

## **GREEN DISTRIBUTION PRACTICES AND COMPETITIVENESS OF FOOD MANUFACTURING FIRMS IN KENYA**

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### **Abstract**

*Distribution determines the overall profitability of a firm. Increased environmental awareness has led more companies to adopt sustainable, or green, distribution practices. The main purpose of this study was to determine the effect of green distribution practices on the competitiveness of food manufacturing firms in Kenya. A cross-sectional survey was conducted on a sample size of 130 companies listed in the Kenya Association of Manufacturers directory. Primary data was collected through questionnaires. Factor analysis was used to examine the construct validity while multivariate linear regression was employed to test criterion validity. This research indicated that, technology has greatly influenced distribution techniques with more firms using the internet as a distribution channel. Support for green distribution practices is an indicator that firm managers are willing to embrace this form of distribution by taking control of*

*their own distribution patterns. Further this research concluded that the adoption of green distribution practices positively and significantly influences the competitiveness of Kenya's food manufacturing firms. This study recommends that to enhance environmental sustainability, Kenyan manufacturing firms should be encouraged to embrace more of the green distribution practices. The study suggests further research to be done on how green distribution practices affect performance of firms in the services industry such as wholesalers and retailers.*

*Keywords: Green supply chain, Green distribution practices, Firm competitiveness, Food manufacturing firms, Kenya*

## **INTRODUCTION**

Businesses that find themselves in cut-throat competitions have to learnt to collaborate, share information and knowledge with their suppliers, customers and even competitors with the aim of creating a common supply chain capable of competing if not leading in that particular industry. This has brought about improvements in the production networks including logistical practices, to an integration of horizontal processes aimed at providing value to both intermediate and final customers (McCormack, Ladeira & de Oliveira, 2008). Emphasis has not been limited to increasing the internal proficiency of organizations, but has now been increased to include methods of waste reduction and value addition across the entire supply chain. This is made possible when organizations create “win-win” strategies so as to realize profits and market share objectives and at the same time lower their environmental impact (Cheruiyot, Rotich & Mburu, 2014), while improving their environmental efficiency. Consequently greening the supply chain has become necessary as managers have increasingly begun to realize the need to be both environmentally and socially accountable for their activities.

Distribution refers to the movement of a product from the production stage to the customer in the supply chain. Distribution determines the overall profitability of a firm as it directly affects both the supply chain cost and the customer experience. Increased environmental awareness has led more companies to adopt sustainable, or green, distribution practices. These practices span from reducing the amount of fossil fuels and greenhouse gases used in manufacture and distribution to increased emphasis on the environment during distribution. Toke, Gupta & Dandekar (2010) define green supply chain management (GSCM) as the integration of environmental thinking into supply chain management, including product design, material sourcing and selection, manufacturing processes, delivery of the final product to the consumers, and end-of-life management of the product after its useful life. Green

Distribution is thus the integration of environmental concerns into the inter-organizational practices of supply chain management. It can also be defined as the sustainable distribution of goods and services.

Sustainable distribution practices include those that reduce carbon dioxide, are economically viable and will bring about a better quality of life for the earth's future inhabitants. Green distribution practices range from changing the way distribution centres and vehicles are powered to implementing greater transparency regarding the environment and distribution practices. As environmental concerns increase, the integration of environmental issues into the supply chain studies have become a thriving subfield (Sarkis, 2009). Studies carried out in the Chinese Electronics industry emphasize that the implementation of GSCM practices does enhance firm performance (Zhu & Sarkis, 2007). Other studies highlighted that there has to be a trade-off between economic activities and their negative effects on the environment (Choi, 2011).

### **Kenya's Manufacturing Scene**

Kenya's manufacturing activities has intensified greatly. However, this has been associated with the increased use of plastic bags as these are often used to package manufactured goods and groceries. Not only are plastic bags a source of aesthetic pollution but they are also a threat to the biodiversity of the country. Even though the ban enforcement on the manufacture, importation and distribution of plastic carrier bags with gauges of less than 30 microns by both National Environmental Management Authority (NEMA) and the Kenya Bureau of Standards (KEBS) has helped lessen the use of flimsy plastic bags, it has done little to encourage the use of the more readily biodegradable paper bags or conventional bags (Businge *et al.*, 2011). The manufacturing sector should, under the auspices of its umbrella Kenya Association of Manufacturers (KAM), be encouraged to adopt distribution techniques that minimize pollution and encourage environmental sustainability.

Several countries, Kenya included, have instituted programs with an aim of minimizing the amount of packaging materials that enter into the waste system so as to tackle the environmental impact of packaging. In a green distribution system, the required parameters include the type of transport, company infrastructure and the use of biodegradable materials such as packing materials and fuels. These constraints and the dynamics that connect them, determine the environmental impact generated in the distribution phase of the supply chain. In this research the parameters for green distribution will include packaging and packaging materials, vehicle loadings, warehouse utilization and the channels of distribution used.

## Firm Competitiveness

The core focus of competitiveness of a firm is price and cost developments of production factors that can potentially affect economic growth, market shares and other performances of companies in the targeted sectors (Testa, 2010). This enables an organization to create, strengthen and sustain competitive advantage. Competitiveness is identical to a firm's long-run economic performance. Economic performance of a firm determines its ability to compensate its employees and provide superior returns to its owners (Mwaura et al, 2015). Meeting the economic performance goals remains the primary objective of firms. If a firm does fail to meet high levels of operational and business priorities in a highly competitive world then its very survival is short-lived. It is therefore important for firms to meet economic performance and respond to green imperatives, so as to gain a competitive advantage. Economic performance goals include all features of a firm's economic interactions. They examine how the financial status of the stakeholders changes as a result of the organization's activities. Economic performance indicators include market share, sales growth and profitability (Yang, 2013).

## Problem Statement

Kenyan food manufacturers cater for only 7 percent of the market share, facing firm rivalry from imported food stuffs which has resulted into poor performance (Businge *et al.*, 2011). The main thrust of Kenya's industrial policy is to raise the share of products from 7 to 15 percent and develop niche products for existing and new markets (KIPPRA, 2013). As firm managers are confronted with the question of how to increase their market share, they have to show commitment to the natural environment. Some authors suggest that environmental management may be a tool, which helps organizations to improve their competitiveness (Ambec and Lanoie, 2008) while others have questioned the optimism of environmental advocates (Jaffe et al., 1995). This study seeks to find out whether green distribution practices actually enhance firm competitiveness.

Studies done on green supply chains in Kenya, have recognized a positive relationship between green marketing and organizational performance in ISO 14001 certified companies (Kinoti, 2012). Studies have also been done on green purchasing/procurement in the public sector (Nasiche & Ngugi, 2014) and in the aviation industry (Lagat, 2013). Both were case studies and showed that despite Kenya having the Procurement and Disposal Act (2005), many companies still have to incorporate green purchasing which can be done by appreciating environmental issues and inculcating the same to their employees and suppliers. However, there is a dearth of empirical research concerning green distribution practices and firm

competitiveness and it is important to investigate the effect of green distribution practices on the competitiveness of organizations.

The general purpose of this study was to analyse the relationship between Green distribution practices and their effect on the competitiveness of food manufacturing firms in Kenya. To fully understand this issue the research questions posed were:

- 1) What green distribution practices do the Kenyan food manufacturers use?
- 2) How do the green distribution practices adopted by the Kenyan food manufacturers enhance firm competitiveness?

## **LITERATURE REVIEW**

### **Theoretical Framework**

The Resource Based Theory (RBT), (Penrose, 1959) states that firms compete based on their resources and capabilities. According to Peteraf & Barney (2003) resources are both tangible and intangible and refer to assets, processes and knowledge that are within the control of a firm and enable it acquire sustainable competitive advantage. Every firm controls a heterogeneous bundle of resources that is rare, imitable and valuable. According to Foss et al.( 2007), Resource Based theory includes commitment, dynamic capabilities and knowledge based view, the concept of heterogeneity is given due consideration in terms of changing market opportunities and different capabilities in the coordination of knowledge. This study used the RBT to evaluate the green distribution resources available to firms and established whether there was a correlation between the resources and firm competitiveness. Consequently it examined the direct relationship between these resources to performance of the food manufacturing firms.

### **Empirical Review**

#### ***Green Distribution***

According to Murphy (2012) manufacturing industries are increasingly being pressurized to have more eco-friendly policies. In order to address the environmental impact of packaging, many countries now have programs that aim to minimise the amount of packaging that enters the waste stream (Hasan, 2013). Consequently, many governments have incorporated environmental policies and regulation frameworks in their administration. As a result more eco-friendly activities are being embraced by various industries such as the integration of design for the environment into their products (Murphy, 2012) and the use of sustainable distribution practices. Manufacturers therefore must appreciate the requirements and ensure that their products conform to the regulations.

Key in distribution is transportation of goods and services. 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. Vehicles powered by gasoline and diesel emit carbon dioxide, which causes global warming and acid rain. Further, use of fossil fuels contributes to the increasing scarcity of these fuels. Businesses can thus adopt sustainable practices by using fleets run by alternative fuels. Also, businesses can use alternate transport methods, such as rail instead of using company fleets to transport materials. Businesses can also implement new operations, such as building distribution centres closer to where they deliver or form partnerships with local merchants and distributors to reduce the miles they must drive. This will improve operational excellence by reducing waste, enhancing the resources available. This should translate into bigger profits and competitive position.

The storage facility is another essential aspect of green distribution. The storage facility should be able to store different categories of materials. Businesses should use sustainable practices when powering their storage facilities. Instead of powering these storage facilities with electricity, companies can use hydro, wind or solar power further optimizing resources. Furthermore, the design and construction of storage facilities should meet the prerequisites of non-polluted environment, while strengthening maintenance of good humidity, corrosion, waterproofing in addition to other factors (Zhang and Zheng, 2010). This will not only help generate efficiencies but will also enable organizations to contain costs. As organizations restructure to reduce their company's environmental footprint, supply chains have increasingly become a key area of focus. Improvements in transportation efficiency and packaging should be at the top of the green supply chain initiatives list.

Once goods are manufactured they have to get to the market and the market has to be informed about the product attributes. This involves a proper distribution system. According to Muma *et al.* (2014) green distribution consists of green packaging and logistics. This study which adopted a correlational research design was carried out to determine the effect of GSCM on environmental performance. 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.

The chief advantage of greening a supply chain comes from the ability to market and sell green products. A study done by Hasan (2013) using case studies, concludes that green distribution has an important part to play in the link between environmental innovation and competitive advantage. This study concluded that the benefits achieved by companies were increased efficiency, reduced cost, improved risk management, improved service, increased

sales and market share, revenue growth and reputation. The study however, did not specify whether green distribution practices enhanced firm competitiveness or increased market share. However, the ability to create new products helps build a competitive advantage for organizations. Yet many firms may not be able to earn this image benefit due to consumers' inability to discern how green the products from the supply chain are (Delmas & Montiel, 2009). The above studies were case studies which limits the generalizability of their findings.

Green distribution consists of green packaging. Packaging features such as size and materials used, influence distribution because of their effect on the transportation features of the product. 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. This study incorporated both reverse logistics aspects and distributional aspects in green distribution. The green distribution aspect should only involve getting goods to the consumers. Studies done by Amemba *et al.* (2013) suggest that better packaging and rearranged loading patterns reduces the use of materials, as well as increasing warehouse and trailers utilization. This also reduces the amount of handling required. Both studies indicate that green packaging involves use of packaging the goods into smaller units so as to reduce the amount of space and the materials used hence increasing warehouse utilization.

However, there are challenges associated with green distribution such as the high start-up investments associated with employees training and environmental auditing, limited financial resources, the attitude that firm's strong environmental commitment results in added costs which places the firm at an economic disadvantage as compared with other less environmentally responsible firms, and reduction of the pool of qualified suppliers due to stricter environmental standards (Kinoti, 2012). This study therefore proposes that

$H_0$  : Green distribution practices do not have a statistically significant effect on the competitiveness of food manufacturing firms in Kenya

### ***Firm competitiveness in Kenya***

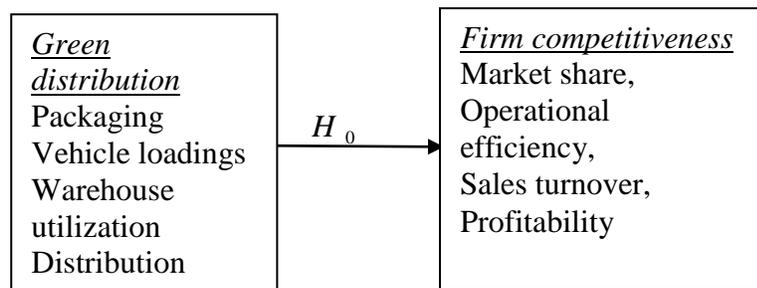
Competitiveness is a multi-faceted word that signifies the ability of a firm or product to compete and be more successful than others. Firm competitiveness would thus relate to the ability of an organization to provide goods and services in a particular market, and be able to do better than comparable firms in sales, market shares, or profitability (Liargovas & Skandalis, 2008) in the same market. A firm can be said to be competitive when it adapts to changes in its environment

and still generate profits. Firm competitiveness thus requires a continual harmonisation of activities in accordance with changes in its immediate environment (Chikán & Gelei, 2010). Firms' competitiveness consists of firm performance in terms of sales, market share, profitability (Lalinsky, 2012) and operational efficiency in terms of cost and delivery flexibility.

Distribution function of an organization aims to address the customer –organization relationship issue. For instance every market has to be informed about the products manufactured, their features their availability and their various capabilities. In addition the manufactured goods have to reach the market in time. This necessitates suitable distribution systems. It is important that environmental concerns are considered by offering environmentally friendly products through environmentally friendly distribution systems. Green distribution is achievable through; green packaging, green transportation (Dheeraj & Vishal, 2012) and green storage. In order for firms to fully implement and realize potential gains of green distribution, manufacturers should comprehend the requirements and ensure that their products conform to the environmental concerns in addition to controlling and accessing their distribution patterns to gain a competitive advantage.

The conceptual framework was developed on the basis of the extensive literature review on green distribution practices and firm competitiveness. From the review of the empirical research the following model and hypothesis have been identified for the study.

Figure 1: Conceptual Framework



## METHODOLOGY

This study adopted a descriptive cross-sectional survey research design which can be used to collect data and make deductions about a population at a given time (Lavrakas, 2008). The food manufacturing companies that were included in this study consisted of those that were listed in the KAM directory 2014 and were strictly food processors or manufacturers. Thus of the one hundred and eighty one registered companies only one hundred and thirty companies were food

manufacturers or processors and these made the target population. The study used a census survey approach for data collection (Zhang, 2009).

The study used primary data which was collected using semi-structured questionnaire. A pilot study was conducted which enabled the researcher to make the alterations and improve the self-designed questionnaire thus validating the instrument. The questionnaire administered contained Likert type questions as well as both open and closed ended questions so as to provide enough and accurate information in line with the research questions of the study. In order to test the reliability of the instruments, internal consistency techniques were applied using Cronbach's Alpha. Upon analysis of this data, the reliability coefficient for the factors with 15 test items, was found to be 0.931 which showed a strong acceptable level of internal reliability (Bryman, 2008; Sekaran & Bougie, 2010).

## **ANALYSES AND RESULTS**

### **Descriptive Analyses**

The results of this study found that the most common channel of distribution used by majority of the companies, 41.7%, was the wholesale → retail → consumer channel of distribution. The Website/Catalogue channel was used by 31.3% of the companies, 21.9% used agents for distribution whereas 5.2% used field sales for distribution as shown in Figure 2. According to Kinoti (2012) there are challenges associated with green distribution such as the high start-up investments. This study thus sought to find out the percentage costs that were attributed to green distribution practices.

Out of the total costs incurred by the company, most of the companies, 22.9%, attributed 5 to 10% of their costs to green distribution strategies while 18.9% of the companies attributed more than 26% of their total costs to green distribution strategies. Of the respondents, 16.7% attributed less than 5% of their total costs to green distribution strategies, another 16.7% assigned 21 to 25% while 15.6% of the companies attached 16 to 20% of their total costs towards green distribution strategies. Though green distribution strategies has high start-up costs many of the respondents use these strategies as a measure of improving operational efficiency. This is in accordance to literature that green distribution practices do improve operational efficiency in terms of cost and delivery flexibility.

There being many different types of green environmental distribution strategies the study sought to find out which of them is more commonly used by the food manufacturers in Kenya. To find out this a cross tabulation was done between the different types of companies and the various green distribution methods.

The research results showed that 29.5% of the privately locally owned firms formed partnerships with local distributors so as to reduce the miles driven. Parastatals and public companies used fleets that were run on alternative fuels instead of petroleum. Privately owned companies and multinationals powered their warehouses with alternative sources of power not just electricity. Only 2.3% of the companies used alternative distribution methods such as rail. The results showed that there was no significant difference between the various green distribution methods adopted by the various types of companies ( $\chi^2 = 10.902, p = .759$ ).

The study also sought to find out the type of sales that companies made whether there were business to business or business to consumers. Majority of the companies sampled (57.3%) engaged in business to business sales and only 38.5% of the companies relied on direct sales to customers. Of the respondents 4.2% were non-committal an indication that they were engaging in both business to business and business to consumer sales. A cross tabulation was carried out on the type of company and their main customers. The results indicate that the major customers of a company did not significantly differ with the type of organizations ( $\chi^2 = 0.753, p = 0.861$ ). Privately/locally owned, multinational, public companies and/ or Parastatals all had other businesses as their main customers.

The study further sought to find out if the respondents used bio-degradable packaging materials. In the distribution of products, 46.9% of the companies used Bio-degradable materials while 50.0 % did not use Bio-degradable materials. Consequently most of these companies, 61.5% packaged their goods in both large and small quantities. 31.3% packaged their products only in small quantities while 5.2% packaged only in large quantities. Companies that used both small and large packaging of their products (64.9%) also used bio-degradable packaging materials while those that packaged their goods only in small quantities (76.7%) and those who packaged only in large quantities (75.0%) did not use Bio degradable packaging materials.

A cross tabulation was thus carried out to find if there was a significant difference in the packaging of goods in the quantities packed. According to the cross tabulation results there was a significant difference in the quantities packed and the use of bio degradable packaging materials ( $\chi^2 = 14.594, p < 0.001$ ).

The study sought to find out whether the use of bio-degradable packing increased the number of goods transported in a single trip. Companies were found to package their products in such a way that increased the number of goods that can be transported in a single trip. However, in 18.8% of the companies, the packaging did not increase the number of goods that can be transported in a single trip. Use of bio-degradable packaging materials also improves

warehouse utilization. Thus the study sought to find out the extent that food manufacturing companies improved their warehouse utilization as a result of the use of bio-degradable packaging materials and the results are indicated in Table 1.

Table 1: Extent the vehicle loading and warehouse utilization had improved due to improved packaging

Extent	F	%
<b>Vehicle loading improved</b>		
Less than 10%	28	29.2
10 -15%	22	22.9
15 – 20%	12	12.5
20 – 25%	6	6.3
25 – 30%	11	11.5
More than 30%	8	8.3
Non-committal	9	9.4
<b>Warehouse utilization improved</b>		
Less than 10%	26	27.1
10 – 15%	28	29.2
15 – 20%	14	14.6
20 – 25%	6	6.3
25 – 30%	7	7.3
More than 30%	9	9.4
Non-committal	6	6.3

Packaging of products did not improve vehicle loading significantly. According to Table 1, in 29.2% of the companies' vehicle loadings improved by less than 10%, while in 22.9% of the companies vehicle loadings improved with a margin of between 10- 15%. It was only in 8.3% of the companies where vehicle loading improved by more than 30%. Warehouse utilization also improved due to improved packaging. In 29.2% of the companies warehouse utilization improved by 10-15% while only in 9.4% was the improvement noted to have improved by more than 30%.

### Correlation Analysis Results on Green Distribution to Company Competitiveness

Using Pearson's moment correlation analysis, the extent to which the test items of green distribution on the competitiveness among food manufacturing firms in Kenya was established. The results are displayed in Table 2.

Table 2: Green distribution Influence on firm competitiveness among food manufacturing firms

Green Distribution Practices		Firm Competitiveness
The organization uses local products to reduce transportation costs	r- value	.446
	P- value	.000
The organization uses minimum packaging materials on the products to preserve natural resources which increases delivery of goods	r- value	.264
	P- value	.010
Use of IT has helped increase the market share of goods	r- value	.327
	P-value	.001
The company's financial position has improved due to the use of IT	r- value	.451
	P- value	.000
.The organization's distribution costs have been greatly reduced per unit	r- value	.228
	P- value	.027
The organization uses green label as an indicator of environmental friendliness thus increasing sales	r-value	.393(*)
	P-value	.000
The organization applies packaging made of recyclable materials enhancing quality of goods	r-value	.430**
	P-value	.000
The organization's profit margins increased when it reduced the material required to offer services to customers (dematerializes)	r-value	.346**
	P-value	.001
The organization redesigns logistical system components for greater efficiency in delivery of goods	r-value	.514**
	P-value	.000
The organization's warehouse has been rearranged leading to better utilization of space which has led to reduced costs	r-value	.381**
	P-value	.000
	N	96

According to Table 2, firm competitiveness was strongly and positively influenced by a company's redesign of its logistical systems components to increase efficiency in the delivery of goods ( $r = .514$ ,  $P = .000$ ). The result also revealed that firm competitiveness was positively and moderately influenced by use of IT which helped to increase market share, ( $r = 0.451$ ,  $P = 0.000$ ), improve the company's financial position ( $r = 0.451$ ,  $P = 0.000$ ), and also reduced the distribution costs green distribution ( $r = 0.228$ ,  $P = 0.027$ ). An organization's use of local products to reduce transportation costs ( $r = 0.446$ ,  $P = 0.000$ ), and the use of green label as an indicator of environmental friendliness ( $r = .393$ ,  $P = 0.000$ ) also positively and significantly influenced firm competitiveness. This showed that there was a positive but moderate relationship between green distribution and firm competitiveness and the competitiveness of a firm was enhanced by a company's practice of more of the test items.

### Chi-square and Factor analysis

Green distribution test items were subjected to Chi-square and factor analysis. According to Table 3, the Pearson chi-square goodness-of-fit test found all the test items to be statistically significant with  $p < .005$ . The test thus failed to demonstrate that the test items were not equally significant.

Table 3: Test Statistics for Green Distribution Factors

Variable Constructs	Mean	Kendall's Rank	Chi-square	Asymp. Sig.	N
The organization uses minimum transportation packaging materials to preserve the natural resources which has reduced the cost of transportation	3.7789	1	55.684	.000	95
The organization applies packaging made of recyclable materials enhancing quality of goods	3.4737	7	27.684	.000	95
The organization's profit margins increased when it reduced the material required to offer services to customers (dematerializes)	3.5158	7	36.526	.000	95
The organization packaging materials are bio-degradable which has increased sales	3.5217	15	31.261	.000	92
The organization uses minimum packaging materials on the products to preserve the natural resources which increases delivery of goods	3.6211	14	46.211	.000	95
The organization uses local products to *reduce transportation costs	3.7333	9	20.400	.000	90
The organization's warehouse has been rearranged leading to better utilization of space which has led to reduced costs	3.6915	11	46.532	.000	94
The amount of handling of goods has been minimised to increase flexibility in delivery	3.5368	5	54.000	.000	95
The organization applies the internet as a major channel of distribution reducing distribution costs	3.4149	13	15.894	.003	94
Use of IT has helped increase flexibility in the distribution of goods	3.4632	10	29.053	.000	95
Use of IT has helped increase the market share of goods	3.5532	12	31.000	.000	94
The company's financial position has improved due to the use of IT	3.5426	2	32.064	.000	94
The organization redesigns logistical system components for greater efficiency in delivery of goods	3.5106	3	50.255	.000	94
The organization's distribution costs have been greatly reduced per unit	3.6000	4	36.316	.000	95
The organization uses green label as an indicator of environmental friendliness thus increasing sales	3.6316	6	34.526	.000	95

### **Factor analysis of Green distribution**

Factor loadings of all the indicators are above 0.5. The KMO value for reverse logistics in this study was approximately 0.824 which is above the suggested minimum of 0.5. This implies that the study sample was good for factor analysis procedure as recommended by Tabachnick and Fidell (2007). Bartlett's test of sphericity was significant ( $\chi^2 (36) = 740.847, p < .05$ ). The diagonals of the anti-image correlation matrix were all over .5, supporting the inclusion of each item in the factor analysis. It was also an affirmation that factor analysis was appropriate for the data. The indicators for green distribution constructs were found to explain 67.81% of the total variance in the data. Table 4 shows the Rotated Component Matrix for green distribution.

Table 4: Rotated Component Matrix<sup>a</sup> (Green Distribution)

Variable Construct	Component		
	1	2	3
KMO= .824; Bartlett's sig =.000			
The organization packaging materials are bio-degradable which has increased sales	.823		
The organization uses minimum packaging materials on the products to preserve the natural resources which increases delivery of goods	.823		
The organization uses green label as an indicator of environmental friendliness thus increasing sales	.696		
The organization applies packaging made of recyclable materials enhancing quality of goods	.689		
The organization's profit margins increased when it reduced the material required to offer services to customers (dematerializes)	.557		
The amount of handling of goods has been minimised to increase flexibility in delivery		.762	
The organization's warehouse has been rearranged leading to better utilization of space which has led to reduced costs		.738	
The organization uses minimum transportation packaging materials to preserve the natural resources which has reduced the cost of transportation		.704	
The organization redesigns logistical system components for greater efficiency in delivery of goods		.702	
The organization uses local products to reduce transportation costs		.691	
Use of IT has helped increase the market share of goods			.820
The organization applies the internet as a major channel of distribution reducing distribution costs			.785
The company's financial position has improved due to the use of IT			.739
Use of IT has helped increase flexibility in the distribution of goods			.723
Bartlett's Test of Sphericity: Approx. Chi-Square	740.847		
Total Variance Explained	67.811		
Extraction Method: Principal Component Analysis.			
Rotation Method: Varimax with Kaiser Normalization.			
a. Rotation converged in 6 iterations.			

Table 4 presents the Rotated Component Matrix which shows the three factors after Varimax rotation. To identify the representation of these factors, it was important to consider the items that loaded on each of the three factors. During factor analysis, only absolute values of more than 0.50 were considered significant. Five items loaded on Factor 1 and consisted of bio-degradable packaging materials, use of minimum packaging materials, use of recyclable packaging materials, and use of the green label as an indicator of environmental friendliness and dematerializing which improved the profit margins of the company. This indicates that manufacturers consider packaging reuse and recyclability as important aspects towards environmental sustainability. In this way the goal of reducing the amount of packaging used and ensuring that it can be recycled is achieved. Consequently firms are able to meet their sustainability goals. This finding concurs with Murphy (2012) who indicates that packaging and reuse implies a firm's commitment to its products even after it has been sold either as a final consumer product or a component of a further manufactured product.

Five items loaded on Factor 2 and comprised of minimum handling of goods, better utilization of the ware house, use of minimum packaging products to preserve the environment, use of local products to reduce costs and redesigning of logistical systems components for greater efficiency in delivery. This finding is in harmony with Ninlawan *et al.* (2010) and Amemba *et al.* (2013) who indicate that green packaging involves use of packing the goods into smaller units thus reducing the amount of space and materials used which in turn affects the transport characteristics of a product. Dheeraj & Vishal (2012) contend that companies that have adopted green distribution activities have successfully improved their business on many levels as these activities imply improved efficiency. Redesigning the logistical network particularly enables a firm to minimize the total distribution costs and improve the customer service levels (Ravet, 2013).

Factor 3 loadings were composed of the use of the internet as a major channel of distribution. This is seen as the internet helped increase the market share, flexibility in the distribution of goods and improved the company's financial position. These results indicate that green logistics activities were mainly related to the use of the internet in the distribution of goods. Use of IT greatly reduced distribution costs even as the flexibility of distribution and market share were increased thus increasing firm competitiveness. Use of the internet would help greatly to reduce environmental costs in terms of energy consumption and pollution. The internet can also be used to establish a distribution channel between the producer, wholesalers, retailers and customers, which could minimize transportation and packaging needs. The internet can also be seen as a process by which information about products and profiles of businesses can be transmitted.

### Hypothesis testing

A bivariate regression method was used to investigate the relationship between green distribution and firm competitiveness. Generally regression models are used as a means of predicting values or scores on the outcome variable using one or more predictor variables. The value of this relationship can then be used to test hypotheses and provides support for causality. The hypothesis to be tested is

$H_{01}$ ; Green distribution practices do not positively influence firm competitiveness among food manufacturing firms in Kenya.

The regression model capturing the hypothesized relationship between green distribution and firm competitiveness was presented in the following equation:

$$FC = \beta_0 + \beta_1 X_1 + \varepsilon$$

Where FC is firm competitiveness

$\beta_0$ , and  $\beta_1$  = coefficients

$X_1$  = Green distribution practices

$\varepsilon$  = Error term

Table 5: Regression Results of green distribution on firm competitiveness

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.683	.287		2.376	.020
Green distribution	.631	.078	.639	8.059	.000
F-Statistic	64.946				.000
R-Square	.409				
Adjusted R- Squared	.402				

a. Dependent Variable:

As shown in Table 5 the beta value of the computed scores of green distribution practices is 0.639 with a t test value of 8.059 and a significance level of  $\alpha = .000$ . The hypothesis that green distribution practices do not positively influence firm competitiveness among food manufacturing firms in Kenya is thus rejected. This means that there is a statistically significant relationship between computed green distribution practices and firm competitiveness.

The model fitness found that 40.9% of a firm's competitiveness is explained by green distribution practices ( $R^2 = .409$  Adjusted  $R^2 = .402$ ). This also shows that the relationship between green distribution practices and firm competitiveness is moderate with a model fit of

.409. Thus, there appears to be a positive and significant relationship between green distribution and firm competitiveness (sig. = .000 at .05 level).

## Discussion

Green distribution activities were divided into green packaging and green logistics in accordance to Muma *et al.* (2014). The findings of green distribution indicate that green packaging such as the use of green packaging materials and bio-degradable packaging materials leads to an increase in sales, quality and delivery of goods as well as reducing the transport costs which increases the profit margins. Ninlawan *et al.* (2010) and Olga (2012) maintain that companies that align their distribution networks experience load and thus transportation efficiency. Toke *et al.* (2010) argue that easy access to information greatly saves on operating costs by cutting down on storage and retrieval movements.

The findings indicate that technology has influenced distribution techniques with more firms using the internet as a distribution channel. This has guaranteed easy access to information. This is in resonance with Okello & Were's (2014) finding that technology affects food manufacturing companies to a high extent. Support for green distribution practices indicates that managers are willing to embrace green distribution by taking control of their own distribution pattern thus reducing the costs of production (Hasan, 2013). This finding is consistent with Muma *et al.* (2014) who indicated a positive relationship between green distribution and environmental performance. Green distribution therefore significantly influences firm competitiveness a finding which concurs with Hasan (2013) who concludes that green distribution has a positive link between environmental innovation and competitive advantage.

## CONCLUSION AND FURTHER RESEARCH

The findings from this study clearly show that green distribution practices significantly and positively influence firm competitiveness, reduce cost and improve efficiency. To be able to curb waste in Kenya, manufacturing firms should be encouraged to embrace more of the green distribution practices. This will enhance environmental sustainability. Green distribution practices are thus a worthy strategy which the management should be committed to in order to remain innovative, effective, competitive and efficient in today's ever changing dynamic marketing environment.

The study suggests further research to be done on how GSCM practices affect performance of firms in the services industry as well as other types of organizations such as wholesalers and retailers.

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