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**Effect of Green Purchasing Practices on Performance of Large Chemical Manufacturing Firms in Nairobi County Kenya**

Bob Evans Ochieng

School of Business and Human Resource Development

Rongo University, Kenya

**Corresponding Author email:** bevans@rongovarsity.ac.ke

**Cell Phone:** +254721146614

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**Abstract**

The study established the effect of green supply chain practices on performance of large chemical manufacturing firms in Kenya. The study specifically focused on green purchasing practices. This study was built on the Resource Based View Theory and the Institutional Theory. 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 data collection instrument was a questionnaire and secondary data collection template. Mean, frequencies and percentages was used to describe the data. The study used correlation and regression to achieve the specific objectives. Data presentation was done through charts, figures and tables. Analysis was conducted using SPSS version 21. The study established that green purchasing practices significantly influence the performance of large chemical manufacturing firms in Kenya.

**Key Words:** *Green Purchasing Practices, Performance, Large Chemical Manufacturing Firms*

## **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 (Xie & Breen, 2012). According to Dyllick and Hockerts (2002), 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.

According to Hsu and Hu (2012), 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. Wang and Lin (2011) defined green supply chain management 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. Xie and Breen, (2012) described green supply chain management as integrating 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. Green supply chain management has increased an environmentally conscious mindset to supply chain management and has been introduced into many final manufacturing processes (Colicchia *et al*, 2011).

Ninlawan (2010) breaks down green supply chain management 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. 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 (Van & Hock, 2010). 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 (Rao, 2012).

## **Statement of the Problem**

Social and political concerns about the environment in Kenya have increased in the recent years. Recently, the Kenyan government has established a new environmental management and natural resources Act, that aims to ban the use, manufacture and importation of all plastic bags used for commercial and household packaging, a move which was faced by huge protests from the manufacturers (Mwiti, 2017). According to Green *et al*. (2010), in the context of the deteriorating environment, green supply chain practices stands for innovations in supply chain management and industrial purchasing. Srivastava (2010) argue that success in the environmental protection is contributes to the building of a positive image for customers and provide many new opportunities to expand business thus improving the overall performance of a firm.

In the recent times, the performance of manufacturing firms in Kenya has scored poorly. The sector’s contribution

to the GDP has stagnated at an average of 10 per cent for more than ten years with a growth of 3.1 percent, significantly lower than the overall economic growth of 5.0 percent (WB, 2016). Kenya Association of Manufacturers (2016) 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 management is driven mainly by the escalating deterioration of the environment for instance diminishing raw material resources, overflowing waste sites and increasing levels of pollution, (Srivastava, 2010). However, it is not just about being environment friendly; it is about good business sense and higher profits. In fact, it is a business value driver and not a cost center, (Wilkerson, 2015).

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 (Sheu, Chou & Hu, 2015). However, there was a need for more research in the area as most of the previous studies haven't 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 therefore timely.

### **Objective**

To determine the effect of Green Purchasing Practices on performance of large chemical manufacturing firms in Nairobi County Kenya

### **Theoretical Review**

The Resource Based View theory of the firm emphasizes that valuable, rare, imperfectly imitable, and non-substitutable resources create a competitive edge, (Melville, Kraemer and Gurbaxani, 2004). Cardeal and Antonio (2012) explained that the resource based view considers certain resources and notes that a competitive edge is founded on Valuable, Rare, Inimitable resources and Organization. These resources include assets, capabilities, organisational processes, information, grouped as tangible or intangible resources. The Resource Based View highlights that the environment may create a barrier that affects the competitive business edge and hence the need for businesses to leverage on the environmental advantages in order to be ahead of competition (Hart, 1995). Prahalad and Hamel (1994) promoted the theory of core competences. Competences represents what a company is able to excel (Prahalad and Hamel, 1994), however, the core competencies represents a set of abilities that a company can leverage to outperform peers in the market place (Lawson and Lorenz, 1999). Under the Resource Based View, it is important that companies channel resources to leverage their core competences.

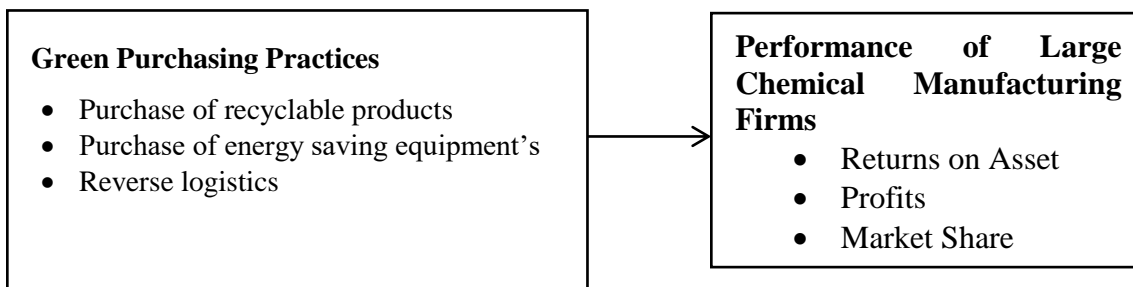
Institutional theory posits that external pressures strongly affect organizational decision making for instance green purchasing practices as firms operate in a way that meets social and legal regulations (Tate *et al.* 2011). Pressures from stakeholder's such as governments, customers, competitors, communities and environmental interest groups, and industry associations are likely to dictate environmentally responsible behaviour, (Delmas & Toffel, 2004). The pressures for environmental sustainability vary along the supply chain (Hall 2000).

Large, high-profile firms are under considerable pressure from external stakeholders to improve their environmental performance, whereas smaller suppliers or suppliers far upstream from the final consumer have fewer apparent incentives (Lee *et al.* 2014). Greening a supply chain is a potentially effective mechanism to improve a firm's record on corporate social responsibility, to abate reputational risks, to reduce wastes and to increase the flexibility to respond to new environmental regulations (Simpson *et al.* 2007). Less regulated contexts

support the emergence of green supply chains designed with the objective of providing innovation and differentiation, resulting in green supply chain practices initiatives diffusing through normative or mimetic pressures (Carbone & Moatti, 2011). Increasing the environmental awareness of consumers forms a core normative pressure for manufacturers to implement green supply chain practices (Sarkis *et al.* 2011). Recent literature also indicates that shippers' demands for environmentally friendly logistics services are also increasing, especially in developed economies, (Martinsen & Björklund, 2012).

Furthermore, peer pressure from professional networks and industry associations has a positive impact on green supply chain practices adoption (Tate *et al.* 2011). Normative isomorphism can occur if a few leading firms wish to derive first-mover advantages from green supply chain practices implementation (Carbone & Moatti, 2011). Suppliers and other members of the supply chain sharing similar characteristics or locations become aware of environmental practices and use this information to evaluate and compete with other supply chain members, (Tate *et al.* 2011). 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.

### **Conceptual Framework**



### **Independent Variable**

### **Dependent Variable**

Figure 1: Conceptual Framework

### **Empirical Review**

Pembere (2016) conducted a study to determine the effect of green purchasing practices on the supply chain performance of companies listed at the Nairobi Securities Exchange. The study adopted descriptive research design. The target population for the study was procurement managers of each listed company. The study used primary data. The findings of the study revealed that the adoption of green purchasing practices improves the supply chain performance.

Blomea, Hollosby and Paulrajac (2013) conducted a study to establish the effect of Green purchasing and green supplier development on supply chain performance of Western European firms within the manufacturing and service sector. The target population for the study comprised of senior corporate leaders from supply chain consulting companies in Europe. Data was collected using questionnaires. The findings of the study indicated that green supplier development and purchasing has a direct impact on supply chain performance.

Otanez and Glantz (2011) conducted a research on social responsibility in tobacco production in Tanzania and Malawi. The results of the study showed that tobacco industry uses green supply chains to make tobacco farming in developing countries appear sustainable while continuing to purchase leaf produced with child labour and high

rates of deforestation. Results of the study further indicated that strategies to counter green supply chain schemes consist of securing implementing protocols for the WHO Framework Convention on Tobacco Control to regulate the companies' practices at the farm level. Eltayeb, Zailani, and Ramayah (2011) conducted a study to determine the impact of the adoption of green purchasing practices. 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. The findings of the study indicated that green purchasing practices had influence on organizational performance outcome.

A study Muma *et al.* (2014) sought to investigate the effect of Green Supply Chain Management (GSCM) on Environmental Performance among tea processing firms in Kericho County. The study used a correlation research design. The target population for the study was 32 tea processing firms in the County. The findings of the study revealed that Green purchasing has positive effect on environmental performance. Kankanit (2015) sought to examine the influence of green supply chain management on business performance of electronic industry in Thailand. The study used both email and telephone survey. The target population for the study was 81 electronic manufacturing firms. The results showed that green purchasing and green distribution have positive and significant effect to economic and operational performance.

### **Research Methodology**

This study adopted a descriptive survey design. The study targeted 63 chemical manufacturing firms. KAM (2016) report indicates that there were 63 chemical manufacturing firms as at 2016. 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,  $\alpha$  = regression constant

### **Research Findings**

A total of 52 filled questionnaires were returned out of the 63 that were distributed, yielding a 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. Garg and Kothari (2014) 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. 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.

### **Reliability Results**

The study conducted a pilot test on 6 respondents who were not included in the final survey. This was conducted to establish the reliability of the research instrument. Cronbach (1951) argues that Cronbach Alpha value of 0.7 is the

threshold for determining reliability. The study used this threshold. The results indicated in Table 1 reveal that all the variables met the minimum threshold of 0.7 hence they were reliable to be used and hence the questionnaire was not adjusted.

**Table 1: Reliability Test Results**

Variable	Cronbach's Alpha	Number of questions	Recommendation
Green Purchasing	0.768	5	Reliable
Performance	0.814	5	Reliable

### Descriptive Findings and Analysis

The respondents were asked to rate statements on each of the variables of the study on a scale of 1 to 5 ranging from strongly disagree to strongly agree. The percentage response of the 52 respondents on each scale per variable is presented the section.

#### Green Purchasing Practices

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.

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 corporate 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. The results concur with the findings of study by Kyalo (2015) which showed that manufacturers utilize lean production, use biodegradable materials and total quality management in their operations.

**Table 2: Green Purchasing Practices**

<b>Statement</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>Mean</b>	<b>Std Dev</b>
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
<b>Average</b>						<b>4.36</b>	<b>0.71</b>

**Firm Performance**

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. 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.

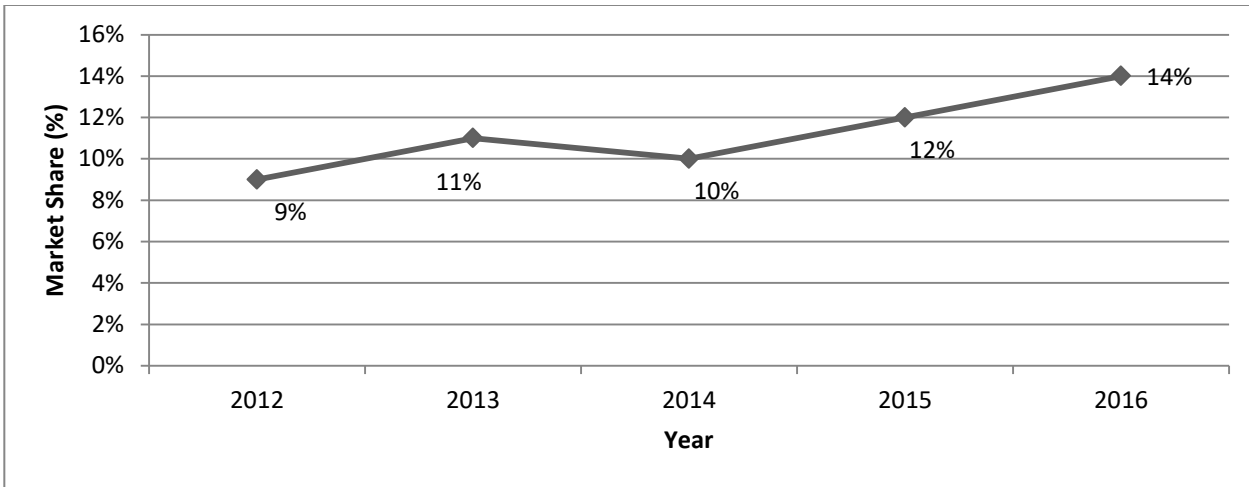


Figure 2: Trends for Market Share

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. 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.

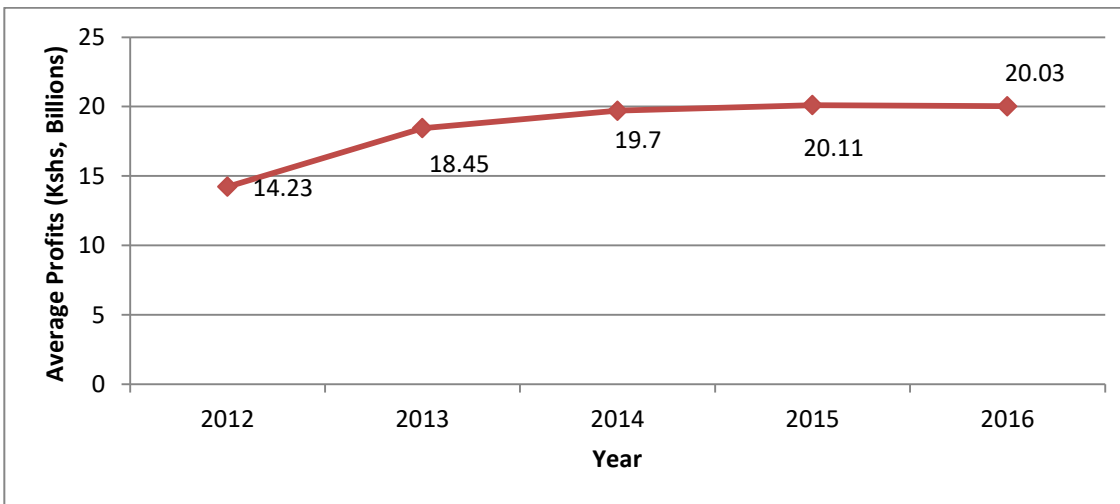


Figure 4: Trends for Profits before Tax

### Correlation Analysis

The association among the variables used in the study was examined using the correlation analysis whose results are presented in table 3. 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 of a study by Blomea, Hollosby and Paulrajac (2013) which indicated that green supplier development has a direct impact on supply chain performance.

**Table 3: Correlation analysis**

<b>Correlations</b>		<b>Green purchasing</b>	<b>Performance</b>
Green Purchasing Practices	Pearson Correlation	1	
	Sig. (2-tailed)		
Performance	Pearson Correlation	.0780**	1
	Sig. (2-tailed)	0.000	
	N	52	52

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

**Regression Model Estimation**

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 4.

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 4 Model Summary**

<b>R</b>	<b>R Square</b>	<b>Adjusted R Square</b>	<b>Std. Error of the Estimate</b>
.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 5 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). 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. The results are consistent with the findings of a study by Pembere (2016) which revealed that the adoption of green procurement practices improves the supply chain performance.

**Table 6 : 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**

**Conclusion**

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.

**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’s. 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.

**Conflict of Interest**

No potential Conflict of Interest was recorded by the authors

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