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# Influence Green Logistics management on performance of registered automotive the firms in Kenya

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## Abstract

The automotive sector is a fast growing sector and competition is stiff. The sector players are seeking way of improving performance through green procurement. Both public and private sector organizations are implementing Green procurement practices that include environmental (and social) considerations so as to improve performance. This has been captured by scholars in empirical literature and they point at a possible relationship between green procurement and organizational performance. These studies show both positive and negative relationship. The objective of the study was to study the influence of green procurement practices on performance of registered automotive in Kenya. The study design used was correlational research. The target population for the study was 305 heads of departments of the registered automotive firms in Kenya and a sample of 170 was arrived at using the Fischers' model. Questionnaires and interview guide were used for collecting primary data. Quantitative data was analyzed through descriptive and inferential statistics. Multiple regression analysis was used to establish the coefficients of regression model in determining the effect of green logistics management on performance of registered automobile firms. Green logistics management had a moderate positive correlation (.260) giving a significant relationship with performance (.004). The study concluded that that some green procurement practices like green logistics management had a significant effect on performance. The study also recommends enhancement and deployment of green logistics management for performance improvement. For further research, studies could be carried out on other elements of green procurement like waste disposal management, supplier screening for environmental management and green logistics management.

**Keywords:** Energy efficiency, Green procurement and Performance.

## Introduction

### Background of Study

Awareness of the world's environmental issues such as global warming, carbon emissions, toxic substance usage, and resource scarcity has escalated over the past decades. Policy makers and activists are advocating for going green, and many organizations throughout the world have responded to this by applying green principles (Xie & Breen, 2012).

Rao & Kondo (2010) did a study to explore the link between green purchasing initiatives and business performance. The study targeted 92 organizations in the Philippines. The study found out that, in product content restriction the organization needs to specify that the products purchased should not contain environmentally hazardous attributes. The organization requires the suppliers to provide a complete listing of the environment and safety attributes of the product contents of the items it buys from the suppliers. There was a statistically significant relationship between product content restrictions; that is, specifying products must not contain environmentally undesirable attributes and requiring suppliers to provide information about their environmental aspects. Greening or monitoring suppliers' products content would ultimately lead to green process and thereafter to environmental performance and business performance. Factors considered in the supply chain, reverse logistics, green packaging, environmental cooperation with customers and working with clients to change their tastes and consider environmental issues were products. Finally, in this study, a model was developed that relationship (positive or negative) between the green and showed the impact of supply chain management. The study also found, in collaboration with the client, ISO14000 certification and green purchasing any of the actions and consequences are related to green supply chain management. In a survey conducted in 2011 by the Loan, the relationship between management and the company's green initiatives were studied. In this study there was a significant positive correlation was found between the approval of the management of the green on three factors affect support for the implementation of internal management, the environment, and co-operation the supply chain partners.

A study by Oclu & Erdal (2016) carried out in Turkey the results of the analysis of the correlations made on Environmental management policy, green procurement, green marketing, green production, green logistics and green information systems showed. There is a positive relationship between environmental, financial, and operational performance. It is expected that the performance of the enterprise will increase as the green supply chain applications increase. Environmental performance improvements; The amount of waste water, the amount of solid waste, the number of environmental accidents, the decrease in the use of hazardous materials, and the improvement of the environmental condition of the operator in the harmful emissions to the air. Financial performance improvements; the cost of raw materials, energy consumption costs, waste treatment costs, waste disposal costs and penalty costs. Operational performance improvements, on the other hand, decline in product schedules, stock levels, scrap rates and increase in product quality, product variety and capacity utilization. By going out of the way; it can be argued that businesses that implement green supply chain management can gain competitive advantage by improving overall performance of their operations, thus enterprises that implement green supply chain management are more advantageous than those that do not (Oclu & Erdal, 2016).

A research carried out in Hungary by Monika & Gabriel, (2015), observed that all companies demand product testing reports and bill of materials from suppliers and provides them with design specifications. Demanding supplier certifications or environmental management system, replacing materials with environmentally less harmful ones, setting environmental requirements for purchasing items and demanding product content labelling at supplier are also popular techniques (3 out of 4 companies apply them). Supplier education in environmental topics, professional and financial support to the supplier and second tier supplier environmental evaluation are less used methods (1 or 2 OEMs performs them), but most companies plan or started to implement them.

In South Africa a study by (2017) Agyepong & Nhamo on Green procurement in South Africa: perspectives on legislative provisions in metropolitan municipalities findings were that although all the metropolitan municipalities have procurement policies in place, only the City of Cape Town and Thekwini metropolitan had incorporated green procurement strategies in their supply chain management. The city of Cape Town and Nelson Mandela Bay metropolitan municipalities also emerged the only ones with stand alone green procurement strategies. To this end, the research concluded that legislative provisions mandating green procurement in south African metropolitan municipalities were not entirely lacking, although more work needs to be done to roll out this out to cover all existing metropolitan municipalities. This is because of the potential green procurement has in terms of social, economic and environmental benefits that are enormous.

In Tanzania a study by Kibwereza (2016) on effect of green public procurement implementation in Tanzania, a case of Morogoro Municipal council established that green public procurement was not fully being implemented by the council. The study established that the scale of implementation was very low. Therefore the study recommended that more should be done in terms of training of staff and policies so as to make the staff aware of the potential benefits of green procurement.

In Kenya s study carried out by Korir (2014) on GSM practices and performance of Automotive firms in Nairobi, Kenya, established that all the firms in the automotive industry appreciate the role of Green Supply Chain Management Practices. The firms practice green procurement where the most practices were ensuring suppliers meet their environmental objectives, purchasing materials that contain green attributes, purchasing energy saving equipment and evaluating suppliers on specific environmental criteria. It was found out that using paperless methods to order materials were least used. Nderitu, & Ngugi (2014), findings further indicate that for every unit change in supplier participation in green procurement and unit increase in capital expenditure in green procurement, there is a 0.901 and 0.409 increase in organizational performance hence directly proportional.

The Automotive industry in Kenya is a very important sector to the economy. It ranges from manufacturing, retailing, repair and maintenance. From the environmental point of view, the crucial issue is a relatively long life span of the industry's products. Thus, about 80% of environmental impacts stem from the usage phase of the car. This offers room for improvement, especially in the design phase (using lightweight materials, improving fuel efficiency, inventing new energy sources). Due to the mass use of cars and their shortening life cycle, end-of-life vehicle is also perceived as an important issue. It is now regulated by the EU, but is also recognized as a CSR issue by the producers themselves. As car manufacturing is characterized by

long and numerous supply chains, producers' responsibility should be expanded to the whole supply chain (Martinuzzi, Kudlak, Robert & Wiman, 2011). The automotive industry in Kenya contributes a lot towards the economic growth of the country and provision of employment opportunities among the Kenyan citizens. Kenya's automotive retail and distribution sector is rapidly expanding due to infrastructure development, increasing incomes and access to credit facilities (Njoroge, 2007).

### **Statement of the Problem**

The concept of green procurement is gaining prominence across many sectors in the world the automotive industry included. The established Motor dealers face intense competition from imported second-hand vehicles, mainly from Japan and United Arab Emirates. These imports account for about 70% of the market. In the last decade, there was a significant decline in the number of new vehicles sold in the country. Despite a steady recovery in the last four years, the numbers achieved still fall far short of the numbers recorded a decade ago. There has been slump in the volume of new cars sold and this has been attributed to depressed economic environment and increased competition from the second hand vehicles (KMI, 2015). Qinghua, Sarkis & Lai (2007) observed that Green procurement in the developed nations such as China has become a key approach for enterprises seeking to become environmental sustainable and increase performance in instances where there is increased competition. Kenyan Automotive companies have also embraced green procurement practices as other automotive firms in the rest of the world. The study was motivated by the desire to use environmental issues as tools for enhancing performance. This is because there is low uptake of environmental sustainability in developing countries. The study sought to bridge the research gap as there are very few studies have been done in this part of the world showing the relationship between green logistics and performance particularly in the Automotive sector. A study by Kimira, Getuno & Kiarie (2016) in Kenya found out that there was a strong positive and statistically significant relationship between procurement and the firms' performance. This study was on a manufacturing firm which might not necessarily be the effect on companies in the Automotive sector. A study by Malaba, Ogolla & Mburu (2014) found out that there was a weak positive relationship between green procurement and organization performance. This show that green procurement has a varying degree of effect on organization performance. This raises curiosity to find more on the causes and effect of the varying performance. Studies reviewed look at an individual aspect, environmental performance only. The study sought to fill in this gap by looking at the effect of green procurement in terms of financial performance indicators. Therefore the study sought to establish the influence of green logistics management on performance of registered Automotive firms in Kenya.

### **General Objectives**

The general objective of the study was to establish the influence of green logistics management on performance of registered Automotive firms in Kenya.

### **Hypothesis**

H<sub>0</sub>1: Green Logistics management has no significant effect on performance of registered Automotive firms in Kenya.



### Literature Review

According to Xie & Breen (2012), reverse logistics is basically the process of planning, implementing and controlling the efficient, cost-effective flow of raw materials, in process inventory, finished goods and related information from the point of consumption to the point of origin for the purpose of recapturing or creating value or proper disposal. It requires organization to be able to reverse the normal logistics flow from suppliers to customers so that inventory deemed unsuitable can be located by customers and returned to suppliers in a timely and cost effective manner. Reverse logistics involves forward and backward information flow that may enable the company to initiate green logistics and lean logistics, which would be of immense competitive advantage (Lyons & Farrington, 2006). According to Smith (2005), reverse logistics aid a company to identify problem areas and patterns of defects, thereby reducing the number of returned items. Lambert (2008); Wisner & Stanley (2007) asserted that reverse logistics activities includes seasonal inventory, processing returned merchandise, restock, salvage recalls, screening defective merchandise. Other practices of reverse logistics are product returns, remanufacturing recovery, reuse and redistribution.

In order to adapt green perspective also called green logistics, companies should think about the following six tips. The company has to create, less expensive and lighter packaging for refurbished products. The following tip is that they need to be able to utilize biodegradable packaging that would preferably made from recycled material. The third tip is to use the regional recycling experts so that transportation costs can be minimized. Another tip is in a timely manner recycle the material so that market viability can be maximized. The last tip is to get the whole organization involved and encourage them to contribute to the companies green causes (Engel, 2008). Green logistics system must include green management, green information, green supply, green production, green distribution, green packaging and waste recycling.

Sari & Yanginlar (2015) investigated the relationship between green logistics practices and firm performance in healthcare organizations in Turkey. The study categorized green logistics practices into three groups as: reverse logistics, green distribution and marketing, green purchasing and manufacturing practices. Firm performance was measured with three indicators- operational, economic, and environmental performances. The study established that green logistics practices positively supported firm performance in all three performance indicators for hospitals in Turkey.

Lacroix (2011) reviewed the effort that many organizations worldwide are making to purchase products and services that are less harmful to local and global environments. The findings suggested some typical green procurement program elements that organizations adopt, they include: recycled content products, energy efficient products and energy efficient standby power devices, alternative fuel vehicles, alternative fuels, and fuel efficient vehicles, bio-based products, non-ozone depleting substances, alternative fuels and fuel efficient vehicles and environmental protection priority chemicals.

### Empirical Literature Review

Kimira, Getuno & Karie (2014) carried out a study titled Effect of Green Procurement Practices on Competitiveness of Manufacturing Firms in Kenya: A Case of Unilever Kenya Limited. The general objective of this study was to determine the effect of green procurement practices on competitiveness of manufacturing firms in Kenya: a case of Unilever Kenya Limited. The study

specifically sought to determine the effect of supplier selection, product contents, procurement process and ethical practices on competitiveness of Unilever Kenya Limited. The study adopted descriptive research design. The target population was 60 managers in Unilever Kenya Limited who includes the senior management, middle level managers and lower level managers. Since the population was small, a census study was adopted whereby the entire population of 60 managers formed the sample size for the study. The study collected primary data using a questionnaire. The findings showed that green logistics influenced competitiveness of the company to a great extent. The study found out that there was a positive and statistically significant relationship between firm competitiveness and green products; green procurement processes; green logistics. The study concludes that Unilever Kenya had embraced green procurement practices among them selection of suppliers are “green” or have adopted green procurement. The company ensured that it adhered to environmental standards and quality control measures to ensure that the products procured are of quality. The study also concludes that Unilever Company had adopted green procurement processes such as the 3Rs and paperless procurement. The green logistics also provided flexible and efficient physical distribution systems to the company; and enhanced reliable and on-time distribution of goods to the market with less environmental damage. The study recommends that organizations should put more effort to develop suppliers into more strategic partners in the supply chain. The managers need to realize that green procurement alone cannot help in improving supplier performance. Instead, focal firms are crucial for improving downstream capabilities of suppliers. The study concluded that Green logistics influenced competitiveness of the company to a great extent. Logistics is a function responsible for all movements of materials through the supply chain and green logistics reduced costs through improvement in packaging and reduction of wastes. The green logistics also provided flexible and efficient physical distribution systems to the company; and enhanced reliable and on-time distribution of goods to the market with less environmental damage. Green logistics lead to more intangible benefits such as image and reputation enhancement (Kimira et al, 2014). This study does not consider the effect of the Green practices on the overall performance of the organization. The study also does not consider the effect of a moderator on performance.

Lin & Ho (2011) carried out a study titled Determinants of Green Practice Adoption for Logistics Companies in China. The study used a survey research design. The study analyzed the factors influencing the adoption of green practices in Chinese logistics industry. Research results reveal that relative advantage and compatibility of green practices, organizational support, quality of human resources, regulatory pressure, and governmental support have significantly positive influences on the adoption of green practices for Chinese logistics companies. Studies in logistics literature are inquired the main reasons to be green: macro environmental factors (legal/social/government pressures, urbanization/industrialization), management strategies (customer pressures, image), operational issues (decrease waste, improve profit) or sincerely (rapid consumption of sources, pollution, global warming, decrease in biological diversity, distortion in ecological balance).

Sambu (2016) carried out a study titled effect of green packaging on business performance in the manufacturing in Nairobi county, Kenya. The study was informed by institutional theory and the resource-based theory. The study adopted the explanatory research design. A census of 133 firm managers working for 47 firms in Nairobi County. Data was gathered from respondents using

questionnaires as data collection instruments. The findings also showed that although the effect of green packaging on firm performance was significant and positive,  $\beta_3 = 0.095$ ,  $p = 0.011$ , it accounted for the least effect on firm performance. Based on the study findings the study concluded that green packaging has a weak positive and significant effect on firm performance in manufacturing industry. This study does not consider the effect of the Green practices on the overall performance of the organization. This study took a very narrow scope of green logistics. Packaging is a small area of green logistics and waste disposal management. It failed short of giving green logistics a wholesome approach. The study also does not consider the effect of a moderator on performance.

### **Firm's Performance**

The greening of procurement can yield higher profitability, which is an important reason why the topic has reached increased attention over the past decade (Theyel, 2001) and (Vachon & Klassen, 2006). For example, (Carter et al., 2000) shows that environmental purchasing can lead both to increased net income and lower costs, thus promoting improved firm performance. In previous researches into green procurement the main efforts have been directed towards private purchasing, as opposed to public procurement, (Walker et al., 2008). When in its cradle research on green procurement focused on product suppliers, where the interest has somewhat shifted to include services, (Bjorklund, 2011).

Firms are currently starting to recognize that environmental sustainability can be a source of competitive advantage in the management of operations (Walton et al., 1998). GSCM can also promote efficiency and synergy among business partners, helps to enhance environmental performance and reduces waste to achieve cost savings (Rao and Holt, 2005). This has been highlighted in recent studies which have shown that the majority of the world's reverse logistics manufacturing will be carried out in Asia within the next couple of decades (Hu & Hsu, 2010). The key inputs any manufacturing set up are energy and water; therefore firms should strive at achieving sustainability through recycling, reuse and reverse logistics. This will enhance their competitiveness through enhancing efficiency and synergy among business partners, helps to enhance environmental performance and reduces waste to achieve cost savings

An investigation of the greening of purchasing can yield higher profitability, which is an important reason why the topic has reached increased attention over the past decade (Theyel, 2001) and (Vachon & Klassen, 2006). For example, (Carter et al., 2000) shows that environmental purchasing can lead both to increased net income and lower costs, thus promoting improved firm performance. In previous researches into green procurement the main efforts have been directed towards private purchasing, as opposed to public purchasing (Walker et al. 2008).

In the EU, the potential of green public procurement was first underlined in the European Commission's announcement from 2003 concerning integrated product policies, encouraging member states to adopt national action plans for such procurements before the end of 2006. The new European legal framework for public procurement contains instructions on how public procurers can include environmental considerations in their processes and procedures. Additionally, the EU's strategy for sustainable development has a political objective to increase the EU's green public procurement average by 2010 to member state best practice in 2006 (Fangmiao Hou, 2007). Stock (1992) thought that green purchasing can improve a firm's



economic position, by reducing disposal and liability costs, conserving resources, and improving an organization's public image.

Min & Galle (2005) find that the two most highly rated obstacles to effectively implementing green purchasing was cost and revenue. In the process of implementing green procurement, the enterprise is bound to increase investment, training staff costs and the communication costs with suppliers, etc, which hence causes the loss of other investment opportunities (Liu Bin, 2009) Zhu Qinghua et al. (2004) found the suppliers stress had greater impact on the implementation of green supply chain through research. Hou (2007) pointed out that the close cooperation of suppliers and buyers would promote the successful completion of green purchasing activities. In the process of purchasing and procurement, Suppliers must consider the ultimate disposition of the materials and components that enter the firm, purchasing managers can ask upstream members of the supply chain to commit waste reduction and provide environmentally friendly product. Suppliers, e.g. transport service suppliers and product suppliers, can impact firms' green purchasing activities and drive green supply chain management (Walker et al., 2008). The availability, characteristics, knowledge, ambitions, equipment and actions of the suppliers can have an impact on purchasing and green purchasing. To achieve an effective environmental performance, the purchaser must take, and be given, the responsibility and resources for educating suppliers and demonstrate ongoing commitment (Knudsen, 2003).

## **Methodology**

### **Study paradigm**

The study assumed a positivism research philosophy. This philosophy, positivism adheres to the view that only "factual" knowledge gained through observation, including measurement, is trustworthy. In positivism studies the role of the researcher is limited to data collection and interpretation through objective approach and the research findings are usually observable and quantifiable. Crowther and Lancaster (2008) inform that as a general rule, positivist studies usually adopt deductive approach.

### **Research Design**

Research design means the general plan or roadmap of how one goes about answering the research questions. It is a structure that helps to obtain answers to research questions (Cooper & Schindler, 2006). The research used correlational research design.

### **Target Population**

According to the KMI, 2016, there are 35 registered Automotive firms in Kenya that provide a variety of services to the sector. The study was based at the firm's headquarters that are in Nairobi, Kenya. The study targeted a total of 305 Heads of departments.

### **Sample Size and Instruments**

A sample of 170 respondents was arrived at using the Fischer's model. Primary data was collected using structured questionnaires which were administered by the researcher to all the target respondents and collected for analysis.

### Reliability

Reliability test for the instruments was carried out using the Cronbach Alpha test. It was found that Green logistics management was 0.781 and performance was 0.826. All the two were above 0.70 the generally accepted lower limit for Cronbach alpha according to (Hair et al, 2006).

### Data Analysis

This study collected quantitative data. Quantitative data was analyzed by employing descriptive statistics and inferential analysis using statistical package for social science (SPSS version 20). Inferential statistics using correlation analysis was carried out to establish the nature of the relationship that exists between variables. The hypothesis testing was done at 5% level of significance. The results were presented using tables.

### Regression Analysis Model

Regression analysis model was used to assess the influence of the dependent and independent. This model was used for testing the hypotheses. This model has been used previously in other empirical studies to establish relationships between variables (Kraus, Harms, & Schwarz, 2006). The following linear regression model was used for the study;

$$y = \beta_0 + \beta_1x + \varepsilon$$

The response variable  $y$  is performance while explanatory variable  $x$  is Energy efficiency management. The term  $\varepsilon$  is the residual and represents deviation of observed values of performance from that approximated by the model.

## Results and Discussions

### Descriptive Statistics

#### Green Logistics Management and Performance

The objective study was to establish the effect of green logistics management on performance of registered automotive firms in Kenya. The accompanying null hypothesis was, "green logistics management has no significant effect on performance of registered automotive firms in Kenya." The respondents were required to provide their opinion based on the likert scale of: 1 = strongly agree (SA), 2 = agree (A), 3 = Neutral (N), 4 = disagree (D) and 5 = strongly disagree (SD). Preliminary analysis involved descriptive analysis of green logistics management. The details are shown in table 4.1.

**Table 4. 1: Descriptive statistics on green logistics management**

Statement	N	M	SD
Consider Alternative Fuel i.e. Bio Diesel in procurement	120	2.42	.940
Consider Cleaner fuel i.e. Unleaded Fuel in procurement	120	1.40	.666
Consider Electrical energy drive in procurement	120	2.03	.879
Consider Hybrid-Electric in procurement	120	2.43	1.027

Consider Low Emissions in procurement	120	1.42	.805
Consider No or lack of hazardous materials-Unleaded Fuel in procurement	120	1.42	.588
Consider Reverse Logistics in procurement	120	2.42	.740
Consider Reduced Travel in procurement	120	2.18	.745
Consider Vehicle Routing in procurement	120	1.95	.924
<b>Overall scores</b>	<b>120</b>	<b>1.96</b>	<b>.813</b>

**Key:** 1.0-1.4 = strongly agree, 1.5-2.4= agree, 2.5-3.4= neutral, 3.5-4.4 = disagree, 4.5-5.0 = strongly disagree; M = mean; SD = standard deviation

**Source: Survey data (2017)**

The finding in table 4.1 shows respondents strongly agreed to consider: cleaner fuels i.e unleaded fuel (M = 1.40; SD = .666); low emissions (M = 1.42; SD = .805); and no or lack of hazardous materials-unleaded fuel (M = 1.42; SD = .588) in procurement. Further the study finding reveals that respondents agreed to consider: alternative fuels i.e. bio diesel (M = 2.42; SD = .940); electrical energy drive (M = 2.03; SD = .879); hybrid-electric (M = 2.43; SD = .1.027); reverse logistics (M = 2.42; SD = .740); reduced travel (M = 2.18; SD = .745) and vehicle routing (M = 1.95; SD = .924) in procurement. Overall scores reveals that respondents agreed that green logistics management had effect on performance of registered automotive firms in Kenya (M = 1.96; SD = .813).

**H<sub>0</sub>1: Energy efficiency management has no significant effect on performance of registered automotive firms in Kenya.**

**Table 2: Regression analysis on Energy efficiency management on performance**

Model	Unstandardized Coefficients		Standardized Coefficients Beta	T	Sig.	Collinearity Statistics	
	B	Std. Error				Tolerance	VIF
1	(Constant)	1.035	.186	5.562	.000		
	Green Logistics Management	.269	.092	.260	2.922	.004	1.000 1.000
<b>Goodness of Fit</b>							
R=.260							
R <sup>2</sup> =.067							
Adjusted R <sup>2</sup> =.060							
F (1,118 ) 8.539							
P < 0.05(.004)							

**Source: Survey data (2017)**

In table 2, R is the correlation coefficient. It provides a moderate degree of positive correlation ( $r = .260$ ) between Green logistics management and performance. R-square of .067 measures part of performance which was explained by energy efficiency management. It showed that approximately 6.7% of the variation in performance was attributed to variation in energy efficiency management. The adjusted R square provides an idea of how the model may be generalized. It should be as close to R square as much as possible if not the same. In this case, the difference for the final model is small; i.e. .060 or 6.0%. This means if the model was derived from the population rather than a sample, then it would have accounted for approximately 0.7% less variance in performance. The overall model was statistically significant ( $F_{(1, 118)} = 2.922$ ;  $p < .05$ ). The null hypothesis was rejected. Green Logistics management therefore had effect on performance of registered automotive firms in Kenya.

Un-standardized coefficient values were used to construct the regression equation. The Beta coefficient for energy efficiency management was .260 ( $p < .05$ ) and was statistically significant. It did not make a positive contribution in explaining performance. Table 1 and model 4.1 shows that optimum regression equation showing the relationship between energy efficiency management and performance was

$$Y = 1.035 - .269x \quad (4.1)$$

Regression model 4.1 has a moderate degree of negative correlation ( $r = -.368$ ) between energy efficiency management and performance. The model is 6.7% explained by the variation in energy efficiency management and is statistically significant.

The results of this study can be confirmed by a study by Sari & Yanginlar (2015) investigated the relationship between green logistics practices and firm performance in healthcare organizations in Turkey. The study categorized green logistics practices into three groups as: reverse logistics, green distribution and marketing, green purchasing and manufacturing practices. Firm performance was measured with three indicators- operational, economic, and environmental performances. The study established that green logistics practices positively supported firm performance in all three performance indicators for hospitals in Turkey.

Korir (2014) found out that the most used green logistics practices were: promoting reverse logistics ( $M = 2.29$ ,  $SD = .03$ ); cooperating with suppliers to standardize packaging ( $M = 2.07$ ,  $SD = .08$ ). The result showed that the firms in the automotive least implement these practices: use of alternative fuels ( $M = 2.89$ ,  $SD = .08$ ); reducing the size of packaging ( $M = 2.60$ ,  $SD = .03$ ). The average mean score is 2.46 which indicate that firms practice green logistics. The firms in the automotive industry practice green distribution to a large extent. According to Arena et al. (2003) tracking all materials 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 should be done. This shows that green logistics practices have a significant effect on the performance of registered automotive firms in Kenya.

### Summary of Findings

The objective of the study was to establish the effect of green logistics management on performance of registered automotive firms in Kenya. The study found out that respondents strongly agreed to consider: cleaner fuels i.e. unleaded fuel ( $M = 1.40$ ;  $SD = .666$ ); low emissions ( $M = 1.42$ ;  $SD = .805$ ); and no or lack of hazardous materials-unleaded fuel ( $M = 1.42$ ;  $SD = .588$ )

in procurement. Further the study finding revealed that respondents agreed to consider: alternative fuels i.e. bio diesel ( $M = 2.42$ ;  $SD = .940$ ); electrical energy drive ( $M = 2.03$ ;  $SD = .879$ ); hybrid-electric ( $M = 2.43$ ;  $SD = .1.027$ ); reverse logistics ( $M = 2.42$ ;  $SD = .740$ ); reduced travel ( $M = 2.18$ ;  $SD = .745$ ) and vehicle routing ( $M = 1.95$ ;  $SD = .924$ ) in procurement. Overall scores reveals that respondents agreed that green logistics management had effect on performance of registered automotive firms in Kenya ( $M = 1.96$ ;  $SD = .813$ ). Further, the regression analysis showed a moderate degree of positive correlation  $.307$  ( $p < .05$ ) that was statistically significant between green logistics and performance. The null hypothesis was rejected. Green logistics management therefore had effect on performance of registered automotive firms in Kenya. The study also looked at the overall effect of green procurement practices on performance. The findings revealed that respondents agreed that green procurement practices: reduced costs ( $M = 1.50$ ;  $SD = .502$ ); increased profits ( $M = 1.52$ ;  $SD = .502$ ); increased market share ( $M = 1.77$ ;  $SD = .764$ ) and increased sales ( $M = 1.47$ ;  $SD = .593$ ). Overall score showed that respondents agreed that green procurement practices affected performance ( $M = 1.56$ ;  $SD = .659$ ). Moreover, the regression analysis revealed a moderate degree of positive correlation ( $r = .614$ ) between green procurement practices and performance. R-square of  $.377$  measures part of performance which was explained by green procurement practices. It showed that approximately 37.7% of the variation in performance was attributed to variation in green procurement practices. The overall model was statistically significant ( $F_{(4, 115)} = 17.386$ ;  $p < .05$ ). The null hypothesis was rejected. Green procurement practices therefore had effect on performance of registered automotive firms in Kenya.

### **Conclusion**

Based on the findings above, the study concluded that, Green logistics management had a significant effect on performance of registered automotive firms in Kenya. It was also concluded that Automotive firms in Kenya needed to embrace green logistics management practices in order to achieve sustainable competitive advantage and improved performance. The results obtained from this study were important in terms of reflecting the situation on the usage of green logistics management practices and performance of automotive firms in Kenya. The results further revealed a positive relationship between the green logistics management and the firms performance. The results provide an insight to automotive industry managers on the importance of the use of green logistics management and its effect on performance.

### **Recommendations**

The automotive firms should enhance green logistics management so as to improve their performance. The firms should ensure that they adopt the appropriate green logistics management practices which could be a source of competitive advantage that can boost their performance. Green logistics tools and techniques such as alternative fuel, cleaner fuels, electric drive, low emissions and reverse logistics should be given prominence in procurement so as to enhance the performance of the firms.



### Suggestion for Further Research

From the findings of the study, there is a need to carry out other studies on other elements of green logistics management practices example the effect of reverse logistics management on performance of organizations in the public and private sectors of the economy.

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