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INFLUENCE OF GREEN OPERATIONS STRATEGY ON PERFORMANCE OF TEA PROCESSING FIRMS IN KENYA

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Abstract

Purpose: The study sought to establish the influence of green operations strategy on performance of tea processing firms in Kenya.

Methodology: This research study adopted a descriptive research design approach. The researcher preferred this method because it allowed an in-depth study of the subject. The target population was heads of procurement and heads of finance in the 66 tea processing firms in Kenya. The study conducted a census since the number of respondents was less than 200, which is a rule of the thumb. The study combined two methods in its data collection, that is, questionnaires and key informant interviews. After data collection, quantitative data was coded using Statistical Package for Social Science (SPSS) version 20.

Results: The independent variables reported R value of 0.846 indicating that there was perfect relationship between dependent variable and independent variables. R square value of 0.715 means that 71.5% of the corresponding variation in performance of tea processing firms can be explained or predicted by (green product design, green distribution and transportation, green warehousing and reverse logistics) which indicated that the model fitted the study data. The results of regression analysis revealed that there was a significant positive relationship between dependent variable and independent variable at (β = 0.715), p=0.000 <0.05).

Conclusion: The findings of the study indicated that green product design, green distribution and transportation, green warehousing and reverse logistics have a positive relationship with performance of tea processing firms.

Policy recommendation: The study recommends that tea processing firms should embrace green operations strategy so as to improve performance and further researches should to be carried out in other institutions to find out if the same results can be obtained.

Key words: *green product design, green distribution and transportation, green warehousing, reverse logistics*

1.0 INTRODUCTION

Supply chain management is the coordination and management of a complex network of activities involved in delivering a finished product to the end-user or customer. Supply chain management (SCM) has been a major component of competitive strategy to enhance organizational performance. The supply chain management concept has been a major topic in the manufacturing sector to achieve competitive advantage in the agri-business context for many years.

In more recent times, agri-supply chain management has gained more attention from academics and practitioners for many reasons, these include; increase in the dependency on the agriculture sector, structural changes, increased competition and customer awareness. The agriculture sector plays a vital role in many developed and developing countries economics. It has been a major income source especially for many African countries where a larger portion of population depends mainly on the agricultural industry (Nee, 2012).

The agricultural industry is in the middle of major structural changes in areas such as product characteristics, worldwide production and geographically spread of consumption, new technology and size of operation. Controlling food quality and safety, uncertainty due to weather changes and sustainability of the sector are some of the other key issues observed in agri- supply chains (Salin, 2008).

Increased competition has compelled agri-supply chain to become overly complicated (Christien, 2006) and the application of better supply chain management strategies in agri-sector is now vital (Van der Vorst, Beulens & Van Beek 2010). Furthermore, because agriculture is primarily a part of natural resources, it has a strong interconnection with sustainability concepts. The manmade activities in food production and consumption inherently have a greater impact on the environment and sustainability in general (Husti, 2006).

Green supply chain management is being practiced not only globally but also regionally. Rwanda, located in Central Africa, is one of the greatest success stories of a post-conflict state in Africa. Rwanda is an inspiring success story for its achievement in nearly reaching all its millennium development goal targets. Environmental sustainability has become a government priority, with the consumption of ozone depleting substances, chloro-fluoro carbons, dropping from 30 metric tons in 2000 to 0 today (UNDP, 2015).

As part of its vision, which is to "maintain a clean, healthy and wealthy environment", the Rwandan government, through its environment regulation body, Rwanda Environment Management Authority, took the decision to ban the use of non-biodegradable plastic bags in the country in 2008. Green Operations Strategy is "a deliberate plan, focused primarily on the long-term, which aims at responding to environmental pressures on products and production systems when creating socio-economic value" (Nunes, & Shaw, 2016). Green operations strategy widens the scope of sustainability analysis beyond manufacturing, which increases complexity and uncertainty in the decision making process. Two main approaches have emerged of late; The first is focused on the decision making processes.

In Kenya, green supply chain management reporting evolved in the mid-1990s as a means for business organizations to manage and balance their productive efforts with those of the environment and their surrounding communities (Odhiambo, 2008). Green supply chain management is not a new phenomenon in Kenya. The Environmental Management and Coordination Act of 1999 was enacted to provide an appropriate legal and institutional framework for the management of the environment and for matters connected therewith and incidental thereto.

1.2 Problem Statement

Tea is the leading foreign exchange earner, contributing 25% of the total foreign exchange and 7% of the GDP (KNBS, 2015). The industry famously known for its black tea supports the livelihoods of over 5 million Kenyans and immensely contributes to rural development. The massive operations involved in the Kenyan tea value chain are a recipe for environmental degradation, high

operating costs and social challenges if not well managed (KTB, 2012). To counter this, tea processing firms in Kenya have embraced green operations strategies.

Green operations strategy seems to offer some reprieve to the sector if well implemented (Babu, 2012). In today's world, people are more concerned than ever before about the environment and subsequent climate changes. Along with these concerns, in today's globalized world buyers' opportunities have increased. This has led to tea processing companies adjusting their strategies in many areas, including R&D and manufacturing (World Bank, 2016).

According to KIPPRA (2014), green operations strategy has become a necessity in the tea processing industry; due to legislations and environmental concerns. Many firms look for new possibilities to create and improve their return systems in order to gain a competitive advantage. Companies are now looking into green operations strategy in order to optimize their return flows (OECD, 2017). Tea processing firms in Kenya operate at a technical efficiency of about 39% compared to their counterparts in Malaysia that average about 84% (Achuora, Guyo, Arasa & Odhiambo, 2015) raising doubts about the sector's capacity to meet its goal of contributing to GDP by 7% (PPRA, 2015). Green operations strategy will come in handy to improve this performance.

Several studies have been done internationally, Pollock (2017) did a study on green operations strategy, he concluded that green operations account for 3% to 4% of a company's total costs and argues that companies can save up to 10% from their annual operational bill by implementing an green operations strategy and system. Locally, Studies have also been done on green operations strategy, Moturi (2015) noted that, given the tightness of margins in many organizations, the improved management of operations can have a significant impact on the bottom-line performance, both business and logistical. 80% of tea processing firms are yet to incorporate green operations strategy which can be done by appreciating environmental issues and inculcating the same to their employees and suppliers.

Debate on the effects of implementing green operations strategy on organization's activities is at best on its nacet stage. Many theories have been advanced on the relationship between the two phenomena. Most of the studies point to a positive relationship between green operations strategy and organization's performance in the global arena. However in the local scene researchers are yet to determine whether the embraced green operations strategies embraced are yielding any positive results to the firms' activities. It is against this back drop that this study seeks to examine the influence of green operations strategy on performance of tea processing firms in Kenya.

1.3 Objectives of the Study

  i.   To establish the influence of green product design on performance of tea processing firms in Kenya.
 ii.   To find out how green distribution and transportation influences performance of tea processing firms in Kenya.
iii.   To assess the influence of green warehousing on performance of tea processing firms in Kenya.
 iv.   To determine the influence of reverse logistics on performance of tea processing firms in Kenya.

2.0 LITERATURE REVIEW

2.1 Empirical Review

Green Product Design and Performance of Tea Processing Firms

Packaging now is regarded as an essential component of our modern lifestyle and the way business is organized. Packaging is the enclosing of a physical object, typically a product that will be offered for sale. It is the process of preparing items of equipment for transportation and storage and which embraces preservation, identification and packaging of products. According to Saliba (2013) packaging is the act of containing, protecting and presenting the contents through the long chain of production, handling and transportation to their destinations in as good a state, as they were, at the time of production packaging is an important part of the branding process as it plays a role in communicating the image and identity of a company.

Due to increasing self-service and changing consumers' lifestyle the interest in package as a tool of sales promotion and stimulator of impulsive buying behavior is growing increasingly. So packaging has an important role in marketing communications, especially from the point of sales and could be treated as one of the most important factors influencing Consumer's purchase decision (Sahay & Mohan, 2016). Consequently the role of package in marketing communications increases: it must attract consumer's attention and transmit adequate value of product to consumer in the short period right in the place of sale. Therefore there is a necessity to explore package and its elements in more detail, in order to understand which of these elements are the most important for consumer's purchase decision.

Green Distribution and Performance of Tea Processing Firms

According to Thompson *et al.,* (2011), there are four key stakeholders involved in urban freight transport: shippers; freight carriers; residents; and administrators/governments. Each group has its own specific objectives and tends to behave in a different manner and needs to be considered. Freight carriers and administrators are the media of the delivery tasks. The characteristic of their relationships is that a slight move in one part may affect the whole situation. For instance, a freight carrier with lower efficiency would impact on the service quality of the system and hence increase the difficulties of management for administrators. Besides, it would also reduce the satisfaction level of consumers and the reliability of firms and increase the operation cost.

Green Warehousing and Performance of Tea Processing Firms

The adoption of green infrastructure helped the automotive practitioners to improve their green performance. Yan and Yazdanifard (2014) established whether green marketing and storage was successful and how it related to the performance of firms. Through interviews, questionnaires and secondary information, the scholars realized that majority of the firms believed that such ideas of going green would be beneficial to the society and that those who implemented, performed better than those who did not.

Reverse Logistics and Performance of Tea Processing Firms

According to Hendricks and Singhal (2015) the growing attention to reverse logistics (RL) is explained primarily by the need to comply with regulations on environmental protection, which in many industries imply the producer's responsibility for the sold goods, even after the sale transaction, and in particular when the products' life cycle is over.

Another explanation of the interest for RL is the concern of some companies for their image in front of the growing number of those customers who in their purchase decisions evaluate not only the product's performance, quality, or price, but also the company's respect for the environment demonstrated by environmentally friendly initiatives, such as the use of recycled raw materials in the production process, or the design of such products and packaging that ensure that waste disposal problem is not further intensified (Preuss, 2015).
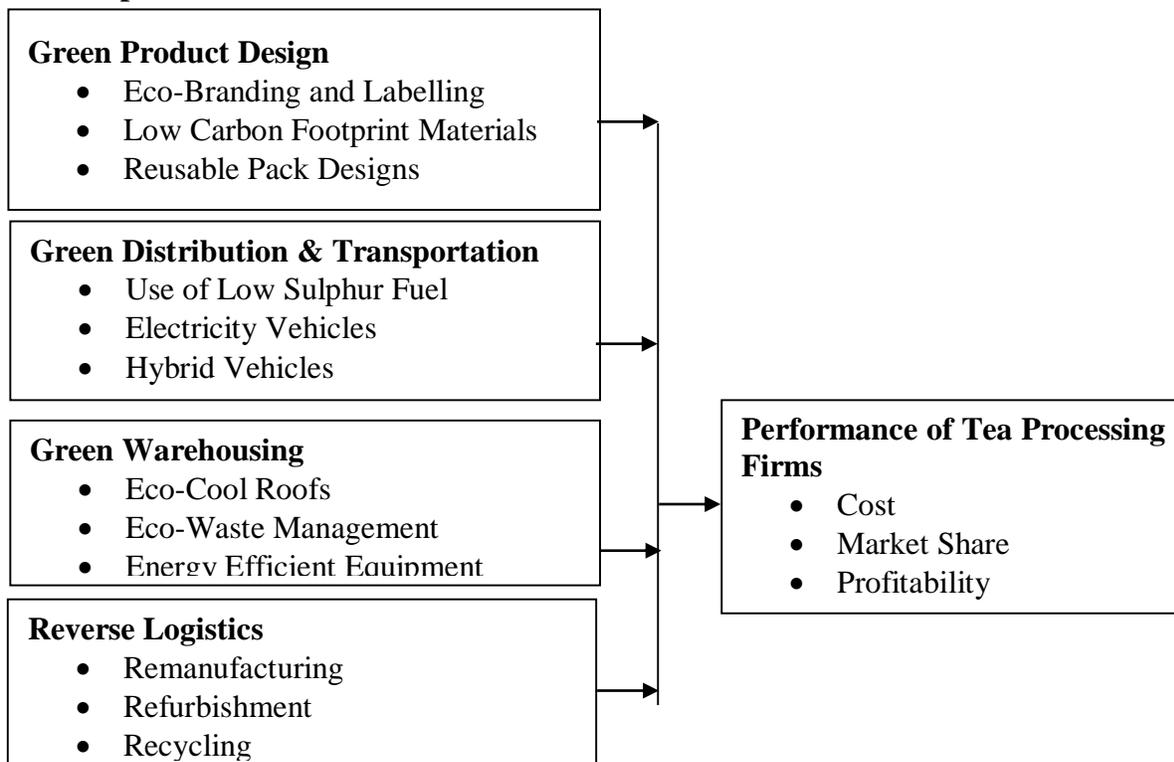
2.2 Theoretical review

Supply Chain Management Theory

Supply chain has its roots in Porter's (1985) value chain, which is the set of processes a firm uses to create value for its customers. Although originally described as a chain, supply chain can nowadays be defined as the network of organizations that are involved through upstream and downstream linkages in the different processes and activities that produce value in the form of products and services in the hands of the ultimate customer (Christopher, 2015). The chain involves two or more legally separated organizations that are linked together by material, information or financial flows and includes the ultimate customer.

The objectives of the supply chain are to provide service to customers, achieve low operating costs and minimize the assets in the chain (Skjøtt- Larsen, 2012). Many companies are now looking at securing cost, quality, technology and other competitive advantages as strategies to pursue in a globally competitive environment and to achieve this many manufacturers are focusing on their supply chain management practices.

2.3 Conceptual Framework

Green Product Design
- Eco-Branding and Labelling
- Low Carbon Footprint Materials
- Reusable Pack Designs

Green Distribution & Transportation
- Use of Low Sulphur Fuel
- Electricity Vehicles
- Hybrid Vehicles

Green Warehousing
- Eco-Cool Roofs
- Eco-Waste Management
- Energy Efficient Equipment

Reverse Logistics
- Remanufacturing
- Refurbishment
- Recycling

Performance of Tea Processing Firms
- Cost
- Market Share
- Profitability

Figure 1: Conceptual Framework

3.0 METHODOLOGY

This research study adopted a descriptive research design approach. The researcher preferred this method because it allowed an in-depth study of the subject. The target population was heads of procurement and heads of finance in the 66 tea processing firms in Kenya. The study conducted a census since the number of respondents was less than 200, which is a rule of the thumb. The study combined two methods in its data collection, that is, questionnaires and key informant interviews. After data collection, quantitative data was coded using Statistical Package for Social Science (SPSS) version 20.

4. 0 RESULTS AND FINDINGS

4.1 Descriptive Analysis

Green Product Design

The respondents were also asked to comment on statements regarding green product design influence on performance of tea processing firms. The responses were rated on a likert scale and the results presented in Table 1 below. It was rated on a 5 point Likert scale ranging from; 1 = strongly disagree to 5 = strongly agree. The scores of 'strongly disagree' and 'disagree' have been taken to represent a statement not agreed upon, equivalent to mean score of 0 to 2.5. The score of 'neutral' has been taken to represent a statement agreed upon, equivalent to a mean score of 2.6 to 3.4. The score of 'agree' and 'strongly agree' have been taken to represent a statement highly agreed upon equivalent to a mean score of 3.5 to 5.

The respondents were asked to indicate their descriptive responses for green product design. The result revealed that majority of the respondent with a mean of (4.3) agreed with the statement that eco-branding and labelling plays a significant role in cost reductions. The measure of dispersion around the mean of the statements was 1 indicating the responses were varied. The result revealed that majority of the respondent with a mean of (3.6) agreed with the statement that low carbon footprint materials plays a significant role in cost reductions. The measure of dispersion around the mean of the statements was 1.4 indicating the responses were varied. The result revealed that majority of the respondent with a mean of (3.8) agreed with the statement that reusable pack designs plays a significant role in cost reductions. The measure of dispersion around the mean of the statements was 1.3 indicating the responses were varied.

The result revealed that majority of the respondent with a mean of (3.0) agreed with the statement that eco-branding and labelling plays a significant role in expanding the market share. The measure of dispersion around the mean of the statements was 1.4 indicating the responses were varied. The result in table 4.5.1 revealed that majority of the respondent with a mean of (4.2) agreed with the statement that low carbon footprint materials plays a significant role in expanding the market share. The measure of dispersion around the mean of the statements was 1 indicating the responses were varied. The result revealed that majority of the respondent with a mean of (3.7) agreed with the statement that reusable pack designs plays a significant role in expanding the market share. The measure of dispersion around the mean of the statements was 1 indicating the responses were varied.

The result revealed that majority of the respondent with a mean of (3.4) agreed with the statement that eco-branding and labelling plays a significant role in improving profitability. The measure of dispersion around the mean of the statements was 1.3 indicating the responses were varied. The result revealed that majority of the respondent with a mean of (3.8) agreed with the statement that low carbon footprint materials plays a significant role in improving profitability. The measure of dispersion around the mean of the statements was 1.2 indicating the responses were varied. The result revealed that majority of the respondent with a mean of (3.8) agreed with the statement that reusable pack designs plays a significant role in improving profitability. The measure of dispersion around the mean of the statements was 1.2 indicating the responses were varied. The findings of this study imply that the use of green product design is prevalent among tea processing firms and that its use improves the performance of a firm significantly. The findings agree with Knudsen (2015) that using green product design when sourcing is a smart move and can reduce expenses significantly.

Table 1: Green Product Design

Statements	Mean	Std. Deviation
Eco-branding and labelling plays a significant role in cost reductions	4.3	1.0
Low carbon footprint materials plays a significant role in cost reductions	3.6	1.4
Reusable pack designs plays a significant role in cost reductions	3.8	1.3
Eco-branding and labelling plays a significant role in expanding the market share	3.0	1.4
Low carbon footprint materials plays a significant role in expanding the market share	4.2	1.0
Reusable pack designs plays a significant role in expanding the market share	3.7	0.5
Eco-branding and labelling plays a significant role in improving profitability	3.4	1.3
Low carbon footprint materials plays a significant role in improving profitability	4.1	4.3
Reusable pack designs plays a significant role in improving profitability	3.8	1.2
Average	**3.8**	**1.5**

Green Distribution and Transportation

The respondents were also asked to comment on statements regarding green distribution and transportationinfluence on performance of tea processing firms . The respondents were asked to indicate descriptive responses for green distribution and transportation. The result revealed that majority of the respondents as indicated by a mean of (3.8) indicated that they agreed with the statement that use of low sulphur fuel plays a significant role in cost reductions. The responses were varied as measured by standard deviation of 1.1. The result revealed that majority of the respondents as indicated by a mean of (3.6) indicated that they agreed with the statement that use of electricity vehicles plays a significant role in cost reductions. The responses were varied as measured by standard deviation of 1.1. The result revealed that majority of the respondents as indicated by a mean of (3.7) indicated that they agreed with the statement that use of hybrid

vehicles plays a significant role in cost reductions. The responses were varied as measured by standard deviation of 1.1.

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The result revealed that majority of the respondents as indicated by a mean of (3.5) indicated that they agreed with the statement that use of low sulphur fuel plays a significant role in improving profitability. The responses were varied as measured by standard deviation of 1.4. The result revealed that majority of the respondents as indicated by a mean of (3.3) indicated that they agreed with the statement that use of electricity vehicles plays a significant role in improving profitability. The responses were varied as measured by standard deviation of 1.5. The result revealed that majority of the respondents as indicated by a mean of (3.6) indicated that they agreed with the statement that use of hybrid vehicles plays a significant role in improving profitability. The responses were varied as measured by standard deviation of 0.5.

However the variations in the responses were varied as shown by an average standard deviation of 1.2 and an average mean of 3.6. The findings of this study imply that the use of green distribution and transportation is prevalent among tea processing firms and that its use improves the performance of a firm significantly. They agree with Lysons (2013) that organizations must look toward their operations for improvement. The opportunities for cost savings and operational improvements can be enormous as the impact on profitability is considerable.

Table 2 : Green Distribution and Transportation

Statements	Mean	Std. Deviation
Use of low sulphur fuel plays a significant role in cost reductions	3.8	1.1
Use of electricity vehicles plays a significant role in cost reductions	3.6	1.1
Use of hybrid vehicles plays a significant role in cost reductions	3.7	1.1
Use of low sulphur fuel plays a significant role in expanding the market share	3.5	1.2
Use of electricity vehicles plays a significant role in expanding the market share	3.8	1.2
Use of hybrid vehicles plays a significant role in expanding the market share	3.5	1.4
Use of low sulphur fuel plays a significant role in improving profitability	3.5	1.4
Use of electricity vehicles plays a significant role in improving profitability	3.3	1.5
Use of hybrid vehicles plays a significant role in improving profitability	3.6	0.5
Average	3.6	1.2

Green Warehousing

Table 3: Green Warehousing

Statements	Mean	Std. Deviation
Use of eco-cool roofs plays a significant role in cost reductions	3.9	1.2
Eco-waste management plays a significant role in cost reductions	3.2	1.3
Energy efficient equipment plays a significant role in cost reductions	4.0	0.8
Use of eco-cool roofs plays a significant role in expanding the market share	4.2	0.9
Eco-waste management plays a significant role in expanding the market share	3.7	0.5
Energy efficient equipment plays a significant role in expanding the market share	2.4	1.3
Use of eco-cool roofs plays a significant role in improving profitability	3.1	1.2
Eco-waste management plays a significant role in improving profitability	3.2	1.3
Energy efficient equipment plays a significant role in improving profitability	3.5	1.3
Average	**3.7**	**1.1**

The respondents were asked to indicate their levels of agreement on statements regarding green warehousing. The results revealed that majority of the respondent (3.9) agreed with the statement that Use of eco-cool roofs plays a significant role in cost reductions. The responses were varied as shown by the standard deviation of 1.2.The results revealed that majority of the respondent (3.2) agreed with the statement that Eco-waste management plays a significant role in cost reductions. The responses were varied as shown by the standard deviation of 1.3. The results revealed that majority of the respondent (4.0) agreed with the statement that Energy efficient equipment plays a significant role in cost reductions. The responses were varied as shown by the standard deviation of .8.

The results revealed that majority of the respondent (4.2) agreed with the statement that Use of eco-cool roofs plays a significant role in expanding the market share. The responses were varied as shown by the standard deviation of .9. The results revealed that majority of the respondent (3.7) agreed with the statement that Eco-waste management plays a significant role in expanding the market share. The responses were varied as shown by the standard deviation of .5. The results revealed that majority of the respondent (2.4) agreed with the statement that Energy efficient equipment plays a significant role in expanding the market share. The responses were varied as shown by the standard deviation of 1.3.

The results revealed that majority of the respondent (3.1) agreed with the statement that Use of eco-cool roofs plays a significant role in improving profitability. The responses were varied as shown by the standard deviation of 1.2. The results revealed that majority of the respondent (3.2) agreed with the statement that Eco-waste management plays a significant role in improving profitability. The responses were varied as shown by the standard deviation of 1.3. The results revealed that majority of the respondent (3.5) agreed with the statement that Energy efficient equipment plays a significant role in improving profitability. The responses were varied as shown by the standard deviation of 1.3.

The average mean of all the statements was 3.7 indicating that majority of the respondents agreed on green warehousing influence on performance of tea processing firms. However the variations in the responses were varied as shown by a standard deviation of 1.1. The findings of this study imply that the use of green warehousing is prevalent among tea processing firms and that its use improves the performance of a firm significantly.These findings imply that through green warehousing, companies can improve competitive positioning, gain entry to new dynamic and technology driven markets (Maina, 2008).

Reverse logistics

Table 4: Reverse Logistics

Statements	Mean	Std. Dev
Remanufacturing plays a significant role in cost reductions	3.2	1.3
Refurbishment plays a significant role in cost reductions	2.9	1.0
Recycling plays a significant role in cost reductions	4.3	0.9
Remanufacturing plays a significant role in expanding the market share	4.3	0.9
Refurbishment plays a significant role in expanding the market share	4.1	1.0
Recycling plays a significant role in expanding the market share	4.2	0.8
Remanufacturing plays a significant role in improving profitability	4.4	0.6
Refurbishment plays a significant role in improving profitability	4.4	0.7
Recycling plays a significant role in improving profitability	4.4	0.6
Average	**4.4**	**0.9**

The respondents were requested to indicate the descriptive replies for reverse logistics. The results revealed that the bulk of the respondents (3.2) accepted the statement that Remanufacturing plays a significant role in cost reductions. The responses were different as shown by a standard deviation of 1.3.The results discovered that majority of the respondent (3.2) approved the proclamation that Refurbishment plays a significant role in cost reductions. The responses were varied as revealed by a standard deviation of 1. The results discovered that majority of the respondent (4.3) approved with the statement that Recycling plays a significant role in cost reductions. The responses were varied as shown by a standard deviation of 1.

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Journal of Business and Strategic Management
ISSN 2520-0402 (Online)
Vol.4 Issue No.1 pp 69- 87 , 2019   www.carijournals.org

The average mean response for the statements on reverse logistics was 4.4 indicating there was agreement on reverse logistics, the variations in the responses was 0.9. The findings of this study imply that the use of reverse logistics is prevalent among tea processing firms and that its use improves the performance of a firm significantly. The results imply that an organization benefits greatly when reverse logistics is embraced to reduce costs (Bird, 2009).

4.2 Inferential Analysis

Correlation Analysis

Correlation analysis was used to determine both the significance and degree of association of the variables and also predict the level of variation in the dependent variable caused by each independent variable in Table 5

Table 5: Summary of Pearson's Correlations

Correlations		Green Product Design	Green Distribution and Transportation	Green Warehousing	Reverse Logistics	Performance of Firms
Green Product Design	Pearson Correlation	1				
	Sig. (2-Tailed)					
Green Distribution and Transportation	Pearson Correlation	.372**	1			
	Sig. (2-Tailed)	0				
Green Warehousing	Pearson Correlation	.353**	.449**	1		
	Sig. (2-Tailed)	0	0			
Reverse Logistics	Pearson Correlation	.363**	.771**	.547**	1	
	Sig. (2-Tailed)	0	0	0		
Performance Of Firms	Pearson Correlation	.556**	.662**	.703**	.691**	1
	Sig. (2-Tailed)	0	0	0	0	

*** Correlation is Significant at the 0.05 Level (2-Tailed).**

The correlation summary shown in Table 5 indicated that the associations between each of the independent variables and the dependent variable were all significant at the 95% confidence level. The correlation analysis to determine the relationship between green product design and performance of tea processing firms, Pearson correlation coefficient computed and tested at 5% significance level. The results indicate that there was a positive relationship (r=0.556) between

Journal of Business and Strategic Management
ISSN 2520-0402 (Online)
Vol.4 Issue No.1 pp 69- 87 , 2019   www.carijournals.org

green product design and performance of tea processing firms. In addition, the researcher found the relationship to be statistically significant at 5% level (p=0.000, <0.05).

The correlation analysis to determine the relationship between green distribution and transportation and performance of tea processing firms, Pearson correlation coefficient computed and tested at 5% significance level. The results indicated that there was a positive relationship (r=0.662) between green distribution and transportation and performance of tea processing firms. In addition, the researcher found the relationship to be statistically significant at 5% level (p=0.000, <0.05).

The correlation analysis to determine the relationship between green warehousing and performance of tea processing firms, Pearson correlation coefficient computed and tested at 5% significance level. The results indicate that there was a positive relationship (r=0.703) between green warehousing and performance of tea processing firms. In addition, the researcher found the relationship to be statistically significant at 5% level (p=0.000, <0.05).

The correlation analysis to determine the relationship between reverse logistics and performance of tea processing firms, Pearson correlation coefficient computed and tested at 5% significance level. The results indicate that there was a positive relationship (r=.691) between reverse logistics and performance of tea processing firms. In addition, the researcher found the relationship to be statistically significant at 5% level (p=0.000, <0.05). Hence, it was evident that all the independent variables could explain the changes in the performance of tea processing firms, on the basis of the correlation analysis.

Regression Analysis

In this study multivariate regression analysis was used to determine the significance of the relationship between the dependent variable and all the independent variables pooled together. Regression analysis was conducted to find the proportion in the dependent variable (performance of tea processing firms) which can be predicted from the independent variables (green product design, green distribution and transportation, green warehousing and reverse logistics).

Table 5 presented the regression coefficient of independent variables against dependent variable. The results of regression analysis revealed that there was a significant positive relationship between dependent variable and the independent variable. The independent variables reported R value of 0.846 indicating that there was perfect relationship between dependent variable and independent variables. R square value of 0.715 means that 71.5% of the corresponding variation in performance of tea processing firms can be explained or predicted by (green product design, green distribution and transportation, green warehousing and reverse logistics) which indicated that the model fitted the study data. The results of regression analysis revealed that there was a significant positive relationship between dependent variable and independent variable at (β = 0.715), p=0.000 <0.05.

Table 6: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.846[a]	.715	.703	.14869

Journal of Business and Strategic Management
ISSN 2520-0402 (Online)
Vol.4 Issue No.1 pp 69- 87 , 2019   www.carijournals.org

a) **Predictors:** *(Constant), Green Product Design, Green Distribution and Transportation, Green Warehousing and Reverse Logistics*

b) **Dependent Variable:** *Performance of Tea Processing Firms*

Table 7: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.002	4	1.251	56.562	.000[b]
	Residual	1.99	91	0.022		
	Total	6.992	95			

a) **Predictors:** *(Constant), Green Product Design, Green Distribution and Transportation, Green Warehousing and Reverse Logistics*

b) **Dependent Variable:** *Performance of Tea Processing Firms*

The significance value is 0.000 which is less than 0.05 thus the model is statistically significance in predicting how green product design, green distribution and transportation, green warehousing and reverse logistics influence performance of tea processing firms. The F critical at 5% level of significance was 18.15. Since F calculated which can be noted from the ANOVA table above is 56.562 which is greater than the F critical (value= 18.15), this shows that the overall model was significant. The study therefore establishes that; green product design, green distribution and transportation, green warehousing and reverse logistics were all important green operations strategy aspects influencing performance of tea processing firms. These results agree with Odhiambo and Kamau (2013) results which indicated a positive and significant influence of green procurement on performance of tea processing firms.

Table 8: Coefficients of Determination

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.07	0.193		10.725	0.000
	Green Product Design	0.166	0.041	0.255	4.048	0.000
	Green Distribution and Transportation	0.138	0.053	0.235	2.603	0.010
	Green Warehousing	0.119	0.021	0.398	5.667	0.000
	Reverse Logistics	0.090	0.043	0.201	2.093	0.037

a) **Predictors:** *(Constant), Green Product Design, Green Distribution and Transportation, Green Warehousing and Reverse Logistics*

b) **Dependent Variable:** *Performance of Tea Processing Firms*

The research used a multiple regression model

$$Y= \beta_0+ \beta_1X_1+\beta_2X_2+\beta_3X_3 +\beta_4X_4 +\mathcal{E}$$

The regression equation will be;

$$Y=2.07+ 0.166X_1 + 0.138X_2 + 0.119X_3 + 0.09X_4$$

The regression equation above has established that taking all factors into account (green product design, green distribution and transportation, green warehousing and reverse logistics) constant at zero, performance of tea processing firms will be an index of 2.07. The findings presented also shows that taking all other independent variables at zero, a unit increase in green product design will lead to a 0.166 increase in performance of tea processing firms. The P-value was 0.000 which is less 0.05 and thus the relationship was significant.

The study also found that a unit increase in green distribution and transportation will lead to a 0.138 increase in performance of tea processing firms. The P-value was 0.00 and thus the relationship was significant. In addition, the study found that a unit increase in green warehousing will lead to a 0.119 increase in the performance of tea processing firms. The P-value was 0.000 and thus the relationship was significant.

Lastly, the study found that a unit increase in reverse logistics will lead to a 0.09 increase in the performance of tea processing firms. The P-value was 0.00 and hence the relationship was significant since the p-value was lower than 0.05. The results of the study show that, green product design underwrote most to the performance of tea processing firms.

5. 0   CONCLUSION AND RECOMMENDATIONS

5.1 Conclusions

The study sought to examine the influence of green operations strategy on performance of tea processing firms in Kenya. The study targeted heads of procurement and finance in tea processing firms. A total of 96 employees participated.

Green Product Design

The study sought to assess influence of green product design on performance of tea processing firms as the first objective of the study. Tea processing firms had embraced green product design with regard to their procurement activities. Eco-branding and low carbon footprint materials were common in the tea processing firms. Correlation and regression results revealed that this was an important variable that could perhaps be explained by the observation from the findings that green product design was an important factor in influencing performance of tea processing firms.

Green Distribution and Transportation

The influence of green distribution and transportation on performance of tea processing firms was the second objective of the study. The tea processing firms had embraced green distribution and transportation with regard to their procurement activities. Low Sulphur fuel and hybrid vehicles were common in the tea processing firms. Correlation and regression results revealed that this was an important variable that could perhaps be explained by the observation from the findings that green distribution and transportation was an important factor in influencing performance of tea processing firms.

Green Warehousing

The study endeared to assess influence of green product design on performance of tea processing firms as the third objective of the study. The tea processing firms had embraced green warehousing with regard to their procurement activities. Energy efficient equipment and eco-waste management were common in the tea processing firms. Correlation and regression results revealed

that this was an important variable that could perhaps be explained by the observation from the findings that green warehousing was an important factor in influencing performance of tea processing firms.

Reverse Logistics

The study sought to assess influence of reverse logistics on performance of tea processing firms as the last objective of the study. The tea processing firms had embraced reverse logistics with regard to their procurement activities. Refurbishment and recycling were common in the tea processing firms. Correlation and regression results revealed that this was an important variable that could perhaps be explained by the observation from the findings that reverse logistics was an important factor in influencing performance of tea processing firms.

5.2 Recommendations

The current study should be expanded further in future in order to include other green operations strategy platforms that may as well have a positive significance to performance of tea processing firms. Existing literature indicates that as a future avenue of research, there is need to undertake similar research in other institutions and organizations in Kenya and other countries in order to establish whether the explored green operations strategy platforms herein can be generalized to affect performance in other institutions.

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