

Effects of Green Purchasing Practices on the Performance of Large Chemical Manufacturing Firms in Nairobi County, Kenya

Bob Evans Ochieng

School of Business and Human Resource Development,

Rongo University,

P.O. Box 103-40404, Rongo, Kenya



Abstract - Social and political concerns about the environment in Kenya have increased in the recent years. Kenya Association of Manufacturers reiterates that the declining performance is disturbing for business and indicates eroded competitiveness and compromises the government's aspirations of 20% growth that can enable Kenya to become prosperous. The growing importance of green supply chain practices are driven mainly by the escalating deterioration of the environment for instance diminishing raw material resources, overflowing waste sites and increasing levels of pollution. Therefore, there was need to establish the effect of green supply chain practices on performance and provide policy recommendations that can help salvage the poor performance recently witnessed in the manufacturing sector. The study specifically focused on green purchasing practices. This study was built on resource based view and the institutional theories. This study adopted a descriptive survey design. The target population consisted of 63 large chemical manufacturing firms licensed by the Kenya Association of manufacturers. The unit of observation was supply chain managers at different manufacturing sectors of the industry. The sample size was 63 licensed large chemical manufacturing selected using stratified sampling method. The study used correlation and regression to achieve the specific objectives. The study established that green purchasing practices significantly influence the performance of large chemical manufacturing firms in Kenya.

Keywords - Green Purchasing Practices, Performance, Large Chemical Manufacturing Firms

I. INTRODUCTION

Manufacturing firms just like other organizations throughout the world are increasingly becoming aware of the danger posed by environmental issues such as global warming, carbon emissions, toxic substance usage, and resource scarcity. It is this worrying realization that has had policy makers and activists advocate for going green, and many organizations including manufacturing firms throughout the world have responded to this by adopting green supply chain practices ([1]). Green supply chain management has emerged as an important component of the environment and supply chain strategies for a number of

manufacturing firms and they have been aiming at integrating environmental concerns in their business operations and in interactions with their stakeholders in embracing environmental sustainability into business strategies ([2]).

Moreover, green supply chain management is defined as an approach to improve performance of the process and products according to the requirements of the environmental regulations ([3]). Green supply chain management is deemed as the improvement in environmental impact which is achieved by the management of raw materials, parts/components and processes from suppliers to

manufacturers to customers ([4]). It integrates environment thinking into supply chain management, including product design, material sourcing and selection, manufacturing process, delivery of the final product to the consumers and end-of life management of the product after its useful life ([1]). Green supply chain management has increased an environmentally conscious mindset to supply chain management and has been introduced into many final manufacturing processes ([5]).

In addition, green supply chain management is broken into four components: i) Green purchasing which involves the purchase of products that are environmentally friendly, ii) Green distribution which involves environmental thinking in green design, green packaging and eco-labeling, iii) Green manufacturing; involves use of inputs with relatively low environmental impacts and iv) Reverse Logistics; the process of planning, implementing and controlling the effective flow of raw materials, in process inventory, finished goods and related information from the consumer to the point of origin for the purpose of creating value ([6]). Green supply chain management practices has emerged as an important new innovation that helps organizations develop “win-win” strategies that achieve profit and market share objectives by lowering their environmental risks and impacts, while raising their ecological efficiency ([7]). Green supply chain management has numerous benefits to an organization, ranging from cost reduction, to integrating suppliers in a participative decision-making process that promotes environmental innovation ([8]).

With increase in environmental concerns during the past decade, a consensus is growing that environmental pollution issues accompanying industrial development should be addressed together with supply chain management ([9]). However, there was a need for more research in the area as most of the previous studies have not focused on green supply chain management specifically green purchasing practices. There was need to establish the effect of green purchasing practices on performance of Large chemical Manufacturing firms and provide policy recommendations that can help salvage the poor performance recently witnessed in the manufacturing sector. This study was determine the effect of green purchasing practices on performance of large chemical manufacturing firms in Nairobi County Kenya

The study was based on the resource based view theory of the firm emphasizes that valuable, rare, imperfectly imitable, and non-substitutable resources create a

competitive edge ([10]). The Resource based view considers certain resources and notes that a competitive edge is founded on valuable, rare, inimitable resources and organization ([11]). The Institutional theory is relevant to the study in linking the role of the government regulations as well as other external forces such as suppliers and customers in achievement of green supply chain practices by companies.

II. MATERIALS AND METHODS

This study adopted a descriptive survey design. The study targeted 63 chemical manufacturing firms. According to the Kenya Association of Manufacturers report indicates that there were 63 chemical manufacturing firms as at 2016 ([12]). The study adopted a census approach since the population was small. The supply chain managers or the procurement managers were requested to respond to the questionnaire. The study used both primary and secondary data. A questionnaire was used to collect primary data in this study. The data collected was analyzed using descriptive and inferential statistics. Descriptive statistics describes data by percentages, frequencies, means, and standard deviations while inferential statistics was carried out using a regression model. SPSS version 22 was used to carry out data analysis and also regression analysis in order to establish the relationship between the variables. The model of the study was presented in a linear equation form as shown below.

$$Y = \alpha + \beta_1 X_1 + e$$

Where:

Y = Performance of Large chemical Manufacturing Firms

X_1 = Green Purchasing Practices

e = Error term

α = regression constant

III. RESULTS AND DISCUSSIONS

A total of 52 filled questionnaires were returned out of the 63 that were distributed, yielding an 82% percent response rate. However, 11 questionnaires were completely not responded to by the targeted respondents (representing 18%). The response rate of 82% was found to be above the acceptable range for such a survey. Scholars have argued that in research a response rate of above 50% is adequate, 60% is good and a response rate of over 70% is very good ([13]). Based on these assertions, the response rate of 82% was therefore considered representative of the respondents

to provide information for analysis and deemed acceptable for making statistical inferences.

The study sought to determine the effect of green purchasing practices on performance of large chemical manufacturing firms in Nairobi County Kenya. The study asked the respondents to rate the extent to which they agree or disagree with the statements on green purchasing practices based on five point Likert scale where; 1 = strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = strongly agree. The findings of the study are as indicated in Table 2.

As shown in Table 1, the results of the study indicated that 39.7% of the respondents strongly agreed with the statement that the purchases recyclable products, those who indicated agree were also 39.7%, those who neither agreed nor disagreed were 13.8% while 6.9% of them disagreed. Moreover, majority 81% of the respondents strongly agreed that the company purchases energy saving equipment's while only 19% of them neither agreed nor disagreed. Additionally, results of the study revealed that majority 86.2% of the respondents indicated that they strongly agree with the statement that the company allows

for reverse logistics by accepting products back from consumers while only 13.8% of them indicated agree.

Further, the findings of the study revealed that 15.5% of the respondents strongly agreed with the statement that company purchases products that have been stamped by reliable eco-labels, 27.6% of them indicated agree, those who neither agreed nor disagreed were 39.7% while those who indicated disagree were 6.9% and 10.3% of them indicated strongly disagree. Finally, results of the study showed that majority 86.2% of the respondents indicated that they strongly agree with the statement that company cooperate with suppliers to ensure standard packaging while only 13.8% of them indicated agree.

The implication of the findings of the study is that the respondents agreed that green purchasing practices affects the performance of large chemical manufacturing firms in Nairobi County Kenya as indicated by a mean of 4.36. The responses given by the respondents were less varied as shown by a standard deviation of 0.71.

Table 1 Green Purchasing Practices

Statement	1	2	3	4	5	Mean	Std Dev
The company purchases recyclable products	0.0%	6.9%	13.8%	39.7%	39.7%	4.12	0.90
The company purchases energy saving equipment's	0.0%	0.0%	19.0%	0.0%	81.0%	4.62	0.79
The company allows for reverse logistics by accepting products back from consumers	0.0%	0.0%	0.0%	13.8%	86.2%	4.86	0.35
The company purchases products that have been stamped by reliable eco-labels	10.3%	6.9%	39.7%	27.6%	15.5%	3.31	1.14
The company cooperate with suppliers to ensure standard packaging	0.0%	0.0%	0.0%	13.8%	86.2%	4.86	0.35

The market share in terms of the percentage of the market covered for the large chemical manufacturing firms was established and indicated in a trend analysis from the year 2012 to the year 2016 (Figure 1). The results indicate an unsteady increase in the market share from 2012 to 2016. The market share increased from 9% in 2012 to 11% in

2013. Results indicate a decrease in the market share to 10% in 2014 but it steadily increased to 12% and 14% in 2015 and 2016 respectively.

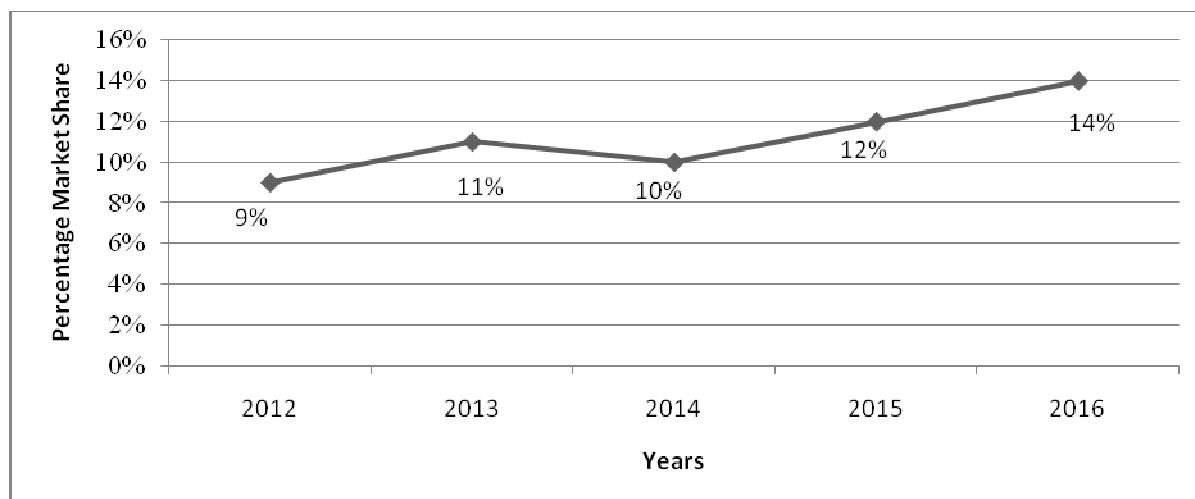


Figure 1 : Trends for Market Share

The returns on investment for the large chemical manufacturing firms was established and indicated in a trend analysis from the year 2012 to the year 2016. Results indicate a steady increase in the returns on investment from

2012 to 2015. Returns on investment increased from 13.23 billion shillings in 2012 to 19.12 billion shillings in 2015. Results indicate a slight decrease in returns on investment in 2016 to 18.23 billion shillings (Figure 2).

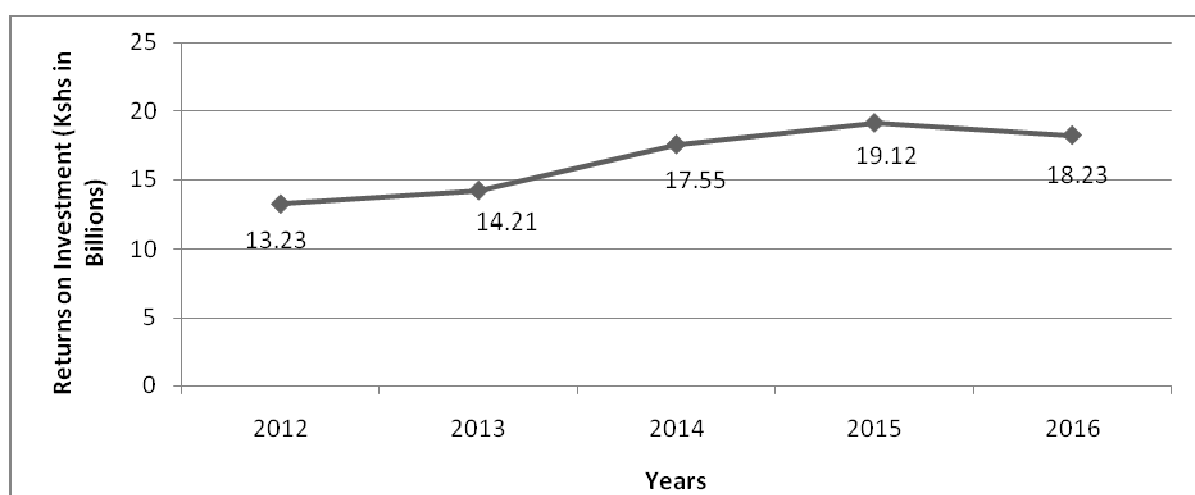


Figure 2: Trends for Returns on Investment

The profits before tax in billion shillings for the large chemical manufacturing firms was established and indicated in a trend analysis from the year 2012 to the year 2016 (Figure 3). The results indicate a steady trend from the year 2012 to 2016. Profits before tax steadily increased from

14.23 billion shillings to 20.11 billion shillings in 2015 but it slightly decreased in 2016 to 20.03 billion shillings.

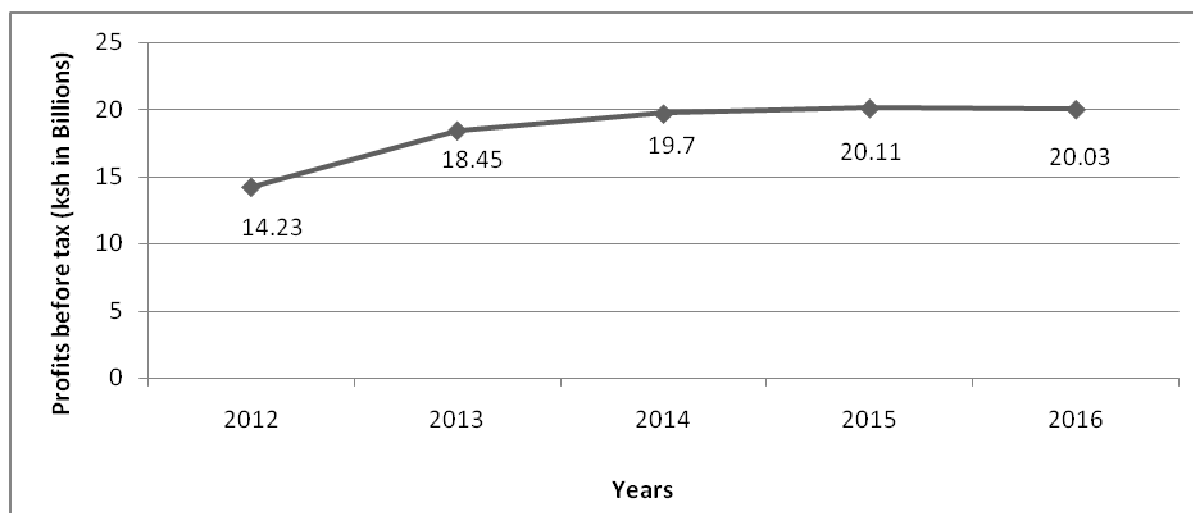


Figure 3: Trends for Profits before Tax

The returns on assets in billion shillings for the large chemical manufacturing firms was established and indicated in a trend analysis from the year 2012 to the year 2016 (Figure 4). The results indicate an unsteady trend from the

year 2012 to 2016. Return on assets steadily increased from 0.03 billion shillings in 2012 to 0.34 billion shillings in 2014 but it significantly dropped in 2015 to 0.09 billion shillings and subsequently improved in 2016 to 0.11 billion shillings.

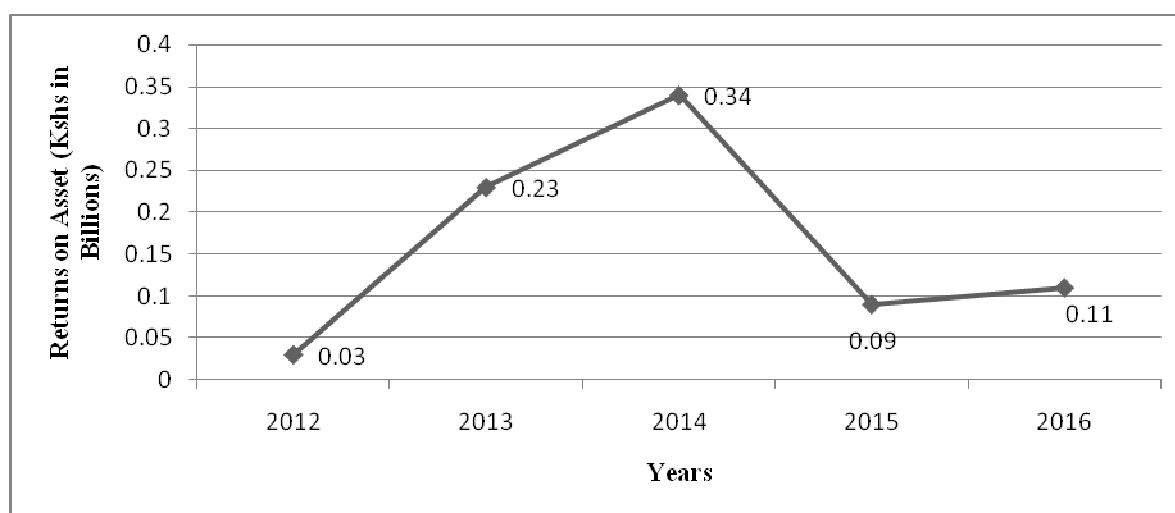


Figure 4 : Trends for Returns on Asset

The association among the variables used in the study was examined using the correlation analysis whose results are presented in Table 2. The summary of the correlation analysis results shows that there was a strong positive and significant association between green purchasing practices and the performance of large chemical manufacturing firms in Nairobi County Kenya as shown by a Pearson coefficient of 0.780 and significance level of 0.000. This shows that an increase in green purchasing practices such as practicing green manufacturing system, purchasing energy saving

equipment's by the company, purchasing products that have been stamped by reliable eco-labels, cooperating with suppliers to ensure standard packaging and allowing for reverse logistics by accepting products back from consumers leads to a positive and significant effect on the performance of large chemical manufacturing firms in Nairobi County Kenya. The study findings are consistent with the findings which indicated that green supplier development has a direct impact on supply chain performance ([14]).

Table 2 : Correlation analysis

Correlations		Green purchasing	Performance
Green Purchasing	Pearson Correlation	1	
	Sig. (2-tailed)		
Performance	Pearson Correlation	.0.780**	1
	Sig. (2-tailed)	0.000	
	N	52	52

** Correlation is significant at the 0.01 level (2-tailed).

In order to establish the effect of green purchasing practices on performance of large chemical manufacturing firms in Nairobi County Kenya, the study used an ordinary least square regression model. The results for model summary are as shown in Table 3. The study findings showed that green purchasing practices account for 60.8% of

the variation in the performance of large chemical manufacturing firms in Kenya. This is shown by a by an R-square value of 0.608. Regression results also show that R was 0.780 that shows that the correlation between the independent variables and the dependent variable was positive.

Table 3: Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
.780	0.608	0.579	0.2711

The results of the study revealed that the regression model linking green purchasing practices and the performance of large chemical manufacturing firms in

Kenya was significant as indicated by a significant F statistic value of 20.572 at 5% significance level (Table 4).

Table 4 ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	6.048	1	1.512	20.572	.000
Residual	3.895	50	0.073		
Total	9.943	51			

Dependent Variable: Performance

Predictors: (Constant) Predictors: (Constant), Green purchasing

The regression coefficients revealed that green purchasing practices had a positive and significant effect on the performance of large chemical manufacturing firms in Kenya ($\beta=0.385$, Sig=0.000) (Table 5). This implies that an increase in the include practicing green manufacturing system, purchasing energy saving equipment's by the

company, purchasing products that have been stamped by reliable eco-labels, cooperating with suppliers to ensure standard packaging and allowing for reverse logistics by accepting products back from consumers leads to 0.385 unit effect in the performance of large chemical manufacturing firms in Kenya.

Table 5 : Regression coefficients

Predictor	Beta	Std. Error	T	Sig.
(Constant)	0.260	0.480	0.541	0.591
Green purchasing	0.385	0.102	3.781	0.000

Dependent Variable: Performance

IV. CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

The study concluded that green purchasing positively and significantly affect the performance of large chemical manufacturing firms in Kenya. An increase in the practice of green manufacturing system, purchasing energy saving equipment's by the company, purchasing products that have been stamped by reliable eco-labels, cooperating with suppliers to ensure standard packaging and allowing for reverse logistics by accepting products back from consumers positively influences the performance of large chemical manufacturing in Kenya.

4.2 Recommendations

The study recommends large chemical manufacturing firms in Kenya to ensure they have green manufacturing system. There is also need for large chemical manufacturing firms to purchase energy-saving equipment. There is also need for firms to purchase products that have been stamped by reliable eco-labels. The study also recommends large chemical manufacturing firms to cooperate with suppliers to ensure standard packaging. Lastly, the study recommends manufacturing firms to allow for reverse logistics by accepting products back from consumers.

REFERENCES

- [1] Xie, Y., & Breen, L. (2012). Greening community pharmaceutical supply chain in UK: a cross boundary approach. *Supply Chain Management: An International Journal*, 17(1), 40-53.
- [2] Dyllick, T., & Hockerts, K. (2002), "Beyond the business case for corporate sustainability", *Business Strategy and the Environment*, v. 11, n. 2, p. 130-41.
- [3] Hsu, C. & Hu, A. (2008). Green supply chain management in the electronic industry. *International Journal of Environmental Science & Technology*, Vol. 5 No. 2, pp. 205-16.
- [4] Lin, R. J. (2013). Using fuzzy Dematel to evaluate the green supply chain management practices. *Journal of Cleaner Production* 40 (February), 32-39.
- [5] Colicchia, C., Melacini, M. & Perotti, S. (2011). Benchmarking supply chain sustainability: insights from a field study. *Benchmarking: An International Journal* 18 (5), 705-732.
- [6] Ninlawan, C., Seksan, P., Tossapol, K., & Pilada, W., (2010). The Implementation of Green Supply Chain Management Practices in Electronic Industry. *International Multi-Conference of Engineers and Computer Scientists*, 3 (1) : 978-988.
- [7] Hock, R.I. & Erasmus, R. (2000). From reversed logistics to green supply chains. *Logistics Solutions*. 2: 28-33.
- [8] Rao, P. (2002). Greening of the supply chain: a new initiative in South East Asia. *International Journal of Operations & Production Management*, Vol. 22 No. 6, pp. 632-55.
- [9] Sheu, J.B., Chou, Y.H., & Hu, C.C. (2005). An integrated logistics operational model for green supply chain management. *Trans. Res.*, 41(4), 287-313.
- [10] Melville, N., Kraemer, K., & Gurbaxani, V. (2004). Information technology and organizational performance: An integrative model of IT business value. *MIS Quarterly*, 28(2), 283-322.
- [11] Cardeal, N., & Antonio, N. (2012). Valuable, Rare, Inimitable resource and organization (VRIO) resources or valuable, rare, inimitable resources (VRI) capabilities: what leads to competitive advantage? *African journal of business management*, 6 (37) : 1-8.
- [12] Kenya Association of Manufacturers (2016). Kenya's Economic Outlook, 2016. Retrieved from <http://www.kam.co.ke/?itemld=17&newsld=459>.
- [13] Kothari, C.R. & Garg, G. (2014). *Research Methodology : Methods and techniques* (3rd ed). New Age International, New Delhi.
- [14] Blomea, C., Hollos, D. & Paulraj, A. (2013). GP and green supplier development: antecedents and effects on supplier performance. *International Journal of Production Research*, 52(1), 32-49.