

Influence of Energy Efficiency 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 general 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 Energy efficiency management on performance of Automobile firms. Energy efficiency management had a moderate negative correlation (-.459) giving a significant relationship with performance (.000). The study concluded that that some green procurement practices like energy efficiency management had a significant effect on performance. The study also recommends enhancement and deployment of energy efficiency 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.

1. 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).

The automotive industry comprises a product system that directly and indirectly relates to economic wealth creation as well as impacts on the natural and human environment along all stages of the product's life cycle, Seuring, Sarkis, Müller & Rao (2008). The industry plays an important role for the environmental and social development of our world in the context of sustainability. It has become a widely accepted concept that polluting the environment could harm the company image which could adversely affect its profitability and sales.

A study carried out on the European Automotive industry by, Nunes & Bennett (2010) investigated green operations initiatives in the automotive industry that were documented in the environmental reports of selected companies. They found that car manufacturers are pursuing a wide range of green operations practices such as green buildings, eco-design, green supply chains, green manufacturing, reverse logistics, and innovation. Green supply chain management practices

have been investigated by Zhu, Sarkis, & Lai (2008). The basic approaches here are: selection of suppliers, transfer of technology, and more efficient logistic systems (e.g. packaging, reduction of empty container travelling). Zhu & Sarkis (2007) found that implementation of GSCM has slightly improved firms' environmental and operational performance, and has not improved firms' economic performance. It has been discussed that the automotive industry witnessed a great shortening of product life cycle. This can be perceived as another factor increasing the negative environmental pressure from the industry.

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. 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. These studies also do not consider the effect of a moderating variable on performance. 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 energy efficiency management on performance of registered Automotive firms in Kenya.

General objective:

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

Hypothesis:

H₀1: Energy efficiency management has no significant effect on performance of registered Automotive firms in Kenya.

2. LITERATURE REVIEW

Energy efficiency is key to ensuring a safe, reliable, affordable and sustainable energy system for the future. It is the one energy resource that every country possesses in abundance and is the quickest and least costly way of addressing energy security, environmental and economic challenges. Improving energy efficiency is a valuable near-term step along the road to sustainability. It can deliver increased productivity, a reduction in pollution, lower consumption of natural resources, and improved financial performance - all this without affecting the benefits that are derived from energy use. In 2014, the overall energy intensity for the production of oil and gas in our upstream business (excluding oil sands and gas-to-liquids (GTL)) slightly improved compared with 2013, partially driven by increased production in Brazil, Iraq and Nigeria. All our major facilities have energy management plans in place to make the best use of those facilities, including the use of improved field management techniques. We expect that maintaining the energy efficiency levels of recent years will be more difficult in the future as existing fields age and new production comes from more energy-intensive sources. This may increase our upstream energy intensity over time. In our oil sands operations, energy intensity in 2014 improved compared with 2013. In 2014, the overall energy intensity for the manufacturing of oil products at our refineries improved compared with 2013. The overall energy intensity of our chemical plants in 2014 was higher than in 2013, due to increased unplanned downtime (Royal Dutch Shell plc, Sustainability Report, 2014).

The materials and parts should be purchased only from Green partners (Zhu, et al. 2007). The suppliers who have ISO certification should only be considered (Sarkis, et al. 2003). The supplier who control hazardous substances in the industries and has obtain green certificate achievements can be considered has efficient supplier (Ninlawan et al., 2010).

Atlas and Florida (1998) also stated that Green manufacturing can lead to lower the raw material cost, increase the production efficiency and reduces the environmental and occupational safety expenses. The power consumption can be reduced to greater extent by implementing green manufacturing process. Green manufacturing enhance environmental consciousness through Reuse/ Recycle/ Refurbish activities (Zhu, et. al.2007).

Green procurement policies and programs can reduce expenditure and waste; increase resource efficiency; and influence production, markets, prices, available services and organizational behavior. They can also assist countries in meeting multilateral requirements such as the Kyoto Protocol and Rotterdam Convention. International Standards Organization and other bodies have established guidelines for green procurement program. Numerous studies also support that adopting green purchasing can reduce the cost, increase efficiency, eliminate waste and pollution, and generate brand reputation (Duber-Smith, 2005; Gunther, 2006; Stevels, 2002). Many private firms in Kenya are working to improve the environmental performance of their operations and products and green procurement has been a logical extension of this work. Similar to public buyers, private sector organizations have in the last two decades adopted green procurement practices for specific products (for example, recycled-content office paper, renewable energy, paints and cleaners), with a few others have developed green procurement policies that cover a wider range of products, services and environmental issues As the business benefits of these efforts become better known, green procurement is continuing to grow in the private sector.

Empirical literature review:

A study by Wu, Dunn & Forman (2012) titled a Study on Green Supply Chain Management Practices among Large Global Corporations carried out in the united Kingdom employed a survey research design. The study found out that Energy efficiency, fuel efficiency, and fuel saving are among the most mentioned green procurement initiatives employed by many large corporations. This means that companies are paying attention to the low hanging fruits of both environmentally responsible and cost saving measures. Greenhouse gas emission, carbon footprint, and environmental stewardship were also mentioned in a large majority of the reports. This may indicate a compliance issue or media generated hot topic among managers. We are pleased to find out that a few supply chain related keywords such as green procurement, sustainable supply chain, and supplier audit are mentioned by some companies. Even though the number of companies mentioning these keywords is small, it's a beginning. This is probably a reflection of the interest in uncovering the potential sustainability benefits along the stretched global supply chain. This study does not consider the effect of the Green practices on the overall performance of the organization.

Reza, Ehsan & Laleh (2015) carried out a study titled The Impact of Green Procurement on Consequences of Green Supply Chain Management in Iran. The study design used was the correlational research design and was based on structural equation modeling. The findings showed that green procurement and significant positive impact on outcomes of green supply chain management that includes four of the consequences of operational, economic, environmental and intangible. The population the study to included all managers and experts from cement factories of Fars province in Iran. Using a two-stage cluster sampling method and sample size of 103 was Morgan and finally 132 questionnaires were collected by means of questionnaire and LISREL software to test the hypothesis that a valid application of structural equation modeling is used. The study we examined the effects of green procurement of green supply chain management implications discussed. Intended outcomes for this study included: the impact of operational, economic, environmental and intangibles were identified through the study of literature. Finally, after analyzing the data and hypotheses on the impact of green logistics operations revealed a significant positive impact ($T = 5.8$, $B = 0.7$). The second hypothesis of the study is also significant and positive impact on the economic consequences of the Green Procurement Confirmed ($T = 5.75$, $B = 0.7$). The third hypothesis is that research on the impact of environmental implications raised by the Green Distribution ($T = 6.93$, $B = 0.67$) was confirmed. Last hypothesis about the distribution of the green on intangible outcomes such as customer loyalty, which was approved and it was found that a significant positive impact on green distribution ($T = 6.85$, $B = 0.67$) and intangible outcomes. The results obtained in this study with review of Chiu et al. 2011 and Zue et al. 2013 matches. This study was done in the cement industry, whereas there are other industries that should be considered to be the next review other industries should be considered (Reza, Ehsan & Laleh, 2015. This study does not consider the effect of the Green practices on the overall performance of the organization.

Atambo & Omachar (2016) carried out a study titled Effects of Green Procurement Practices on Operational Efficiency at Kenya Airways Limited, Kenya. The study used descriptive research design. Questionnaires were used to collect primary data. The respondents were requested to indicate the extent to which low energy consuming goods influence their organization supply chain integration practices. From the findings mean and standard deviation was calculated. It was observed that power consumption can be reduced to greater extent by low production cost had the highest mean 4.00 with

a standard deviation of 0.881 followed by there is strong relationship building between suppliers and the company thus production efficiency with a mean 3.67 with a standard deviation of 0.914, Suppliers are involved in the design and quality of the product and services to procure had a mean of 3.59 with a standard deviation of 1.117, green manufacturing enhance environmental consciousness through Reuse, Recycle, and Refurbish activities had a mean of 3.54 with a standard deviation of 1.168, green procurement is a solution for environmentally concerned and economically conservative business as minimizes environmental impact by selection of products had a mean of 3.51 with a standard deviation of 0.989 and green manufacturing can lead to lower the raw material cost, increase the production efficiency and reduces the environmental and occupational safety expenses had a mean of 3.48 with a standard deviation of 1.070. This finding is consistent with Atlas and Florida (1998) who stated that Green manufacturing can lead to lower the raw material cost, increase the production efficiency and reduces the environmental and occupational safety expenses. This study does not consider the effect of the Green practices on the overall performance of the organization.

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).

3. 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 Energy efficiency management was 0.821 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 ε is the residual and represents deviation of observed values of performance from that approximated by the model.

4. RESULTS AND DISCUSSIONS

Descriptive statistics:

The objective of the study was to establish the effect of energy efficiency management on the performance of registered automotive firms in Kenya. The accompanying null hypothesis was, “energy efficiency 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 energy efficiency. The details are shown in table 4.1.

Table 4.1: Descriptive statistics on energy efficiency management

Statement	N	M	SD
consider energy star compliance in procurement	120	2.22	.780
Consider Energy efficiency in procurement	120	1.75	.891
Consider Fuel efficiency-Improved Engine performance in procurement	120	1.50	.674
Consider Renewable energy in procurement	120	2.32	.907
Consider Energy conservation in procurement	120	1.55	.808
Overall Scores	120	1.87	.812

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 agreed to consider: energy star compliance in procurement (M = 2.22; SD = .780); energy efficiency in procurement (M = 1.75; SD = .891); fuel efficiency improved engine performance in procurement (M = 1.50; SD = .674); renewable energy in procurement (M = 2.32; SD = .907); and energy conservation in procurement (M = 1.55; SD = .808). Overall scores reveals that respondents agreed that energy efficiency management had effect on performance of registered automotive firms in Kenya (M = 1.87; SD = .812).

H₀1: 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	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.270	.133		17.114	.000		
	Energy Efficiency Management	-.379	.067	-.459	-5.620	.000	1.000	1.000
	Goodness of Fit							
	R=.459							
	R ² =.211							
	Adjusted R ² =.204							
	F (1,118) 31.580							
	P < 0.05(.000)							

Source: Survey data (2017)

In table 2, R is the correlation coefficient. It provides a moderate degree of positive correlation (r= .459) between energy efficiency management and performance. R-square of .211 measures part of performance which was explained by energy efficiency management. It showed that approximately 21.1% 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. .204 or 20.4%. 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 ($F_{(1, 118)} = 31.580$; $p < .05$). The null hypothesis was rejected. Energy efficiency 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 -.459 ($p < .05$) 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

$$Y = 2.270 - .379x \tag{4.1}$$

Regression model 4.4 has a moderate degree of negative correlation ($r = -.368$) between energy efficiency management and performance. The model is 21.1% explained by the variation in energy efficiency management and is statistically significant.

The results of the study show that energy efficiency management has a significant contribution to performance of registered automotive firms in Kenya. This results concur with a study by Wu, Dunn & Forman (2012) concludes that Energy efficiency, fuel efficient, and fuel saving are among the most mentioned keywords in our study. This means that companies are paying attention to the low hanging fruits of both environmentally responsible and cost saving measures.

The Berlin energy saving partnership (ESP) is a participation model to reduce carbon emissions and energy costs for property owners (City of Berlin, 2011:1). The ESP is a joint project between the City of Berlin and the Berlin energy agency (BEA). An energy service company (ESCO) was contracted to determine the most applicable energy saving investment to implement. The ESCO upgrades and refurbishes hardware components and retrofits public and commercial buildings. Hardware components that can be refurbished include automatic control engineering systems, heating, lighting, ventilation and air conditioning control systems. The BEA acts as the intermediary between ESCO and building owners and helps both parties to arrange payments after the installations. The ESCO further offers support on consumer behaviour to its clients after the installation of the hardware components. Berlin's ESP projects are also implemented in other countries through the BEA's division called "International Know-How-Transfer" project (City of Berlin, 2011:1).

A study by Atambo & Omachar (2016) established that the power consumption can be reduced to greater extent by low production cost and that there is strong relationship building between suppliers and the company thus production efficiency. The study further established that Green manufacturing enhance environmental consciousness through Reuse, Recycle, and Refurbish activities and a solution for environmentally concerned and economically conservative business as minimizes environmental impact by selection of products thus lead to lower the raw material cost, increase the production efficiency and reduces the environmental and occupational safety expenses.

5. SUMMARY OF FINDINGS

The second objective of the study was to establish the effect of energy efficiency management on the performance of registered automotive firms in Kenya. The findings revealed that respondents agreed to consider: energy star compliance in procurement ($M = 2.22$; $SD = .780$); energy efficiency in procurement ($M = 1.75$; $SD = .891$); fuel efficiency improved engine performance in procurement ($M = 1.50$; $SD = .674$); renewable energy in procurement ($M = 2.32$; $SD = .907$); and energy conservation in procurement ($M = 1.55$; $SD = .808$). Overall scores revealed that respondents agreed that waste disposal management had effect on performance of registered automotive firms in Kenya ($M = 1.87$; $SD = .812$). Moreover, the regression analysis revealed a moderate degree of negative correlation $-.550$ ($p < .05$) that was statistically significant between energy efficiency management and performance. The null hypothesis was rejected. Energy efficiency management therefore had effect on performance of registered automotive firms in Kenya.

6. CONCLUSION

Based on the findings above, the study concluded that, energy efficiency management had a significant effect on performance of registered automotive firms in Kenya. Therefore from the study it was concluded that energy efficiency management strategies be encouraged and adopted in the firms' procurement as they have a positive effect on performance.

7. RECOMMENDATIONS

The management of the automotive industry should enhance the energy efficiency management in order to improve performance. Energy efficiency tools should be utilized in green procurement by the automotive firms' so that they can enhance their performance.

Suggestion for Further Research:

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

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