

## **Effect of Green distribution on the Performance of Manufacturing Firms in Kenya**

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**Abstract:** *The purpose was to determine the effect of green distribution on the performance of manufacturing firms in Kenya. The study was descriptive in positivist approach. Questionnaire were used to collect data from a random sample size of 330 in 943 manufacturing firms in Kenya registered under the Kenya Association of Manufacturers as at the year 2017. The study was informed by natural resourced based view theory. Findings from linear regression model showed that green distribution had significant and positive influence on the performance of manufacturing firms in Kenya. As such, adoption of green distribution practices will help the manufacturing firm to meet diverse yet drastic changing needs as well as address challenges arising from a dynamic global business environment. Therefore, it is utmost necessary for the firms to use distribution channels with relatively low environmental impacts.*

**Keywords:** *Green Distribution channels, Performance, Manufacturing Firms*

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### **I. Introduction**

The expanding global economy has brought prosperity but also environmental degradation (world bank, 2012), such as climate change, ozone layer depletion, loss of biodiversity, pollution, degradation and the depletion of air, water, minerals and land (united nations environment programme, 2012; world bank, 2012). These issues have become important to firms because their stakeholders, such as regulatory authorities, customers, competitors, non-governmental organisations and employees, are increasingly demanding that firms address environmental and social sustainability in business operations (carter & easton, 2011). Gscm has emerged one of the best innovative strategies to improved business competitiveness in a sustainable environment. On the other hand, many organizations worldwide are making an effort to purchase products and services which are less harmful to local and global environments (nikbakhsh, 2009). According to brandenburg, govindan, sarkis&seuring (2014), the focus of environmental management has shifted from firm level to supply chain level. As a result, gscm has emerged as a way to combine elements of environmental management and supply chain management (green jr, zelbst, meacham&bhadauria, 2012). The whole life cycle of a product is taken into account, from product design to end-of-life management (srivastava 2007). Firms tend to adopt gscm practices due to external factors, which are mostly linked to stakeholder pressure and internal factors stemming from business-led strategic processes (ashby, leat&hudson-smith, 2012). In a survey by mckinsey (2014), 43 per cent of respondents said that their company seeks to align sustainability with their overall business goals. Previous studies argue that properly designed environmental management in the supply chain can create competitive advantage and result in performance improvements (pagell&shevchenko, 2014). A significant body of gscm research has examined the competitiveness effects of these strategies, pollution prevention in particular (winter &knemeyer, 2013). This research addresses the economic and environmental dimensions of sustainability, particularly in the context of green supply chain management (GSCM). According to Brandenburg, Govindan, Sarkis&Seuring (2014), the focus of environmental management has shifted from firm level to supply chain level. However, GSCM practices are still less adopted by manufacturing firms in Kenya. Notably, few studies have combined green Distribution and environmental performance being moderated by Firms collaborative capability.

### **Hypothesis Development (Review of Literature)**

Green distribution consists of, green packaging, marketing, transportation, storage, sales and green logistics. Packaging characteristics such as size, shape and materials have an impact on the distribution (zhu, sarkis&lai, 2008). Mama, Nyaoga, Matwere and Nyambega (2014) conducted a study on green distribution using green packaging and logistics variables. This study which adopted a correlational research design was carried out to determine the effect of GSCM on environmental performance among tea processing firms in Kericho County-Kenya. The findings of this study indicated a positive relationship between green distribution and environmental performance. However, this study was carried out among tea processing firms where the

product has an established market unlike food manufacturers who have to carve a niche in the market for their products. Kankanit (2015), sought to examine the influence of green supply chain management on business performance of electronic industry in Thailand. The study used both email and telephone survey. The target population for the study was 81 electronic manufacturing firms. The findings of the study revealed that green distribution have significant effect on competitive performance. The results further showed that green manufacturing and green distribution have positive and significant effect to economic and operational performance

Mwaura *et al* (2016), indicated that technology has greatly influenced distribution techniques with more firms using the internet as a distribution channel. Better packaging along with rearranging loading patterns can reduce materials usage, increase space utilization both in the warehouse and trailer and reduce amount of handling required. Some of the green distribution practices are: green design which is the use of environmentally conscious design (ECD) and life cycle assessment analysis (lca) with the aim of developing and understanding how design decisions affect the product environmental compatibility (Glantsching, 1994). Environmental labeling/ Eco labeling is another practice of green distribution. It entails describing the information of a product about the environmental impact associated with the production or use of the product (Zhu, *et.al* 2008).

Zhu, Sarkis, Cordeiro&lai (2008),pointed out that life cycle assessment is a practice of green distribution. It is the process of assessing and evaluating the environmental, occupational health and resource related consequences of a product through all phases of its life. Green Disposal involves tracking all material and energy flows of a product from the retrieval of its raw materials out of the environment with the disposal of the product to the environment (Arena *et al.*, 2003). It is important that environmental concerns are taken care of by offering environmentally friendly products through environmentally friendly distribution and marketing system. Green distribution is achievable through; green packaging, green transportation and logistics (Nimawat&Namdev, 2012). According to Ninlawan *et al.*, (2010) green packaging involves downsized packaging and use of green packaging materials. They also point out the need to cooperate with vendors to standardize packaging, encourage and adopt returnable packaging methods, promote recycling and reuse of packaging materials. The storage facility is another important aspect of green distribution. The storage facility should be capable of storing different categories of materials. In addition, the design and construction of storage facilities must meet the requirements of non-polluted environment, while strengthening maintenance of good humidity, corrosion, waterproofing among other factors (Zhang & Zheng, 2010). Key in distribution is transportation, according to Al-odeh and Smallwood (2012), factors like fuel, modes of transport, infrastructure, and operational practices are important factors to consider in developing green transportation. Manufacturing firms are under a lot of pressure to develop and incorporate eco-friendly measures in their disposal activities (Murphy, 2012). Many countries have put in place programs with a purpose of reducing the quantity of packaging that enter the misuse flow so as to tackle the environmental effect of packaging, (Hasan, 2013). As a result, governments have adopted environmental policies and regulation frameworks in their administration. As a result, eco-friendlier activities are being embraced by various industries such as the integration of design for the environment into their products and the use of sustainable distribution practices (murphy, 2012) In the Kenyan context, the influence of Green Disposal on the Kenya manufacturing firms remains unexplored and there is lack of a guiding framework on how manufacturing firms should embrace Green Disposal. Hence this creates major gaps this study is going to fulfill. Thus, this study hypothesized that:

**H<sub>1</sub>** *Green distribution significantly affect performance of manufacturing firms in Kenya*

## **II. Theoretical Review**

The theoretical perspective relevant to this study is based on green supply chain practices that are presumed to influence the effectiveness of a business value chain consequently affecting environmental performance of large manufacturing firms in Kenya. This study was informed by natural resourced based view theory.

The resource-based view (RBV) was first developed by Wernerfelt (1984) who perceived a firm as a broader set of resources compared to the traditional view which accounts only for categories such as labor, capital and land. The extension of the RBV to the natural-resource-based view (NRVB) is widely used in explaining why firms adopt GSCM. The NRBV posits that strategy and competitive advantage can be created from capabilities facilitating environmentally sustainable economic activities (Hart 1995). Hart argues that for a resource to be valuable, rare, inimitable and non-substitutable, it must possess three characteristics: it must be causally ambiguous, socially complex and firm specific. Thus, the theory is relevant to the study as NRBV theory is often used to explain more strategic motivations of GSCM adoption, such as why firms operating within the same context (market or industry) pursue different GSCM strategies despite experiencing similar institutional pressures (Testa&Iraldo 2010). According to the theory, environmental management in the supply chain can create competitive advantage to those practicing it. It highlights the whole concept of adopting this

practice. Availability of the necessary infrastructure will make adoption of green practices easier hence the theory links to the independent variable of the study which Green Distribution.

### III. Methodology

This study adopted exploratory research design using both quantitative and qualitative approaches. The target population for this study was 757 manufacturing industry from Nairobi and Kiambu counties where over 80% of the industries are located. Magenta (2008) indicates that a sample of between 10% to 30% is appropriate for a study. A sample size of 40% of the total population in this study is hence good. Hence, sample size for this study was 386 manufacturing industry from Nairobi county where over 80% of the industries are located, and from each industry the researcher administered questionnaire to operational managers to be respondents in the study. The study collected primary data using structured questionnaires and capture information through a 5-point Likert scale type. reliability was measured using Cronbach alpha. The measurement scale for reliability was tested using Cronbach alpha coefficient for every independent variable and for an alpha ( $\alpha$ ) of 0.7 and above the instrument was interpreted as reliable (Cronbach, 1951) The study adopted confirmatory factor analysis to test for construct validity. Regression model below was used to test hypotheses.

$$y_i = b_0 + b_1 X_1 + e$$

$y$  = firm performance

$X$  = GreenDistribution.

### IV. Results

The focus of green distribution is on reducing the amount of fossil fuels and greenhouse gases used in distribution and to increased emphasis on the environment during distribution. The study therefore sought to assess the effect of green distribution on performance of manufacturing firms in Kenya.

#### Sample characteristics

The study sought to establish general managers' characteristics in an attempt to identify demography related gaps within the study and how they influence the realization of the study's objectives. Table 4.3 highlights the results.

The findings of the respondents' age indicated that 48.2% of the general managers are in the 41 to 50 years age bracket, 27.7% of them were over 50 years and 24.1% are between 31 to 40 years. The age profile of the general managers clearly indicates that it takes years of experience for an employee to be at managerial level since 75.9% of general managers are over 41 years of age. Furthermore, all the general managers had university level of education with 92% of them having over 3 years of work experience. In addition, all the general managers are aware of environmental sustainability practices. Further on the same, 64.3% of the general managers noted that staff are informed about environmentally sustainable practices through meeting while 35.7% through training. The implication is that both managers and staff are well informed on environmental sustainability practices.

**Table 4.1 General Manager's characteristics**

	Frequency	Percent
Respondents Age	31- 40 Years	54 24.1
	41 - 50 Years	108 48.2
	Over 50 Years	62 27.7
	Total	224 100
Level of Formal Education	University	224 100
Work Experience	3 Years	18 8
	Over 3 Years	206 92
	Total	224 100
informed about environmental sustainability practices	Yes	224 100
	Meetings	144 64.3
staff informed about environmental sustainability practices	Training	80 35.7
	Total	224 100

**Descriptive statistics**

Firm performance is on the premise that an organization is in possession of productive assets such as human, physical, and capital assets required to accomplish a common purpose (Hayes, 2013). The benefits made by firms through the utilization of assets is expected to be of advantage to the firms so long as the benefits incurred supersede the costs. Firm performance is alluded to as productivity and viability in the usage of assets to accomplish desired targets. There are various measures of firm performance that have been identified for both short and long-haul targets between financial and non-financial. Table 1 highlights the results.

**Table 4.1 Firm performance**

n=224	Mean	Std. Dev	Skewness	Kurtosis
Profitability has changed after the introduction of green supply chain management	1.24	0.43	1.22	-0.52
percentage change in profits after introduction of green supply chain management	2.24	0.44	1.38	0.36
Direction of change of market share after introduction of green supply chain management	1.40	0.49	0.40	-1.85
percentage change in market share after introduction of green supply chain management	2.13	0.66	-0.15	-0.72
Direction of change of average return on investment after introduction of green supply chain management	1.41	0.50	0.49	-1.50
percentage change in average return on investment after introduction of green supply chain management	2.21	0.61	0.35	0.47
Direction of change of average sales volume after introduction of green supply chain management	1.17	0.37	1.82	1.31
percentage change in average sales volume after introduction of green supply chain management	2.29	0.61	-0.24	-0.60
Direction of change of earnings per share after introduction of green supply chain management	1.24	0.64	2.79	6.97
percentage change in earnings per share after introduction of green supply chain management	2.13	0.67	-0.05	-0.53
Direction of change of company's usage of energy resources after introduction of green supply chain management	1.24	0.43	1.22	-0.52
percentage change in company's usage of energy resources after introduction of green supply chain management	1.80	0.64	0.20	-0.64
<b>Firm performance</b>	<b>1.71</b>	<b>0.21</b>	<b>-0.26</b>	<b>0.22</b>

Basing on the findings, there hasn't been much change in profits after the introduction of green supply chain management (mean = 1.24, SD = 0.43). In fact, there has only been a slight percentage change in profits after the introduction of green supply chain management (mean = 2.24, SD = 0.44). There is a possibility that the firms have not aligned their corporate strategies with green supply chain management hence the firms have not elicited an increase in the profit levels. Similarly, the direction of market share has not elicited much change after the introduction of green supply chain management (mean = 1.40, SD = 0.49). As such, there is minimal percentage change in market share after the introduction of green supply chain management (mean = 2.13, SD = 0.66). The implication is that the introduction of green supply chain management has not been instrumental in increasing the market share. It could be that the firms have not implemented green supply chain management hence they have not been able to fully benefit from it. Further, the direction of change of average return on investment after the introduction of green supply chain management is minimal (mean = 1.41, SD = 0.50). This has also reflected in percentage change in average return on investment after the introduction of green supply chain management (mean = 2.21, SD = 0.61). The results suggest that there has not been returns on investment after the introduction of green supply chain management. This could be due to inability to fully implement GSCM.

The introduction of green supply chain management has not brought about change of average sales volume (mean = 1.17, SD = 0.37). This is evident in the percentage change in average volumes after the introduction of green supply chain management (mean = 2.29, SD = 0.61). As such, the introduction of GSCM has not been key in bringing about a change in the sales volume. Moreover, there is minimal change of earnings per share after the introduction of green supply chain management (mean = 1.24, SD = 0.64). As such, there is slight percentage change in earnings per share after the introduction of green supply chain management (mean = 2.13, SD = 0.67). In addition, there is no change in the firm's usage of energy resources after the introduction of green supply chain management (mean = 1.24, SD = 0.43). Consequently, there is minimal percentage change in the firm's usage of energy resources after the introduction of green supply chain management (mean = 1.80, SD = 0.64). The implication is that the manufacturing firms have not fully adopted GSCM hence they are unable to elicit changes in the firms' usage of energy resources. In a nutshell, firm performance realized a mean of 1.71, standard deviation of 0.21, skewness of -0.26 and a kurtosis of 0.22. The results suggest that not much change

has been elicited in the performance of the manufacturing firms after the introduction of green supply chain management.

The focus of green distribution is on reducing the amount of fossil fuels and greenhouse gases used in distribution and to increased emphasis on the environment during distribution. The study therefore sought to assess the effect of green distribution on performance of manufacturing firms in Kenya. Table 2 illustrates the findings.

**Table 2 Green Distribution**

n=224	Mean	Std. Dev	Skewness	Kurtosis
The company uses green packaging materials	2.43	0.56	-0.32	-0.84
The company works in collaboration with vendors to standardize packaging	2.61	0.56	0.19	-0.85
The company cooperates with vendors to encourage reuse of packaging materials	2.57	0.73	0.31	-0.40
<b>Packaging</b>	<b>2.54</b>	<b>0.48</b>	<b>0.42</b>	<b>-0.79</b>
The company's logistics providers have increased space utilization in the trailers to reduce handling requirement	3.14	0.79	0.18	-0.55
Setting of pick up points for wastes to optimize waste disposal	2.96	0.83	-0.32	-0.64
The company considers fuel factors in the selection of transporters	3.00	0.80	0.00	-1.45
<b>Transport</b>	<b>3.04</b>	<b>0.64</b>	<b>0.09</b>	<b>-1.04</b>
The company has adopted life cycle assessment analysis to understand environmental compatibility of products	2.82	0.71	0.27	-1.00
The company has adopted ecolabelling to describe the information of a product about the environmental impact associated with its use	2.71	0.70	-0.17	-0.11
<b>Eco labelling</b>	<b>2.77</b>	<b>0.62</b>	<b>0.37</b>	<b>-0.55</b>
<b>Green Distribution</b>	<b>2.77</b>	<b>0.62</b>	<b>0.37</b>	<b>-0.55</b>

Based on the results, the use of green packaging materials is lowly evidenced (mean = 2.43, SD = 0.56). Also, there are limited collaborations with vendors to standardize packaging (mean = 2.61, SD = 0.56). Moreover, there is less cooperation with vendors to encourage reuse of packaging materials (mean = 2.57, SD = 0.73). The results suggest that the firms have laid less emphasis on collaborating with vendors who standardize packaging and encourage the reuse of packaging materials. In regards to packaging, there is doubt if the company's logistics providers have increased space utilization in the trailers to reduce handling requirement (mean = 3.14, SD = 0.79). Besides, there is doubt if firms' have set up pick up points for wastes to optimize waste disposal (mean = 2.96, SD = 0.83). Also, it is undefined if the company considers fuel factors in the selection of transporter (mean = 3.00, SD = 0.8). The results suggest that there are several gaps in the packaging process that range from space utilization to waste disposal and the consideration of fuel factors. As such, the firms are incapable of improving the overall green distribution since adequate considerations have not been made on setting up pick up point for disposing wastes, fuel factors and the selection of logistic providers that increase space utilization. With reference to transport, it is undefined if the company has adopted life cycle assessment analysis to understand environmental compatibility of products (men = 2.82, SD =0.71). Further, it is not clear whether efforts have been made towards the adoption of ecolabeling to describe the information of a product about the environmental impact associated with its use (mean =2.71, SD =0.70). Overall, green distribution had a mean of 2.77, standard deviation of 0.62, skewness of 0.37 and kurtosis of -0.55. The firms have made efforts towards ensuring packaging is environmentally friendly though transport and ecolabelling has not been sufficiently optimized.

**Inferential Statistics (Hypothesis Testing)**

Essentially, correlation analysis depicts to a given degree, the aspect of how one factor influences another although correlations do not imply a cause-effect relationship.

the findings revealed that there is a positive and significant relationship between green distribution and firm performance ( $r = 0.580$ ,  $p\text{-value} = 0.000$ ) at 0.01 level of significance.

**Table 3 Influence of Green Distribution on Performance of Manufacturing Firms in Kenya**

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	0.471	0.177		2.666	0.008
Green Distribution	0.691	0.065	0.580	10.613	0.000
<b>Model Summary Statistics</b>					
R	0.580				
R Square	0.337				
Adjusted R Square	0.334				
Std. Error of the Estimate	0.716				
<b>Model Fitness Statistics (ANOVA Results)</b>					
F	112.627				
Sig.	0.000				

**H<sub>03</sub>**      *Green distribution does not significantly affect performance of manufacturing firms in Kenya*

The Third (H<sub>03</sub>.) hypothesis postulated that green distribution does not significantly affect performance of manufacturing firms in Kenya. However, the findings in table 4.25 showed that green distribution has a positive and significant effect on firm performance ( $\beta_3 = .691$ ,  $p < 0.05$ ). Thus, hypothesis was rejected. This can be explained further by assessing the value of the t-test which indicates that green distribution would be attributed to the regression model 10 times more compared to the effect of the standard error associated with the estimated coefficient ( $t = 10.613$ ). The findings in Table 4.3 further indicate that the variation in firm performance was attributed to 33.7% change in green distribution. Cognate to the results, Mama, Nyaoga, Matwere and Nyambega (2014) in a study focusing on tea processing firms in Kericho County-Kenya indicated a positive relationship between green distribution and environmental performance. As well, Kankanit (2015) affirmed that green distribution had significant effect on the business performance of electronic industry in Thailand.

### V. Conclusions

Green distribution exhibited a positive and significant influence on the performance of manufacturing firms. The implication is that the firms have made efforts towards ensuring there is green distribution within the supply chain. The challenge however is that there are several aspects within green distribution that have not been fully adopted. For instance, there is limited cooperation with vendors to encourage reuse of packaging materials as well as the adoption of life cycle assessment analysis to understand environmental compatibility of products. Consequently, green distribution has not been fully adopted among the manufacturing firms.

### VI. Recommendations

Green distribution is key in improving the performance of manufacturing firms. It is therefore recommended for the firms to focus on cooperation with vendors to encourage reuse of packaging materials. Moreover, it is important for the firms to set up pick up points for wastes to optimize waste disposal. Besides, they should fully adopt life cycle assessment analysis to understand environmental compatibility of products. Finally, there is need to adopt ecolabeling to describe the information of a product about the environmental impact associated with its use.

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