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# INFLUENCE OF GREEN DISTRIBUTION PRACTICES ON ENVIRONMENTAL PERFORMANCE OF CHEMICAL MANUFACTURING FIRMS IN KENYA

Francis Kirunga<sup>1</sup> & Dr. Allan Kihara<sup>2</sup>

<sup>1 & 2</sup> College of Human Resource Development

Jomo Kenyatta University of Agriculture and Technology, Kenya

Corresponding Author email: <a href="mailto:francis.kirunga@gmail.com">francis.kirunga@gmail.com</a>

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Abstract: The study sought to establish the influence of green distribution practices on environmental performance of chemical manufacturing firms in Kenya. The study specifically focused on green packaging, green transportation, green storage and eco-labeling. The target population of the study comprised 27 chemical manufacturing companies in Kenya according to the Kenya Association of Manufacturers report. The study used census technique. The data collection instrument was a questionnaire and quantitative data was used. Mean, frequencies and percentages were used to describe the data. The study used correlation and regression to achieve the specific objectives. Analysis was conducted using SPSS version 21 and the findings indicated that green storage, green packaging, green transportation and eco labeling have a positive and significant influence on environmental performance of chemical manufacturing firms in Kenya. The study recommends that chemical manufacturing firms and other manufacturing firms should enhance their adoption of green packaging practices such as using recyclable materials for packaging; invest more in adoption of the green storage practices and eco labeling.

**Key Words:** Green Packaging, Green Transportation, Green Storage, Eco-Labeling, Environmental Performance

## Introduction

There have been increasing environmental concerns from the governments and the general public regarding the effect of chemical manufacturing on the environment. There is release of harmful chemicals which are affecting the environment by causing global warming as well as scarcity of useful resources. There is hence a need for critical reevaluation of the business processes to factor in environmental issues (Tonape & Owk, 2013). On this account, manufacturing firms and particularly chemical manufacturing firms must therefore put in place measures to ensure there activities are friendly to the environment (Bansal & Roth, 2000). There is a need for the chemicals to be produced on time and to be of quality but again the ingredients, features and availability of the product need to be carefully stated. A better distribution mechanism is hence required and hence there is a need for taking care of environmental concerns through environmentally friendly distribution systems (Bansal, 2002).

Adoption of green distribution practices is hence a mandatory for the chemical manufacturing firms (Mwaura *et al.*, 2016). They range from green transportation whereby the fuel type, operational practices as well as the mode of transport is considered. Furthermore, storage facilities are also considered whereby the most efficient ways are to be used to power the storage facilities. Space utilization should also be well done and store various materials in the same store room. The design should also not waste much space (Liu, Li Ma, & Cheng, 2010). Another important factor is green packaging whereby, it is important to consider the size and type of materials. Furthermore, downsizing the packaging and using materials that are returnable is key (Ninlawan *et al.*, 2010). Ecolabelling on the other hand involves labeling the materials so that there is friendly disposal and consumption.

## **Statement of the Problem**

According to the United Nations Emissions Gap Report, the largest emitters of greenhouse gases (GHGs) in Kenya are companies that operate in extractive industries such as oil and gas extraction, mining, chemical manufacturing (UNEP, 2016). The report further indicated that the companies contribute to 62% of greenhouse gases that have hazardous environmental effects (Goldemberg & Lucon, 2010). Environmental disclosures in financial reports of the chemical manufacturing firms in Kenya that have been used as a means to communicate with external stakeholders have also confirmed an increasing environmental threat of the firms. Despite the fact that manufacturing firms account for 13% of gross domestic product (GDP) of Kenya's industrial sector, chemical manufacturing firms have failed to give a good account of their environmental performance, a constituent of their overall performance (UNEP, 2016). On the same note, increasing number of industries in urban environments has led to an increase in the rates of pollution.

According to the World Health Organization report (2015), asbestosis, lung cancer and Peritonial Mesothelioma are sicknesses associated with exposure to materials such as asbestos in the air emitted by industries. About 2.4 million loss their lives for air pollution related problems. The designing of eco-friendly distribution practices helps manufacturing firms look critically into the role played by each channel member in an effort to meet customer needs and at the same time meet desired environmental standards. The specific green distribution practices of green transportation, green packaging, green storage and eco-labeling have been found to have positive impacts on environmental performance. Thus it is not enough for a firm to be 1S014000 certified or to have NEMA certificate for the Kenyan situations, but there should be other practices by the firm aimed at improving its environmental accountability. This motivated the study to examine the influence the effect of the above mentioned green distribution practices on chemical manufacturing firms' environmental performance.

Volume 1, Issue 7, 2018, ISSN: 2617-1805

Studies done on green distribution have mostly focused on GSC and not distribution (Kinoti, 2012). Less empirical focus exist on green distribution practices among chemical manufacturing firms as the existing ones have focused on the entire manufacturing sector, while others as already mentioned have examined green supply chains and green procurement and not particularly green distribution (Nasiche *et al.*, 2014). Other studies focused on green distribution but a case study was followed and that the study focused on developed economies and not Kenya (Zu'bi *et al.*, 2015; Hasan, 2013; Holt & Ghobadian, 2009; Trigos, 2007).

# **Objectives of the Study**

- i. To establish the influence of green packaging on environmental performance of chemical manufacturing firms in Kenya
- ii. To determine the influence of green transportation on environmental performance of chemical manufacturing firms in Kenya
- iii. To establish the influence of green storage on environmental performance of chemical manufacturing firms in Kenya
- iv. To determine the influence of eco-labeling on environmental performance of chemical manufacturing firms in Kenya

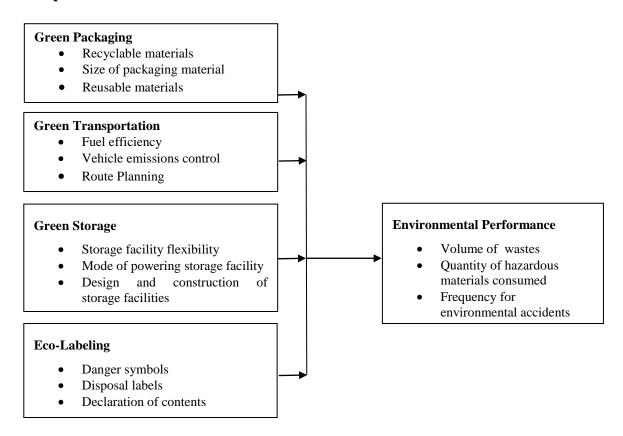
## **Literature Review**

In this study, the main theories were the Transaction Cost Economics, Resource Dependence, Stakeholder and Institutional Theory. Transaction cost theory by Williamson in 1981 explains how much cost is required to complete a transaction between two parties. The costs can be as a result of searching for information or haggling. In the context of this study, costs can in in form of the costs needed to learn new technologies that are required to go green (Avdagic, 2011). Costs are also required to effectively monitor and sustain the suppliers to ensure that they completely adhere to the quality standards set by the customer (Varsei, Soosay, Fahimnia, & Sarkis, 2014). The theory is relevant to the study as it explains that costs can be saved when a firm goes green for instance through green storage.

The Resource Dependence Theory by Pfeffer and Salancik (1978) explains how firms with resources can control other firms and make them dependent. Dependence of one firm on the other firm, for resources and competence, as argued by Awaysheh and klassen (2010) leads to competitive advantage by the firm with those resources and competence since it can control the weaker firms due to its strong bargaining power (crook & combs 2007). Therefore, in the context of this study, the firms which are relied upon for resources can use that power to ensure that the smaller firms conform to environmental practices (sarkis et al, 2011). Stakeholder Theory by Freeman (1984) on the other hand indicates the role of stakeholders in a firm's decision making process and value creation. The theory has since been adopted to explain supply chain issues (Genovese et al., 2013). Various stakeholders can determine and force firms to go green especially where the firm's public image is at stake (Gualandris & Kalchschmidt, 2014; Reuter et al. 2012). There is a long list of stakeholders who may force a firm in adopting GSC practices such as government, customers and other manufacturers (Markmann et al. (2012). The theory is relevant to the study in explaining how coercion affects adoption of green SC practices by the firms whereby, other forces from outside the firm play a significant role in coercing a firm to adopt green SC practices. Such can included suppliers, customers and government, to mention but a few.

The Institutional Theory Developed by Di Maggio and Powell in 1983, explains how coercion from external environment affects the organizational performance. In this context, adoption of green SC practices can be coerced by the regulations and laws that demand so and hence firms are left with limited options. Similarly, pressures from external environment of lobby groups, government, customers can force a firm to improve its environmental performance (Delmas & Toffel, 2004). Other forms of coercion can come from the societal cultural demands and expectations as well as the industry related pressure, technology driven pressure or environmental uncertainty (Di Maggio & Powell 1983; Hoejmose, 2014). In order for a firm to look like its having legitimate operations, it conforms to such pressure (Sarkiset al, 2011). This is because when there is failure to comply, a firm may lose its earnings, reputation, tarnished public images and litigation. The theory is relevant to the study in explaining the adoption of green distribution practices in manufacturing firms especially due to pressures from the enforcing bodies such as KAM, the government, customers and other stakeholders.

# **Conceptual Framework**



Independent Variables Figure 1 Conceptual Framework Dependent variable

# **Empirical Review**

Mutisya, and Kinoti (2017) interrogated how GSC practices impacted chemical manufacturing firms performance in Nairobi. It adopted a descriptive approach, primary data, correlations and ordinary linear regressions to achieve the objective. Green packaging was specifically a significant determinant. It was encouraged among the firms. In a similar setting, Eltayeb, Zailani, and Ramayah (2011) interrogated whether GSCM practices including green ecodesign practices impacted how firms performed. The study was conducted by mailing questionnaire to 551 ISO 14001 certified Malaysian manufacturing organizations. The study used descriptive statistics, validity & reliability test and One-way ANOVA. It was realized that GSCM practices had influence on organizational performance outcome in which eco-design had a direct link to the firm's internal performance.

Mwaura et al (2016) focused on Green distribution practices and how it would impact on the competitive advantage of manufacturing firms in the food sub sector. By cross sectional method, the major data was primary and with the use of various methods of analysis such as regressions, it was realized that indeed using green transportation means helped to cut costs and enhance competitive advantage. Conding (2015) linked green practices and whether they can influence performance but the focus was the context of automotive firms in Malaysian. The target was 230 Malaysian automotive companies. The study used questionnaires to capture primary data which revealed that green innovation and green practices such as green transportation has a positive outcome on the environmental performance. The adoption of green infrastructure helped the automotive practitioners to improve their green performance. Yan and Yazdanifard, (2014) established whether green marketing and storage was successful and how it related to the performance of firms. Through interviews, questionnaires and secondary information, the scholars realized that majority of the firms believed that such ideas of going green would be beneficial to the society and that those who implemented, performed better than those who did not. Muma, Nyaoga, Matwere and Nyambega (2014) conducted a study on green distribution using green packaging and green storage variables. Various methods were used and the data was mixed, both secondary and primary. Correlations were conducted and a significant effect was established. At the end, the study recommended practice of the same to enhance more results.

Mostly, studies have indicated that Eco labeling is beneficial. Focusing on the Germany blue angel, Thidell, Leire & Lindhqvist (2015) revealed that its beneficial. Similarly, in South Korea, it was established to be significant. In Sweden, Eco labels are believed to have been implemented by detergent manufacturers to a small extent although its impact was significant (Rahbar, & Abdul Wahid, 2011). Piotrowski and Kratz, (2005) established whether markets were aware of and had come across Eco labels. The study was conducted in European countries. The main focus was whether consumers could use eco labels to find and dispose off products. Surprisingly, few consumers took notice of the Eco labels and fewer even followed the labels.

## **Research Methodology**

A descriptive survey design was suitable in this work because it was able to support the use of questionnaires as well as provide answers to the sort of questions it sought to answer. The study focused on 27 registered firms in the subsector of chemical manufacturing. The study adopted a census whereby all the 27 firms were considered. This study used a questionnaire which was semi-structured to capture both qualitative and quantitative data. The questionnaire had both open and closed questions. This study used two methods to analyze data. Quantitative analysis methods through SPSS to obtain descriptive and inferential results. There was also thematic analysis of the data from the open ended questions. Mean and frequencies as well as percentages were used to describe the population. Correlation and regression established a relationship between the variables. A multiple regression analysis was suitable:

Volume 1, Issue 7, 2018, ISSN: 2617-1805

 $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$ 

Where; Y = Environmental performance of the chemical manufacturing companies

 $X_1$  = Green transportation,  $X_2$  = Green packaging,  $X_3$  = Green storage,  $X_4$  = Eco-labeling

 $\varepsilon$  = Error term,  $\beta_0$  is the regression constant or intercept, and  $\beta_1$ ,  $\beta_2$ ,  $\beta_3$  and  $\beta_4$  are the unknown parameters to be determined. The study findings were presented using tables and figures.

## **Research Findings**

Out of the 108 administered questionnaires, 74 were completed without errors or blank spaces making a rate of 69% out of 100%. Finchman (2008) argues that a response return rate of more than 60% is enough for the study to continue. This response rate was, therefore considered representative of the respondents to provide information for analysis and deemed acceptable for making statistical inferences.

# **Descriptive Findings and Analysis**

## **Green Packaging**

The descriptive findings indicated that on average the respondents agreed that on average the packaging material used by the company are standardized by KEBS (Mean = 4.62), the packaging materials are recyclable (Mean = 4.65) and that the size of the packaging materials is standardized to avoid wastage of materials (Mean = 3.62). The findings also indicated that the respondents had divided opinion on whether the packaging materials are reusable (Mean = 3.41) and on whether the packaging materials are less hazardous (Mean = 3.17). Generally, there was an agreement with statements on green packaging (Average Mean = 3.91). The findings are similar to Ninlawan *et al.* (2010) who indicated that a number of green packaging practices were important for manufacturing firms.

**Table 1 Descriptive Statistics of Green Packaging** 

|   |      | Standard  |
|---|------|-----------|
| Statement   | Mean | Deviation |
| The packaging material used by the company are standardized by KEBS               | 4.62 | 0.79      |
| The packaging materials can be recycled   | 4.65 | 0.68      |
| The packaging materials can be reused   | 3.41 | 1.08      |
| The packaging materials are less hazardous  | 3.27 | 1.19      |
| The size of the packaging materials is standardized to avoid wastage of materials | 3.62 | 1.27      |
| Average   | 3.91 | 1.00      |

## **Green Transportation**

The descriptive findings indicated that on average the respondents agreed that their company uses sustainable practices when powering their storage facilities (Mean = 3.61) and that their company distribute their products with materials that are capable of storing in different categories (Mean = 3.68). The findings also indicated that the respondents had divided opinion on whether the mode of powering the company storage facility is environmentally friendly (Mean = 3.16), whether the design of the company storage facilities subscribe to the environmental demands (Mean = 3.04) as well as on whether their company storage facilities are capable of storing different categories of materials (Mean = 3.20). On average, the respondents had divided opinion on the statements on green transportation (Mean = 3.34). The findings are consistent with Al-Odeh and Smallwood (2012).

**Table 2 Descriptive Statistics of Green Transportation** 

|   |      | Standard  |
|---|------|-----------|
| Statement   | Mean | Deviation |
| The company uses energy efficient powering means  | 3.61 | 1.46      |
| The company uses environmentally friendly powering means                                | 3.16 | 1.56      |
| The company distribute their products with materials that are capable of storing in     |      |           |
| different categories  | 3.68 | 1.51      |
| The design of storage facilities is environmental friendly                              | 3.04 | 1.44      |
| The company storage facilities are capable of storing different categories of materials | 3.20 | 1.20      |
| Average   | 3.34 | 1.43      |

## **Green Storage**

The descriptive findings indicated that on average the respondents agreed that their company uses sustainable practices when powering their storage facilities (Mean = 3.95), the mode of powering their companies storage facility is environmentally friendly (Mean = 4.28) and that their company distribute their products with materials that are capable of storing in different categories (Mean = 3.62) and that their company storage facilities are capable of storing different categories of materials (Mean = 3.95). On average the findings indicated that the respondents agreed on the statements of green storage practices (Average Mean = 3.95). The findings are consistent with Young, Hwang, McDonald and Oates (2010) who argued that the best green storage practices should range from having a storage facility capable of storing different categories of materials as well as adopting sustainable practices when powering their storage facilities.

**Table 3 Descriptive Statistics of Green Storage** 

|  |      | Standard         |
|--|------|------------------|
| Statement  | Mean | <b>Deviation</b> |
| Sustainable powering practices   | 3.95 | 1.26             |
| Environmentally friendly powering options  | 4.38 | 1.00             |
| The company distribute their products with materials that are capable of storing in different categories | 3.62 | 1.11             |
| Design of warehouses is according to environmental requirements  | 3.84 | 1.27             |
| The company storage facilities are capable of storing different categories of materials                  | 3.95 | 1.26             |
| Average  | 3.95 | 1.18             |

## **Eco Labelling**

The descriptive statistics indicated that on average, the respondents agreed that their products have danger symbols (Mean = 4.62), the products being distributed have disposal labels (Mean = 4.78), their products have declared the contents (Mean = 4.57), their products have labels on ISO certification (Mean = 4.35) and that the products have labels on conformity with standards (Mean = 4.41). On average, the respondents agreed on statements on eco labeling (Average Mean = 4.55). The findings are consistent with Fujii *et al.* (2013).

Volume 1, Issue 7, 2018, ISSN: 2617-1805

**Table 4 Descriptive Statistics of Eco Labeling** 

| Statement   | Mean | <b>Standard Deviation</b> |
|---|------|---------------------------|
| The products have danger symbols                      | 4.62 | 0.79                      |
| The products being distributed have disposal labels   | 4.78 | 0.41                      |
| The products have declared the contents               | 4.57 | 0.50                      |
| The products have labels on ISO certification         | 4.35 | 0.82                      |
| The products have labels on conformity with standards | 4.41 | 0.49                      |
| Average   | 4.55 | 0.60                      |

## **Environmental Performance**

The descriptive findings indicated that on average, the respondents agreed that the amount of solid waste released to the environment has reduced (Mean = 4.62), most of the chemicals substances that their company use are less hazardous (Mean = 4.89) and that the number of environmental accidents in their company has reduced (Mean = 4.65). The findings also indicated that on average the respondents agreed that the industrial affluent are efficiently treated before they are released to the water bodies (Mean = 3.53) and that in their company, the amount of air pollution has reduced (Mean = 4.11). On average, the respondents indicated an improvement in the environmental performance of chemical manufacturing firms in Kenya (Average Mean = 4.36). However, since the response was not unanimous, with varied opinions, it indicates that environmental performance of chemical manufacturing firms in Kenya still needs improvement. This is consistent with the report by UNEP (2016) which indicated that increasing number of industries in urban environments has led to an increase in the rates of pollution.

**Table 5 Descriptive Statistics of Environmental Performance** 

| Statement  | Mean | Standard<br>Deviation |
|--|------|-----------------------|
| The amount of solid waste released to the environment has reduced                            | 4.62 | 0.79                  |
| Most of the chemicals substances that the company use are less hazardous                     | 4.89 | 0.34                  |
| The number of environmental accidents in the company has reduced                             | 4.65 | 0.53                  |
| The industrial affluent are efficiently treated before they are released to the water bodies | 3.53 | 1.49                  |
| In our company, the amount of air pollution has reduced                                      | 4.11 | 0.39                  |
| Average  | 4.36 | 0.71                  |

# **Correlation Analysis**

The findings showed that green packaging has a positive and significant correlation with environmental performance of chemical manufacturing firms in Kenya (r = 0.392, sig < .05). This shows that increasing green packaging practices such as using recyclable materials for packaging, using standardized packaging materials and using reusable materials leads to a significant increase in environmental performance of chemical manufacturing firms in Kenya. The findings are consistent with Mutisya and Kinoti (2017) who also indicated a positive relationship. The findings also showed that green transportation has a positive and significant correlation with environmental performance of chemical manufacturing firms in Kenya (r = 0.222, sig < .05). This shows that increasing green transportation practices such as using vehicles which have fuel efficiency, using vehicles which have vehicle emissions control and conducing proper route planning leads to a significant increase in environmental performance of chemical manufacturing firms in Kenya. The findings agree with Mwaura *et al* (2016) who also established a positive relationship between the same variables.

It was also established that green storage has a positive and significant correlation with environmental performance of chemical manufacturing firms in Kenya (r = 0.447, sig < .05). This shows that adoption of green storage practices such as improving the storage facility flexibility, using efficient methods of powering storage facility and proper design and construction of storage facilities to use less space leads to a significant increase in environmental performance of chemical manufacturing firms in Kenya. The findings are consistent with Yan and Yazdanifard, (2014) obtained similar results. Lastly, the findings indicated that eco labeling has a positive and significant correlation with environmental performance of chemical manufacturing firms in Kenya (r = 0.471, sig < .05). This shows that adoption of eco labeling practices such as having danger symbols, disposal labels and declaration of contents being distributed leads to a significant increase in environmental performance of chemical manufacturing firms in Kenya. The findings are consistent with Thidell, Leire and Lindhqvist (2015) who argued that eco labels are significant.

**Table 6 Correlation Analysis** 

|                      |                 | Green     | Green          | Green   | Eco      | Environmental |
|----------------------|-----------------|-----------|----------------|---------|----------|---------------|
|                      |                 | Packaging | Transportation | Storage | labeling | Performance   |
|                      | Pearson         |           |                |         |          |               |
| Green Packaging      | Correlation     | 1         |                |         |          |               |
|                      | Pearson         |           |                |         |          |               |
| Green Transportation | Correlation     | 266*      | 1              |         |          |               |
| _                    | Pearson         |           |                |         |          |               |
| Green Storage        | Correlation     | -0.062    | 292*           | 1       |          |               |
| -                    | Pearson         |           |                |         |          |               |
| Eco labeling         | Correlation     | 0.136     | 0.074          | .339**  | 1        |               |
| Environmental        | Pearson         |           |                |         |          |               |
| performance          | Correlation     | .392**    | 0.222**        | .447**  | .471**   | 1             |
| _                    | Sig. (2-tailed) | 0.001     | 0.007          | 0.000   | 0.000    |               |
|                      | N               | 74        | 74             | 74      | 74       | 74            |

# **Regression analysis**

The value of R-square was 0.665 which showed that green distribution in terms of green storage, green transportation, green packaging and Eco labeling explain up to 66.5% of the variation in environmental performance of chemical manufacturing firms in Kenya.

**Table 7 Model Summary** 

| R    | R Square | Adjusted R Square | Std. Error of the Estimate |
|------|----------|-------------------|----------------------------|
| .816 | 0.665    | 0.646             | 0.246264                   |

The study also conducted an Analysis of Variance to establish the model fitness or significance and established that the test for the joint significant which is given by the F statistic is 34.252 and as observed in table 8, it is statistically significant (0.000 which is less than .05) at 5 percent level of significance. This implies that green storage, green transportation, green packaging and Eco labeling significantly influence environmental performance of chemical manufacturing firms in Kenya. F calculated that is 34.252 were also compared to F critical which was established to be 2.505. Since 34.252 > 2.505, it collaborated the findings of significant model.

**Table 8 Model Significance (ANOVA)** 

|            | Sum of Squares | df | Mean Square | F      | Sig. |
|------------|----------------|----|-------------|--------|------|
| Regression | 8.309          | 4  | 2.077       | 34.252 | .000 |
| Residual   | 4.185          | 69 | 0.061       |        |      |
| Total      | 12.494         | 73 |             |        |      |

The model coefficients were lastly established as indicated in Table 9. The data findings analyzed shows green packaging can have a significant improvement in environmental performance (Beta = 0.360, P- value = 0.000) implying that with an increase of 1 unit, environmental performance increases by 0.360 units. The findings are consistent with Eltayeb, Zailani, and Ramayah (2011) who focused on determining the impact of the adoption of GSCM practices including green eco-design practices and established a positive relationship. The data findings analyzed shows green transportation can have a significant improvement in environmental performance (Beta = 0.179, P- value = 0.000) implying that with an increase of 1 unit, environmental performance increases by 0.179 units. The findings are consistent with Conding (2015) who investigated the impact of green practices, green innovation and adoption of green infrastructure on green performance in Malaysian Automotive Industry and established that green innovation and adoption of green practices such as green transportation has a positive impact on the environment.

The data findings analyzed shows green storage can have a significant improvement in environmental performance (Beta = 0.244, P- value = 0.000) implying that with an increase of 1 unit, environmental performance increases by 0.244 units. The findings are consistent with Muma, Nyaoga, Matwere and Nyambega (2014) who conducted a study on green distribution using green packaging, green storage and logistics variables and indicated a positive relationship between green packaging, green storage as well as reverse and environmental performance. The data findings analyzed shows Eco labeling can have a significant improvement in environmental performance (Beta = 0.191, P- value = 0.042) implying that with an increase of 1 unit, environmental performance increases by 0.191 units. The findings are consistent Rahbar and Abdul Wahid (2011).

**Table 9 Regression Model Coefficients** 

|                      | Unstandardized Coefficients |            | Standardized Coefficients |       |       |
|----------------------|-----------------------------|------------|---------------------------|-------|-------|
|                      | В                           | Std. Error | Beta                      | t     | Sig.  |
| (Constant)           | 0.519                       | 0.412      |                           | 1.259 | 0.212 |
| Green Packaging      | 0.360                       | 0.05       | 0.545                     | 7.239 | 0.000 |
| Green Transportation | 0.179                       | 0.027      | 0.525                     | 6.643 | 0.000 |
| Green Storage        | 0.244                       | 0.034      | 0.579                     | 7.161 | 0.000 |
| Eco labeling         | 0.191                       | 0.092      | 0.161                     | 2.077 | 0.042 |

#### **Conclusion**

The findings led to the conclusion that green packaging has a positive and significant influence on environmental performance of chemical manufacturing firms in Kenya. The findings implies that increasing green packaging practices such as using recyclable materials for packaging, using standardized packaging materials and using reusable materials leads to a significant increase in environmental performance of chemical manufacturing firms in Kenya. The findings led to the conclusion that green transportation has a positive and significant correlation with environmental performance of chemical manufacturing firms in Kenya. This implies that that increasing green transportation practices such as using vehicles which have fuel efficiency, using vehicles which have vehicle emissions control and conducing proper route planning leads to a significant increase in environmental performance of chemical manufacturing firms in Kenya.

The study also concluded that green storage has a positive and significant correlation with environmental performance of chemical manufacturing firms in Kenya. This implies that adoption of green storage practices such as improving the storage facility flexibility, using efficient methods of powering storage facility and proper design and construction of storage facilities to use less space leads to a significant increase in environmental performance of chemical manufacturing firms in Kenya. It was also concluded that eco labeling has a positive and significant correlation with environmental performance of chemical manufacturing firms in Kenya implying that adoption of eco labeling practices such as having danger symbols, disposal labels and declaration of contents being distributed leads to a significant increase in environmental performance of chemical manufacturing firms in Kenya.

#### Recommendation

Since green packaging has a positive and significant influence on environmental performance of chemical manufacturing firms in Kenya, the study recommends that chemical manufacturing firms and other manufacturing firms should enhance their adoption of green packaging practices. Among the practices they can adopt is using recyclable materials for packaging, using standardized packaging materials and using reusable materials. Based on the findings that green transportation has a positive and significant correlation with environmental performance of chemical manufacturing firms in Kenya, the study recommends that chemical manufacturing firms should invest more in adoption of green transportation practices since some of them have not adopted. Some of the practices that need adoption is using vehicles which have fuel efficiency, using vehicles which have vehicle emissions control and conducing proper route planning.

Based on the findings that green storage has a positive and significant correlation with environmental performance of chemical manufacturing firms in Kenya, the study recommends that chemical manufacturing firms and other manufacturing firms should invest more towards adoption of the green storage practices. They can seek to adopt

## Volume 1, Issue 7, 2018, ISSN: 2617-1805

practices such as improving the storage facility flexibility, using efficient methods of powering storage facility and proper design and construction of storage facilities to use less space. Since the findings indicated that eco labeling has a positive and significant correlation with environmental performance of chemical manufacturing firms in Kenya, the study recommends that manufacturing firms should adopt eco labeling practices to a high extent in order to improve their environmental performance. Some of the activities they can engage in having danger symbols, disposal labels and declaration of contents being distributed.

## **Conflict of Interest**

No potential conflict of interest was reported by the authors

## References

- Adams, B. (2008). Green development: Environment and sustainability in a developing world. Routledge.
- Al-Odeh, M., & Smallwood, J. (2012). Sustainable supply chain management: Literature review, trends, and framework. *International Journal of Computational Engineering & Management*, 15(1), 85-90
- Alter, L. (2013). Green Globes Certification System Launches Anti-LEED Screed.
- Bansal, P. (2002). The corporate challenges of sustainable development. *The Academy of Management Executive*, 16(2), 122-131.
- Bansal, P. (2005) Evolving sustainability: A longitudinal study of corporate sustainable development. *Strategic Management Journal*, 26 (3), 197–218
- Bansal, P., & Roth, K. (2000). Why companies go green: A model of ecological responsiveness. *Academy of management journal*, 43(4), 717-736.
- Bolo, A. Z., & Wainaina, G. (2011). An Empirical Investigation of Supply Chain Management Best Practices in Large Private Does your organisation in Kenya. *Prime Journal of Business Administration and Management*, 1(2), 2-3
- Dangelico, R. M., & Pujari, D. (2010). Mainstreaming green product innovation: Why and how companies integrate environmental sustainability. *Journal of business ethics*, 95(3), 471-486.
- Delmas, M., &Toffel, M. W. (2004). Stakeholders and environmental management practices: an institutional framework. *Business strategy and the Environment*, 13(4), 209-222.
- DiMaggio, P. J. Powell, W. W. (1983) The iron cage revisited: institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, 48 (2), 147–160
- Eltayeb, T. K., Zailani, S., &Ramayah, T. (2011). Green supply chain initiatives among certified companies in Malaysia and environmental sustainability: Investigating the outcomes. *Resources, conservation and recycling*, 55(5), 495-506.
- Farr, D. (2011). Sustainable urbanism: Urban design with nature. John Wiley & Sons.

#### Volume 1, Issue 7, 2018, ISSN: 2617-1805

- Finchman, C. M. (2012). Best practices for survey research reports: a synopsis for authors and reviewers. *American journal of pharmaceutical education*, 72(1), 11-16
- Freeman, R. Edward (1984). Strategic Management: A Stakeholder Approach. Cambridge University Press
- Fujii, H., Iwata, K., Kaneko, S., & Managi, S. (2013). Corporate environmental and economic performance of Japanese manufacturing firms: Empirical study for sustainable development. *Business Strategy and the Environment*, 22(3), 187-201.
- Jennings, P. D. Zandbergen, P. A. (1995) Ecologically sustainable organizations: An institutional approach. *The Academy of Management Review*, 20 (4), 1015–1052
- KAM. (2018). Kenya Association of Manufacturers, Sector Report.
- Lee, S.-Y. Klassen, R.D. Furlan, A. Vinelli, A. (2014) The green bullwhip effect: Transferring environmental requirements along a supply chain. *International Journal of Production Economics*, 7(9), 39–51.
- Lin, P. C., & Huang, Y. H. (2012). The influence factors on choice behavior regarding green products based on the theory of consumption values. *Journal of Cleaner Production*, 22(1), 11-18.
- Markmann, C., Darkow, I. L., & von der Gracht, H. (2013). A Delphi-based risk analysis—Identifying and assessing future challenges for supply chain security in a multi-stakeholder environment. *Technological Forecasting and Social Change*, 80(9), 1815-1833
- Milstein, M. B. Hart, S. L. York, A. S. (2002) Coercion breeds variation: The differential impact of isomorphic pressures on environmental strategies. In: *Organizations, policy and the natural environment*, ed. by A. J. Hoffman M. J. Ventresca, 151 –172. California: Stanford University Press.
- Muma, B. O., Nyaoga, R. B., Matwere, R. B., & Nyambega, E. (2014). Green supply chain management and environmental performance among tea processing firms in Kericho County-Kenya. *International Journal of Economics, Finance and Management Sciences*, 2(5), 270-276
- Mutisya, F. M., & Kinoti, J. (2017). Effect of Green Supply Chain Practices on Performance of Large Chemical Manufacturing Firms in Nairobi County Kenya. *International Journal of Supply Chain Management*, 2(2), 1-21.
- Mwaura, A. W., Letting, N., Ithinji, G. K., & Orwa, B. H. (2016). Green Distribution Practices and Competitiveness of Food Manufacturing Firms in Kenya.
- Nasiche, F., & Ngugi, G. K. (2014). Determinants of adoption of green procurement in the public sector: A case study of Kenya Pipeline Company. *International Journal of Social Sciences and Entrepreneurship*, *I*(11), 351-372.
- Ngui, D.M. (2008). On the Efficiency of the Kenyan Manufacturing Sector: An Empirical Analysis, Shaker, Aachen

## Volume 1, Issue 7, 2018, ISSN: 2617-1805

- Ninlawan, C., Seksan P., Tossapol K. & Pilada W. (2010). The implementation of green supply chain management practices in electronics industry. *Proceedings of the International Multi Conference of Engineers and Computer Scientists*, 17-19 March 2010 Hong Kong
- Okello, J. O. & Were, S. (2014). Influence of supply chain management practices on performance of the Nairobi Securities Exchange's listed, food manufacturing companies in Nairobi. International Journal of Social Sciences and Entrepreneurship, 1 (11), 107-128.
- Omonge, W. O. (2012). Green supply chain management practices and competitiveness of commercial banks in Kenya. *Unpublished MBA project, University of Nairobi*.
- Ones, D. S., & Dilchert, S. (2012). Environmental sustainability at work: A call to action. *Industrial and Organizational Psychology*, 5(4), 444-466.
- Piotrowski, R., & Kratz, S. (2005). Eco-labelling in the Globalised Economy. In *Challenges of globalization: new trends in international politics and society* (pp. 217-237). Transaction Publishers New Jersey.
- Rahul, T. M., & Verma, A. (2013). Economic impact of non-motorized transportation in Indian cities. *Research in transportation economics*, 38(1), 22-34.
- Rentizelas, A. A., Tolis, A. J., & Tatsiopoulos, I. P. (2009). Logistics issues of biomass: the storage problem and the multi-biomass supply chain. *Renewable and Sustainable Energy Reviews*, 13(4), 887-894.
- Rozar, N. M., Mahmood, W. H., Ibrahim, A., & Razik, M. A. (2013). A Study of Success Factors in Green Supply Chain Management in Manufacturing Industries in Malaysia. *Journal of Economics, Business and Management*, 3 (2), 2-7
- Ruteri, J, M., & Xu, Q. (2009). Supply chain management and challenges facing the food industry sector in Tanzania. *International Journal of Business and Management*, 4(2), 67-89
- Sarkis, J. Zhu, Q. Lai, K.-H. (2011) An organizational theoretic review of green supply chain management literature. *International Journal of Production Economics*, 130 (1), 1–15.
- Smith, A. D. (2012). Green manufacturing in the packaging and materials industry: case study of small-to-medium sized corporate eco-friendly initiatives. *International Journal of Logistics Systems and Management*, 11(4), 429-449.
- Tate, W. L. Dooley, K. J. Ellram, L. M. (2011) Transaction cost and institutional drivers of supplier adoption of environmental practices. *Journal of Business Logistics*, 32 (1), 6–16.
- Thidell, Å., Leire, C., & Lindhqvist, T. (2015). Indicators for Ecolabelling: Opportunities for GEN Members to demonstrate and benchmark advancements in performance and effects.
- Williamson, O. E. (1981). The economics of organization: The transaction cost approach. *American journal of sociology*, 87(3), 548-577.

#### Volume 1, Issue 7, 2018, ISSN: 2617-1805

- Wong, C. W., Lai, K. H., Shang, K. C., Lu, C. S., & Leung, T. K. P. (2012). Green operations and the moderating role of environmental management capability of suppliers on manufacturing firm performance. *International Journal of Production Economics*, 140(1), 283-294.
- Brockhaus, S., Kersten, W., & Knemeyer, A. M. (2013). Where do we go from here? Progressing sustainability implementation efforts across supply chains. *Journal of Business Logistics*, 34(2), 167-182.
- Foerstl, K., Azadegan, A., Leppelt, T., & Hartmann, E. (2015). Drivers of supplier sustainability: Moving beyond compliance to commitment. *Journal of Supply Chain Management*, 51(1), 67-92.
- World Health Organization. (2015). WHO guidelines for indoor air quality: household fuel combustion. World Health Organization.
- World Manufacturing Production, (2014). Report on world manufacturing production
- Yan, Y. K., & Yazdanifard, R. (2014). The concept of green marketing and green product development on consumer buying approach. *Global Journal of Commerce & Management Perspective*, 3(2), 33-38.
- Yelpaala, K. (2004). Mining, Sustainable Development and Health in Ghana: The Akwatia Case-Study. U.S.A: Brown University
- Young, W., Hwang, K., McDonald, S., & Oates, C. J. (2010). Sustainable consumption: green consumer behaviour when purchasing products. *Sustainable development*, 18(1), 20-31.
- Zawadi, A. E. J. (2018). Determinants of green procurement implementation in the public sector in kenya: a case of rural electrification authority. *Strategic Journal of Business & Change Management*, 5(1).
- Zsidisin, G. A., & Siferd, S. P. (2001). Environmental purchasing: a framework for theory development
- Zu'bi, M. F., Tarawneh, E., Abdallah, A. B., & Fidawi, M. A. (2015). Investigating supply chain integration effects on environmental performance in the Jordanian food industry. *American Journal of Operations Research*, 5(04), 247.