be working together to fulfil the overall objective of the organization in an industrial setup.There are two variants system theory that are deployed up-to-date one is based on scientific system and sociological theorizing and research (Miller & Page, 2007). The social system provide solution to social problems where (Morgaine, 2001) cited that it's a set of interrelated objects showing coherent characteristics as traits. The general system represent scientific model approach of system theory provides ideas that procurement procedures can be interlinked together and information arrange so that each procedure forms a subsystem. It is characterized by input-process-output with feedback in the model that can be made up of subsystem. The subsystem can then be linked together to develop the larger system which would allow procurement practices to work in line with the organization goals. Green supply chain practices should be inculcated be in line with the multination tea processing companies with the right system in the processing until the final tea buyers. The supply chain model under investigate which is the main system incorporates green manufacturing, reverse logistics practice, green purchasing and green distribution practices as the subsystem from supply end to sale and marketing in supply chain.

2. Empirical Review

Green Manufacturing Practices (GMP), refers to the system that incorporates product and product design issues with issues of manufacturing, planning and control in such a way to identify, quantify, access and manage the flow of environmental waste with the aim of reducing and ultimately minimizing environmental impact while also endeavouring to maximize efficiency of use of resources (Testa & Iraldo, 2010). Wisner and Stanley (2007) sees green manufacturing as production process which use inputs with relatively low environmental impacts, which are highly efficient and which generate little or no waste or no pollution. It can lead to lower raw material costs, production efficiency gains, reduced environmental and occupational safety expenses and improved corporate image.Green technology and Eco- innovation is one the green manufacturing practices. It is the driver in the move towards green and low carbon economy. Many organizations view the application of green manufacturing technologies as the corner stone for their policies for economic growth.The evolution of sustainability and GM concepts has given rise to a series of GMP, from the application of technology for the treatment of pollution at the end of the pipe to more integrated systems of production which support the collaboration across functional areas within a firm as well as inter-organizational level such as closed-loop production and industrial symbiosis, (OECD, 2010). Generally, the development of GMP can be seen at the three levels, i.e. product, process and system, (Jayal, Badurdeen, & Jawahir, 2010). At the product level, traditional 3R concept (reduce, reuse, recycle) has been transformed to a greener 6R approach (reduce, reuse, recycle, recover, redesign, remanufacture), changing paradigm from single life cycle to multiple life cycles, (Jayal, Badurdeen, & Jawahir, 2010). While numerous efforts have been made in the process level on optimizing technological improvements and process planning for reducing resource consumption, waste generation and occupational hazards as well as improving product life, the orientation of the system is evolved from organizational-based to the entire supply chain and beyond the chain of production, (Jayal, Badurdeen, & Jawahir, 2010); Jawahir and Dillon, 2007). Considering the evolution of GM, GMP can be defined as a firm's intra- and inter-0rganizational practices that integrate environmental, economic and social aspects into operational and business activities. Differentiated based on the orientation of green thinking, there are two types of GMP namely internal GMP and external GMP. While internal GMP focuses on the green practices within a firm, external GMP refers to the inter-organizational practices within the value system and beyond the chain of production to improve economic, environmental and social sustainability simultaneously.

III. METHODOLOGY

[1] Research Design ,Target Population And Sampling

The research design that was employed in this study was descriptive survey study enables a researcher to closely examine the data within a specific context. It is appropriate because it very useful in deserving the chief variables associate with retention. Descriptive research design will be relevant in the field study whereby variables associated with retention will

be gathered in the field. Descriptive research design was used to measure the central tendency mean, mode & variance. The methodology used in the study will include descriptive research design that utilizes survey method in collection of data.

[2] Research Instruments and data collection and analysis

The study used a questionnaire to collect primary data on the assessment of the influence of the supply chain practices on organizational performance of multinational tea processing companies in Kenya. The study used closed ended questions where Likert scale was used. According to Kothari (2004), closed-ended questions are important because: they are easier to analyze since they are in an immediate usable form; they are easier to administer because each item is followed by alternative answers. The validity of the instrument was determined by giving the questionnaire to two experts at JKUAT. These are individuals who had a wide experience in teaching and supervising post graduate students. They determined the content validity of the questionnaire. Reliability was determined by pilot testing it. In conducting the pilot study, the questionnaire was presented to procurement officers at Sotik tea (K) limited in Kericho County. The officers did not take part in the main study to avoid data contamination. The results of the pilot test were subjected to Cronbach reliability coefficient. A Cronbach's Alpha coefficient of 0.891 was obtained from the pilot questionnaire with using the aid of SPSS. Reid (2006) indicate that as a general rule, a coefficient greater than or equal to 0.7 is considered acceptable and a good indication of construct reliability.

Once data had been collected from the field, it was coded for analysis. Data was then analyzed using descriptive statistics such as frequency counts, percentages, means, and standard deviations. Inferential statistics were analyzed using regression model. The analysis was done by use of Statistical Package for social Sciences (SPSS) version 22.0. The regression model used was:

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

Where;

Y is the dependent variable (organizational performance) β_0 Was the constant $\beta_1 \beta_2 \beta_3 \beta_4$ Were the slopes of the regression equation .The independent variables were; X_1 Green manufacturing practices ,X_2 Reverse logistics practices ,X_3 Green purchasing practices ,X_4 Green distribution practices,e Error term. The results were then tabulated interpretted and discussed.

IV. RESULTS AND DISCUSSIONS

1. Response Rate and reliability test

The researcher distributed a total of 62 questionnaires to the potential respondents who comprised of Chief Procurement Officer, procurement officers, unit factory manager and assistant managers. They were 60 returned questionnaires. The study obtained 60 completely filled questionnaires which were 96.8% response rate. This response rate was deemed sufficient for data analysis given the recommended 80.0% by Mugenda & Mugenda (2013). The Cronbach alpha coefficients of compliance with terms and conditions, green manufacturing practices was above 0.7 threshold hence deemed reliable.

2. Demographic analysis

The background information that was retained for analysis relating to the respondents included: Above three quarters of the respondents (78.3%) were male while 21.7% of the respondents were female. The higher number of male respondents could be attributed to the nature of work and community background which is male dominated. Since the general proportion of males to females in leadership positions across Kenya is higher, this could still have attributed the higher number of male respondents in the study. Hence the multination procurement and unit manager is male dominated position.Almost half of the respondents 28(46.7%) were aged 40 – 50 years. Respondents who were over 50 years were 19(31.7%) of the respondent, those aged 29 – 39 years were 11(18.3%), and those aged 18 – 28 years were the least in number 2(3.3%).A majority of respondents were 40 years and above which could be attributed to the number of years required to rise through the ranks to senior positions in the company. The multination tea processing firms have high job retention in their human resource. The multinational tea companies seemed to provide best motivation incentive that ensure high job retention among its employ as well as making them loyal to the organization.Most of the respondents (73.3%) had their highest education level as degree while none of the respondents had either primary or secondary level as their highest education level. Respondents with post graduate education as their highest level were 16.7% of

respondents while those with diploma level were 10.0% of the respondents.The respondents for this study were made up of Chief procurement officer, procurement officers both senior and junior levels which are all positions that require a minimum of a diploma thus the lack of respondents with below diploma level of education. Additionally, since these roles are specialised roles and management positions, a degree would be a minimum requirement for qualification for middle level and post graduate for higher level of employment. The multinational procurement and unit managers are well educated where those holding degree are many as well as master with few diploma. They embrace expertized labour force to ensure high performance in the organization.Most of the respondents 22(36.6%) have worked in the organization for more than 14 years. Respondents who have worked in organization for 3-8 years were 19(31.7%), 9-14 years were 12(20.0%), and 2 years or less were 7(11.7%).The higher number of staff who have worked the organization for more than 14 years could be attributed to high staff retention levels at the company. This also explain why age of most of the manages are past youth stage. The multinational tea processing companies has high job retention time.

3. Green Manufacturing Practices

The study sought to establish the influence of manufacturing practices on organizational performance of the organization. The aspects of manufacturing practices that were examined included the product design, process design, and environment friendliness, and results shown in Table1.

Table 1: Descriptive Statistics for Green Purchasing Practices

	SA Freq. (%)	A Freq. (%)	U Freq. (%)	D Freq. (%)	SD Freq. (%)
Efficiency in green manufacturing practices improves profitability	18 (30.0%)	30 (50.0%)	6 (10.0%)	5 (8.3%)	1 (1.7%)
Green manufacturing incorporates technologies that minimize energy consumption	15 (25.0%)	20 (33.3%)	15 (25.0%)	10 (16.7%)	0 (0.0%)
Green manufacturing incorporates techniques that minimize on waste	18 (30.0%)	31 (51.7%)	5 (8.3%)	5 (8.3%)	1 (1.7%)
Green manufacturing helps eliminate incorrect product variations	32 (53.3%)	15 (25.0%)	7 (11.7%)	6 (10.0%)	0 (0.0%)
Green manufacturing helps minimize the number of malfunctioned products	16 (26.7%)	28 (46.7%)	13 (21.7%)	2 (3.3%)	1 (1.7%)

Half of the respondents (50.0%) indicated a tendency to agree with the statement efficiency in green manufacturing practices improves profitability. Further, 30.0% of the respondents indicated a strong tendency to agree with the same statement. A quarter of the respondents tended to strongly agree (25.0%) and be undecided (25.0%) when asked whether green manufacturing incorporates technologies that minimize energy consumption. Most of the respondents tended to agree (33.3%) with the statement green manufacturing incorporates technologies that minimize energy consumption, although there were a few respondents who tended to disagree (16.7%) with the statement. However, none of the respondents (0.0%) tended to disagree with the statement green manufacturing incorporates technologies that minimize energy consumption. Similarly, about half of the respondents (51.7%) tended to agree with the statement that green manufacturing incorporates techniques that minimize on waste, further supported by 30.0% of respondents who tended to strongly agree on this statement. Slightly above half of the respondents (53.3%) were inclined to strongly agree with the statement green manufacturing helps eliminate incorrect product variations, with an additional 25.0% of the respondents inclined to agree with the statement. On the other hand, there was no respondent (0.0%) who was inclined to strongly disagree with the statement, although 10.0% of the respondents disagreed with it. Most of the respondents (46.7%) tended to agree that green manufacturing helps minimize the number of malfunctioned products and 26.7% tended to agree with the same. However, there were 21.7% of respondents who were undecided on whether green manufacturing helps minimize the number of malfunctioned products.

4. Organizational performance:

The study assessed the influence of the supply chain practices on organizational performance of multinational tea processing companies in Kenya on the basis of three indicators which included profitability, sales volume, cost reduction

and market share. Table 4.13 shows the results. A majority of the respondents affirmed that profitability of the business has been favorable (Agree=45.0%; Strongly Agree=28.3%) and the company's customers show satisfaction (Agree=45.0%; Strongly Agree=20.0%). On the other hand, some respondents had a contrary opinion as they tended to disagree and strongly disagree with the statement profitability of the business has been favorable (Disagree=3.3%; Strongly Disagree=1.7%) and the company's customers show satisfaction (Disagree=11.7%; Strongly Disagree=1.7%).

Table 2: Descriptive statistics for Organizational performance

	SA Freq. (%)	A Freq. (%)	U Freq. (%)	D Freq. (%)	SD Freq. (%)
Profitability of the business has been favorable.	17 (28.3%)	27 (45.0%)	13 (21.7%)	2 (3.3%)	1 (1.7%)
The company's customers show satisfaction hence favorable sales.	17 (28.3%)	33 (55.0%)	6 (10.0%)	3 (5.0%)	1 (1.7%)
The company has cut cost through minimal wastage.	29 (48.3%)	17 (28.3%)	9 (15.0%)	5 (8.3%)	0 (0.0%)
The company's share of market is satisfactory through proper distribution and delivery.	12 (20.0%)	27 (45.0%)	13 (21.7%)	7 (11.7%)	1 (1.7%)
The company has been experiencing performance in procurement	17 (28.3%)	30 (50.0%)	7 (11.7%)	5 (8.3%)	1 (1.7%)

Above half of the respondents (55.0%) tended to agree with the statement the company's customers show satisfaction hence favorable sales and an additional 28.3% tended to strongly agree with the statement. Most of the respondents tended to strongly agree (48.3%) and 28.3% tended to agree with the statement the company has cut cost through minimal wastage adopted of multinational tea processing companies in Kenya. There were respondents who were undecided (15.0%) on company has cut cost through minimal wastage. While no respondents (0.0%) tended to strongly disagree that the company's share of market is satisfactory, 8.3% of the respondents tended to disagree. Half of the respondents tended to agree (50.0%), 28.3% tended to strongly agree, and 11.7% were undecided in respect to the statement the company has been experiencing performance in procurement.

1. Regression Analysis

The estimation of the effect of the independent variables on the dependent variable was done using a multiple linear regression analysis. In this context, the influence of the independent variables (green manufacturing practices on the dependent variable (organizational performance of multinational tea processing companies in Kenya) was examined.

Table 3: Correlation Coefficient and Coefficient of Determination

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.793[a]	.628	.601	.43224	.628	23.249	4	55	.000	2.532

a. Predictors: (Constant), Green manufacturing practices

The study used simple OLS Regression analysis. The independent variable was financial capacity and the dependent variable was Accessibility of the preferential public procurement opportunities. Univaritae regression analysis involved calculation of coefficient of determination (R^2), Analysis of Variances (ANOVA) and regression coefficients.

Table 4: ANOVA for the Linear Regression

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17.374	4	4.344	23.249	.000[b]
	Residual	10.276	55	.187		
	Total	27.650	59			

a. Dependent Variable: Organizational performance

b. Predictors: (Constant), Green manufacturing practices

The analysis of variance (ANOVA) was undertaken to determine whether the regression model was a good fit for data with a threshold of a p-value of less than 0.05. Sen and Srivastava (2011) say that the appropriateness of the linear regression model as a whole can be tested using F test. The F-test of overall significance indicates whether linear regression model provides a better fit to the data than a model that contains no independent variables. As seen in table 4.17, F (4, 55) = 23.249, p= 000<0.05 indicates that the model as a whole has statistically significant predictive capability. Therefore, the regression model provides a better fit to the data and proves that the model to be significant This therefore implied that the regression model with green manufacturing practices.

Table 5: Coefficients for the Multiple Linear Regression

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.798	.373		2.138	.037		
	Green manufacturing practices	.173	.088	.209	1.977	.043	.605	1.654

a. Dependent Variable: organisation performance.

Organisation performance = 0.798 + 0.173(green manufacturing practices)

This implies that for every unit increase in green manufacturing practices and with other factors kept constant, the organization performance will increase by 0.173. Therefore, green manufacturing practice has a positive influence on the organization performance of multinational tea processing in kericho.

2. Hypothesis Tests

H01: There is no significant influence of manufacturing practises on organizational performance of multinational tea processing companies in Kenya. The t-statistic for manufacturing practises, t = 0.209, p<0.05, indicated that manufacturing practises significantly influence organizational performance of multinational tea processing companies in Kenya. Therefore, the study rejected the null hypothesis that there is no significant influence of manufacturing practises on organizational performance of multinational tea processing companies in Kenya. This implies that there is significant influence of manufacturing practises on organizational performance of multinational tea processing companies in Kenya.

V. CONCLUSION

1. Conclusion

All the mean scores of the green purchasing practices matrix were below indicating that on average respondents tended to agree with each statement of the matrix. All the standard deviations of statements in the green purchasing practices matrix were above 3.5 indicating that respondents had moderate consensus on each statement of the matrix.Respondents on

average tended to agree and have moderate consensus that green purchasing raises consumer awareness in green products helps increase demand for green products hence improving company performance, and motivates the industry to adopt greener production processes. On average respondents tended to agree and have moderate consensus that green purchasing motivates the industry to adopt greener distribution processes. Similarly, respondents tended to agree and have moderate consensus that green purchasing practices help improve the public image of the company, and can reduce solid waste, conserve water and protect natural resources of multinational tea processing companies in Kenya.According to the result from ANOVA and regression analysis there was significant effect of green purchasing practices on the organizational performance. It means with the use of green procurement the performance of procurement has improve to a greater extend.

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