



GREEN SUPPLY CHAIN PRACTICES AND PERFORMANCE OF THE FOOD AND BEVERAGE FIRMS IN NAIROBI CITY COUNTY, KENYA

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ABSTRACT

Over the period 2018 to 2019, based on KNBS 2020 economic survey report food and beverage exports by Kenya remained the predominant category of domestic exports having a share of 44.2 percent of total domestic export revenues for the country. This study therefore sought to establish the effect of green supply chain practices on operational performance of food and beverage firms in Nairobi County, Kenya. The study was guided by both general and specific objectives. The study was guided by the following research objectives; to examine the effect of reverse logistics and supplier collaboration on operational performance of food and beverage firms in Nairobi County. The study adopted stakeholder theory and transactional cost theory. This study used a descriptive survey research design. Population of the study was 86 food and beverage firms in Nairobi County. The total target population was 172 procurement officials. The study used census survey. A pilot study was conducted to test for validity and reliability of the research instruments. Content validity was used as validity test while reliability was tested using Cronbach's alpha coefficient. Descriptive statistics including mean, percentages and frequencies were used while inferential statistics that is multiple regression model and product moment correlation was used to make inferences of the population using data drawn from the population. The study is important to the management and staff of food and beverage firms as it gave insight on green supply chain practices which can be capitalized to enhance the operational performance of food and beverage firms. The government, regulators and the policy makers are able to use the findings of the study to formulate viable policy documents that effectively in turn boosts operational performance of food and beverage firms. The study concludes that reverse logistics has a positive and significant effect on operational performance of food and beverage firms in Nairobi County. The study also concludes that green purchasing has a positive and significant effect on operational performance of food and beverage firms in Nairobi County. From the findings; this study recommends that the management of food and beverage firms should consider adopting more advanced recycling technologies to improve efficiency and effectiveness in recycling processes. In addition, the management should evaluate and streamline reverse logistics processes to ensure efficiency and effectiveness.

Key Words: Reverse Logistics, Green Purchasing, Green Supply Chain Practices And Operational Performance

Background of the Study

Operational performance is the strategic dimension by which a company chooses to compete. According to Al-Sa'di, Abdallah, and Dahiyat (2017), it's the technique of determining the advancement in attaining set objectives, including information on efficient utilization of resources that are converted into goods and services. Sharma and Modgil (2019) outlines operational performance indicators as, amount of goods delivered on time, reduced scrap rate, product quality, faster response in delivery, reduced costs and capacity utilization. Operational performance therefore takes into consideration the company's performance in achieving its basic objectives (Croom, Vidal, Spetic, Marshall, & McCarthy, 2018).

Operational performance is a firm's performance measured against a standard or prescribed indicator of effectiveness, efficiency and environmental responsibility such as cycle time, productivity, waste reduction and regulatory compliance (Buer, Semini, Strandhagen & Sgarbossa, 2021). The major tasks that contribute to improvement of operational performance include procurement, new product development, production, marketing and logistics. Integration within the organization and with green supply chain serves to support these tasks and ensure that accurate supply information is gathered (Santos, Lannelongue & Gonzalez-Benito, 2019).

Green supply chain is when an institution is able to meet its goods and services' need in a manner that is conducive to the environment, cost effective for the organization and in a manner that adds value to the society at large (Croom et al., 2018). Santos et al., (2019) defines green procurement as the process of meeting organizational needs in terms of goods and services required as well as utilities and works, in a cost-effective way while at the same time being conscious of the society and doing it with minimal damage to the environment. According to Pan, Pan, Song and Guo (2020), the absence of operational performance hinders the progression of the purchasing function and inhibits the organization's endeavour to perform.

Consequently, it is imperative that firms achieve significant level in operational performance in terms of quality of supply, efficiency and environmental compliance (Santos et al., 2019). Firms which embrace green procurement are likely to see a positive change in their operational performance through significant decrease in operational cost and effective utilization of resources which in turn results to environmental protection. Food and beverage processing firms have no choice but to integrate green operations into their processes as early as possible to begin reaping the benefits as well as optimizing the operational performance (Ong, 2017).

The Bangkok and Metropolitan area food and beverage firms are adopting green supply chain strategies to enhance operational performance (Onputtha, Makerd & Rojanapanich, 2018). Firms can effectively practice green manufacturing practices through the use of solar energy, recycling of raw materials and utilize biodegradable energy sources in their manufacturing operations. Reverse logistics focuses mainly on the return or take-back products and materials from the point of consumption to the forward supply chain for the purpose of recycling, reuse, remanufacture, repair, refurbishing, or safe disposal of the products and materials (Thakur, 2021). Green supply chain practices have emerged as an important driver of operational performance and an innovative channel of investments delivery to the enterprises (Sukortpromme & Onputtha, 2019).

Green supply chain management has emerged as a set of managerial practices that integrate environmental issues into supply chain management. If implemented successfully, green supply chain management can be a way to achieve competitive advantage while enhancing the environmental sustainability of the firm (Zaid, Jaaron, & Bon, 2018). Firms tend to adopt GSCM practices due to external factors, which are mostly linked to stakeholder pressure and internal factors stemming from business-led strategic processes. On the positive side, an improved corporate image, increased efficiency and innovation leadership have been mentioned as driving

managers to adopt green supply chain management (Ahmed, Najmi, Arif, & Younus, 2019). In a recent survey by McKinsey (2014) 43 per cent of respondents said that their company seeks to align sustainability with their overall business goals. Previous studies argue that properly designed environmental management in the supply chain can create competitive advantage and result in performance improvements. Citing the case of Wal-Mart, greening supply chain is a valuable strategy in terms of business profitability and environmental sustainability (Plambeck, 2016).

In Africa, the need for green supply chain management has become a necessity given the growing impact of climate change and global warming. Many African countries are less resilient to climate change due to extensive poverty, frequent droughts, inequality in land and natural resource distribution and heavy reliance on rainfall for agricultural purposes (Agyemang, Zhu, Adzanyo, Antarciuc & Zhao, 2018). Green supply chain management (GSCM) has arisen as a set of business practices that allow organizations to improve environmental performance and hence their image. More and more organizations are thus focusing on incorporating and enhancing their green practices (Ahi & Searcy, 2015).

The government of Kenya in a bid to protect the environment instituted various policies legislative and institutional frameworks to govern all activities of businesses (Odhiambo, 2014). For example, the constitution of Kenya assigns specific obligations to the individuals and the state on matters related to the management of the environment and the green use of resources (Mwenda & Kibutu, 2018). Article 69(2) of the constitution of Kenya, 2010, states that every Kenyan has a duty to cooperate with the authorities in the protection and conservation of the environment and ensuring ecologically green development as well as use of resources. Articles 185 (2) and 186 (1) as well as article 187 (2) of the constitution have distributed functions for protecting the environment between the national government and the county governments with a view to instituting a system of development that is green and that enhances good governance as far as the environment is concerned (Mwenda & Kibutu, 2018).

Statement of the Problem

Today's business environment is changing dynamically. The composition of Kenya's national exports for the period 2015 to 2019 shows that domestic export receipts decreased by 4.1% from KSh 541.5 billion in 2018 to KSh 520.8 billion in 2019. However, food and beverage exports remained the predominant category of domestic exports. with a share of 44.2 percent of total domestic export revenues. This is mainly due to the added value of processed food and beverage exports for industry and private consumption (KNBS, 2020).

Business operations are influenced by changing customer requirements, demographic changes and environmental regulations. For this reason, companies need tools and techniques that allow them to be more flexible and to adapt quickly to uncertainties. Green operations are one of those concepts that cannot be ignored. Managers need to adopt environmentally friendly operations to reduce the impact of their operations on the environment (Mobolaji, 2017).

Operation Green is a global concept with the ultimate goal of reducing environmental pollution. The introduction of environmentally friendly processes leads to an appropriate use of scarce resources and at the same time protects the environment from harmful products. Dipietro, Cao and Partlow (2013) argue that the preference for environmentally conscious food companies using environmentally friendly products is increasing and that green practices were indeed important to customers and influence customer preferences (Dipietro *et al.*, 2019).

Ikiao (2018) indicated that input market and human capital internationalization have a significance positive effect on organizational performance of food and beverages manufacturing firms in Kenya. Ojanga, Muteshi and Okello (2019) revealed that both equipment optimization and strategic employee empowerment have a positive and significant effect on manufacturing performance of food and non-alcoholic beverage firms in Nairobi County. Firms intending to overcome the unpredictable dynamics in the global marketplace of today are under pressure to adopt and implement more effective business models.

Green supply chain management (GSCM) has emerged as one of the most topical emergent business best practices, perhaps based on its microeconomic and macroeconomic significance (Geng, Mansouri & Aktas 2017). However, benefits of the eco-procurement and green supply chain practices have not been empirically quantified to justify the continued investment in the practice, in the food and beverage industry and more so in the local perspective additionally there is need to develop a framework of implementation of the green supply chain practices based on a hierarchal order. Hence the study on the influence of green supply chain practices on the operational performance of food and beverages manufacturing firms in Nairobi County.

General Objective

The general objective of the study was to establish the effect of green supply chain practices on operational performance of food and beverage firms in Nairobi County, Kenya.

Specific Objectives

- i. To determine the effect of reverse logistics on operational performance of food and beverage firms in Nairobi County.
- ii. To assess the effect of green purchasing on operational performance of food and beverage firms in Nairobi County.

Theoretical Review

Stakeholder Theory

Stakeholder theory was advanced by Freeman in 2004. Stakeholder theory recognizes the fact that other than shareholders, there are other individuals or groups who the organization is obligated to and who are likely to be directly influenced by the actions taken by it, or have an explicit contractual relationship with it (Freeman, 1984; Mainardes, Alves & Raposo, 2018). The stakeholders include customers, general public, suppliers, employees and financial institutions.

It is notable that organizations produce externalities that influence diverse partners. These externalities regularly cause partners to expand weights on organizations to lessen negative effects and increment positive ones. The hypothesis proposes that a firm should seek after methodologies that consider the gatherings influenced by choices while endeavoring to limit harm or amplify advantages to the agent gatherings (Freeman et al., 2004).

This call for organizations to think past money related execution however has commitments towards society and its constituent gatherings (Jones, 2000). In this interchange organizations' commitments go past the customary guardian obligations to investor and reach out to the clients, representatives, providers and neighboring networks (Jones, 2000). The firm as an arrangement of partners considered legitimate element which worked to support the general public. He held that the motivation behind the firm was to make riches or incentive to the value holders and partners.

With respect to the environment, some stakeholders expect that firms will operate in ways that minimize externalities such as water pollution, solid waste disposal, forest cover depletion and

emission of environmentally harmful gases and assume greater responsibility to correct any negative effects that may occur. Failure by the organization to meet these expectations results in loss of legitimacy and subsequently diminishes its chances of survival. As the firm meets societal expectations, they should expect a decrease in government regulation and increase in societal support. This support is expected to translate into increase in performance of the firm.

From a strategic point, firms that adopt GSCM practices find these actions to be a source of competitive advantage, especially, if the firm's primary stakeholders' value such environmental initiatives. The reputation and image are considered a significant resource overall and that there is evidence linking these to GSCM practices which is considered to have business value (Foerstl, Reuter, Hartmann & Blome, 2018). Being environmentally conscious and establishing a strong environmental image may help firms to attract environmentally conscious suppliers and customers eventually translating into improved marketing and financial performance.

Transactional Cost Theory

This theory was developed by Ronald Coase in 1937. Transactional cost theory tries to explain why companies exist, and why companies expand or source out activities to the external environment. Transactional cost theory is related to production theory and they are often used together. However, the question is usually how much to produce, as opposed to which inputs to use. That is, assume that we use production theory to choose the optimal ratio of inputs (for example two fewer engineers than technicians), how much should we produce in order to minimize costs and/or maximize profits? We can also learn a lot about what kind of costs matter for decisions made by managers, and what kinds of costs do not.

Transactional cost theory supposes that the companies try to minimize the costs of exchanging resources with the environment, and their companies try to minimize the bureaucratic costs of exchanges within the company.

The theory sees institutions and market as different possible forms of organizing and coordinating economic transactions. When external transactions costs are high than the company's internal bureaucratic costs, the company will grow, because the company is able to perform its activities more cheaply, than if the activities were performed in the market. According to Williamson (2018), a transaction cost occurs when a good or service is transferred across a technologically separable interface.

Therefore, transaction costs arise every time a product or service is being transferred from one stage to another, where new sets of technological capabilities are needed to make the product or service. In this case a company or organization will adapt green supply chain if the transaction cost is less than the costs of manually process of procurement. Transaction cost theory is based on idea that cooperation exists because the use of markets or the price mechanisms generate transaction costs as green supply chain enables effective automation of processes, which in turn decrease operational transaction costs and increase competitiveness of cooperative purchasing.

Conceptual Framework

A conceptual framework is a hypothesized model which describes the variables under study. Borg, Gall & Gall (2015) describes conceptual framework as a diagrammatical representation of the variables' relationships in a study from relevant fields of enquiry.

Independent Variables

Dependent Variable

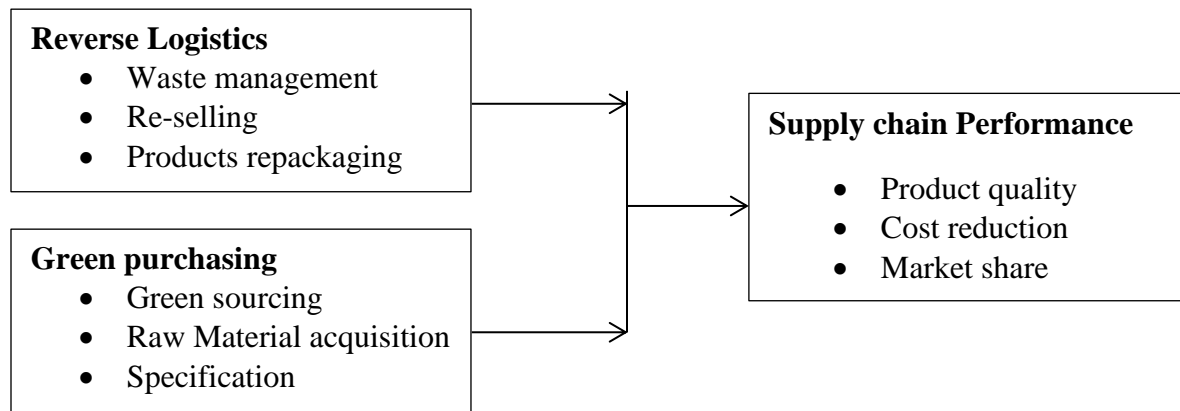


Figure 2. 1: Conceptual Framework

Empirical Review

Reverse Logistics and Supply chain performance

According to Anne, Nicholas, Ithinji, and Bula (2016) reverse logistics practices and their effect on competitiveness of food manufacturing firms in Kenya. The results of this research indicated that, the adoption of reverse logistics practices would enhance the competitiveness of Kenya's food manufacturing firms. Further this study found that due to lack of awareness on the importance of sustainability, there is a low level of adoption of reverse logistics practices.

Anne *et al.* (2016) recommended that organizational managers should appreciate the environmental issues and adopt reverse logistics practices. This is important as it would curb waste; enhance cost savings thus increasing competitiveness. This study further recommended that the government and all stakeholders in the manufacturing sector should carry out public awareness campaigns on the importance of environmental conservation as it would encourage the locals to become active drivers towards the adoption of reverse logistics practices.

Nderitu (2016) studied green supply chain management and organizational performance of food and beverage manufacturing firms in Kenya. The study concluded that on reverse logistics there exists a positive correlation coefficient with organizational performance of Food and Beverage Manufacturing Industry in Kenya. There is also a positive relationship between reverse logistics and organizational Performance of Food and Beverage Manufacturing Industry in Kenya. On the green technology adoption, the study found out there was strong positive correlation between green technology adoption and organizational performance of Food and Beverage Manufacturing Industry in Kenya.

Ahmed, Akter and Ma (2018) conducted a study on green supply chain management (GSCM) performance implemented by the textile industry of Gazipur district, Dhaka. Globally, pollution has spurred corporate players to use eco-friendly polishes and the textile industry is not an

uncommon case. Textile commercial enterprises should adopt the same green supply chain management (GSCM) practices and this research paper seeks to identify the green supply chain management (GSCM) practices embraced by a textile industry in Gazipur District, Dhaka. Essential information was sourced from 200 respondents to support the review. Information was dissected with the assistance of weighted arithmetic mean and chi-square tests and it has been concluded that a huge number of green supply chain management practices are being embraced by the textile industries of Gazipur district.

Namagembe, Ryan, and Sridharan (2019) focused on green supply chain practice adoption and firm performance: manufacturing SMEs in Uganda. Different green practices affect different performance dimensions in different ways across different industries. For example, eco-design and internal environmental management practices significantly influence environmental performance; green purchasing and internal environmental management practices significantly influence economic benefits; and internal environmental management practices affect economic costs. Overall internal environmental management is the key to positive outcomes across the three performance criteria. The authors show how the results obtained vary from similar studies conducted in developing countries and explain possible reasons for the difference.

Okemba and Namusonge (2018) studied green supply chain management practices as determinants of supply chain performance in Kenya's manufacturing firms: A case study of Nairobi-based firms in the food and beverage sector. Results indicated that respondents had adopted reverse logistics practice to a significant degree. However, there was a disconnect between adoption and practice of this GSCM component since respondents affirmed incorporation of recyclable content and reusability of their packaging but a significant percentage (46%) remained non-committal on the issue of used-package collection, implying an incomplete reverse logistics loop. The study recommended institution of measures to facilitate collection of used packaging by having collection points where customers could drop off used oil/milk/beverage containers. Collection of expired products from customers for disposal was also recommended. These measures would complete the reverse logistics loop fully, thereby reducing the firms' environmental footprints.

Green Purchasing and supply chain performance

Shahbaz, Rasi, Ahmad, and Sohu (2018) studied the impact of supply chain collaboration on operational performance: Empirical evidence from manufacturing of Malaysia. Due to regional and economic shift toward China and India this sector is facing numerous problems. Supply chain collaboration has dogged the performance in various industries and in various regions. The aim of this study is to explore the potential benefits of supply chain collaboration toward achieving operational performance. This is an empirical investigation conducting among manufacturing industries in Malaysia. Factor analysis and multiple regressions through SPSS have been used for data analysis. The finding of this study reveals that two supply chain management approaches information sharing (IS), joint decision making (JDM) significantly effect, while Electronic Data Interchange (EDI) does not have a significant effect on operational performance (Shahbaz *et al.*, 2018).

Cheruiyot (2018) conducted a study on the effect of supply chain integration on operational performance of manufacturing organizations in Kenya. The findings showed that supplier integration had a positive influence on operational performance followed by internal integration. Customer integration was determined to have a negative influence on operational performance. There was an association between both supplier integration and customer integration with

internal integration. Based on the findings, it can be concluded that supply chain integration has a positive impact on operational performance. The organizations management should therefore invest more on integrating with their supply chain partners so as to improve operational performance of the organization.

Berut (2020) examined the influence of supply chain collaboration on performance of dairy processing firms in Kenya. All study variables had a positive and significant correlation with performance of dairy processing firms. The study recommends that dairy processing firms should exploit supply chain information sharing, incentive alignment, teamwork and mediation dairy board policies and regulations as it proved to be crucial in the performance of the dairy processing firms. The study also recommends realignment of dairy processing firms' policies with other collaborative partners as is driving force behind performance.

Al-Doori (2019) studied the impact of supply chain collaboration on performance in automotive industry: This is an empirical investigation conducting among the supply chain department of automotive industries in Pakistan. The finding of this study reveals that two supply chain management approaches information sharing (IS), joint decision making (JDM) significantly effect, while Electronic Data Interchange (EDI) does not have a significant effect on operational performance. This study consists only three approaches, the next study should include more approaches. Secondly, this study is limited to the automotive sector. This study helped the managers of the automotive industry in making their operation smooth by applying information sharing, joint decision making, and electronic data interchange.

RESEARCH METHODOLOGY

Research Design

The study adopted a descriptive survey research design. A descriptive survey research seeks to obtain information that describes existing phenomena by asking individuals about their perceptions, attitude, behavior or values (Mugenda & Mugenda, 2019). A descriptive study design is deemed the best design to the objectives of the study. A research design is the general plan of how one goes about answering the research question (Saunders, Lewis & Thornhill, 2000). This design is considered appropriate for the type of objective of this study as it is enable the researcher to describe the as they exist without manipulation of variables which is the aim of the study. This research adopted descriptive survey because the design gives room for establishing the effect of personal green supply chain practices on operational performance among food and beverage firms in Nairobi County, Kenya.

Target Population

Population refers to the entire group of person or elements that have at least one thing in common. The target population is the total number of subjects targeted by the study (Mugenda & Mugenda, 2018). The target population for this study was procurement heads and the quality assurance heads of food and beverage firms in Nairobi County. Accessible population is the subset of the target population. It is the part of the target population which the researcher can actually access. The target population for this study was 172 procurement officials and quality assurance officers of the 86 food and beverage firms in Nairobi County (KAM, 2020).

Sampling Technique and Sample Size

Sampling refers to the act of selecting individual members or a subset of the population with the sole purpose of making statistical inferences from them and estimate characteristics of the whole population (Kothari & Garg, 2011). This study sought to assess effect of green supply chain practices on performance of beverage industries in Nairobi City County. The study relied on the primary data that was collected from the field.

The researcher used probability sampling in selecting the samples because all the members of the population have an equal opportunity to be part of the sample thus producing results that are representative of the whole population (Mugenda & Mugenda, 1999). Each head from the two departments was identified to provide information about the green supply chain practices. A further two heads of each department shall be sampled, hence a sample of 172 from this group shall be selected.

Data Collection Methods

Primary data was collected from the respondents through the use of questionnaires. The questionnaire is the most appropriate research tool as it allows the researcher to collect information from a large sample with diverse background; the findings remain confidential, save time and since they are presented in a manner so as to limit opportunity for bias (Kothari & Garg, 2011). Likert scale was used to measure variables which was then measured using a combination of different questions administered through the questionnaire.

Pilot test of Research Instruments

According to Nixon (2002), pre-testing is the main chance for researchers to gauge the meaning attributed to survey questions before it is too late. Pilot study was carried out to test validity and reliability of research questionnaires. It involves 10% of the sample population hence 17 questionnaires were used in pilot study.

Data Processing and Analysis

Data collected was first cleaned, classified and coded to facilitate analysis. Secondly, data solicited was analyzed using inferential and descriptive statistics. Analysis of data was done with the help of SPSS (Version 23.0). The study mainly collected quantitative data and therefore quantitative analysis methods were adopted to achieve the objectives of the study. Descriptive (frequencies, percentages, mean and standard deviation) as well as inferential statistics (regression model) was adopted to analyse the data. Regression model was used to establish the significant difference between personal green supply chain practices on operational performance among food and beverage firms. Data was presented using mainly tables. Inferential statistics was done through regression model.

PRESENTATION, ANALYSIS AND INTERPRETATION OF DATA

Descriptive Statistics Analysis

Reverse Logistics and Operational Performance

The first specific objective of the study was to determine the effect of reverse logistics on operational performance of food and beverage firms in Nairobi County. The respondents were requested to indicate their level of agreement on reverse logistics and operational performance of food and beverage firms in Nairobi County. The results were as shown in Table 4.1

From the results, the respondents agreed that reverse logistics accounts for significant portion of logistics cost. This is supported by a mean of 3.996 (std. dv = 0.865). In addition, as shown by a mean of 3.819 (std. dv = 0.945), the respondents agreed that firm uses packaging materials that can be reused for other purposes. Further, the respondents agreed that firm encourages distributors and consumers to return faulty products. This is shown by a mean of 3.798 (std. dv = 0.611).

The respondents also agreed that firm encourages distributors and customers to return used products for reuse. This is shown by a mean of 3.731 (std. dv = 0.908). With a mean of 3.711 (std. dv = 0.776), the respondents agreed that through tracking of reverse flows, returned products will reach the firm faster and customer complaints will be resolved more quickly. The

respondents agreed that the primary goal of reverse logistics is to recover value from assets to increase revenue and reduce expenses. This is shown by a mean of 3.675 (std. dv = 0.897). With a mean of 3.613 (std. dv = 0.786), the respondents agreed that establishing a reverse logistics strategy can also boost the efficiency of a traditional supply chain by separating the operations.

Table 4. 1: Reverse Logistics and Operational Performance

| | Mean | Std. Deviation |
|--|--------------|-------------------|
| Reverse logistics accounts for significant portion of logistics cost. | 3.996 | 0.865 |
| Firm uses packaging materials that can be reused for other purposes | 3.819 | 0.945 |
| Firm encourages distributors and consumers to return faulty products. | 3.798 | 0.611 |
| Firm encourages distributors and customers to return used products for reuse. | 3.731 | 0.908 |
| Through tracking of reverse flows, returned products will reach the firm faster and customer complaints will be resolved more quickly. | 3.711 | 0.776 |
| The primary goal of reverse logistics is to recover value from assets to increase revenue and reduce expenses. | 3.675 | 0.897 |
| Establishing a reverse logistics strategy can also boost the efficiency of a traditional supply chain by separating the operations. | 3.613 | 0.786 |
| Aggregate | 3.732 | 0.841 |

Green Purchasing and Operational Performance

The second specific objective of the study was to assess the effect of green purchasing on operational performance of food and beverage firms in Nairobi County. The respondents were requested to indicate their level of agreement on various statements relating to green purchasing and operational performance of food and beverage firms in Nairobi County. A 5 point Likert scale was used where 1 symbolized strongly disagree, 2 symbolized disagree, 3 symbolized neutral, 4 symbolized agree and 5 symbolized strongly agree. The results were as presented in Table 4.2.

From the results, the respondents agreed that their organization prioritizes environmentally friendly purchasing practices to reduce our ecological footprint. This is supported by a mean of 4.168 (std. dv = 0.905). In addition, as shown by a mean of 3.959 (std. dv = 0.885), the respondents agreed that they actively seek out suppliers who demonstrate a commitment to sustainability in their operations. Further, the respondents agreed that the environmental criteria are considered integral to our purchasing decisions to align with our sustainability goals. This is shown by a mean of 3.920 (std. dv = 0.605). The respondents also agreed that their organization has implemented specific policies and guidelines to promote green procurement practices. This is shown by a mean of 3.915 (std. dv = 0.981).

The respondents agreed that regular evaluation of the environmental impact of their purchases helps them make informed decisions. This is supported by a mean of 3.911 (std. dv = 0.873). In addition, as shown by a mean of 3.897 (std. dv = 0.786), the respondents agreed that integrating green purchasing practices positively impacts their organization's overall operational performance. Further, the respondents agreed that cost savings have been observed as a direct result of implementing green purchasing initiatives. This is shown by a mean of 3.789 (std. dv = 0.896).

Table 4. 2: Green Purchasing and Operational Performance

| | Mean | Std. Deviation |
|--|--------------|----------------|
| Our organization prioritizes environmentally friendly purchasing practices to reduce our ecological footprint. | 4.168 | 0.905 |
| We actively seek out suppliers who demonstrate a commitment to sustainability in their operations. | 3.959 | 0.885 |
| Environmental criteria are considered integral to our purchasing decisions to align with our sustainability goals. | 3.920 | 0.605 |
| Our organization has implemented specific policies and guidelines to promote green procurement practices. | 3.915 | 0.981 |
| Regular evaluation of the environmental impact of our purchases helps us make informed decisions. | 3.911 | 0.873 |
| Integrating green purchasing practices positively impacts our organization's overall operational performance. | 3.897 | 0.786 |
| Cost savings have been observed as a direct result of implementing green purchasing initiatives. | 3.789 | 0.896 |
| Aggregate | 3.890 | 0.867 |

Inferential Statistics

Inferential statistics in the current study focused on correlation and regression analysis. Correlation analysis was used to determine the strength of the relationship while regression analysis was used to determine the relationship between dependent variable (operational performance of food and beverage firms in Nairobi County, Kenya) and independent variables (reverse logistics and green purchasing).

Correlation Analysis

The present study used Pearson correlation analysis to determine the strength of association between independent variables (reverse logistics and green purchasing) and the dependent variable (operational performance of food and beverage firms in Nairobi County, Kenya) dependent variable. Pearson correlation coefficient range between zero and one, where by the strength of association increase with increase in the value of the correlation coefficients. The current study employed Taylor (2018) correlation coefficient ratings where by 0.80 to 1.00 depicts a very strong relationship, 0.60 to 0.79 depicts strong, 0.40 to 0.59 depicts moderate, 0.20 to 0.39 depicts weak.

Table 4. 3: Correlation Coefficients

| | | Operational Performance | Reverse Logistics | Green Purchasing |
|-------------------------|---------------------|-------------------------|-------------------|------------------|
| Operational Performance | Pearson Correlation | 1 | | |
| | Sig. (2-tailed) | | | |
| | N | 161 | | |
| Reverse Logistics | Pearson Correlation | .856** | 1 | |
| | Sig. (2-tailed) | .001 | | |
| | N | 161 | 161 | |
| Green Purchasing | Pearson Correlation | .859** | .189 | 1 |
| | Sig. (2-tailed) | .000 | .081 | |
| | N | 161 | 161 | 161 |

The results revealed that there is a very strong relationship between reverse logistics and operational performance of food and beverage firms in Nairobi County, Kenya ($r = 0.856$, p value $=0.001$). The relationship was significant since the p value 0.001 was less than 0.05 (significant level). The findings conform to the findings of Muiruri and Were (2016) that there is a very strong relationship between reverse logistics and operational performance.

The results also revealed that there was a very strong relationship between green purchasing and operational performance of food and beverage firms in Nairobi County, Kenya ($r = 0.859$, p value $=0.000$). The relationship was significant since the p value 0.000 was less than 0.05 (significant level). The findings are in line with the results of Minjeong and Sungyong (2021) who revealed that there is a very strong relationship between green purchasing and operational performance

Regression Analysis

Multivariate regression analysis was used to assess the relationship between independent variables (reverse logistics and green purchasing) and the dependent variable (operational performance of food and beverage firms in Nairobi County, Kenya)

Table 4. 3: Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|------|----------|-------------------|----------------------------|
| 1 | .925 | .848 | .849 | .10120 |

a. Predictors: (Constant), reverse logistics and green purchasing

The model summary was used to explain the variation in the dependent variable that could be explained by the independent variables. The r -squared for the relationship between the independent variables and the dependent variable was 0.848 . This implied that 84.8% of the variation in the dependent variable (operational performance of food and beverage firms in Nairobi County, Kenya) could be explained by independent variables (reverse logistics and green purchasing).

Table 4. 4: Analysis of Variance

| Model | Sum of Squares | df | Mean Square | F | Sig. |
|--------------|----------------|-----|-------------|--------|-------------------|
| 1 Regression | 12.027 | 2 | 6.0135 | 144.56 | .000 ^b |
| 1 Residual | 6.568 | 158 | .0416 | | |
| Total | 18.595 | 160 | | | |

a. Dependent Variable: Operational Performance Of Food And Beverage Firms

b. Predictors: (Constant), reverse logistics and green purchasing

The ANOVA was used to determine whether the model was a good fit for the data. F calculated was 144.56 while the F critical was 2.429 . The p value was 0.000 . Since the F -calculated was greater than the F -critical and the p value 0.000 was less than 0.05 , the model was considered as a good fit for the data. Therefore, the model can be used to predict the influence of reverse logistics and green purchasing on the operational performance of food and beverage firms in Nairobi County, Kenya.

Table 4. 4: Regression Coefficients

| Model | | Unstandardized | | Standardized | t | Sig. |
|-------|-------------------|----------------|--------------|--------------|-------|-------|
| | | Coefficients | Coefficients | | | |
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 0.341 | 0.089 | | 3.831 | 0.000 |
| | reverse logistics | 0.387 | 0.095 | 0.386 | 3.949 | 0.000 |
| | green purchasing | 0.398 | 0.102 | 0.399 | 3.716 | 0.002 |

a Dependent Variable: Project Performance

The regression model was as follows:

$$Y = 0.341 + 0.387X_1 + 0.398X_2 + \varepsilon$$

The results revealed that reverse logistics has significant effect on operational performance of food and beverage firms in Nairobi County, Kenya, $\beta_1=0.387$, p value= 0.000). The relationship was considered significant since the p value 0.000 was less than the significant level of 0.05. The findings conform to the findings of Muiruri and Were (2016) that there is a very strong relationship between reverse logistics and operational performance.

In addition, the results revealed that green purchasing has significant effect on operational performance of food and beverage firms in Nairobi County, Kenya $\beta_1=0.398$, p value= 0.002). The relationship was considered significant since the p value 0.002 was less than the significant level of 0.05. The findings are in line with the results of Minjeong and Sungyong (2021) who revealed that there is a very strong relationship between green purchasing and operational performance

Conclusions

The study concludes that reverse logistics has a positive and significant effect on operational performance of food and beverage firms in Nairobi County. The study revealed that waste management, re-selling and products repackaging influences performance of food and beverage firms in Nairobi County

The study also concludes that green purchasing has a positive and significant effect on operational performance of food and beverage firms in Nairobi County. The study revealed that green sourcing, raw Material acquisition and specification influences performance of food and beverage firms in Nairobi County.

Recommendations

This study recommends that the management of food and beverage firms should evaluate and streamline reverse logistics processes to ensure efficiency and effectiveness. This may involve optimizing transportation routes, consolidating returns, and implementing technology solutions such as tracking systems to monitor the movement of returned products.

The study also recommends that the management of food and beverage firms in Nairobi County should consider full implementation of operational performance of food and beverage firms in Nairobi County. The firms should prioritize green sourcing, raw Material acquisition and specification

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