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Drivers of Green Procurement Eco-Innovation and Performance of Manufacturing Firms in Trans-Nzoia County, Kenya

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ABSTRACT

The study is aimed at exploring drivers of Green Procurement eco-innovation and performance of manufacturing firms in Trans Nzoia County, Kenya. The specific objectives of the study were; to evaluate the effect of reverse logistics on performance of manufacturing firms in Trans Nzoia County, Kenya, and to find out the effect of supplier selection on performance of manufacturing firms in Trans Nzoia County, Kenya. The study was anchored on stakeholder theory, Institutional theory. The study adopted descriptive Research Design while adopting a census method for data collection. The target population in this study was 200 respondents from manufacturing firms in Trans-Nzoia County, Kenya. The research instrument used was a structured questionnaire. Data was analyzed with the help of statistical package for social science version 26, Correlation and regression analysis tools were used establishing the relationship between the variables. The F-test (F=10.0449) which was greater than the critical value. The F-test indicated an overall statistically significant model with reverse logistics explained 59.1% (t~1.350); and supplier selection explained 64.2% (t~2.191). The findings therefore revealed statistically significant regression effect among the variables. The study was significant to both the leadership of Trans Nzoia County and management of the manufacturing firms and other firms in the county, procurement fraternity, and academicians in general. The study recommended that a replica of the study be performed in other counties for the manufacturing firms to determine whether the same variables derived from this study affects performance of manufacturers.

Keywords: [*Eco-innovation, Environmental laws, Green Procurement, Reverse Logistics*]

INTRODUCTION

In response to the growing urgency of environmental concerns in civil society, governments have increased their awareness of the impact of their purchase decisions. Green procurement (GP) has emerged as an important concept at a national and international level helping to drive markets toward environmental sustainability and producing positive environmental benefits (Walker & Phillips, 2009). However, GP is a complex and extreme departure from traditional procurement methods and it entails significant changes in fundamental organizational culture, beliefs, and technology surrounding procurement practices (Coggburn, 2004). Further, GP does not refer to any single process but to entire supply chains and types of services (Chersan, Dumitru, Gorgan, & Gorgan, 2020). For this reason, investigations that explore the internal factors that support the successful implementation of GP have been taking place for a decade. Leadership attributes and styl (Brammer & Walker, 2011; Liao & Zhang, 2020; Pirayesh & Pourrezay, 2019; Singh, Giudice, Chierici,

& Graziano, 2020). Ultimately, an organization's orientation toward sustainability is driven by its leadership's understanding of value (Stahl, Brewster, Collings, & Hajro, 2019, p. 9). Further, Van den Berg, Labuschagne, and Van den Berg (2013) suggested that leadership and innovation management are two of the most important ways of increasing competitiveness and achieving better environmental performance. Hence, for GP to be developed and sustained, organizations must foster change by enhancing leadership and innovation capabilities (Dost, Badir, Ali, & Tariq, 2016; Schwarz & Huber, 2008; Mazzucchelli, Chierici, Tortora, & Fontana, 2019; Zhang & Hartley, 2018). Successful GP transformation requires a shift in mindset to foster an environment that is conducive to innovation and novel value-added activities associated with sustainability and GP (Kumar & Rose, 2010; Fallon-Byrne & Harney, 2017).

Drivers of Green procurement practices are now a modern-day supply chain method to procure raw materials and to enhance the manufacturing process in organizations. Green procurement process is also known as the sustainable procurement method. One of the emerging issues that are experienced by the companies is to reduce the wastage or to decrease pollution in the process of the procuring material in the manufacturing process while companies are taking effective measure to do so. Most of the regimes globally employ effective and strict measures for the manufacturing firms to establish green procurement concepts and performances that could add value in the manufacturing sector (Nderitu &Ngugi, 2014). Procuring methods are essential and an important way to contribute to the performance excellence. The purpose of this section is to provide the background information regarding the green practices of the procurement and to improve its performance from a global perspective with respect to Vietnam. Manufacturing firms are playing an important role in the economy where most of the firms are persuaded to take green initiatives in the raw material procurement process (Sánchez-Flores *et al.*, 2020).

Green purchasing is defined as "affirmative selection and acquisition of products and services that most effectively minimize negative environmental impacts over their life cycle of manufacturing, transportation, use and recycling or disposal", (NIH, 2011). The attributes which products and services, must include are its ability to conserve energy and water, minimize generation of waste and releases of pollutants, and can be recycled. Green purchasing is key to superior performance 189 In simple words, green purchasing, environmental aspect is taken into consideration along with other dimensions like quality, cost, delivery, technology, service and others strategic importance variables (O'Connor *et al.*, 2011), while making procurement decisions. Ultimate goal is to reduce environmental impacts of sourcing and to increase resource efficiency. There is range of green purchasing strategies available to companies.

Different strategies have different impacts on the environmental behavior of suppliers. The strategies can be grouped into three major categories: product standards, behavior standards, and collaboration (Green *et al.*, 1998). For example, specifying product standards is not likely to change a supplier's behavior since the supplier only has to change ingredients. In general, more effort by buyers is needed to increase the environmental performance of suppliers. Thus buyers must make a cost-benefit analysis regarding how much they want their suppliers to improve. Product standard is the first strategy to implement eco-friendly purchasing. According to this, purchase products that have environmentally-friendly attributes (recycled materials and non-toxic ingredients). It is required to know about the practices, implemented by supplier, by manufacturer. Behavior standards favor to disclose information about their environmental practices, pollution

discharges, etc. by supplier. Audit suppliers to evaluate their environmental performance require suppliers to implement and maintain environmental management system requires suppliers to have a system that meets recognized standards (ISO 14001, Responsible Care, etc.).

Collaboration is always desirable in supply chain. For green procurement it is to work with suppliers to help them reduce environmental impacts through changes in product design and materials use. Active management is needed, from both sides, in all aspects of the product from raw materials to final disposal. Broadly, suppliers responded to (environmental) problems only if the customer companies required them to do so, indicating that the area is very market-driven. This general response should be considered in relation to the range of green purchasing strategies available. The evidence indicates that it takes direct communication from buyers for suppliers to take environmental issues seriously, Cox (1996).

Most organizations that include environmental criteria in purchasing limit themselves to product standards. They may assume that such standards promote environmental improvement up the supply chain but this is not likely to be the case. Active involvement is needed to ensure true improvements from both sides in all aspects. The business benefits of working closely with suppliers as strategic partners are extensively documented. Companies that collaborate with suppliers on solving environmental problems was used in general from improved communications, systems integration, planning and research. Specific environmental benefits include reduction of environmental risks to supply reliability and less pollution control cost (which is passed on eventually to buyers). In summary, the effort and cost to buyers of collaborating with suppliers on environmental improvement will generally be offset by the general and specific business advantages from better business partnerships. Globalization increases the opportunities for buyers to source from in an increasing number of countries. As buyers increase their focus on environmental improvement, the issue of supplier environmental performance will increase in importance. This is particularly true for organisations that regard environmental improvement as a social goal, not just an issue of cost, risk and public image (Guang *et al.,* 2012)

In order to produce environment friendly products, manufacturers need to work with their suppliers of raw materials and components. Using their purchasing power, the industries can set up environmental criteria for their suppliers upstream in supply chain. In addition to setting up the requirements, the big buyers can also provide assistance to the suppliers for meeting these requirements. The supplies and eventually the end product thus become environment-friendly. As this phenomenon percolates along the supply chain, ultimately it can result in the 'greening' of the entire supply chain (Lehner, 2007) and the benefits from greening supply chain can be measured using framework to enhance effective managerial control (Bjorklund *et al*., 2012).

Statement of the Problem

Amina (2013) researched on drivers of green supply chain of personal care manufacturing firms in Nairobi, targeting procurement managers as one of the study's respondents found out that managers were well aware of the threats that firms have on the environment resulting from supply chain waste. The study found out that although most firms were aware, they did not use environmental seven issues in the criteria for selecting suppliers and that a great percentage of these firms did not have professional personnel to coordinate environmental purchasing efforts. Green supply chain management practices by manufacturing firms in Kenya.

Khatra (2012) in his study, drivers of Green Supply Chain Management and Performance of the Manufacturing firms in Mombasa, Kenya" sought to identify the

green supply chain practices and challenges. He found out that the practices have a positive impact and also highlighted the relevance of Green supply chain in overcoming environmental challenges was highly appreciated by manufacturing firms in Mombasa. Kenya led the banning of plastic bags in 2017 as proposed by EAC in the year 2011. The plastics bags were replaced with alternatives made from biodegradable materials in line with eco-innovation principles and practices. This motivated most firms to implement Green procurement and thus produce eco-friendly products. However, most of the organization have not fully implemented despite its numerous advantages which include: Economic benefits, competitive advantage through innovation, improved public image, helping governments to meet set standards. Organization face complex deliberations on whether to adopt the green purchasing (Davila, 2003). The study carried out a census manufacturing firms to establish the extent of Green procurement and performance of manufacturing firms in Trans-Nzoia County, Kenya.

General Objective

The General Objective was to establish drivers of Green Procurement eco-innovation and performance of manufacturing firms in Trans-Nzoia County, Kenya.

Specific Objectives

The specific objectives of the study were:

1. To evaluate the effect of reverse logistics and performance of manufacturing firms in Trans-Nzoia County, Kenya.
2. To find out the effect of suppliers ’selection and performance of manufacturing firms in Trans-Nzoia County, Kenya.

Research Questions

1. What is the effect of reverse logistics on performance of manufacturing firms in Trans-Nzoia County, Kenya?
2. How does supplier selection affect performance of manufacturing firms in Trans- Nzoia County, Kenya?

LITERATURE REVIEW

Theoretical Framework

The theoretical framework is the structure that can hold or support a theory of a research study. The theoretical framework introduces and describes the theory that explains why the research problem under study exists (Abend & Gabriel, 2008).

Stakeholder Theory

The stakeholder theory is a theory of organizational management and business ethics that accounts for multiple constituencies impacted by business entities like employees, suppliers, local communities, creditors, and others (Lin &Tom, 2018). It addresses morals and values in managing an organization, such as those related to corporate social responsibility, market economy, and social contract theory. The stakeholder view of strategy integrates a resource-based view and a market-based view, and adds a socio-political level. One common version of stakeholder theory seeks to define the specific stakeholders of a company (the normative theory of stakeholder identification) and then examine the conditions under which managers treat these parties as stakeholders (the descriptive theory of stakeholder salience) (Phillips & Robert, 2003). In fields such as law, management, and human resources, stakeholder theory succeeded in challenging the usual analysis frameworks, by suggesting that stakeholders' needs should be put at the beginning of any action (Harrison, Wicks, Parmar & De Colle, 2010). Some authors such as Geoffroy Murat tried to apply stakeholder's theory to irregular warfare (Connelley & Tripodi, , 2012). According to Freeman (1984) defines a stakeholder as any individual, organization or institution that is associated with a firm, and is either affected by the firm in some way, or affects the firm’s action and goals.

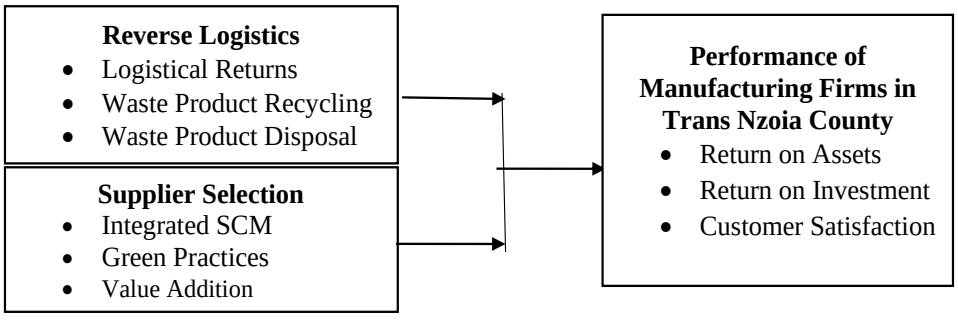
On the other hand Hart (1995) argues that firms that seek to develop and implement a proactive strategic environmental commitment are considered to be more aware of stakeholder needs than those that are only concerned with meeting minimum environmental regulation requirements. Stakeholder theory describes the purpose and strategic direction of the firm through the concept that managers need to simultaneous incorporate the legitimate interests of all appropriate stakeholders when making business decisions.

Institutional Theory

Meyer and Rowan (2006) on Institutional Theory argue that the institutional environment strongly influence the development of formal structures in an organization more than market pressures. To improve efficiency in organizations innovative structures are legitimized. Ultimately this innovations reach a level of legitimization where failure to adopt them is seen as „irrational and negligent". Here, new and existing organizations will embrace the structural form even if it doesn't boost efficiency. This means that the „institutional myths" are ceremoniously accepted so that organizations maintain legitimacy in the institutional environment with „vocabularies of structure such as job titles, procedures and roles. In the 10 long run, this formal structure of legitimacy reduces efficiency and become an impediment to the organizations competitive position in their technical environment. To avert these, organizations will decouple their technical core from these legitimizing structures to maintain external and internal confidence informal structures while reducing their efficiency impact. The institutional theory explains the companies undertaking certain strategies that are based on the forces outside the company. However, acceptance by the customers and stakeholders is an essential part for the firm. Each company is shaping effective measures for the corporate social responsibility (CSR) and how every firm is adopting practice within the environmental context to lower the pressure from the external parties such as government and other environment regulative agencies (Pembere, 2016). The theory is used to cope with the institutional pressures that are taken by the institution on green procurement

Conceptual Framework

Conceptual framework is an analytical tool with several variations and context. It can be applied in different categories of work where an overall picture is needed. It is used to make conceptual distinctions and ideas (Berlin Isaiah, 1953).



Empirical Review

Reverse Logistics

Reverse logistics is more than reusing containers and recycling packaging materials. Reverse logistics also involves recycling of waste products, monitoring of logistics returns and proper disposal of waste products redesigning packaging to use less material, or reducing the energy and pollution from transportation are important activities, but they might be secondary to the real importance of overall reverse logistics. Reverse logistics also includes processing returned merchandise due to

damage, seasonal inventory, restock, salvage, recalls and hazardous material programs, obsolete equipment disposition and asset recovery. One of the more interesting and significant trends in supply chain management is the recognition of the strategic importance of reverse logistics operations (Stock *et al.,* 2006).

These reverse logistics operations support a variety of activities ranging from what is termed "green logistics," i.e., "efforts to reduce the environmental impact of the supply chain" to activities that encompass product returns, repairs, and refurbishment (Srivastava, 2013). The prominent environmental issues in logistics are consumption of non-renewable natural resources, air emissions, congestion and road usage, noise pollution, and both hazardous and non-hazardous waste disposal (Russo & Cardinali, 2012). Reverse logistics practices can reduce the customer's risk when buying a product, and increase the customer value (Russo & Cardinali, 2012). However, the success of reverse logistics implementation requires the coordination of forward and backward flows of both materials and information. The reverse flow of products entering the chain impacts the dynamics of SC members' inventories. This, in turns, affects the dynamics of order placed to suppliers and, thus, impacts the eco-innovation of the entire SC in terms of the order and inventory variance amplification. (Stock *et al.*, 2006).

Supplier Selection

Adopting a green procurement process is highly dependent on the supplier selection that adds value to the supply chain process. It is essential for the top management to select suppliers that promote and deal with the green practices adopted by the firm. Adoption of the green procurement practices is an essential part for the firm as the rules and regulations that are employed by the governmental bodies on the management of the firm are one of the major elements (Blome *et al.,* 2014). Nowadays, most of the companies are operating integrated supply chain methods to select a supplier that are dealing with the green practices such as building raw materials and to influence the process of the wastage and the cycling system that could enhance the environmental responsibilities. The corporate ethics is one of the major aspects for the firm in order to influence the environment. Sustainability is referred to the environmental management such as purchasing, operational management, social and business perspective (Zhou & Xu, 2018).

Performance of Manufacturing Firms in Trans Nzoia County

Firm performance is measures are the reflection of the competitiveness of the firm (Short *et al.*, 2007). The firm performance is measured form financial and non-financial perspective. From literature review, it is clearly evident that common financial measures that are used are return on assets (ROA), market share, return on investment (ROI), operating profit of firm (EBIDTA), growth rates in domestic and export sales growth (Dubey, 2011). Similarly, the non-financial measures of performance include management's perception of productivity, profitability, and customer satisfaction relative to competitors. The possibility of using non-financial performance measures was suggested by Dess and Robinson (1984) if the accurate objective measures are unavailable. Subjective measures of performance have been used by several researchers.

MATERIALS & METHODS

Research Design

Research design is a detailed outline of how an investigation will take place (Kothari, 2011). This research project used descriptive research design where both qualitative and quantitative research was applied. This was necessary because the two designs complement each other. Secondary data which was largely qualitative was described in the same way as it was without variations from the original scholars in

supporting the content of this research study. A questionnaire was the main tool used to collect primary data for this study. Primary data being quantitative in nature was described in an exploratory format incorporating evidence from past studies.

Target Population

Population has been defined by Mugenda and Mugenda (2003) an entire group of individuals, events of objects having observable characters. In this study, the target population was 200 respondents who comprised Procurement officer, finance manager, production manager, and administrator of each manufacturing firm in Trans-Nzoia County, Kenya. The researcher chose the manufacturing firms for the easy of making reliable conclusions. These firms are Kapsara Tea Factory, Kitale Wool Company, Kenya Seed Kitale, Elgon Tea and Coffee Limited, Agriculture Development Corporation, Kengen Kitale, SupaLoaf Kitale Branch, Kitale Indusries Limited, New Kenya Cooperative creameries, Kitale Tanneries and Kitale Wool Company. The researcher employed census of the above mentioned large manufacturing firm in Trans-Nzoia County, Kenya.

Sample and Sampling Technique

The technique used was census survey was carried out since the targeted population is very small so as to give chance of achieving a hundred percent of the targeted population. A census method is where the researcher incorporates the whole population because they have unique characteristics, experience, and exposure and each one of their belief matters. According to Kothari (2011), Sampling is the process by which relatively smaller number of individual, objects or event is selected in order to find out something about the entire population from which it was selected. According to Mugenda & Mugenda (2003) states that sampling is a method of picking a small sample from the manufacturing firms.

Data Collection Procedures

The primary data was to be collected using questionnaires. The questionnaire were developed through the guidance of the objective of the study as well as research question. The questionnaire consists of both structured and semi-structured questions covering issues related with green procurement eco-innovation. The questionnaires were varieties of list of possible alternatives from which the respondent was expected to choose answers that describe their situation. The semi-structured question gives the respondent complete freedom of response, meaning that they was used free to express their own views regarding the questions. Questionnaires were chosen because they were easier for researcher to collect information at a short period of time. Confidentiality is assured to the respondent through the letter of transmittal that has been attached to the questionnaire (Okoth, 2000).

STATISTICAL ANALYSIS

Analysis of Performance of Manufacturing Firms

The dependent variable, Performance of Manufacturing Firms, had its data collected, sorted analyzed and presented in the table as shown below;

Table 1: Performance of Manufacturing Firms

N=163	SD	D	NS	A	SA
	%	%	%	%	%
With automatic order processing, we are able to keep a short lead time in our manufacturing sector	4	5	2	36	53
We are reliable to our clients due to timely order of all manufacturing firm inputs	7	9	12	44	28
With proper performance of manufacturing firms, we have kept high morale in Trans Nzoia County employees	6	8	10	37	39
Our firm/manufacturing has been reporting high green procurement ,hence growth in number of our farmers	7	14	13	29	37
We receive repeated orders since manufacturing firms are satisfied with our products from our manufacturing sector in Trans Nzoia County	4	10	7	34	45

The findings on the dependent variable (Performance) revealed the following feedback from the respondents; on whether with automatic order processing, the firms are able to keep a short lead time in the manufacturing sector, 4% of the respondents strongly disagreed, 5% disagreed, 2% was not sure whether with automatic order processing, the firms are able to keep a short lead time in the manufacturing sector. 36% of the respondents agreed while 53% strongly agreed. As to whether their firms are reliable to the clients due to timely order of all manufacturing firm inputs, 7% of the respondents strongly disagreed, 9% agreed, 12% were not sure, 44% agreed while 28% strongly agreed that their firms are reliable to the clients due to timely order of all manufacturing firm inputs.

On whether with proper performance of manufacturing firms, high morale has been kept in Trans Nzoia County employees, 6% strongly disagreed, 8% disagreed, 10% were not sure. 37% of the respondents agreed that with proper performance of manufacturing firms, we have kept high morale in Trans Nzoia County employees while 39% strongly agreed. 7% of the respondents strongly disagreed on whether their firm/manufacturing has been reporting high green procurement, hence growth in number of their farmers, 14% disagreed, 13% were not sure, 29% agreed while 37% strongly agreed that their firm/manufacturing has been reporting high green procurement, hence growth in number of their farmers. 4% of the respondents strongly disagreed on whether they receive repeated orders since manufacturing firms are satisfied with their products from the manufacturing sector in Trans Nzoia County, 10% disagreed, 7% were not sure, 34% agreed and 45% strongly agreed that they receive repeated orders since manufacturing firms are satisfied with their products from the manufacturing sector in Trans Nzoia County.

Analysis of Specific Variables

Effect of Reverse Logistics on Performance

Data collected on reverse logistics variable was presented in the table below;

Table 2: Effect of Reverse Logistics on Performance

Item N=163	SD %	D %	NS %	A %	SA %
We are able to give Reverse logistics	7	17	8	37	31
We have an automated Reverse logistics system thus able to track firm as it occurs real time	10	21	8	36	25
We conduct Reverse logistics in our manufacturing firm.	10	21	7	28	34
Our Reverse logistics techniques assists drivers of manufacturing firms	5	17	4	40	34
We are able to avail inventories to our customers just in time in our manufacturing firms	2	3	7	43	45

The findings on the second variable, reverse logistics, revealed the following feedback from the respondents; on whether firms are able to give Reverse logistics, 7% of the respondents strongly disagreed, 17% disagreed, 8% were not sure whether their firms were able to give reverse logistics. 37% of the respondents agreed while 31% strongly agreed that their firms were able to give reverse logistics. As to whether the firms have an automated reverse logistics system enabling them to be able to track firms as it occurs real time, 10% of the respondents strongly disagreed, 21% disagreed, 8% were not sure, 36% agreed while 35% strongly agreed that their firms have an automated reverse logistics system enabling them to be able to track firms as it occurs real time.

On whether the manufacturing firms conduct reverse logistics, 10% strongly disagreed, 21% disagreed, 7% were not sure. 28% of the respondents agreed that the manufacturing firms conduct reverse logistics while 34% strongly agreed. 5% of the respondents strongly disagreed on whether reverse logistics technique assists drivers of manufacturing firms, 17% disagreed, 4% were not sure, 40% agreed while 34% strongly agreed that reverse

logistics technique assists drivers of the manufacturing firms under study. 2% of the respondents strongly disagreed on whether the firms were able to avail inventories to their customers just in time in the manufacturing firms, 3% disagreed, 7% were not sure, 43% agreed and 45% strongly agreed that indeed the firms were able to avail inventories to their customers just in time in the manufacturing firms.

Effect of Supplier Selection on Performance

The findings of the effect of supplier selection on performance of manufacturing firms in Trans Nzoia county were arrived at after analyzing the collected data. The table below presented the data on supplier selection variable;

Table 3: Effect of Supplier Selection on Performance

Item N=163	SD %	D %	NS %	A %	SA %
We have a reliable supplier selection timely processing of orders to our firms	6	9	13	36	36
We are able to track supplier selection during environmental process to our firm	6	10	15	33	36
.Through our supplier selection we ensure no double selection	4	3	5	43	45
We ensure smooth supplier selection functions within our manufacturing firm	2	4	4	45	45
Manufacturing use drivers of supplier selection customer to get feedback from manufacturing firms	13	12	15	31	29

The data on the third specific variable (Supplier Selection) was analyzed and the results were as shown in the table above. Asked whether the firms have a reliable supplier selection timely processing of orders to our firms, 6% of the respondents strongly disagreed, 9% disagreed and 13% were not sure. 36% of the respondents agreed that their firms have a reliable supplier selection timely processing of orders to our firms while another 36% strongly agreed. On whether the firms are able to track supplier selection during environmental process, 6% strongly disagreed, 10% disagreed, 15% were not sure, 33% agreed while 36% strongly agreed that indeed their firms are able to track supplier selection during environmental process to our firm.

The respondents were also required to respond on whether the firms through supplier selection ensure no double selection, 4% strongly disagreed, 3% disagreed, 5% were not sure whether their firms through supplier selection ensure no double selection, 43% agreed while 45% strongly agreed that their firms through supplier selection ensure no double selection. When required to say whether their firms ensure smooth supplier selection functions, 2% of the respondents strongly disagreed, 4% disagreed, another 4% were not sure, 45% agreed while another 45% strongly agreed that their firms ensure smooth supplier selection functions. The final question was whether the manufacturing firms use drivers of supplier selection customer to get feedback, 13% strongly disagreed, 12% disagreed, 15% were not sure whether the manufacturing firms use drivers of supplier selection customer to get feedback, 31% agreed while 29% strongly agreed that the manufacturing firms use drivers of supplier selection customer to get feedback.

RESULT

Correlation Analysis

The study used the SPSS version 26 to measure the relationship between the independent variables and the dependent variable and presented the results as shown in the table below;

Table 4: Correlation Matrix

Variables	Reverse Logistics	Supplier Selection	Performance
Reverse Logistics	1		
Supplier Selection	.515	1	
Performance	.624*	.713**	1

****Correlation is Significant at the .01 level(2-tailed).**

The correlation matrix above depicted the association among the variables. There was a strong relationship among the variables where: Supplier Selection at r=.713, Reverse Logistics at .624 both variables having been measured at p<.01. According to Ekumba (2020), the study correlation and regression results utilized in the measurement of the strength and nature of the relationship among the variables and eventual conclusions and recommendations thereof.

ANOVA

The ANOVA table presented below was for the results of the data analysis for predicting the variables in the study regression model:

Table 5: ANOVA[a]

Model		Sum of Squares	df	Mean Square	f	Sig.
1	Regression	27.985	1	27.985	10.0449	.05[b]
	Residual	451.369	162	2.786		
	Total	479.354	163			
a. Dependent Variable: Performance						
b. Predictors: (Constant); Reverse Logistics, and Supplier Selection						

The F-ratio (F=10.0449) was found to be greater than the F-critical value (table value), at a significance level of p<.05 and from these results, the regression model was concluded to be fit for use in the analysis and prediction of the study results and model fitting.

Regression Results

The study used the independent variables (Reverse Logistics, and Supplier Selection) to explore the indicators of the dependent variable (Performance). The coefficient of determination (R-Squared) was used for identifying the variance to which the independent variables affected the dependent variable in the model. According to Kothari (2013), the higher the R-Squared value, the higher the degree of reliability and vice versa.

Table 6: Model Summary

Model	R	R-Square	Adjusted R-Square	Std. Error of the Estimate
1	.846[a]	.716	.723	.015
a. Predictors: (Constant), Reverse Logistics, and Supplier Selection				

The overall contribution of the independent variables accounted for 84.6% (R^2=.846) of the predictability on the dependent variable (Performance) as shown in the table, with the balance of 15.4% being the variation in the dependent variable caused by other variables not forming part of the study.

Multiple Regression Analysis

The following was the presentation of the relationship among the study variables analyzed from the collected data:

Table 7: Regression Coefficients[a]

Model		Unstandardized Coefficients[a]		Standardized Coefficients	t	Sig.
		β	Std. Error	Beta		
1	(Constant)	14.035	2.136		3.656	.000
	Reverse Logistics	.591	.315	.612	1.350	.001
	Supplier Selection	.642	.338	.687	2.191	.056

a. P<.01, 95% Confidence level, N=163

The following multiple regression model was therefore extracted from the above table:

$$Y = 14.035 + .591X_1 + .642X_2$$

The regression results indicated that the effect of the independent variables on the dependent variable was significant and in a linear relationship as shown by the multiple

linear regression model extracted above. From the analysis of the model, it's evident that a unit increase (since all the variables have positive coefficients) in the dependent variables positively affects the dependent variable upwards by the same increment as in the independent variable as follows; Reverse Logistics 0.591; and Supplier Selection 0.642 respectively. The effects take place while holding other factors constant at zero and the Performance at 14.035.

CONCLUSION

Performance of Manufacturing Firms in Trans-Nzoia County

The firms, with automatic order processing, were able to keep a short lead time in the manufacturing sector and that the firms are reliable to the clients due to timely order of all manufacturing firm inputs as evidenced by the respondent feedback. The proper performance of manufacturing firms have kept a high morale among Trans-Nzoia County employees and that with firm/manufacturing, firms have been reporting high green procurement, hence growth in number of their farmers and finally, firms receive repeated orders since manufacturing firms are satisfied with their products from the manufacturing sector in Trans-Nzoia County.

Reverse Logistics

The following were the conclusions on the second variable, reverse logistics; that the firms are able to give reverse logistics; that from the respondents' point of view, a number of firms have an automated reverse logistics system enabling them to be able to track firms as it occurs real time while others do not or the system is not convincing to the respondents who happen to be senior officers in these firms, the firms also seem to conduct reverse logistics either frequently or not at all. Reverse logistics technique assists drivers of manufacturing firms, and finally, that it was possible for the firms to avail inventories to their customers just in time.

Supplier Selection

The following were the conclusions drawn from the findings on the third specific variable (Supplier Selection); that the firms had reliable supplier selection timely processing of orders, the firms were able to track supplier selection during environmental process in the firms, the firms also through supplier selection, ensure no double selection and consequently, the firms ensure smooth supplier selection functions. Manufacturing firm's use of drivers of supplier selection customer to get feedback was doubtful since almost half of the respondents returned negative feedback.

RECOMMENDATIONS

Reverse Logistics on Performance

The firms were found not to be doing badly on this variable, however, from the numbers, it was recommended that they ensure that they are able to give reverse logistics seamlessly, and the fully automate reverse logistics systems to enable them to be able to track firms real time as they also conduct reverse logistics as these reverse logistics technique assist drivers of the manufacturing firms.

Supplier Selection

The following recommendations were drawn from the findings: that the firms ensure that they have reliable supplier selection timely processing of orders and ensure accurate and modernized tracking of supplier selection during environmental process in the firms as well as eliminating, through supplier selection, double selection ensure smooth supplier selection functions. Strengthen the use of drivers of supplier selection customer to get feedback.

Areas for Further Studies

The study focused on the manufacturing firms in Trans-Nzoia County only. The scope of the study was a combination of both public as well as private firms where access to information in private firms is very limited. There is need to carry out the same on public institutions only and gauge

or compare the findings with these results for a better conclusion. The study also focused on senior management which may tend to favor or defend their organizations where need be, there is therefore need to carry out a research using a different group of respondents since some questions in this study required objective reactions from outsiders to these firms to get a feedback without bias.

Declaration by Authors

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