INBOUND LOGISTIC STRATEGIES, QUALITY MANAGEMENT SYSTEM AND SUSTAINABLE PROCUREMENT PERFORMANCE AMONG KENYA TEA DEVELOPMENT AGENCY FACTORIES IN KENYA

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UNIVERSITY OF KABIANGA

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DECLARATION AND APPROVAL

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This thesis my original work and has not been presented for the conferment of a degree or for the award of a diploma in this or any other university:

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DEDICATION

I dedicate this thesis to my family for their prayers support, inspiration and encouragement during my academic journey. Your love; patience, understanding and support during my academic journey will always be in my heart.

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I acknowledge my research supervisors Dr. Pauline Keitany and Dr. Penina Langat for their guidance and encouragement towards my academic achievements. Much gratitude and appreciation go to the lecturers who tutored me, my classmates, research assistants and the entire University of Kabianga staff for their support; My God richly bless you.

ABSTRACT

Companies involved in a supply chain must coordinate their operations through adoption of inbound logistics strategies so as to enhance business performance. Kenya Tea Development Agencies factories have adopted inbound logistics strategies as well as quality management system with the aim of turning around their performance and hence reduce on operational costs leading to sustainable procurement performance. However, despite this, the factories still experience wide variations in earnings. The drop in earnings and high variation in tea bonuses among factories has been blamed on operational cost at the factory and the quality management system being adopted by these factories. This points out that although inbound logistics have been adopted, they have not resulted in sustainable procurement performance. The purpose of this study was to establish the relationship between inbound logistic strategies, quality management system and sustainable procurement performance among Kenya Tea Development Agencies Factories in Kenya. The study specifically sought to determine the relationship between suppliers sourcing strategy, transportation strategy, material handling strategy, reverse logistic strategy and sustainable procurement performance and determine the moderating effect of quality management system on the relationship between inbound logistics strategies and sustainable procurement performance among Kenya Tea Development Agencies factories. The study was anchored on the resource-based view theory, total quality management, strategic choice theory and stake holder theory. The study adopted correlation research design. The target population of the study was 188 staff drawn from the 16 Kenya Tea Development Agencies managed Region 5 factories. A census method was used to collect data from the production managers, information communication technology managers, procurement Managers, leaf base managers, factory unit managers and directors using a structured questionnaire. The validity of the instrument was determined through professional judgment and reliability was determined using Cronbach's alpha coefficient where the alpha coefficient of 0.865 was actualized. The findings revealed that suppliers sourcing strategies had a positive significant correlation with sustainable procurement performance ($r = 0.545$, $p < 0.05$); transportation strategy ($r = 0.352$, $p < 0.05$); material handling strategy ($r = 0.078$, $p > 0.05$); reverse logistic strategy ($r = 0.254$, $p < 0.05$); and that quality management system ($r = 0.526$, $p < 0.05$). The results showed that R Square changed from 30.8% to 41.2% as a result of the moderator effect of quality management system and that changed was significant. The study recommends that factories sourcing strategies need to aligned to organizational sustainability goal, develop procedures and policies on material handling with sustainability goal well outlined, manage return flows in accordance with organizational objectives so as to prevent wastage and minimize environmental costs in an ethical and ecological way as well as employ quality management system by following total quality concept's guiding principles in the management and purchase of material resources. The study may contribute to the existing body of knowledge on inbound logistic strategies and sustainable procurement performance by creating new knowledge based on the research findings. The results of this study may advice on policy formulation in relation to inbound logistics strategies and sustainable procurement performance. Other researchers may benefit from the literature on inbound logistics and sustainable procurement performance since the current study provided a basis for further studies.

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LIST OF ABBREVIATIONS AND ACRONYMS

ANOVA	Analysis of Variance
APICS	American Production and Inventory Control Society
BGS	Board of Graduates Studies
BOD	Board of Director
COVID-19	Coronavirus Disease 2019
CSCMP	Council of Supply Chain Management Professionals
GOK	Government of Kenya
ISO	International Standard Organization
IT	Information Technology
KTDA	Kenya Tea Development Authority
MRM	Multiple Regression Model
NACOSTI	National Commission of Science Technology and Information
QMS	Quality Management System
SCM	Supply Chain Management
SP	Sustainable Procurement

SPSS	Statistical Package for Social Sciences
SSCM	Sustainable Supply Chain Management
TBK	Tea Board of Kenya

OPERATIONAL DEFINITION OF TERMS

Inbound Logistics: It is the process of managing the transportation, storage, and receiving of goods or materials that a company or organization requires to operate (Sreekumar & Rajmohan, 2019). In the study they entails material handling, are used in the study as tools to support business efficiency by supplying the materials, spare parts, and goods needed for daily operations.

Material handling strategies: It is the transfer of materials from the point of manufacture to the point of distribution, which includes the efficient and safe movement, storage, and control of materials. This allows for the proper transfer of materials from their original source to their final destination, preventing material waste (Steve, 2022). They are the modes of transport used in the study to transport tea leaves from the field to processing factories and manufactured tea to distribution points.

Quality management system: It is a defined system that outlines the steps to take in order to fulfill quality policies and objectives, (ISO, 2017). In the study, they are actions that assist in coordinating and directing an organization's activities in order to satisfy consumer and regulatory needs and continuously enhance effectiveness and efficiency.

Reverse Logistics Strategies: These are the procedures for organizing, carrying out, and overseeing the economical and efficient movement of raw materials, production-related inventory, finished items, and related data from the point of consumption back to the place of origin in order to recoup value or correctly dispose of it (Elmas & Erdogmus, 2011). In the study, they are the processes in the study that implement, control, and plan the efficient movement of finished goods, raw materials, and inventory that is still being processed from the place of consumption to the point of origin in order to dispose of them properly or to recover value.

Suppliers Sourcing Strategies: These are the processes for determining whether suppliers are meeting legal requirements and complying with all supplier-related activities such as surprise visits and scorecards (Alikhani, Torabi, & Altay, 2019), they are approaches to supply chain management that formalize how goods are gathered and used in accordance with KTDA's purchasing strategy and business goals.

Sustainable Procurement performance: It is the process of selecting products and services to satisfy an organization's needs in a way that benefits society as a whole and the environment while minimizing environmental effect (ISO, 2017). In this study it is the adoption of inbound logistics strategies with the aim of ensuring sustainability of KTDA factories.

Transportation Strategies: These are methods of ensuring the smooth and as a sort of lubricant, the product acts as a constant flow of goods back and forth through the chain, enabling greater penetration of newer markets far from the place of production (Deshmukh & Mohanty 2004). They are functions used in the study to determine how products get to distribution centers or customers, and how products get from distribution centers to customers or end users.

CHAPTER ONE

INTRODUCTION

1.1 Overview

The chapter presents the background information, statement of the problem, general objective, specific objectives, research hypothesis, scope, significance and limitation of the study.

1.2 Background of the Study

Council of Supply Chain Management Professionals (2018), noted that procurement process focuses on acquiring the required materials, goods and components. It also involves; buying of goods and services, planning, inventory management, traffic, receiving, inbound inspection, and salvage operations (American Production and Inventory Control Society (2016). Sustainable procurement takes into account social and environmental factors in addition to economic factors. Sustainable procurement performance (SPP) ensures that purchases of goods and services made satisfy a company's requirements in a way that benefits the business and society at large while having the fewest adverse effects on the environment, (ISO, 2017).

In their empirical case study in Italy, Gualandris & Kalchschmidt (2016) emphasized the importance of monitoring the supply chain's long-term performance from the viewpoints of procurement and supplier management. The study concluded that manufacturing companies' environmental and social performance can be enhanced by SSCM, which grows and evolves within a firm from internal to external practices.

Suraraksa & Shin (2019) in a study in Thailand, found that purchasing is the crucial role of supply chain management that could be used to define strategic processes. The complexity of the supply chain is increased by the integration of the global market, which also has a significant impact on effective supplier management techniques. The results offer thorough understandings of the criteria that managers, practitioners, and decision-makers may use to select the best suppliers and keep track of their performance in the automotive sector. A business should implement the supplier selection and monitoring procedure based on study's' findings.

Jambulingam & Dodangeh (2013), used a case study of a medium-sized manufacturing company in East Asia to conduct research on logistics performance. The study included both a case study of the logistic performance of a real-world organization and a theoretical analysis of the gathered online data. The study came to the conclusion that competitive firms must routinely assess their performance in sustainable procurement and logistics in order to operate economically in the current environment. They asserted that a company's supply chain and logistics operations directly affect its success.

Rajeev et al., (2017) observed in a study in India that sustainable procurement makes it easier to combine consumer base, distribution network, internal firm activities, and supply base in their study on the evolution of sustainability in supply chain management. As a result, SCM techniques have a big impact on how stakeholders outside the company see organizational success, sustainability performance, and other factors. The strategic management of all internal and external stakeholders, from raw material suppliers to end users, is the main focus for sustainable procurement given the current trend of globalization and rising competition.

In India, according to Menon & Ravi (2021), the key enablers for achieving sustainability in supply chains are governmental regulations, rewards and incentives, and paying attention to customer opinions. The study also suggest the best use of resources, time, and money requires selecting the appropriate practices to support sustainable supply chain management.

According to Mugo (2017), organization will have a competitive advantage in their sustainable procurement by incorporating quality management since supplier social sustainability standards will be implemented throughout supply chain which focuses on labor rights, health and safety, societal responsibility, diversity, and product accountability. Khan, Kusi-Sarpong, Arhin, & Kusi-Sarpong (2018), did a study in Pakistan and suggested a system for evaluating and choosing suppliers based on their success in terms of sustainability. The findings reveal that among economic, environmental, and social sustainability dimensions, the top three parameters are quality representing 10.87%, Cleaner Technology Implementation representing 11.51%, and Information Disclosure which represented 13.75%. The top suppliers in terms of the triple sustainability dimension were those whose suppliers disclose their information.

In Kenya, according to Tea of Board Kenya (2018), poor infrastructure, unstable electricity, expensive fuel, and expensive packing materials are examples of inbound logistical activities that drives manufacturing costs. The restriction on obtaining wood fuel from the forest also severely affected the factories. This is as a result of the tea being dried using wood fuel. The manufacturers have been forced to buy fuel from farms where trees are scarce and consequently sold at excessive costs ever since the prohibition went into place three years ago.

1.2.1 Inbound logistic strategies

Kimaro (2020), inbound logistics strategies deal with the transfer of goods from the supplier to the organization that makes purchases so as to foster business efficiency by providing the products, spare parts, and materials needed for regular operations. It entails inbound shipment collection and transportation, material handling, and warehousing with the objectives of cost reduction, inventory optimization, and customer service (Baker and Rushton, 2018).

Hansen, et al., (2018), asserts that, reverse logistics is concerned with the flow of goods from consumer to manufacturer, with the goal of reducing waste and lowering business costs through remanufacturing repair, and recycling. Remanufacturing used products brings them up to quality standards similar to those for new products, while recycling uses materials from used products or components while repair get used products back in working order. Reverse logistics techniques lower waste and its environmental impact while also saving money, increasing operational effectiveness, improving customer service levels and profitability, and improving brand perception Thus KTDA managed factories need to adopt reverse logistic in order to increase their operational effectiveness which leads to sustainable procurement performance.

A review of the literature on techniques and sources for sustainable supplier selection was published in 2019 in Iran by Alikhani et al*.,* Multi-Criteria Decision-Making (MCDM) strategies were shown to be the most popular, according to the findings. Selecting sustainable suppliers is an essential SSCM choice because of the overall effect it has on the organization's sustainability performance. The upstream supply chain was

established in a study in Germany that it must be integrated for this decision to yield the greatest benefits, (Zimmer, Frohling, & Schultmann, 2016).

According to IFC (2020), the COVID-19 epidemic has had a direct impact on businesses involved in the flow, storage, and transit of commodities, according to an assessment on its effects. Transport enables trade and commerce as a crucial component of value chains and aids in getting goods from producers to consumers. Therefore, supply chain interruptions brought on by the pandemic could affect the sector's competitiveness and economic expansion. Governments all throughout the world implemented measures including lockdowns and border closures that limited the flow of people and products in (World Bank, 2020).

The transfer of product ownership is facilitated by transportation as a business enabler where businesses benefit from time and location utilities as they move goods from the source to the point of use. Hence for effective movement of materials to predetermined production, a business can choose one mode of transportation or combine several modes since efficient transportation promotes sustainable procurement by cost-effectively and securely delivering goods to the final customer (Branch, 2019). Therefore, KTDA managed factories should prioritize transport visibility by striking a balance between customs clearance, holding costs, transport lead times, and inventory holding costs since SPP is impacted by transportation costs, delivery times, and consistency of product delivery of materials in the proper quantity, quality, order, and time (Bowersox, 2020).

In Belgium, Moons, Waeyenbergh & Pintelon (2019), established that, vendors can manage materials in the warehouses of their clients through information system integration, which simplifies material handling by storing stocks for business operations and specifying the size and placement of stock in stores but also during transit. In order to guarantee that products are available it was found in Indonesia that, the appropriate quantities, quality, and timeliness, a company will engage in material handling, utilizing information technology, which improves logistics performance by minimizing manual operations, guarantees they offer the best service while keeping costs under control (Pujiarto, Hanafi, Setyawan, Imani, & Prasetya, 2021).

Supplier is charged with ensuring replenishment of warehouse inventory, availability and ensuring adequate supplies. Hence it is necessary to evaluate their qualities. According to Paswa (2018), in a study in India, effective inbound logistics can result in better product quality, bigger cost reductions, and higher revenues. Additionally, it will cut back on needless expenditure and total costs while improving customer satisfaction.

It guarantees safe, lowered carrier rates, which will guarantee higher inventory management accuracy. Investing in product storage, transportation and management enables sustainable procurement in the long run. The advantages of inbound logistics extend to other processes since it is the initial step in the value chain. Despite the significance of inbound logistics, the tea manufacturing industry tends to ignore this procedure in favor of customer service and other crucial outward logistics components. This result in poor quality goods and services, disgruntled customers, and lost money, (Paswa, 2018).

Waters (2021), argues that, in specifying the size and placement of stock, which takes place not only in stores but also during transit, is a requirement of material management, in order to guarantee that products are available in the appropriate quantities, quality, and timeliness, a company will engage in material handling.

Reid & Sanders (2017), utilizing information technology, improves logistics performance by minimizing manual operations and offer the best service while keeping costs under control, hence there is need to go beyond suppliers to make sure the entire supply chain complies with all the requirements necessary when evaluating their qualities.

Studies on supplier sourcing and sustainable performance many have been conducted in developed countries like China, Iran, Spain, India, Germany and United Kingdom Many adopted different methodologies in their studies with some using empirical literature investigation, stochastic programming approach, multi-method approach with some using secondary data to measure the study variables. (China, Li, et al., 2019; Ghadge, 2018; Koberg & Longoni, 2019; Luthra, et al., 2017; Torabi, et al., 2015; Zimmer, et al., 2016).

A study by Koberg & Longoni (2019) reported that supplier assessment alone is insufficient in achieving sustainable performance and recommended that businesses should adopt a collaborative approach. This suggests that supplier sourcing strategy should be investigated in collaboration with other inbound logistic strategies in order to establish their collective relationship with sustainable procurement performance. The current study sought to determine supplier sourcing strategies and sustainable procurement performance in the tea industry in Kenya.

Many studies on transportation strategy and sustainable procurement performance used secondary data, empirical reviews and case studies while the current study was founded on primary data and deployed correlation approach to find out relationship between the variables being investigated. The results from previous studies in some studies conflicted, in that they supported transportation in sustaining performance, , (Ashuro, 2022; Bowie, 2019; Gitahi & Ogollah, 2014; Prothan et al., 2017; Kyusya, 2015; Langat, 2013; Muchori, 2015; Mukolwe & Wanyoike, 2015; Musau et al., 2017); while others did not agree (Musyoka, 2016; Mwangangi, 2016; Mwangi & Ndubi et al., 2016; Waweru, 2013). There was need therefore to examine the relationship between transportation strategy and sustainable procurement performance for firms in the tea sector.

The studies conducted on material handling and sustainable procurement performance showed that there were conflicting findings, with some studies showing that material handling had a positive significant impact on sustainable procurement performance while others manifested the contrary. Many of the studies combined primary and secondary data collection methods and used different research designs. Also, many of the studies were done in other sectors of the economy with little being done in the tea sector (Abdinasir, 2020; Aminazahra & Chege, 2020; Geoffrey & Muturi, 2018; Ifeyinwa, 2022; Jusoh & Kasim, 2017; Kisioya & Moronge, 2019; Nyongesa & Shale, 2019; Ronald et al., 2020; Rono & Musau, 2020). There was need therefore to evaluate the relationship between material handling strategy and sustainable procurement performance for firms in the tea sector.

Studies that were reviewed on reverse logistics and sustainable procurement performance adopted various research methodologies with some adopting descriptive, explanatory, analytical and case study research designs. The studies done in Kenya were done for firms operating in liquefied petroleum gas, KEMSA, Kenyan fast moving consumer goods, Kenyan building sector, companies for imported furniture, construction firms, sisal processing enterprises and in Kenya's industrial sector. The research that was done on tea processing firms sought to determine the effects of reverse logistics on environmental performance which is just one aspect of sustainable performance (Bernard, Onyango, Muma et al., 2014; Gikonyo et al., 2022; Gregersen & Ghosh, 2018; Kabergey & Richu, 2015; Manyaga & Mburu, 2018; Mbovu & Mburu, 2018; Muttimos, 2014; Mutuku & Moronge (2020); Ndung'u & Moronge (2017); Njeri (2021); Njuguna & Kagiri's, 2017; Panya & Marendi, 2021; Samson & Gacuiri, 2018; Salim, 2016; Wambaya et al., 2018). There was need to examine the relationship between reverse logistics strategy and sustainable procurement performance.

1.2.2 Quality Management System

Quality is the fundamental components of any product that is essential not only for firms' sustainability but also for customers retention (Pambreni, Khatibi, Azam, & Tham, 2019). It is a key factor that provides the competitive edge to the organizations over their rivalry firms, that is why considered important for their survival. Therefore, businesses particularly, manufacturing concerns paid much attention towards maintaining their products and service quality.

Manufacturing industries are continuously working on quality enhancement by compliance of international quality standards (Sahoo & Yadav, 2018). The total quality management (TQM) practices and quality management system (QMS) in this regard play an integral role in enhancing the product quality and even decreasing the manufacturing expenses (Kunz, Puchta, Groll, Fuchs, & Pernul, 2019). One of the most challenging parts of implementing QMS in any organization is the culture of quality prevailing in its departments and sectors (Awan, Bhatti, Bukhari, & Qureshi, 2008). Various segments and parts of QMS should work with legitimate combination for the successful execution of it in the organizations.

The technologically advanced countries like USA, Japan, and the UK presented and implemented ISO standards in their associations. Motivated by the successful execution of ISO gauges in advanced nations, the manufacturing association of emerging countries also started implementing of ISO standards (Dahlgaard-Park, Reyes, & Chen, 2018). The developing countries are also following these standards to meet the customers' demands and remain in the competitive market (Yun, Lee, Park, & Zhao, 2019). ISO offers an assortment of advantages to the businesses. These advantages incorporated improved quality, better efficiency, and greater market exposure (Ayodele, Chang-Richards, & González, 2020). ISO certification has now become the mandatory requirement for all types of organizations by international traders (Iatridis & Kesidou, 2018).

Most of the manufacturing organizations in Kenya are ISO 9001 certified organizations, and they have implemented QMS according to the guidelines of ISO 9001 standards. QMS with manufacturing execution systems develop the strategies and provide complete information about the product development process that help to improve its quality,

design, features and customers' requirements in future. This information also helps to achieve production optimization, allowing quicker ramp up in manufacturing, decreasing delivery time and risk, wastage and per-item cost. The manufacturing sectors through ISO implementation can produce better quality products, expand business opportunities and hence remain sustainable (Sreekumar & Rajmohan, 2019).

According to Esfahbodi, Zhang, Watson & Zhang (2017), in China, an environmental certification like ISO 14000 is required for suppliers in a quality management system, and these businesses should be running training programs and encouraging collaboration to achieve long-term goals like minimizing or reducing expenses, upholding social responsibility, and eliminating environmental effect. However, since it might not include reaping financial rewards, maintaining sustainable production within an SSCM context has been one of the most important issues in emerging markets.

The studies reviewed have sought to establish a direct relationship between QMS and its effects on various aspects of performance. Many sought to compare the performance of firms between those ISO certified and the non-certified firms (Ikay & Aslan (2011); Carmilleri (2021); Siongok & Noor, 2016). Daoud (2021) evaluated the moderating effect on ISO 9001 Certification on the relationship between quality management practices and innovation for 81 firms from the manufacturing sector in Tunisia but did not give conclusive results on the moderated relationship between quality management practices and innovation hence the need for this study. The reviewed studies did not show how inbound logistic strategies such as suppliers sourcing strategy, material handling strategy, transport strategy, reverse logistic strategy moderated by quality management system has on sustainable procurement practices necessitating the need for this study.

1.2.3 Sustainable procurement performance

Sustainable procurement is about socially and ethically responsible purchasing, minimizing environmental impact through supply chain, delivering economically sound solutions and good business practice (CIPS, 2014). The UK Governments Sustainable Procurement Task Force (2012) identified sustainable procurement as a purchasing investment process that takes into account the economic, environmentally and social impacts of the entity's spending.

Hsu & Hu (2008) argued that the concept of sustainable procurement is an approach to improve performance of the process and products according to the requirements of the environments regulation. Procuring organizations and other supply chain partners are more seriously involved in designing and implementing sustainable procurement policies focusing on how environmental issues and issues relating to other aspects of the sustainable development pillars (Society and Economy) can be integrated in the procurement process activities (Hsu & Hu, 2008). Sustainable procurement performance should be measured under various perspectives; these include quality, efficiency, productivity, profitability and sustainability.

Procurement practices in the tea industry should be looked at as part of organizational strategy and be involved in the budgeting process, supplier choice and consolidation, concern for the environment and issues touching on quality and technological advances. KTDA should address and manage environmental and social issues that impact organization (Carter & Liane, 2011) and use supply chain strategies that enable them gain competitive advantage (Belfit et al., 2011).

In USA, Pettit, Croxton & Fiksel (2019), cites eight reasons for conducting a sustainability assessment for suppliers, including the following, aligning your organization's sustainability initiatives with its suppliers/customers to save and reduce costs; receiving a results-oriented supplier/customer review of sustainability efforts; gaining knowledge of the various supplier/customer sustainability initiatives; identifying supplier/customer strengths and opportunities for sustainability improvements; and improving overall sustainability.

According to Hasselbalch, Costa & Blecken (2014) in a survey of perceptions on Sustainable Procurement (SP) in the United Nations (UN), concluded that, good SP practices are significantly correlated with low demand, performance assessment, and tool barriers, thus it is essential to closely watch procurement activities in order to assist supplier capacity development. In order to accomplish quality management and increase supply chain competitiveness, sustainable procurement operations at KTDA must take a stand and involve all supply chain participants; even procurers should be required to adhere to a quality management standard. According to Mathivathanan, Kannan and Haq's (2018), in India, sustainable procurement performance entails, selection, development, and assessment of suppliers, as well as marketing of a company's products and services. According to the study, certain practices are incorporated into the conventional supply chain and aid in the transition of an industry to a sustainable supply chain. However, firms have trouble determining which practices are the most beneficial and understanding how these practices interact with one another. The findings showed that the most effective methods for adopting sustainable supply chain management are

management commitment to sustainability and integrating the triple bottom line strategy into strategic decision making which KTDA managed factories need to consider.

A study in Saudi Arabia by Islam, Turki, Murad and Karim (2017), established that supply and demand have a strong relationship with financial performance of firms. As a result, sustainable procurement practices have become an essential part of assisting organizations in achieving their goals. They conducted a mediational analysis in their research to identify the direct and indirect effects of SP practices on financial performance. They did not find any evidence that the summary measures of SP practices had a statistically significant direct impact on the financial performance of the company, but they did find evidence of an indirect impact of SP practices' nonfinancial performance on financial performance. Through creating a conceptual model for the results of SP performance and identifying statistically significant connections between inbound logistic strategies and quality management system as moderating variables, this study adds to the body of literature on sustainable procurement performance.

1.2.4 Kenya Tea Development Agency Factories

In order to encourage and promote tea cultivation on small farms, Kenya Tea Development Authority was founded in 1964 as a division of Special Crops Development Authority (SCDA). Kenya Tea Development Authority, one of the biggest private tea management companies in the country, changed its name to Kenya Tea Development Agency Limited in 2000 and was incorporated as a private company under the Companies Act CAP 486, (KTDA, 2013).

Kenya's small-scale tea industry is managed by KTDA with seven tea-growing regions represented by the board of directors who oversees the company management. KTDA is in charge of overseeing 66 factories which use the same type of business strategy. KTDA managed factories are grouped into following regions: Region 1: covering (Kambaa, Mataara, Kagwe, Theta, Ngere, Ikumbi, Ndarugu, Gachege, Njunu, Nduti, Makomboki and Gacharage Tea Factories); Region 2: Covering (Githambo, Kanyenyaini, Kiru, Gatunguru, Chinga, Iriaini, Gitugi, Gathuthi and Ragati Tea Factories); Region 3: Covering (Ndima, Kangaita, Mununga, Kimunye, Thumaita, Kathangariri, Mungania and Rukuriri Tea Factories); Region 4: Covering (Weru, Kinoro, Kionyo, Imenti, Githongo, Igembe, Michimikuru and Kiegoi Tea Factories); Region 5: Covering (Toror, Tegat, Momul, Litein, Chelal, Olenguruone, Kapkatet, Mogogosiek, Kobel ,Kapset, Rorok, Kapkoros, Tebesonik, Boito, Motigo and Tirgaga tea factories); Region 6: Covering (Sanganyi, Tombe, Sombogo, Gianchore, Nyansiongo, Matunwa, Kebirigo, Nyankoba, Itumbe, Nyamache, Ogembo, Eberege, Kiamokama and Rianyamwamu Tea Factories) and; Region 7: Covering (Chubut Kaptumo, Mudete and Kapsara Tea factories).

In 2006, KTDA resolved to adopt sustainable agriculture practices to ensure that farming is done in a responsible manner by conserving biodiversity and safeguarding the social and environmental well-being of the farmers and other stakeholders. This has led to improving the local economy for present and future generations of small-scale tea farmers and local communities (KTDA, 2022). The company receives tea from small-scale farmers, process it and ensure proper marketing. Good supply chain management techniques are needed both upstream and downstream for all of these activities since they involve complex supply chains with value addition.

Supply chain activities may be disrupted, resulting in losses, which could prevent KTDA factories from operating efficiently if proper supply chain management procedures are not put into place (KTDA, 2013). Farmers whose produce is marketed by KTDA have seen their earnings drop annually by a quarter or 25% to Sh46.45 billion from Sh62 billion. There is also wide variation in bonuses payment with factories in the East receiving very high bonuses rate as compared to the factories in the West of Rift. The second payment known as tea bonus dropped by 36% to Sh28 billion, compared to Sh 44 billion where farmers in Kiambu, Muranga, Nyeri, Kirinyaga, Embu and Meru earned more per kilo compared to their peers in Kericho, Bomet, Kisii, Nyamira, Vihiga, Kakamega and Nandi, (KTDA, 2013).

All KTDA managed factories practices inbound logistics practices such as suppliers sourcing strategy, transportation strategy, material handling strategy and reverse logistic strategy but its application in the day to day operation very per region. Thus KTDA region 5 factories were chosen for a study since their performance was not good as per other factories in other regions and is hoped that if fully implemented will actualize sustainable procurement of the factories.

1.3 Statement of the Problem

Inbound logistics strategies help companies can manage their supply chain more effectively. Hence companies involved in a supply chain must coordinate their operations through adoption of inbound logistics so as to enhance business performance. KTDA factories have adopted inbound logistics strategies with the aim of turning around their performance as well as reduce operational costs leading to sustainable procurement

performance. However, despite this KTDA tea factories still experience wide variations in earnings. The factories earned a total of Ksh 69.77 billion from tea sales for the year 2019 which was 18% below 2018 performance when the factories earned Ksh 85.74 billion. The drop in earnings and high variation in tea bonuses among factories has been attributed to operational cost at the factory. This points out that although inbound logistics have been adopted, they have not resulted in sustainable procurement performance. Most of the previous studies have focused on inbound logistics and performance on government corporations, telecommunication industry, cement manufacturing industries, transportation firms but limited studies have been done on sustainable procurement performance in the tea industry moderated by QMS. In addition, many of the studies have reported varying degrees of effects of inbound logistics on various aspects of business performance with some reporting contradicting findings. Another study recommended that supplier sourcing strategy should be investigated in collaboration with other inbound logistic strategies in order to establish their collective contribution to sustainable procurement performance. There was need to establish how inbound logistics strategies, whether directly or indirectly, influence sustainable procurement performance. Further, the study sought to determine the moderating effect of quality management system on the relationship between inbound logistic strategies and sustainable procurement performance of KTDA tea factories in Kenya.

1.4 General objective

The general objective of this study was to establish the relationship between inbound logistic strategies, quality management system and sustainable procurement performance among selected Kenya Tea Development Factories in Kenya.

1.5 Specific objectives

The specific objectives were;

i. Determine the relationship between suppliers sourcing strategy and sustainable procurement performance among KTDA factories in Kenya,
ii. Examine the relationship between transportation strategy and sustainable procurement performance among KTDA factories in Kenya,
iii. Evaluate the relationship between material handling strategy and sustainable procurement performance among KTDA factories in Kenya,
iv. Examine the relationship between reverse logistic strategy and sustainable procurement performance among KTDA factories in Kenya,
v. Determine the moderating effect of quality management system on the relationship between inbound logistics strategy and sustainable procurement performance among KTDA factories in Kenya.

1.6 Research Hypotheses

The hypotheses of the study were;

Ho_1: There is no statistically significant relationship between supplier's sourcing strategy and sustainable procurement performance among KTDA factories, Kenya,

Ho_2: There is no statistically significant relationship between transportation strategy and sustainable procurement performance among KTDA factories, Kenya,

Ho_3: There is no statistically significant relationship between material handling strategy and sustainable procurement performance among KTDA factories, Kenya,

Ho_4: There is no statistically significant relationship between reverse logistic strategy and sustainable procurement performance among KTDA factories, Kenya,

Ho_5: There is no statistical significant moderating effect of quality management on the relationship between inbound logistics strategy and sustainable procurement performance among KTDA factories, Kenya.

1.7 Justification of the study

The Public Procurement and Disposal Act (PPDA) of 2015 increased the effectiveness and efficiency of public procurement in Kenya. Regulations governing public procurement were swiftly adopted, enabling better realization of purchasing rights and fostering cooperation between the entity doing the procuring and the suppliers. The individual and combined influences of logistics variables such as material handling strategy, supplier sourcing strategy, transport services strategy, and reverse logistic strategy have not been fully studied both regionally and even globally as well as locally. The tea industry is Kenya's second largest foreign exchange earner, and the majority of tea produced in the country is managed by KTDA factories, which have seen declining performance and high production costs. Inbound logistics strategies have been implemented in KTDA factories, but the effects are unknown due to limited studies, necessitating a closer examination of inbound logistics elements in KTDA region 5 factories.

1.8 Significance of the study

Theoretical literature review and this study's findings aims to establish the link between suppliers' sourcing strategy, transportation strategy, reverse logistics strategy, material handling strategy, quality management system, and sustainable procurement, which provided a basis for understanding of SPP for inbound logistics. The research shed light on the importance of inbound logistics in enhancing SPP in KTDA factories and the tea industry in general. Shareholders will learn about the various mechanisms available to them for practicing sustainable procurement. Additionally, suppliers may profit from being able to identify which KTDA factories are properly governed, enabling them to make better investment choices. Government and policymakers may learn more about the crucial part that inbound logistics plays in SPP from KTDA Factories. Policymakers are informed about the type of inbound logistics to be implemented in KTDA factories. This study identified additional research areas where other researchers may be able to conduct additional research and expand their knowledge in inbound logistics and sustainable procurement.

1.9 Scope of the Study

The study determined the relationship between inbound logistics strategies, quality management systems, and sustainable procurement performance in KTDA Region 5 Factories which are located in Kericho, Bomet and Nakuru Counties. The region was preferred because of its strong economic growth, which is expected to spur the opening of more factories in the region involved in the procurement process. It is also the largest of the seven regions in terms of the number of factories and, by extension, the area of

land under tea plantation. Supplier sourcing strategy, transportation strategy, and reverse logistics strategy, material handling strategy, quality management, and SPP are the study variables. The research was conducted between September 2023 and October 2023.

1.10 Limitation of the Study

The study was limited to the study variables, which were the selected inbound logistic strategies namely; suppliers sourcing strategy, transportation strategy, reverse logistic strategy, and material handling strategy; sustainable procurement performance and the quality management system used by KDTA.

The use of self-administered questionnaires posed a challenge in terms of comprehension and accurate completion of the questions. The respondents received thorough instructions to address this. Confidentiality was ensured to respondents who filled the questionnaires willingly by letting them know that the results were only used for academic purposes. Time constraint to finish the research on time was addressed by careful planning and allocating additional resources and manpower to complete the work as schedule.

1.11 Assumptions of the Study

The assumption was that the respondents were in a position to answer the questionnaire honestly and correctly. Additionally, it was considered that the sample population's responses represented a genuine image of inbound logistics tactics, the efficacy of the quality management system, and sustainable procurement performance.

Further, the researcher assumed that all factors remained as planned such that the time frame flow and no pandemic like coviv-19 stroke to warrant a lock down hence hinder movement to and from the field. In addition, it was assumed that the management of the targeted tea factories accepted to form part of the study but all respondents took part accordingly after they were notified.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Theoretical review, literature review on inbound logistics strategies, conceptual framework, and knowledge gaps were included in this chapter.

2.2 Theoretical Literature Review

This section reviewed existing theories that were pertinent to inbound logistics strategies and sustainable procurement. It makes an effort to show how inbound logistics strategies and SPP are related.

2.2.1 Resource-Based View

The resource-based view, a managerial framework, is used to determine the strategic resources that a company can use to gain a long-term competitive advantage. In his 1991 article "Firm Resources and Sustained Competitive Advantage," Barney presented this notion. The theory presupposes that companies have access to a variety of resources, some of which are hard to create or replicate and cannot be traded on factor markets that can give them a competitive advantage (Barney & Clark, 2007). The theory emphasizes how important a firm's resources are in determining how competitive and high-performing it is (Cool, Almeida Costa & Dierickx, 2002). Reducing operating costs and raising customer willingness to pay for the company's goods and services, businesses can use their resources to increase efficiency.

When a company transfers efficiency gains to its customers, it gains a competitive advantage over other companies in the same market (McWilliams, Van Fleet & Cory, 2002). According to Wong & Karia (2010), the main finding of the resource dependence theory is that organizations have networks of connections with other organizations, and that these connections result in dependencies. These dependencies can take the form of market dependencies or resource dependencies, which occur when an organization relies on another organization to gain access to crucial markets or resources (Zimmermann & Foerstl, 2014; Ahmed, Kristal & Pagell, 2014). This understanding is expanded upon by the resource-based model, which contends that a firm's distinct resources and capabilities can also contribute to competitive advantage in addition to resource and market dependence. The source of a company's competitive advantage is its special assets and skills. The focuses on internal resources as a means of creating a competitive advantage guided on utilization of transport by KTDA in their endeavor to remain competitive in relation to procurement performance. The organization need to leverage on this resource so as to reduce on cost of operations (Lewis et al., 2010).

RBT has come under fire for four main causes. First, the traditional RBT struggles to describe why and how some businesses succeed in a market that is constantly changing, (Kleinschmidt, de Brentani & Salomo, 2007). Second, the concept of value creation is static and tautological, suggesting that the theory is self-validating and cannot be tested empirically (Barney, 2001), which could be related to some subpar RBT research. The idea has also come under fire for being static and for leaving out how organizational actions impact resource efficacy over time, (Kozlenkova, Samaha & Palmatier, 2014).

Third, since the theory mainly corresponds to Barney's (2001) work, any resource that meets the conditions of value, non-substitutability, and uniqueness is uncommon, so the evidence for this claim may be redundant, (Priem & Butler, 2001). Lastly RBT has a tendency to disregard external resources and believes that only internal elements are required to offer competitive advantage, even while exogenous forces could otherwise provide prospectively favorable capabilities (Lewis et al., 2010). Despite the theory's limits, the quick development of RBT and the innovation to the theory through adjustment, clarification, and change continue to increase its breadth and applicability (Kozlenkova, Samaha, & Palmatier, 2014). The theory will be used to explain how KTDA managed factories use the inbound logistic strategies recourses at their disposal are linked with quality management system to enhance their sustainable procurement.

2.2.2 Total Quality Management Theory

Total quality management theory was introduced in the 1940s by Edwards Deming. The basic tenet of the theory is that cost-effective quality improvement is possible through continuous improvement. He made the argument that the manufacturing process is a whole system rather than a collection of unrelated processes starting in the 1940s, and that when it is seen as a whole system, opportunities for efficiency improvements are more readily apparent. Deming also asserted that the idea of tolerance limits is harmful to the caliber of the final product. The levels of deviation from the goal that management will tolerate are known as tolerance limits.

Hubbard (2020) asserted that tolerance limits reduce quality management but won't alter production as long as there are enough products that fall within the tolerance limits. To ascertain the moderating impact of a quality management system on long-term procurement in KTDA factories, the total quality management theory was used. TQM theory states that performance is improved by developing goods or services to meet or surpass consumer expectations and by enabling employees to identify and get rid of any elements that compromise the performance of goods or services, (Sallis, 2014).

According to Maritim and Ochiri, (2015), TQM theory promotes organizational effectiveness by fostering proactive leadership, fostering stakeholder satisfaction, and striving for continuous improvement. TQM proponents argue that only people who use the product or service can judge its quality hence suppliers could improve by adopting the practices of their "best pier" suppliers.

According to the theory, KTDA factories that implement TQM were able to produce goods with fewer flaws. One of the fundamental tenets of TQM is to make things and provide services correctly the first time. When products are delivered, there might be fewer problems, necessitating fewer future product modifications, product recalls, and customer support. Since fewer things are returned to the company as a result, reverse logistics is not as necessary. KTDA managed factory consumers were happy since high-quality goods increases customer happiness, which led to a rise in market share, an increase in sales, and word-of-mouth marketing started by the customers. Due to fewer product defects, businesses spend less on customer care, product replacements, field service, and the creation of product remedies. The decreases in expenses lead to higher

profit margins. TQM using organizations create and advance core principles centered on quality assurance and continuous development, (Maritim & Ochiri, 2015).

One of TQM's limitations is the need for corporate-wide dedication to quality improvement and the difficulty in establishing this commitment (Miranda and Bottorff, 2022). All management levels must support the program for it to be genuinely effective hence lack of resources can undermine a TQM program's efficacy and have a negative impact on the entire company. While certain executives were able to understand the theory and execution clearly, not every employee did, (Cartana, 2020).

2.2.3 Strategic choice theory

The concept of a strategic choice is related to John Child's work from 1972 and has significant implications for management and organization studies. The understanding of organizations prior to the concept's introduction in the early 1970s was primarily deterministic and functional. In essence, it was believed that specific organizational responses were automatically required depending on the environment (such as whether it was dynamic or static) and organizational contingencies (such as batch or mass manufacturing) (Harney, 2016).

The theory explains how decision-making in a diffusive political process gives leaders or leading groups the ability to affect an organization. It provides an alternative that emphasizes the power of people and groups within organizations to make decisions, sometimes out of self-interest, that have a dynamic impact on how those organizations develop. These tactical choices were made as part of an organizational learning process that adjusted to the political environments both internally and externally. The theory

emphasizes the significance of gathering all available data when deciding whether to construct or purchase (Gregory et al., 2009). It explains not only how resources are obtained, but also how dependencies with suppliers can be managed or minimized, as dependencies imply vulnerability (Caniels & Gelderman, 2005).

Making the best decision depends on a number of external elements, such as suppliers and the organization's strategic orientation. A sourcing plan must be devised once a company has decided it needs to buy goods from outside sources. The engineering problem of the Strategic Choice Theory is related to the development of sourcing systems that support business strategy (Gregory et al., 2009).

An organization would prioritize single sourcing strategies that allow for innovation since it ensures greatest level of control, interdependence of buyers and suppliers. This might favor vertical integration or sourcing from a select group of vendors that can be managed through purchasing power, thereby putting the vendor at the whim of the purchasing organization (Caniels & Gelderman, 2005). This theory was applied to explain the effect of sourcing strategy on sustainable procurement. It described the sourcing strategies used by KTDA factories in the day-to-day procurement of goods and services, as well as their impact on sustainable procurement.

2.2.4 Stakeholder Theory

The stakeholder theory is an organizational management and business ethics theory that discusses ethics and values in management organizations which was proposed by Edward Freeman (1984). It describes and offers management ways for taking into account the interests of the stakeholder groups that make up a corporation in addition to naming and

modeling those organizations' stakeholder groups. It makes an attempt to answer the question, "Who or What Really Matters?" (Miles, 2012).

The theory holds that an organization is made up of various stakeholders, such as workers, clients, vendors, payers, governing bodies, political parties, trade groups, and unions. Competitors may occasionally be regarded as stakeholders depending on their ability to influence the firm and its stakeholders. The stakeholder perspective on strategy includes a sociopolitical level, resource-based and market-based perspectives, and both (Miles, 2012). Every organization must meet the expectations of its stakeholders. Customers provide the revenue required to satisfy the other stakeholders for many organizations, particularly business organizations.

Customers, according to Foley (2005), are the most important stakeholder among equals. Customers play an important and complex role in gaining competitive advantages for most organizations, and there is a need to satisfy or preferably exceed their needs and expectations with a limited amount of resources in order to achieve sustainability in all of its operations. The process of developing and implementing appropriate strategies is complex, but it ensures that the organization truly understands the consequences of its actions in relation to its various stakeholders.

According to Harrison (2015), the strategy should make sure that organizational behavior and expectations of stakeholders are in sync, but it is highly unlikely that this happened. The process of managing stakeholders enables an organization to determine which stakeholders are most crucial or have the greatest impact on organizational behavior. As a result, the organization can make sure that its sustainable procurement strategies don't

"conflict" with those of "key" stakeholders. Organizations must continuously monitor stakeholders to make sure that organizational strategy changes as stakeholder power and expectations do.

Stakeholder theory effectively combines ethics and economics. If a business only cares about its owners' profits, it did not succeed. It must be open to feedback from all stakeholders, including clients, staff members, and suppliers. In the end, a stakeholder's funding has a direct impact on the expansion and success of the business. Therefore, the entire firm stood to benefit from directors who kept stakeholders in mind, (Parmar et al., 2010). This theory was used to explain on the extent to which KTDA factories manages their quality of production so as to meets and exceed the stakeholders expectation hence attain sustainability.

2.3 Review of Literature

This section gives the review of literature based on the study variables which were; suppliers sourcing strategies, transportation strategies, material handing strategies, reverse logistic strategies and quality management system and sustainable procurement performance.

2.3.1 Suppliers sourcing strategies and sustainable procurement performance

Supplier sourcing entails identifying, evaluating, selecting, and engaging with a suitable supplier who can provide quality goods and services, allowing the organization to get the best value in terms of both product and cost. This process necessitates the management of suppliers through continuous evaluation and quality initiatives, as well as the

management and mitigation of supply risks. The goal of sourcing suppliers is to evaluate the efficiency of quality, delivery, and cost in relation to profitability in order to promote more sustainable business activities (Guide, 2013).

In their study in Germany on sustainable supplier management, Zimmer, Frohling and Schultmann (2016), used models for sustainable supplier selection, monitoring, and development. According to their findings, the Analytic Hierarchy Process (AHP), Analytic Network Process, and interest in sustainable supplier management have all increased. AHP and Multi-criteria Optimization and Compromise Solution (VIKOR) were combined by Luthra, Govindan, Kannan, Mangla, & Garg (2017) to evaluate sustainable supplier selection criteria from a supply chain viewpoint in an Indian car maker. Environmental costs, product quality, cost, Occupation, Health and Safety programs, and the most crucial criteria for choosing a sustainable supplier were found to be environmental capabilities.

Ghadge, Karantoni, Chaudhuri, & Srinivasan (2018), in United Kingdom, studied the trends in big companies' sustainability performance for supplier selection across supply chain tiers and geographical areas. With the help of hierarchical multiple regression analysis, secondary data on 83 large, international companies discussing sustainable procurement methods was analyzed. In order to develop the hypotheses, the dynamic capabilities view and stakeholder theory was used. The findings reveal that the performance of large firms' sustainable procurement varies throughout supply chain tiers and improves in the direction of the final consumer. There are no discernible differences between geographic regions due to the standardization of legislation and the adaptable capacities of multinational, huge corporations.

Torabi, Baghersad, & Mansouri (2015), in Iran did a study to solve supplier selection in a disrupted supply chain using a two-stage stochastic programming approach. Because disruptive events have an effect on the supply bases that are chosen as well as the overall demand that suppliers must meet, they came to the conclusion that they should be taken into account when choosing a supply portfolio.

In China, Li, Fang, & Song (2019), developed a methodology for identifying sustainable supply chain management techniques that may be utilized to assess and select suppliers. Sustainable suppliers were chosen using the TOPSIS (Technique for Order Performance by Similarity to Ideal Solution) technique. Then it was advised to employ an integrated weighing approach to assign various criteria weights based on arbitrary and factual data. In order to support the suggested method, the energy firm owned by the Chinese government participated in a case study. The findings demonstrated that managers can analyze suppliers more successfully, suppliers can identify their performance gaps, and suppliers are ranked more precisely when various uncertainties are taken into account.

A hybrid Strengths, Weaknesses, Opportunities, and Threats (SWOT-QFD) systematic framework was developed by Vahidi et al., (2018) in Iran, to pinpoint the most important sustainability requirements, an illustration case study was used to show how useful the framework is, employing a case study from the electronics sector, Aghajani, & Ghadimi, (2018) suggested employing Multi-Agent Systems (MASs) to automate and streamline the process of selecting sustainable suppliers and allocating orders in the medical device.

A comprehensive literature review on extending sustainability to suppliers was done by Koberg & Longoni (2019), in Spain, was done using a structured literature review analysis of previously published studies was used in the study's design with the aim of evaluating contributions, compiling knowledge, and identifying managerial implications as well as potential research directions. From the study, collaboration and supplier evaluation are efficient ways to raise sustainability. The results show, though, that assessment alone is insufficient, and businesses must adopt a collaborative approach. This study aimed to accomplish this by incorporating supplier evaluation techniques, codes of conduct, and collaborative activities into their performance, like surprise visits and scorecards.

Alikhani, Torabi & Altay (2019), in Iran, used a multi-method approach based on quantitative empirical investigations and analytical modeling to study the selection of strategic suppliers based on risk and sustainability criteria. Using interval type-2 fuzzy sets and an extended super-efficiency DEA model with both desired and undesirable inputs and outputs, the study monitored decision maker inputs and evaluated providers. This strategy deals with supplier selection, sustainability, and supplier risk factors all at once. The study's findings suggest that making decisions without taking sustainability criteria or risk factors into account can be detrimental.

Studies on supplier sourcing and sustainable performance many have been conducted in developed countries like China, Iran, Spain, India, Germany and United Kingdom. Many adopted different methodologies in their studies with some using empirical literature investigation, stochastic programming approach, multi-method approach with some using secondary data to measure the study variables. A study by Koberg & Longoni (2019)

reported that supplier assessment alone is insufficient in achieving sustainable performance and recommended that businesses should adopt a collaborative approach. This suggests that supplier sourcing strategy should be investigated in collaboration with other inbound logistic strategies in order to establish their collective relationship with sustainable procurement performance. There was need to determine supplier sourcing strategies and sustainable procurement performance in the tea industry in Kenya.

2.3.2 Transportation strategies and sustainable procurement performance

Beirão et al., (2016), in a study to investigated how city logistics initiatives impacted the regional economy in their study, investigating the effects of City Logistics Measures on the City's Economy in Europe. The study conducted a survey by interviewing city logistics experts in order to determine the extent of benefits or costs anticipated by the implementation of city logistics measures. According to the research, urban freight transportation has rapidly expanded, posing a threat to the environment and the economy and driving up the cost of logistics and product prices. The study reports that rapid transportation development has negative effects on the environmental and economic as it results in highest logistic cost.

Moen (2016), studied Sweden commercial vehicle routing software used to examine a manually dispatched transport network to 324 retail shops. The outcomes were then compared to the route-optimized solution. A new technique of transport strategy called the "Five-step model" was then connected to the case study. A problem analysis, simulation of new routes, specification definition, provider selection, procurement process, open book pricing, joint route review, negotiations, contractor agreement, and

payment with reverse billing are the five steps that make up the procedure. Stakeholders in the Five-step model bargain in terms of distance, time, and sequential itineraries rather than a single price per stop, as is usual in Sweden's transportation industry. Inferentially, the transport buyer gains control over the transport firm in the supply chain, enhancing transparency and altering the dynamic between the parties.

Sethanan, Chetchotsak, Tongsokhowong, Chaikanha, & Kusoncum (2012), investigated inbound logistics models for the Thai Sugar Industry using Arena software to improve mill yard management and reduce wait times for sugarcane transport vehicles. The two alternative scenarios that were presented were the creation of a registration procedure based on grower type priority, serving all grower types on a first come, first served (FCFS) basis, and allocating unloading equipment based on sugarcane grower type. According to the findings, different firms with similar inbound logistics chains will have varying levels of efficiency depending on their management. This suggests that efficiency in the supply chain may be dependent on how inbound logistics aims is managed.

In Italy, Evangelista, Santoro, & Thomas (2018), discovered that there is still a gap in the body of literature despite the growing interest in environmental issues in the freight transportation and logistics service sector. Their systematic review of the literature from 2000 to 2016 on environmental sustainability in third-party logistics service providers. Through an analytical framework based on five topic areas influencing factors, information and communication technology (ICT) tools supporting green actions, shipper perspectives, energy efficiency in road freight transport, and collaboration the review gave readers a glimpse into the important aspects of green issues in transportation and logistics service companies. The results show that despite a considerable rise in papers

published since 2008, several disciplines, such as ICT and performance assessment, remain significantly under-researched. Each of the listed topic areas has many research gaps that the current study attempts to fill.

In a study on the elements of logistic customer service provided by the commercial cargo motor transport businesses in the Silesian Province in Poland Kadlubek (2015), discovered that the SERVQUAL method places these businesses on a quantifiable level (region in southern Poland). The study's survey questionnaire, which was completed by 294 commercial cargo motor transport enterprises, was constructed around 22 logistic customer service determinants. The study discovered that sustainable transportation and logistics processes lead to sustainability in the transportation and logistics sectors.

In Bangladesh, Prothan, Marazul, Atikur, & Ashrafuzzaman (2017), analysed the transport system at the major roads in Rangpur City. The main objectives of the study were to discuss potential solutions and identify current traffic and transportation issues. Numerous surveys, including traffic volume surveys, physical feature surveys, delay time surveys, and parking surveys, have been carried out to assess the state of transportation and traffic in the area. The design or pictorial data was analyzed using MS Excel, GIS, and Google Sketch-up, in addition to the data, which was analyzed using MS Excel. The study found that organizations involved in the physical movement of goods need a variety of transportation services, and that the best option is chosen based on the type of item that needs to be moved. The demand for distribution and transportation will almost certainly rise as the global economy and trade continue to expand.

Bowie (2019), in Nigeria, Nestle introduced inexpensive nutrition, new routes to the market, ecologically responsible packaging options, and viable methods for moving cocoa plantlets in Nigeria. Nestlé supports and promotes sustainable agricultural practices and green manufacturing in all of its operations around the world, maximizing eco-efficiency production through conservation programs, by improving capacity utilization of its factories, and through other investments to maximize production while concurrently minimizing resource consumption, reducing waste, and emissions.

A case study of the Bedele Brewery Share Company was used by Ashuro (2022) to analyze the impact of transportation logistics and procurement on the operational performance of Ethiopian brewery Share Company. Both a descriptive and an explanatory research design were used in the study. Techniques of purposeful sampling were used to sample 158 respondents. At the conclusion of the study, it was determined that transportation management and procurement accounted for 65.3% of the total variability in the operational performance of Bedele Brewery Share Company. Multiple regression analysis was used to estimate the relationship between the dependent variable and independent variables.

The government of Kenya views transport sector as the promoters of economic growth and development toward the middle-level economy, as envisioned in the development blueprint of Vision 2030 (RoK, 2012), for example, the logistics market is expected to cross USD 5 billion by 2023 (Ken, 2019). However, the gross domestic product from the transport sector decreased to Kenya Shillings 84312 Million in the first quarter of 2020 from 106123 KES Million in the fourth quarter of 2019 (KBS, 2020).

In their study Musau, Namusonge, & Makokha (2017), looked at how transport management affected the supply chains of Kenyan textile manufacturing enterprises in terms of profitability, dependability, cost, responsiveness, flexibility, and asset management effectiveness. The main theoretical foundation of the study was cooperative game theory. The study employed the convergent parallel mixed techniques design. The study's target population consisted of 196 respondents who worked in procurement departments and departmental heads from each of the 15 textile manufacturing sectors present in Nairobi County. 139 respondents who worked in the procurement divisions of their respective textile companies were selected using stratified sampling and basic random selection methods. Inferential statistics were used to analyze the link between the variable and the proposed hypothesis, including hierarchical multiple regression and correlation analysis. The study's conclusion, which acknowledges the importance of transportation management in the supply chain, is that it can enhance the performance of the supply chains for textile industries.

Muchori (2015), investigated how the Mombasa port's freight logistics were affected by the volume of traffic. Building on the infrastructure demand on the route from Nairobi to Mombasa, which has continued to disrupt logistical operations at the port, the study utilized a descriptive survey approach and a sample size of 150 replies from a possible 10450 employees. The correlation results show a positive association between transportation expenses and traffic congestion. As a result of the backed-up traffic, freight logistics were less efficient.

In Mukolwe & Wanyoike (2015), assessed how management practices used in logistics have an impact on Mumias Sugar Company's operational efficiency. The study discovered, among other things, that the practices used for physical distribution and transport management are equivalent to the flow of goods and raw materials that is cost-effective, which has a positive influence on operational efficiency. Mwangangi (2016), looked into how logistics management affects manufacturing companies' productivity in Kenya. The inquiry examined primary and secondary data from corporate employees as well as published and unpublished information. Using multiple regression analysis, the study discovered that the use of transport management systems in transport management was a major predictor of business performance.

Gitahi & Ogollah (2014) examined how fleet management practices have an impact on the provision of services to refugees participating in the UNHCR Kenya program. The analysis is based on the premise that transportation is at the center of logistics. The study, which employed a descriptive research approach, included 390 target participants. Researchers came to the conclusion that the rate of fuel consumption on tracking, fuel monitoring, fuel sourcing, fuel allocation on a daily basis, and the rate at which fuel usage is monitored affect the UNHCR program in Kenya's delivery of services to refugees.

Ndubi, Iravo, & Onchiri (2016) looked at how Safaricom Limited's inbound logistics performed in relation to lead time variability. Delivery time, cost, and quantity were used as metrics to assess the effectiveness of inbound logistics. The lead times for production, shipping for customs brokerage, and the velocity for products inspection were found in the study to have direct and substantial effects.

Kyusya (2015) investigated the influence of logistics outsourcing on the efficiency of Kenya's shipping sector's operations. 42 shipping companies with operations in Kenya were included in the study. The data were analyzed using descriptive and inferential statistics. A connection between transport management and a firm's operational success was discovered by the study. Businesses should foster a culture of logistic outsourcing, according to the report, among cross-functional teams made up of service providers and transportation companies.

Mwangi & Waweru (2013), investigated the connection between inbound logistics and the effectiveness of the supply chains for Kenyan mobile phone operators. The study used primary data gathered using semi-structured questionnaires in a descriptive survey approach. The study concluded that inbound logistics procedures have a statistically significant impact on supply chain performance indicators and that transportation is a crucial supply chain link. Additionally, the study reported that rising transportation costs had a negative impact on the supply chain and that sluggish inbound transit jeopardized timely delivery of goods and services.

Maweu (2016), conducted a study to ascertain the connection between incoming logistics and Kenyan mobile phone providers' supply chain performance. In order to gather primary information for the study, which examined inbound logistics practices and supply chain performance, structured and semi-structured questionnaires were used. The study found a statistical significant logistic practices on supply chain cost. However, the study reports that inventory level and accuracy has no significant effect on supply chain cost. Therefore, it is important to establish relationship between inbound logistic

strategies, quality management system and sustainable procurement performance among selected Kenya Tea Development Factories in Kenya.

Langat (2013), investigated the impact of inbound logistics management on the efficiency of public procurement at Kenyan public institutions with a focus on the Kenya Medical Supplies Agency. The study's specific goals were to assess how inbound transportation services affected the effectiveness of public procurement. Using proportionate random sampling and simple random sampling techniques, 200 KEMSA employees were sampled for the examination. Questionnaires were used to collect the data, which was then analyzed using descriptive and inferential statistics.

Many studies on transportation strategy and sustainable procurement performance used empirical reviews and case studies while the current study was founded on primary data and deployed correlation approach to find out relationship between the variables being investigated. The results from previous studies in some studies conflicted, in that they supported transportation in sustaining performance, while others did not agree. There is need to examine the relationship between transportation strategy and sustainable procurement performance for firms in the tea sector.

2.3.3 Material handling strategies and sustainable procurement performance

In their review of the literature on sustainable supply chain management: trends and framework, in USA, Al-Odeh & Smallwood (2012), established that all material handling techniques, tools, controls, and software should be standardized and capable of performing a variety of tasks in a variety of operating environments. The findings suggest

that unnecessary movement that decreases productivity be reduced, combined, shortened, or eliminated from material handling procedures.

The impact of green inventory management strategies on the effectiveness of procurement was studied by Mathien & Suresh (2015) in USA. Ninety businesses were polled for their study, which used structural equation modeling. The study came to the conclusion that green inventory management practices have a positive impact on procurement performance by raising the function's and the company's level of compliance with environmental regulations, increasing customer loyalty, using less material, which lowers costs, and encouraging returns for recycling and reusing, which results in cheap sources of raw material.

In a case study on the automotive industry in the northeastern region of Rio Grande do Sul State, Brazil, Vieira (2011), collected data and used multiple regressions to analyze it. The factors agility, service dependability, and cost can explain overall satisfaction, according to data analysis. This case study's main objective was to gauge internal customers' levels of satisfaction after the change. 26 respondents who were actively involved in the daily material flow were asked to identify the attributes and deconstruct them into sub-factors that represented the internal process using open-ended questionnaires. Cost, service safety, service reliability, and agility were the traits noted. The findings established that internal customers recognized that the new materials handling management system increased service agility and reliability while decreasing costs, resulting in an increase in overall satisfaction.

Research was done for the book Material Handling System Design; A Case-Study in Bosch Rexroth Japan by Akincilar & Rad (2013). The data was collected using interviews, observations and measurements, was evaluated using the main pillars of the theoretical framework, which are design principles and physical components, information and software, human and management. The findings indicated that efficient and accurate information sharing within the system is more closely related to system success than are the system's purely physical characteristics.

According to Elmas & Erdogmus (2011), in their literature review on the importance of reverse logistics in Turkey, noted that unit loads, such as pallets, containers, or totes of goods, are preferable because they require less effort and work to move than multiple items when moved one at a time. It is important to maintain order and cleanliness in work areas, pack storage spaces as tightly as you can without sacrificing accessibility or flexibility, and make the most of overhead space. The study found that reverse distribution activities are essential to business survival and that organizations prosper when they adapt well to both internal and external changes in order to stay competitive. According to the report, businesses should respond to growing consumer demand for "green" products, follow stringent environmental laws, and carry out environmentally friendly initiatives as a responsible corporate citizen.

Jusoh & Kasim (2017), in Malaysia in their examination of the relationship between material management and project performance, they found that material handling is an important part of project management because materials account for a sizeable portion of the project's overall cost. Additionally, it makes a big difference because every building project depends on having the correct resources. As a result, it affects how well the

project turns out. Despite the significance of material management to project performance, there are not many studies on the subject. The relevant literature including books, journal articles, and conference papers was reviewed. In order to reduce the effects on the performance of construction projects, it was advantageous for construction players to investigate the relationship between material management and project performance. The previous study examined secondary data, but the current study would make use of primary data to ascertain the connection between material handling and sustainable procurement at KTDA-managed facilities.

Egwuatu (2022), investigated the relationship between material management and organizational productivity in plastic manufacturing companies in Anambra State, Nigeria. The study was anchored on Inventory Management Theory. Survey research design was adopted where a sample size of 321 employees in Plastic manufacturing companies was used. Pearson Product Moment Correlation Coefficient analysis was used in testing the hypotheses. It was discovered that material planning strategy has a significant relationship with organizational productivity in plastic manufacturing company and that material handling had a positive significant relationship with organizational productivity in plastic manufacturing company. There is need therefore to determine the relationship between material handing strategies and sustainable procurement practice in Kenya and specifically in KTDA managed factories so as to compare the findings.

With the purpose of determining how an organization can address the difficulties mentioned and how good material management can boost an organization's profitability, Chiyem & Brutus (2015) evaluated materials management and profitability of Nigerian

organizations. According to the study, among other things, the organization's use of material management helps it to be profitable, and having enough storage space stops production from being interrupted. The study made the recommendation that the organization should have a good record-keeping system for its operations since it has an impact on production and employee training to help them gain the new skills and information they needed to do their jobs for the company's advantage. The study fails to indicate the relationship between material handling and sustainable procurement which this study seeks to fill.

Ronald, Nathan, & Jaya (2020), analyze the impacts of materials management on performance throughout Rwanda and on a few specific construction projects in Rwanda. Both qualitative and quantitative methods, descriptive and correlational study designs were also used. A sample size of 195 respondents was chosen, with the target population being 200 contractors and 180 subcontractors. Results showed a 0.518 positive and substantial association between material estimation cost and building project success at Baraka Properties. Future research is important to determine how effective these techniques are at controlling project costs. Thus this study seeks material handling strategies on sustainable procurement performance

Osoro (2015), in Kenya, examine the challenges affecting performance of supply chain systems established that the petroleum industries' procurement systems were less effective when modern trends like timely forecasting, information technology, just-in-time delivery, proactive stock level management, and e-procurement were not implemented. In order to demonstrate how businesses can incorporate the effectiveness of supply chain tools into their supply chains systems, this conceptual paper uses analytical

data that has been collected from the researcher's intended sample size. The analysis is based on already completed research from books, as well as publications and journals that are pertinent. The study's findings support the need for oil businesses to continuously implement supply chain systems in order to establish supply chain operations that are sustainable. According to the study's findings, both domestic and foreign businesses need to increase the proportion of green supply chain management methods they use in running their businesses. This developing supply chain management paradigm allowed businesses to achieve long-term customer satisfaction through accurate inventory forecasting.

Kathurima, Ombul, & Iravo (2016) analyze the impact of material handling systems on the productivity of Machakos County cement manufacturing companies. The study used a descriptive correlational research approach and targeted supply chain, marketing, administration, and human resource departments with respondents chosen from specific departments. The intended target group consisted of 60 workers. The target population was counted by the researcher. Most of the data was gathered using surveys. To demonstrate the relationship between the independent and dependent variables, a regression analysis model was used. According to the study, automating material handling systems has a good and considerable impact on performance, as it can account for 32.8% of the performance of cement production companies in Machakos County (R squared = 0.328). In order to boost performance, the study suggests that the cement production companies in Machakos work to improve their automated material handling systems, information-directed systems, semi-automated systems, and mechanized material handling systems.

In Nairobi City County, Kenya, Nyongesa & Shale (2019) examined the impact of material management on large manufacturing firms' performance. The study employed a stratified random sampling process and a descriptive research design to choose its participants. To determine if the numerous independent factors were statistically significant, the study employed multiple linear regression analysis. The study found that supply, material pricing, and utilization are all part of the basic functions of materials management hence companies ought to look more closely at the roles that materials management plays in enabling production facilities. The previous study utilized a descriptive research strategy; the current study employed a correlation research design. As a result, the relationship between material handling strategies and sustainable procurement practices that this study seeks to establish was not demonstrated in the previous study.

Geoffrey & Muturi (2018) assessed how material handling techniques affected the efficiency of Kenyan tea processing facilities. The control theory, queueing theory, and constraints theory served as the foundation for the study. A census approach was used to choose the 78 management employees at the tea processing plants in Kisii County for the survey research. Descriptive analysis was used to assess the data, while regression analysis and Pearson's correlations were also utilized to test hypotheses. The results showed a substantial correlation of 0.96, which suggests that an improvement in material handling systems improves tea companies' performance by about 0.9. The study included survey research, and descriptive data analysis was used while the current study adopted correlation research design where inferential statistical will be analysed using regression and correlation.

In their study, Kisioya & Moronge (2019), examined how the performance of manufacturing firms in Nairobi, Kenya was impacted by the material handling practices used there. The study's target population consisted of 355 large-scale manufacturing enterprises in Nairobi County, Kenya, and it was conducted using a descriptive survey design. A sample size of 188 large-scale industrial businesses was selected using stratified random selection in Nairobi County, Kenya. Primary data was acquired using standardized questionnaires with a Likert scale. It has been demonstrated that most material handling procedure indicators have a positive impact on the success of the business. The study employed regression analysis to determine the association between the variables at a 5% level of significance. The findings showed that the four factors had a substantial impact on the performance of the companies. The study suggested that a comparable study be carried out in a different area.

Abdinasir (2020), aimed to investigate how material handling affected the performance of pharmaceutical firms in Kenya. Purposive sampling was employed in this study's descriptive research design to select half (75) of the employees of the pharmaceutical businesses who worked in the procurement department. Regression and correlation methods were used in establishing existence of relationships present between the management performance and systems and also to determine existence of hypothetical relationships between variables. The study established that material handling process of majority of the Pharmaceutical companies were manual in nature and were not automated. This study fails to indicate the relationship between material handling and sustainable procurement performance which this study seeks to fill.

Aminazahra and Chege (2020), set out to ascertain how Material Control Practices affected the KMC financial performance. Resource-based theory served as the study's foundation, and a descriptive research design was employed. The KMC headquarters in Athi River, the Ladhies branch in Nairobi, the Mombasa deport, and the user department in Athi River made up the study population. A census was also used. The results demonstrated that the performance of the KMC was significantly impacted by the material planning control system (mean of 4.75). While the current study aims to ascertain the connection between material handling and sustainable procurement performance, the previous study determined financial performance. Rono & Musau (2020), looked into how material handling procedures affected the effectiveness of Eldoret flour processing companies' supply chains. 77 employees, including branch managers, store clerks, and procurement staff, were the study's target population. The study employed a descriptive survey design. The study employed a questionnaire to collect quantitative data, and quantitative analysis to help it achieve its objectives.

The studies conducted on material handling and sustainable procurement performance showed that there were conflicting findings, with some studies showing that material handling had a positive significant impact on sustainable procurement performance while others manifested the contrary. Many of the studies combined primary and secondary data collection methods and used different research designs. Also, many of the studies were done in other sectors of the economy with little being done in the tea sector. There is need to evaluate the relationship between material handling strategy and sustainable procurement performance for firms in the tea sector.

2.3.4 Reverse logistics strategies and sustainable procurement performance

The process by which a manufacturing company manages the return of its goods from consumption sites for reuse, recovering their residual value, or disposal is known as reverse logistics, in a study on integrating or separating forward and reverse logistics in Hansen, Larsen, Nielsen, Groth, Gregersen, & Ghosh (2018). In its simplest form, this is the procedure of recovering the product or bringing it back, typically at the end of its useful life, whether to repair, remanufacture, or recycle the product. The study found that the most optimal degree of combination is determined by six separate contextual conditions. Technical product complexity, product portfolio variety, and product value deterioration with time are a few examples of such factors.

Nimawat & Namdev (2012), observed that reverse logistics plays a role in product returns, source reduction, recycling, materials substitution, material reuse, waste disposal, repair, and remanufacturing in their study on an overview of green supply chain management in India. Depending on the need for sorting, collection, processing, handling, packing, and transportation to specialist treatment facilities, the study found that businesses can use reverse logistics in addition to waste management and recycling.

Reverse logistics (RL) adoption was evaluated by Afum, Sun, & Kusi (2019) with a focus on the Ghanaian manufacturing industry. They also examined how the performance of the supply chain is impacted by the use of RL. The stratified sample technique was used to choose 193 operation managers, logistics managers, and production managers in total for the study. A structured questionnaire served as the primary data collection method.

The evaluation of the assumptions was done using structural equation modeling with partial least squares. The findings demonstrated that all stakeholder variables top management support, corporate citizenship pressure, and customer pressure have a significant impact on the adoption of RL, with the exception of environmental constraints. Additionally, RL improves the performance of the supply chain. Reverse logistic performance and sustainable procurement results need to be assessed, and the findings should be contrasted with those of this study.

Gikonyo, Ngugi, & Paul (2022) established the effect of reverse logistics on the performance of Kenyan building and construction manufacturing firms. The economic theory of company characteristics and the technological acceptance theory served as the study's foundations in order to accomplish this. A descriptive research design was used for the investigation. Purposive sampling, which selected respondents from the 54 organizations' important departments, resulted in a sample size of 270 respondents. Primary data was acquired using a standardized questionnaire. Descriptive and inferential statistics were used to assess quantitative data, and content analysis was used to study qualitative data. The results showed that green logistics through reverse logistics has a significant influence on the productivity of Kenyan building and construction manufacturing enterprises. Reverse logistic performance and sustainable procurement performance need to be compared in a study utilizing a correlation research methodology.

Samson (2018), investigated how distribution companies for imported furniture in Nairobi County are impacted by reverse transportation. The study was influenced by the Inventory theory and the Theory of Constraints. 130 managers from 26 Imported Furniture Distributing Firms in Nairobi County were the target population, which used a

descriptive survey research technique. 83 respondents were chosen at random as the sample size for this study, using a simple random selection procedure. Both primary and secondary data were employed in the investigation. While secondary data came from the inventory records of the businesses, primary data came through surveying respondents within the companies. Both descriptive and inferential statistical techniques were used to analyze the data. It was determined that reverse transportation had a substantial impact on how well imported furniture distribution companies performed in Nairobi County because the majority of these companies had supply systems that were forward-looking and, as a result, did not account for the back-flow of goods. There is need for a study using correlation research design to evaluate the relationship between reverse logistic and sustainable procurement performance which this study fails to study.

Njeri & Achuora (2021), looked into how Kenyan manufacturing companies' performance was impacted by Reverse Logistics Imperatives. The Management staff served as the target demographic for this descriptive research study. When using primary data, a simple random sampling procedure was utilized to determine a sample size. The association between Reverse Logistics Imperatives and performance was investigated using a multiple regression analysis. 187 administrative staff members were the intended audience. 127 participants were selected as the study's sample size using a stratified random sampling methodology. The coefficient of determination (R-square) was 0.728 because the four factors collectively explained up to 72.8% of the variation in the performance of manufacturing companies in Kenya. The success of manufacturing businesses therefore differs by 27.2%. The study recommends that a similar subject be the subject of a follow-up study, evaluating a wider range of the effects of reverse

logistics practices on performance in manufacturing firms or covering a different sector of the economy, including the banking sector, transportation sector, or agricultural sector, among others. In light of this, the current study aims to assess the relationship between reverse logistics and successful sustainable procurement.

Khadija (2016), studied how well liquefied petroleum gas firms in Kenya operated by looking at reverse logistics. The study sampled thirty-four (34) petroleum companies from the exchange pool list using a descriptive research design. Data were gathered for the study using a questionnaire. Operational managers, supply chain managers, and procurement managers all received the questionnaire. The study used a multiple regression analysis to examine the influence of reverse logistics on the operational efficacy of liquefied petroleum gas companies in Kenya. According to the survey, petroleum corporations use recycling and repackaging as efficient reverse logistics solutions. The study's conclusions showed that staff members lacked the necessary training to manage reverse logistics procedures. The study's findings demonstrated a strong correlation between cost, quality, and procedures used in reverse logistics. Reverse logistics, dependability, and speed have a negligible impact on recycling manufactured goods.

Reverse logistics and operational performance: the moderating influence of process innovation among Kenyan manufacturing enterprises were evaluated by Job, Njihia, Maalu, and Iraki (2021). Primary data was gathered from 151 registered companies with the Kenya Association of Manufacturers (KAM) using a correlation cross-sectional survey technique. The theory was tested using covariance-based structural equation modeling (SEM). Results showed that process innovation considerably mitigated the

association between reverse logistics and increasing internal operational competency. The study was based on operational performance hence their need for a study on sustainable procurement performance which this study seek to evaluate.

Ndung'u & Moronge (2017), investigated the factors that manufacturing companies in Nairobi City County, Kenya, considered before using reverse logistics. With a population of 400 manufacturing companies in Nairobi City County, Kenya, the study used a descriptive research approach. Raw data were gathered from a sample of 246 respondents using a questionnaire that included both open-ended and closed-ended questions. Simple randomization was used, and questionnaires were used to collect the primary data. The secondary data came from documents that were published. SPSS was utilized to examine the data. It was noteworthy that the independent and dependent variables had a relationship. A study is required to determine the relationship between reverser logistics and successful sustainable procurement so as to compare the results.

Reverse logistics strategies' implications on Kenyan Fast Moving Consumer Goods (FMCG) company performance were studied by Panya & Marendi (2021). This study's research methodology was descriptive. Like other desktop research studies, this one made extensive use of secondary data. Reverse logistics research was done using journal publications, unpublished papers, and conference papers. To address the research aims, the report took a desktop method. In particular, a descriptive approach was employed in the work to collect data from peer-reviewed books, journal articles, and reports from environmental groups. The study discovered that the organizational performance of FMCG Companies is directly and significantly impacted by reverse logistics methods. The current study used descriptive research design utilizing secondary data while the

study used correlation research design and primary data to evaluate the relationship between reverse logistic and sustainable procurement performance.

Manyaga & Mburu (2018), examined the impact of reverse logistics on the Kenya Medical Supplies Authority's procurement performance. According to a Synovate assessment on the effectiveness of state corporation outsourcing initiatives for procurement, 66 percent of the logistical operations were deemed unsuccessful, while 34 percent were deemed successful. The study used a cross-sectional survey design with a descriptive survey approach. Quantitative and qualitative aspects were both intended to be captured in the design. 240 Kenya Medical Supplies Authority personnel were the study's target population as of May 31, 2015. The managing director, staff in the accounts department, staff in the purchasing, transport, and warehousing departments were all be included in the sample frame because they have in-depth knowledge of the topic under examination. A sample of 150 respondents was selected using stratified random selection techniques based on strata in the management level. Information was compiled using a standardized questionnaire. Multiple linear regression analysis was used to determine the link between the variables and the effectiveness of Kenyan state-owned firms' procurement. According to the findings, third-party logistics, information management, lean agile manufacturing, and waste management all have an impact on Kenya Medical's procurement performance. Reverse logistic performance and sustainable procurement performance need to be compared in a study using correlation research design.

In order to offer suggestions for the proper application of reverse logistics management strategies in manufacturing firms, Mutuku & Moronge (2020), evaluated the impact of reverse logistics on the performance of Kenyan food and beverage manufacturing firms.

A descriptive research design was used for the investigation. Since the population and location of the companies that manufacture food and beverages are known, probability sampling was utilized in this investigation. In particular, stratified random selection was utilized in the study to account for the uneven distribution of businesses among the towns. In order to create a representative sample distribution, the study employed proportions computed in the population distribution based on the distribution of firms in the 10 towns. The proportions calculated indicate how many businesses should be included in each sample. After that, names of the companies that manufacture food and beverages were chosen using simple random sampling for the purpose of collecting data. In order to collect data for the study, key informant interviews and questionnaires were used. Descriptive statistical techniques, such as means, standard deviation, frequencies, and percentages, were used to analyze the data. To investigate the link between the four explanatory factors and the explained variable, inferential analyses were utilized in conjunction with correlation analysis and regression analysis. According to the findings of the regression analysis, the connection between the dependent and independent variables was significantly positive at ($\beta = 0.647$, p=0.000 0.05). The study fails to show the relationship between reverse logistic and sustainable procurement performance necessitating the need for this study.

The impact of reverse logistics techniques on boosting competitiveness in Kenyan manufacturing enterprises was established by Mbovu & Kiarie (2018). The research population at East Africa Breweries Limited's logistics, procurement, and finance department consisted of 240 employees. Simple random sampling was used, and questionnaires were used to collect the primary data. In order to supplement the original

data, secondary data was collected from published sources including journals, periodicals, magazines, and reports. Multiple regression analysis was used in the study to determine the association between independent and dependent variables. The results showed that there is a correlation between independent factors and dependent variables with a value of 0.789. The study falls short of demonstrating the connection between reverse logistics and sustainable procurement that it aims to assess.

Muttimos (2014), investigated the effects of reverse logistics techniques on the efficiency of Kenyan manufacturing firms. The study used a sample of ten national manufacturing companies and a survey research design. Reverse logistics solutions, such as recycling, reuse, and returns, were proven to have a significant positive impact on corporate performance. Kabergey & Richu (2015) investigated the effects of reverse logistics on the operational efficacy of sisal processing enterprises in Nakuru County, Kenya. The study found a correlation between operational performance and reverse logistics. The study suggests that reverse logistics should be used by businesses to achieve a competitive advantage.

Using Hewlett Packard Kenya as their case study, David & Shalle (2014), performed research on the effects of reverse logistics on the efficiency of the supply chain in Kenya's industrial sector. The study resulted to the conclusion that the use of reverse logistics has a significant impact on the supply chain's performance. According to Wanja & Achuora (2017), study on the topic, product reuse and product repackaging have a substantial impact on the operational performance of Bata Shoe Company. The study employed a descriptive survey research design with 92 participants as its sample size.

Reverse logistics greatly impacts an organization's operational effectiveness, according to the study's findings.

In their study on the effect of reverse logistics, Wambaya, Oketch, Namusonge, & Sakwa, (2018), aimed to determine how waste management, lean manufacturing, and information management affected Kenya's state businesses' procurement performance. The management level of a sample of 150 respondents was stratified, and respondents were chosen at random to complete the questionnaire. The current study determine the sustainable procurement performance based on reverse logistics and quality management as a moderating variable.

Reverse logistics' impact on Kenyan state companies' procurement performance was assessed by Wambaya, Oketch, Namusonge, & Sakwa (2018) (using the Kenya Medical Supplies Authority-KEMSA case study). A sample of 150 respondents was chosen using stratified random sampling techniques based on strata in the management level. Multiple linear regression analysis was used to determine the link between the variables and the effectiveness of Kenyan state-owned firms' procurement. The model's fit was evaluated using the coefficient of determination (R-Square) of the linear regression, which gauges how well the model matches the data. As a result, third party logistics, lean agile manufacturing, and procurement performance were all highly correlated. The study was done in KTDA managed factory by examining the relationship between reverse logistic and sustainable procurement performance.

In their study on green supply chain management and environmental performance among Kenyan businesses, Benard, Onyango, Muma et al., (2014), intended to determine the effect of reverse logistics on environmental performance among tea processing businesses in Kericho County. Using self-administered structured questionnaires, the 32 factory production managers and environmental representatives of the tea processing firms in the County provided the data, which was subsequently examined using SPSS. The investigation was done using a correlation research approach. The findings indicate a positive correlation between environmental performance and reverse logistics.

Nimawat & Namdev (2012), observed that reverse logistics plays a role in product returns, source reduction, recycling, materials substitution, material reuse, waste disposal, repair, and remanufacturing in their study on an overview of green supply chain management in India; Reverse logistics (RL) adoption was evaluated by Afum, Sun, & Kusi (2019) with a focus on the Ghanaian manufacturing industry.

Gikonyo, et al., (2022) established the effect of reverse logistics on the performance of Kenyan building and construction manufacturing firms; Samson (2018), investigated how distribution companies for imported furniture in Nairobi County are impacted by reverse transportation; Wanja & Achuora (2021), looked into how Kenyan manufacturing companies' performance was impacted by Reverse Logistics Imperatives; Salim (2016), studied how well liquefied petroleum gas firms in Kenya operated by looking at reverse logistics; the moderating influence of process innovation among Kenyan manufacturing enterprises were evaluated by Job, et al., (2021); Ndung'u & Moronge (2017), investigated the factors that manufacturing companies in Nairobi City County, Kenya, considered before using reverse logistics; Reverse logistics strategies' implications on

Kenyan Fast Moving Consumer Goods (FMCG) company performance were studied by Panya & Marendi (2021); Manyaga & Mburu (2018), examined the impact of reverse logistics on the Kenya Medical Supplies Authority's procurement performance; reverse logistics management strategies in manufacturing firms was studied by Mutuku & Moronge (2020).

Studies that were reviewed on reverse logistics and sustainable procurement performance adopted various research methodologies with some adopting descriptive, explanatory, analytical and case study research designs. The studies done in Kenya were done for firms operating in liquefied petroleum gas, KEMSA, Kenyan fast moving consumer goods, Kenyan building sector, companies for imported furniture, construction firms, sisal processing enterprises and in Kenya's industrial sector. The research that was done on tea processing firms sought to determine the effects of reverse logistics on environmental performance which is just one aspect of sustainable performance. There is need to examine the relationship between reverse logistics strategy and sustainable procurement performance.

2.3.5 Quality management system and sustainable procurement

Wilcock & Boys (2014), a quality management system that adheres to ISO 9000 and ISO 9000: 2005 standards, ISO 9001: 2008 standards, and ISO 9004: 2009 standards can help a business succeed over the long term. The most significant expectations those of customers, shareholders, suppliers, and the community were taken into consideration when developing these criteria, which aim to consistently enhance performance. Daoud (2021) evaluated the moderating effect on ISO 9001 Certification on the relationship

between quality management practices and innovation for 81 firms from the manufacturing sector in Tunisia. Structural equation modelling is used to establish the causal relationship between the variables. The study utilized Mann-Whitey test to compare the QM practices and innovation in ISO and non ISO certifies firms. The study findings did not support the effect of ISO 9001 Certification. The study could not establish the extent to which ISO 9001 could influence the relationship between QM practices and innovation.

Siva et al., (2016), in Sweden, highlighted the importance of quality management (QM) for organizational sustainability and suggested more research into QM tools and techniques to support the advancement of business sustainability. Ikay & Aslan (2011), looked at the performance variations between ISO-certified and non-certified businesses in their study of 255 Turkish SMEs. SME representatives received 892 questionnaires via email, with a response rate of 32.9%. A one-way analysis of variance was used to compare the effectiveness and standards of quality used by certified and non-certified businesses (one-way ANOVA). No statistically significant performance difference between certified and noncertified firms was found, according to the results. Certification had no effect on performance.

Camilleri (2021), in United Kingdom, cite the Balanced Scorecard Measures that Drive Performance with 12 organizations as an innovative approach to performance management. Top managers may quickly and thoroughly view their business with the help of the solution. Both financial and non-financial variables were used in the study to evaluate performance. To ascertain the association between ISO certification and performance in Kenya, the data was studied using regression analysis in the current

study. The methodology gap was closed by the results, which demonstrated that there was a meaningful association between variables.

In a study by Jovanović & Filipović (2016), in Serbia, examined the impact of ISO 9000 quality management systems (SME) on manufacturing in small and medium-sized enterprises. The outcomes of a sample pool of 106 SMEs, 79 of which had implemented ISO 9000 standards, show that standard implementation has a considerable impact on the performance of the firm between certified and non-certified firms. Similar results in the analysis of production parameters and competitive priorities demonstrate that firms gain greatly, prompting the necessity for this study to determine how it alters sustainable procurement.

Siongok (2016), looked at the effectiveness of the procurement techniques employed by Kenyan state corporations by analyzing the impact of control planning, quality, procedures, policies, and reporting on the effectiveness of state corporation procurement, using KeNHA as a case study. The descriptive research design of the study separated the 50 respondents into four groups: department heads, all managers, senior procurement officers, and the head of the procurement function. A questionnaire with both closed- and open-ended questions was used by the researcher to collect primary data. Tables and charts were used to present the findings of the SPSS (version 22) analysis of the data. The study discovered that KeNHA's procurement performance is influenced by its quality control system. Planning for quality control, developing quality control policies, implementing quality control practices, and reporting on quality control all affect how effectively KeNHA procures goods and services. The purpose of the current study is to ascertain how a quality management system affects long-term procurement.

Rajab (2015), studied the effectiveness of the supply chain and the quality control practices used by significant Kenyan manufacturers. The study set out to determine three things: the degree to which large-scale manufacturing companies in Kenya use quality management methods; the relationship between these practices and supply chain performance; and the difficulties these companies face. The data were collected using a descriptive study approach, and descriptive statistics were used to analyze them. According to the study, large manufacturing firms in Nairobi, Kenya, used benchmarking, ISO standards, lean operations, continuous quality improvement, six sigma practices, and supplier collaboration extensively. Positive correlation was found between the independent and dependent variables.

Siongok & Noor (2016) examined the Kenyan State Corporation's effectiveness in carrying out its quality control processes. Analyzing how policies, quality control planning, processes, and reporting impact the procurement performance of State Corporations was one of the study's primary goals. Surveys with both closed- and open-ended questions were the major method the researcher employed to collect data. Along with the pilot study, the data were analyzed and the reliability of the instrument was evaluated. The results of the SPSS (version 22) data analysis were presented using tables and charts. The study concluded that KeNHA's quality control system had an impact on its procurement performance. KeNHA's ability to successfully acquire goods and services depends on a number of factors, including quality control planning, quality control rules development, quality control practices implementation, and quality control reporting.

In Kenyan manufacturing firms Wanyoike (2016), looked into quality management practices and company performance. The study employed both descriptive and explanatory research designs. The target audience consisted of 60 Kenyan manufacturing companies, with a sample size of 120 respondents. The investigation employed the census sample method. The study made use of primary information gathered through self-administered surveys. The study instrument's validity was guaranteed by face and content validity, and the reliability of the instrument was evaluated using Cronbach's Alpha, which yielded an acceptable coefficient of 0.7. Descriptive and inferential statistics were used to analyze the data. The data were summarized using descriptive statistics, and the hypothesis was tested using inferential statistics, namely Multiple Linear Regression. The data analysis program utilized was SPSS, version 21. The study recommended that management show its commitment to quality by providing quality management practices with a strategic direction that is consistent with the company's aims.

The studies reviewed have sought to establish a direct relationship between quality management systems and its effects on various aspects of performance. Daoud (2021) evaluated the moderating effect on ISO 9001 Certification on the relationship between quality management practices and innovation for 81 firms from the manufacturing sector in Tunisia did not give conclusive results as to the extent which ISO 9001 moderates the relationship between quality management practices and innovation. The current study seeks to determine the moderating effect of quality management systems on the relationship between inbound logistic strategies and sustainable procurement performance among KTDA factories in Kenya.

2.3.6 Sustainable procurement performance

Sustainable procurement aims to make products and services as sustainable as possible with the least amount of environmental impact and the best social outcomes by incorporating sustainability criteria into the organization's purchasing evaluations, creating monitoring mechanisms and assessments to promote vendor compliance, encouraging innovation through crowd-sourcing, specifications, and piloting other innovative technologies, and more (UNDP 2022).

Meixell & Luoma (2015), in USA examined empirical data using their systematic review process to examine how a stakeholder viewpoint, while taking stakeholder pressure into consideration, aids in understanding sustainability in the field of supply chain management. According to the study, supply chain management stakeholders' pressure on sustainability may result in increased knowledge of sustainability, the acceptance of sustainability objectives, and/or the adoption of sustainability practices. Different stakeholders appear to have differing levels of impact depending on whether the sustainability issue is social or environmental.

Grandia (2015), claims that there are examples of operationalizing sustainable procurement successfully at various companies throughout the world. Examples include Cape Town, South Africa, which records procurement successes as a result of integrating sustainability criteria within its supply chain management, IBM Global Business in the USA, which reported positive performance due to sustainable procurement practices, and the Coca-Cola Company in the US, which saw a significant improvement in procurement performance as a result of green procurement (Agarwal & Vijayvargy, 2012).

Suraraksa & Shin (2019), conducted a comparative analysis study titled Supplier Monitoring and Selection Criteria: The Thai Automotive Industry. The study's methodology incorporated a quantitative and qualitative approach, ranking the significance of these criteria using the multi-criteria decision-making (MCDM) framework and analytic hierarchy procedure. According to the study's conclusions, a business should combine its supplier selection and monitoring procedures. Manufacturing and purchasing managers should work together and continuously synchronize the relative weights for the important factors.

A model for sustainable supply chain procurement and logistics was presented by Kaur & Singh (2018) in Malaysia. In order to select a supplier, this model was created using the fuzzy-multiple criteria decision making (MCDM) and MINLP (Mixed Integer Non Linear Program) techniques. These methods took into account factors like lead times, costs, and capacity. The model discovered that the best outcomes required sustainable transportation and procurement, both of which significantly increased the supply chain business operations' high carbon emissions.

According to Kim & Chai's (2017) in a study in South Korea on Transition towards Sustainability: Adoption of Eco-Products among Consumers, suppliers are the ones driving the adoption of eco-design, source reduction, and environmental management systems. The data analysis included a survey of the Korean manufacturing industry, Average Variance Extraction (AVE), Cronbach's alpha, composite reliability (CR), confirmatory factor analysis using the partial least squares (PLS) method. The study provided the findings of 47 earlier research papers and conducted a thorough literature analysis on green consumerism. On the basis of a sample of 705 Slovenian customers, the

study used structural equation modeling to test the suggested conceptual model. According to the results, all of the aforementioned structures serve as a mediator between customers' environmental concern and their propensity to buy eco-products.

In order to meet the regulatory need and enhance their performance in the procurement process, many companies in Kenya have adopted ecological procurement techniques. For instance, numerous companies, including Chandaria Industries, Cadbury Kenya Limited, Bidco, East African Breweries Limited, Safaricom, Airtel, MRM, and East African Portland Cement, to name a few, have committed significant sums of money in putting eco-procurement procedures into place (Odhiambo, 2014). In order to meet their needs for goods, services, labor, and utilities in a way that maximizes value for money and promotes positive outcomes for the organization as a whole as well as for the economy, environment, and society, organizations are said to broaden this definition of sustainable procurement, (Tatrai, 2015).

Upadhyay, Sheetal, & Khan (2022), conducted a comparative analysis of Traditional and Sustainable Procurement Strategies. The study focused on sustainable procurement techniques and how they can be compared to conventional strategies in terms of how well businesses perform financially. The study examined 111 research articles on the subject of procurement that were published between 2008 and 2022 in various journals. The study found that, in compared to traditional techniques, procurement strategies have the potential to improve corporate performance in terms of profitability.

World Bank (2019), provides the reasons for implementing sustainable procurement in a paper titled Sustainable Procurement: An introduction for practitioners to sustainable procurement in World Bank IPF projects to be reduction costs by acquiring more efficient and environmentally friendly products works and services, increase market capacity to deliver environmentally friendly solutions, increase demand for environmentally friendly solutions, which in turn increases market competitiveness, pursue innovative and environmentally friendly outcomes, lower costs over the long term by utilizing life-cycle costing, minimize disposal costs and sustainable impacts of products. Risk management involves identifying potential threats and opportunities to economic, legal, environmental, and social sustainability and developing strategies to deal with them. Commitments and objectives that, in accordance with the applicable policies, reflect the organizational culture, values, and ethics of the purchasing agency.

The policy should be clear about commitments and priorities, and procurement procedures should show how the operational execution is carried out. Answers to the growing stakeholder expectations that social responsibility and sustainability issues must be taken seriously. In addition to the requirements outlined by the Bank in its other policies like environmental and social sustainability policies which they can be further addressed by utilizing sustainable procurement methods. Attractive social responsibility and sustainability performance may have an impact on a borrower's or project's reputation. Additionally, it can increase competitiveness and provide businesses a more advantageous position in the market, (World Bank, 2019).

In an effort to safeguard the environment, the Kenyan government established a number of institutional and legislative frameworks to control all corporate activity (Odhiambo, 2014). As an illustration, the Kenyan constitution places obligations on both citizens and the government with relation to resource management and environmental management (Mwenda & Kibutu, 2014). According to Article 69(2) of Kenya's 2010 constitution, every Kenyan has a duty to cooperate with the authorities to protect and maintain the environment, promote ecologically sustainable development, and make optimal use of resources. According to articles 185 (2), 186 (1), and 187 (2) of the constitution, the national government and the county governments are responsible for protecting the environment in order to establish a system of development that is sustainable and that strengthens good governance with regard to the environment (Mwenda & Kibutu, 2014).

Wanja (2020), set out to investigate the effects of sustainable procurement practices on the effectiveness of procurement in the food and beverage manufacturing industries in Nairobi County, Kenya. Stakeholder theory, legitimacy theory, system theory, and organization theory served as the study's cornerstones. As part of the descriptive cross-sectional survey research design for the study, one hundred and eight businesses were strategically selected from among two hundred and seventeen food and beverage manufacturing businesses registered members of Kenya Association of Manufacturers under Nairobi County. The observational unit chosen was procurement managers. Primary data were gathered via a structured questionnaire. The study comes to the conclusion that using sustainable procurement practices considerably improves procurement performance, ultimately improving company performance.

In a study by Kiswili & Ishmael (2016), on the effect of sustainable procurement methods on the effectiveness of Kenya's manufacturing sector's supply chain, a case study of the East African Portland Cement Company was employed. Stratified random sampling was used to choose the study's sample. The study made use of primary data that was collected using questionnaires. The study also used secondary sources of data. Using Pearson's correlation coefficients, the relationship between the independent and dependent study variables that is described in the study aims was examined. In light of the survey, it is critical that companies realize the strategic value of sustainable procurement. According to the study's findings, the conclusion was that the performance of the supply chain and sustainable procurement methods are positively correlated.

Meixell & Luoma (2015), in USA examined empirical data using their systematic review process to examine how a stakeholder viewpoint; Grandia (2015), claimed that there are examples of operationalizing sustainable procurement successfully at various companies throughout the world; Suraraksa & Shin (2019), conducted a comparative analysis study titled Supplier Monitoring and Selection Criteria: The Thai Automotive Industry; A model for sustainable supply chain procurement and logistics was presented by Kaur & Singh (2018) in Malaysia; Kim & Chai's (2017) studied South Korea on Transition towards Sustainability; Upadhyay, et al., (2022), conducted a comparative analysis of Traditional and Sustainable Procurement Strategies; World Bank (2019), provides the reasons for implementing sustainable procurement in a paper titled Sustainable Procurement; Wanja (2020), investigated the effects of sustainable procurement practices on the effectiveness of procurement in the food and beverage manufacturing industries in Nairobi County, Kenya. Kiswili & Ishmael (2016), studied the effect of sustainable

procurement methods on the effectiveness of Kenya's manufacturing sector's supply chain, a case study of the East African Portland Cement Company.

2.4 Conceptual Framework

A conceptual framework is a research tool that demonstrates both the relationships between the various study variables and the overall direction of a study. Additionally, it helps the researcher comprehend the situation that is being studied (Orenywo, 2017). Based on earlier studies in the topic of interest, it is a diagrammatic overview of the research factors that the study wants to analyze in a methodical manner, (Oseno, 2012). The conceptual framework for the study is shown in Figure 2.1, which assisted the researcher in organizing discussions of the literature, (Sekaran & Bougie, 2013).

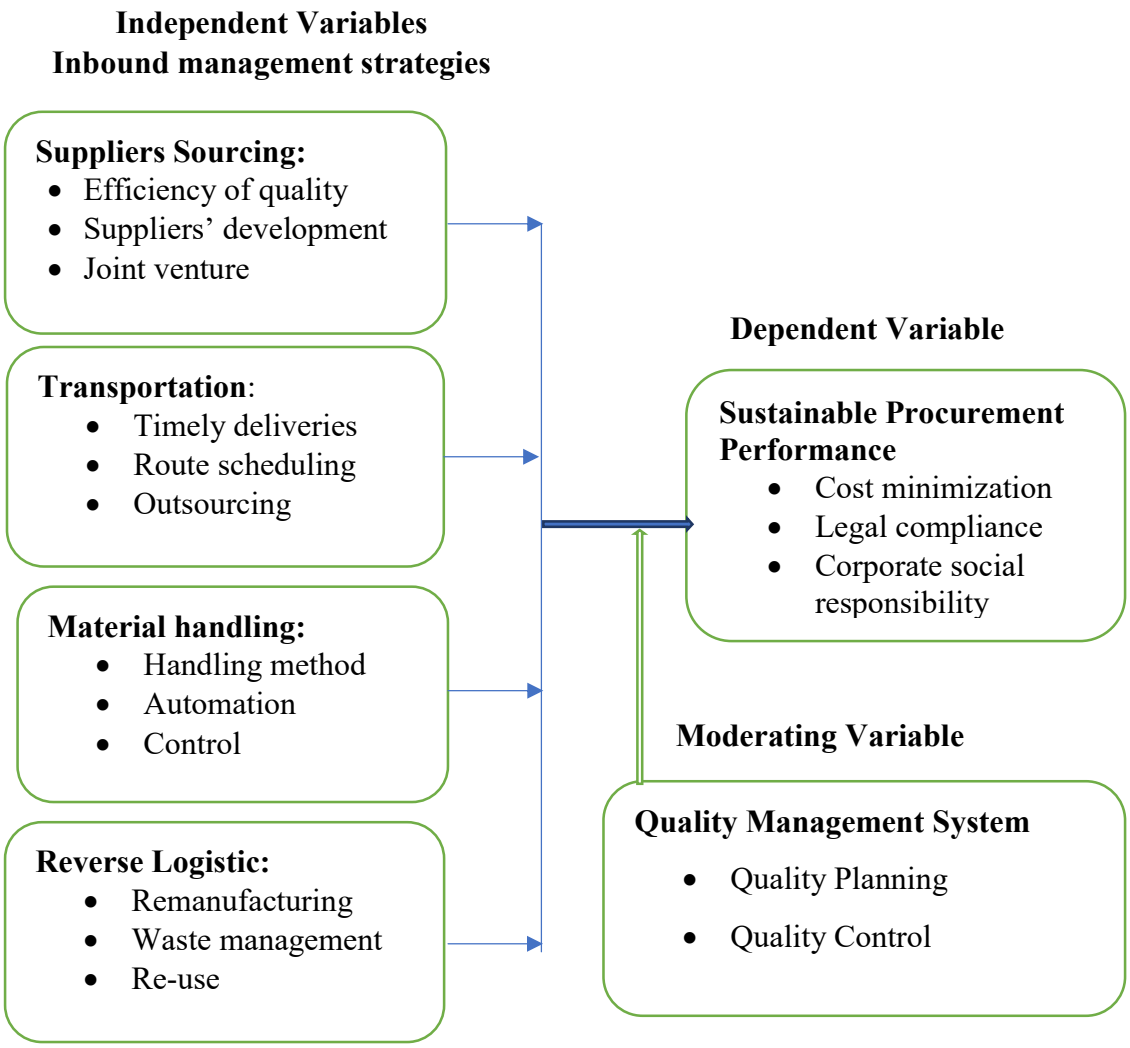


Figure 2.1: Conceptual Framework for Inbound Logistic Strategies on Sustainable Procurement Performance

Source: Adopted and edited from Meera and Chitramani (2020)

As shown in Figure 2.1, independent variables are suppliers sourcing, timely deliveries, material handling and reverse logistic. Suppliers sourcing were measured using efficiency of quality, suppliers' development and joint venture. Timely deliveries, route scheduling and outsourcing were indicators for transportation.

Material handling was measured using handling method, automation and control. Reverse logistic indicators was remanufacturing, eliminate and re-use. Quality management system which is the moderating variable was measured using quality planning and quality control. Sustainable procurement performance which is the dependent variable was measured using value for money and corporate social responsibility

2.5 Identification of Knowledge Gap

Many of the studies reviewed on inbound logistic strategies were carried out in different sectors and focused on ministries for government and government corporations, automobile industry, telecommunication industry, private firms, and other sectors leaving the tea sector largely unexplored. Many of the studies have been conducted in other developed countries like Spain, UK, India and Iran and their study findings cannot be extrapolated to developing countries like Kenya. There is also a differences in terms of the various inbound logistic strategies adopted which could be explain the difference in procurement systems adopted. Some studies adopted an empirical analysis and meta-analysis. The studies depended majorly on secondary data while this study relied on primary data. Other studies used descriptive, case studies and longitudinal designs while the current study adopted correlation research design to bring out the existing relationship in between the chosen variables (Abdinasir, 2020; Alikhani et al., 2019; Aminazahra & Chege, 2020; Ashuro, 2022; Bowie, 2019; Koberg & Longoni, 2019; Upadhyay et al., 2022; Vahidi et al., 2018; Wanja, 2020).

The respondents in those reviewed studies were chosen basing on the government departments, corporation others were from private firms, while the study targeted respondents working in KTDA factories specifically managers and directors. A study by Koberg and Longoni (2019) recommended that businesses should adopt a collaborative suggesting that supplier sourcing strategy should be investigated in collaboration with other inbound logistic strategies in order to establish their collective contribution to sustainable procurement performance. The studies reviewed on quality management system sought to establish a direct relationship between quality management system and its effects on various aspects of performance. The study sought to determine the moderating effect of quality management systems on the relationship between inbound logistic strategies and sustainable procurement performance among KTDA factories in Kenya. The research gaps mentioned informed the need to conduct this study to establish relationship between inbound logistic strategies, quality management system and sustainable procurement performance among selected Kenya Tea Development Factories, Kenya.

All studies reviewed on supplier sourcing and sustainable procurement performance (Alikhani et al., 2019; Ghadge, 2018; Koberg & Longoni, 2019; Li et al., 2019; Luthra et al., 2017; Torabi et al., 2015; Vahidi et al., 2018; Zimmer et al., 2016), were carried out in different sectors and focused on ministries for government and government corporations unlike the current study that is proposing to be carried out in tea sector. These variations in setting must have been guided by different process that the procurement in those regions live on which are likely to be different from the procurement system adopted by KTDA factories.

Some studies were empirical analysis, others meta-analysis, those studies depended majorly on secondary data while this study relied on primary data. The respondents in those reviewed studies were chosen basing on the government departments, corporation others were from private firms, while the study targeted respondents working in KTDA factories specifically managers and directors. The research gaps mentioned informed the need to conduct this study to establish relationship between inbound logistic strategies, quality management system and sustainable procurement performance among selected Kenya Tea Development Factories, Kenya.

Literature that were reviewed on transportation and sustainable procurement performance (Ashuro, 2022; Bowie, 2019; Evangelista et al., 2018; Gitahi & Ogollah, 2014; Prothan el al., 2017; Kadlubek, 2015; Kusoncum & Chaikanha, 2012; Kyusya, 2015; Langat, 2013; Moen, 2015; Muchori, 2015; Mukolwe & Wanyoike, 2015; Musau et al., 2017; Mwangangi, 2016; Ndubi et al., 2016; Mwangi & Waweru, 2013; Musyoka, 2016; Russo et al., 2016). The studies were done in other setting that is in other region globally, other than what the current study is proposing. The setting may have been guided by rules and regulation in those regions unlike the current study proposing to be carried out in KTDA factories in South Rift region. Most of the studies used secondary data, empirical reviews and case studies while the study was founded on primary data and deployed correlation approach to find out relationship between the variables being investigated. The current study relied on stakeholder theory, resource based theory and strategic choice theory unlike previous studies which some only utilized game theory. The results from previous studies in some incidence conflicted, in that it supported transportation in sustaining performance, while others did not agree.

From the reviewed studies on material handling and sustainable procurement performance (Abdinasir, 2020; Aminazahra & Chege 2020; Al-Odeh & Smallwood, 2012; Brutus & Chiyem, 2015; Cameron Rad & Sera Akincilar, 2013; Elmas & Erdogmus, 2011; Geoffrey & Muturi, 2018; Ifeyinwa, 2022; Jusoh & Kasim, 2017; Kathurima,et al., 2016; Kisioya & Moronge, 2019; Mathien & Suresh (2015); Nyongesa & Shale, 2019; Osoro, 2015; Ronald et al., 2020; Rono & Musau, 2020; Vieira, 2011) it revealed that it was conducted in different setting and only one study was carried in tea sector setting. The current study was carried in KTDAs in Kenya. In contrast to the majority of studies, the current study used correlation research design. The majority of studies, which were reviewed, combined primary and secondary data collection methods, whereas the current study only used primary data collection method. The study's results also showed that there were conflicting findings, with some studies showing that material handling had a positive significant impact on sustainable procurement performance while others manifested the contrary. The proposed study seeks to determine the relationship between inbound logistic strategies, quality management system and sustainable procurement performance among selected Kenya Tea Development Factories, Kenya.

Studies that were reviewed on reverse logistics and sustainable procurement performance (Achuora, 2021; Afum et al., 2019; Aggrey et al, 2018; Gikonyo et al., 2022; Gregersen & Ghosh (2018); Job et al., 2021; Kabergey & Richu, 2015; Manyaga & Mburu, 2018; Mbovu & Mburu, 2018; Mutuku & Moronge, 2020; Muttimos, 2014; Namdev, 2012; Ndung'u & Moronge, 2017; Njeri & Salim, 2016; Njuguna & Kagiri's, 2017; Panya & Marendi, 2021; Samson & Gacuiri, 2018; Wambaya et al., 2018) showed that, they majorly focused on government ministries, manufacturing firms such as cement and

construction companies. The different sectors maybe guided by different reversed logistical process in place that form their mode of operations. The studies adopted descriptive and explanatory, analytical and case study approaches research design while the current study adopted correlational research design which will determine the relationship between the variables of the study.

The research respondents were chosen randomly from procurement department while the current study go with respondents from senior management level who understand the system the more for more accuracy. Hence, the proposed study seeks to determine the relationship between inbound logistic strategies, quality management system and sustainable procurement performance among selected Kenya Tea Development Factories, Kenya.

Reviewed studies on quality management and sustainable procurement performance that is (Camilleri, 2021; Ikay & Aslan, 2011; Jovanović & Filipović, 2016; Siongok, 2016; Siongok & Noor, 2016; Siva et al., 2016; Wanyoike, 2016) showed that they were carried out in other region with different setting using different design of research, the current study is proposing to use correlation research design in order to establish relationship between the listed variable. Majority of studies reviewed did cases studies and through empirical review, the study at hand is seeking to purely to depend on the primary data. Ikay & Aslan (2011), did a study targeting 255 Turkish SMEs. SME representatives received 892 questionnaires via email, but the response rate was response rate of 32.9% which shows that the result were skewed and not a representation of the reality.

Siongok (2016) investigated impact of control planning, quality, procedures, policies, and reporting on the effectiveness of state corporation procurement, using KeNHA as a case study, while the current study used supplier sourcing, transportation, material handling and reverse logistics which were moderated by quality management. It is on these gaps that the study sought to determine the relationship between inbound logistic strategies, quality management system and sustainable procurement performance among selected Kenya Tea Development Factories, Kenya.

From the literature reviewed on sustainable procurement and performance (Grandia, 2015; Kim & Chai's, 2017; Kiswili ,2016; Meixell &Luoma, 2015; Odhiambo, 2014; Suraraksa & Shin, 2019; Upadhyay et al., 2022; Wanja, 2020) it was discovered that they were conducted in other countries and regions, and those that was done in Kenya did not focus sustainable procurement performance in KDTA factories. Meixell and Luoma (2015) in USA did an empirical study and established that supply chain management stakeholders' pressure on sustainability may result in increased knowledge of sustainability, making the results only favorable to its setting and not what the current study is proposing.

Suraraksa and Shin (2019), study was carried out in Thai Automotive Industry, the study's methodology incorporated a quantitative and qualitative approach, ranking the significance of these criteria using the multi-criteria decision-making (MCDM) framework and analytic hierarchy procedure. The current study used quantitative data relying majorly on primary data analysed using regression model and correlation technique to help in identifying the relationship between variables using KDTA factories in Kenya.

Kaur and Sing (2018) did in Malaysia using a model created using the fuzzy-multiple criteria decision making (MCDM) and MINLP (Mixed Integer Non Linear Program) techniques. These methods took into account factors like lead times, costs, and capacity. The model reported that the best outcomes required sustainable transportation and procurement, both of which significantly increased the supply chain business operations' high carbon emissions. The current study focused on supplier sourcing, transportation, material handling as independent variable and sustainable procurement as a dependent variable, moderated by quality management, it used correlation research design and multiple regression model in analysis.

CHAPTER THREE

RESEARCH METHODLOGY

3.1 Introduction

This chapter covers the research design, study area, target population, sample size and sampling technique, data collection tools, the methodologies that was utilized for data analysis, and ethical considerations.

3.2 Research Design

According to Collins (2010), research philosophies can be divided into three groups based on their focus on the origin, nature, and development of knowledge: pragmatism, positivism, and realism or interpretivism. The research philosophy of interpretivism was used to guide the investigation and involved researchers interpreting study components, human interests are integrated into research. Interpretive studies also hold that the only way to access reality is through social constructions like language, consciousness, shared meanings, and tools (Myers, 2008). This philosophy produces data with a high level of validity, which is reliable and honest and that it prioritizes qualitative analysis over quantitative analysis (Collins, 2010).

A correlation research design was adopted since it respond to questions like "what, who, and how" of a phenomenon (Donald & Pamela, 2006). Insights into current phenomena relating to circumstances, activities, and relationships were gained through this research design (Salaria, 2012). The design calculates the degree to which various variables are

related and determine whether and how much there is a relationship between two or more quantifiable variables, (Mugenda & Mugenda, 2003).

3.3 Location of the Study

Kenya's South Rift Region produces more tea compared to other regions hence the study was undertaken in the entire 16 KTDA region 5 Factories, also known as Kericho Highlands. The region has a high tea production and small-scale farmers expect factories to pay them well for the tea leaves supplied at the end of the month as well as at the end of the year in the form of bonuses. The payout usually varies from year to year and that the amount paid is unique to an individual factory rather than the region as a whole. This has led to more farmers opting to deliver their tea leaves to private as well as multinational tea companies' factories in the region hence a study on inbound logistics and sustainable procurement performance added value to KTDA managed factories.

3.4 Target Population

Target population refers to the total set of study participants from whom the researcher is seeking information. (Cooper & Schindler, 2011; Kothari, 2011; Oso & Onen 2011; Kombo & Tromp, 2011). Production managers, ICT managers, Procurement Managers, Leaf Base Managers, Factory Unit Managers, and Directors in Region 5 KTDA factories in Kenya were the target population. The target population was selected based on their knowledge on the operations of Kenya tea development authority factory in relation to inbound logistic and sustainable procurement performance. They were also selected based on their involvement in day to day operations of the factory. The target population is shown in Table 3.1.

Table 3.1

Target Population

Respondents	**Population**
Factory Unit Managers	16
Production Managers	16
ICT Managers	16
Leaf-base managers	16
Procurement Managers	16
Directors	112
Total	**188**

Source: KTDA Region 5 (2023)

3.5 Sample and Sampling Procedures

Census method is a method of statistical investigation in which all the members of the population are included in the study (Cooper & Schindler, 2011). Since the target population in the study was manageable the study used census method in that data were collected from all the Production managers, ICT managers, Procurement Managers, Leaf Base Managers, Factory Unit Managers, and Directors drawn from the 16 Region 5 KTDA factories.

3.6 Data Collection Instruments

The study used a structured questionnaire with two sections to gather primary data. Demographic data were gathered about the responder in the first segment, and questions about the study's variables were asked in the second. Both unstructured and structured questions were used to save time and money while also facilitating easier data analysis. Unstructured questions were incorporated into the survey to encourage participants to give a thoughtful, feeling response without feeling compelled to reveal any information, (Kothari, 2013).

3.6.1 Validity of the research instrument

According to Cooper and Schindler (2011), a good measurement tool should have the ability to accurately counter or indicate the variables that the study is trying to measure. The instrument should also be easy to use and effective. Comments from supervisors, colleagues, and other researchers and scholars were updated as necessary to remove unclear passages, spelling errors, and other typographical errors that may have happened. Reviewing the questions to make sure they reflect the intended objectives helped determine face validity. The researcher also made sure that the instructions for completing the questionnaire are the same for every participant and that the questions are written in plain language that the respondents can understand.

Prior to the extraction of the factors, several tests were used to assess the suitability of the respondent data for factor analysis. These tests include Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Bartlett's Test of Sphericity. The KMO index ranges from 0 to 1, with 0.50 considered suitable for factor analysis.

The Bartlett's Test of Sphericity should be significant ($p<.05$) for factor analysis to be carried out (William, *et al*., 2010). Factor analysis of the instrument was statistically tested using the Kaiser-Meyer-Olkin (KMO) value and Bartlett's test of sphericity and the results presented in Table 3.2.

Table 3.2

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.777
Bartlett's Test of Sphericity	Approx. Chi-Square	778.256
	Df	15
	Sig.	.000

Table 3.2 shows the result of KMO and Spherical Bartlett tests, whose value ranges from 0 to 1 and is an indicator for comparing correlation coefficient of observation and partial correlation coefficient. The result of Kaiser-Meyer-Olkin was 0.777 and the results of Bartlett's Test of Sphericity had a significance of 0.00. From the result of Spherical Bartlett test we should fail to reject the null hypothesis which means the variables have a strong association. When the KMO value is below 0.5 it is not suitable to use factor analysis but the results from this study was 0.777 hence it was reasonable to use the factor analysis (William et al., 2010).

3.6.2 Reliability of research instrument

In order to determine internal reliability, the coefficient alpha or Cronbach's alpha was used. A Cronbach's alpha of 0.70 or higher is regarded as acceptable (Zikmund *et al.,* 2010). Pilot research was carried out at Kisii Highland, which is under KTDA Region 6 Tea factories so as to ascertain the instrument's reliability since it is thought to use the same inbound logistics strategies as KTDA Region 5. Cronbach Alpha coefficient was determined from the results of the pilot study this determined the reliability of the research instrument, (Sekaran & Bougie, 2013).

Table 3.3

Reliability Findings

Variable	**Cronbach's Alpha**	**Number of items**
Suppliers sourcing strategy	0.866	6
Transportation strategy	0.923	6
Material handling strategy	0.805	6
Reverse logistic strategy	0.863	5
Quality management system	0.895	6
Sustainable procurement	0.840	6
Average	**0.865**	**35**

The values in Table 3.3 reveals that Cronbach's coefficient for Suppliers sourcing strategy $\alpha = 0.866$, Transportation strategy $\alpha = 0.923$, Material handling strategy $\alpha = 0.805$ Reverse logistic strategy $\alpha = 0.863$, Quality management system $\alpha = 0.895$,

Sustainable procurement $\alpha = 0.840$ are sufficient confirmation of data reliability for the study variables since it had an average of 0.865 Cronbach's alpha which was above 0.70 hence the research instrument was accepted (Zikmund et al., 2010).

3.7 Data Collection Procedures

Requests for authorization to carry out the research accompanied the Research Permit issued by the National Commission for Science, Technology, and Innovation and a letter of introduction from the Board of Graduate Studies of the University of Kabianga. Researcher distributed the questionnaires to the participants during the allocated two-week period before collating the participant responses. During the data collecting phase, the drop and pick method was employed.

3.8 Data Analysis and Presentations

The research data was edited to make it clear and unambiguous so as to maintain consistency and accuracy by reducing large amounts of data to manageable sizes, producing summaries, searching for patterns, and using statistical techniques (Cooper & Schindler, 2011). Data analysis made use of both descriptive and inferential statistics. In order to establish the causal relationship between the dependent variable and the independent factors, multiple linear regression models was used.

The researcher used descriptive statistics, such as frequency, mean, and standard deviation, with inferential statistics, such as regression and correlation analysis, to statistically analyze the data. After obtaining the responses from the respondents, they

were edited, categorized, coded, and tabulated (using SPSS version 26) to aid in the quantitative analysis. Tables and figures was used to present the analyses' findings.

To determine the impact of inbound logistics strategies on sustainable procurement, inferential statistical inform of regression and correlation was used. The multicollinearity assumption was tested using the Pearson Correlation Matrix, and the independence of the error term was tested using an analysis of residuals and plots of regression residuals versus predicted values. A test of variable significance at 5% was conducted using ANOVA and correlation analysis.

The simple regression analysis model was conducted using the equation below;

$$Y = \beta_0 + \beta_1 X_1 + \varepsilon \quad \text{..... (3.1)}$$

Y is SPP (Dependent Variable),

β_0 is the constant term,

β_1, quantify the impact of the dependent variable Y on a change in the independent variable at the unit level,

X_1 is Supplier Sourcing,

ε is the error term

$$Y = \beta_0 + \beta_2 X_2 + \varepsilon \quad \text{..... (3.2)}$$

Y is SPP (Dependent Variable),

β_0 is the constant term,

β_2, quantify the impact of the dependent variable Y on a change in the independent variable at the unit level,

X_2 is Transportation,

ε is the error term

$$Y = \beta_0 + \beta_3 X_3 + \varepsilon \quad \text{..... (3.3)}$$

Y is SPP (Dependent Variable),

β_0 is the constant term,

β_3 quantify the impact of the dependent variable Y on a change in the independent variable at the unit level,

X_3 is Reverse logistic,

ε is the error term

$$Y = \beta_0 + \beta_4 X_4 + \varepsilon \quad \text{..... (3.4)}$$

Y is SPP (Dependent Variable),

β_0 is the constant term,

β_4 quantify the impact of the dependent variable Y on a change in the independent variable at the unit level,

X_4isMaterial handling,

ε is the error term

$$Y = \beta_0 + \beta_5 X_5 + \varepsilon \quad \ldots\ldots\ldots\

$X_3$is Reverse logistic,

X_4isMaterial handling,

ε is the error term

The regression moderator model adopted was;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon \quad \ldots\ldots\ldots\

The relationship between the independent and dependent variables was presented by the regression model.

Before attempting to estimate an equation, it was crucial to make sure that the assumptions of the classical linear regression model (CLRM) are not being violated. When these equations are estimated under conditions where the linear regression assumptions are broken, there is a chance that the parameter estimates were inaccurate, ineffective, and inconsistent. (Brooks, 2008). To confirm accurate specification of the equations presented above, tests for linearity, multicollinearity, autocorrelation, and heteroscedasticity was performed. The tests listed in Table 3.4 were carried out for the following assumptions: homoscedasticity, linearity, autocorrelation, multicollinearity, and normality.

Table 3.4

Diagnostic Test for Multiple Regression Model

Assumption	**Test**	**Threshold**	**Comment**
Multi-Collinearity	Variance Inflation Factor	VIF<5	No Multi-colinearity
Normality	Kolmogorov-Smirnov	P>0.05	Normal Distribution
Linearity	Scatter Graph	P>0.05	Linear relationship
Autocorrelation	Durbin-Watson test	0>d=2.243<4	No Autocorrelation
Homoscedasticity	Chi-square value	p<0.05	Homoscedastic

3.8.1 Multicollinearity Test

Multicollinearity is the statistical term for when two or more predictor variables in a multiple regression model have a high degree of association (Corbin et al., 2014). When there are high correlations between the independent variables, it is known as multicollinearity (Martz, 2013). Testing for multi-collinearity was done since it may prevent the computation of a unique least squares solution to a regression analysis in extreme circumstances of perfect correlations between predictor variables Field. The standard errors and confidence intervals are inflated by multi-collinearity, which results in unstable estimations of the coefficients for individual predictors.

In this study, the Variance Inflation Factor (VIF) and tolerance consistency was used to assess multi-collinearity. (Saunders, 2011). The VIF statistic of a predictor in a model demonstrates how much larger the error variance for a predictor's special effect is than the reciprocal of tolerance, (Baguley, 2012).

The variance inflation factor (VIF), according to Cohen et al., (2013), is a measure of how much the variance of each regression coefficient rises in comparison to the scenario in which all predictor variables are uncorrelated. They suggested a VIF of 5 or higher as a criterion for deciding if a VIF is excessive and, hence, inappropriate. According to Zikmund et al., (2013), multicollinearity must be taken into account in the regression analysis whenever two or more variables have a Variance Inflation Factor (VIF) of 5 or higher. Therefore, one of the variables in this study was removed from the model if two or more of them have a Variance Inflation Factor of 5 or higher.

Table 3.5

Variance Inflation Factor results

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.369	.233		5.877	.000		
	Sourcing	.317	.080	.424	3.970	.000	.317	3.155
	Transport	-.031	.099	-.044	-.309	.758	.179	3.575
	Material	.067	.077	.077	.870	.386	.456	2.195
	Reverse	-.406	.125	-.487	-3.240	.001	.159	3.271
	QMS	.610	.114	.597	5.362	.000	.291	3.440

a. Dependent Variable: Sustainable

Table 3.5 reveals that the variance inflation factor (VIF) for all the study variables was less than 5 where sourcing strategy had VIF of 3.155, Transport strategy had VIF of 3.575, material handling strategy had a VIF of 2.195, reverse logistics had a VIF of 3.271 while quality management system had a VIF of 3.271. This findings reveals that there was no multicollinearity.

3.8.2 Normality Test

Knowing the distribution's form and predicting the values of the dependent variables are both aided by normality, (Paul & Zhang, 2010). Normal data are required for parametric tests like correlation and multiple regression analysis. The outcomes of any future study can be distorted when the data is not regularly distributed. Tests of normality will be used to determine if the data are well-modeled and regularly distributed and whether they fit a normal distribution, (Gujarati, 2009). Ghasemi & Zahediasl (2012) assert that the variables should essentially follow a normal distribution, particularly if the results are to be extrapolated beyond the sample. Using the graphical technique approach and the Kolmogorov-Smirnov test, the normality of the score distribution were evaluated where non-significant results of P>0.05 revealed that the data follows normal distribution, (Tabachnik & Fidell, 2007).

Table 3.6

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	**df**	**Sig.**	**Statistic**	**Df**	**Sig.**
sourcing	.176	169	.000	.899	169	.000
Transport	.238	169	.000	.791	169	.000
Material	.152	169	.000	.892	169	.000
Reverse	.223	169	.000	.835	169	.000
QMS	.085	169	.004	.953	169	.000
Sustainable	.128	169	.000	.967	169	.000

a. Lilliefors Significance Correction

Table 3.6 reveals that the results of test of normality and that the distribution. The findings reveal that the data does not follows a linear distribution.

3.8.3 Linearity Test

The mathematical equation "y = cx," where "c" is any constant number, expresses the relationship between the variables "x" and "y" as linearity. When the slope of change in a relationship between two independent variables and a dependent variable is constant, the connection is said to be linear. The deviation from linearity test is arguably the most straightforward and thorough. The relationship between independent and dependent variables is not linear if the significant value for deviation from linearity is less than 0.05, which causes issues with modeling, (Jin, Parthasarathy, Kuyel, Geiger, & Chen, 2005).

Given that many statistical techniques assume that the data are linear, testing for linearity is crucial. This happens when data are used from a population where the pertinent variables are linearly correlated. This indicates that evaluations for linearity must be carried out before employing standard approaches like linear regression (Jin, Parthasarathy, Kuyel, Geiger, & Chen, 2005). Each variable were subjected to a linearity test. The probability of the data coming from a linear population is easily observed using the statistical software tool SPSS and the scatter graph graphical method. According to Mark (2003), difficulties with linearity can also be resolved by deleting outliers, which was done in the current investigation, which makes the assumption that the data is linear.

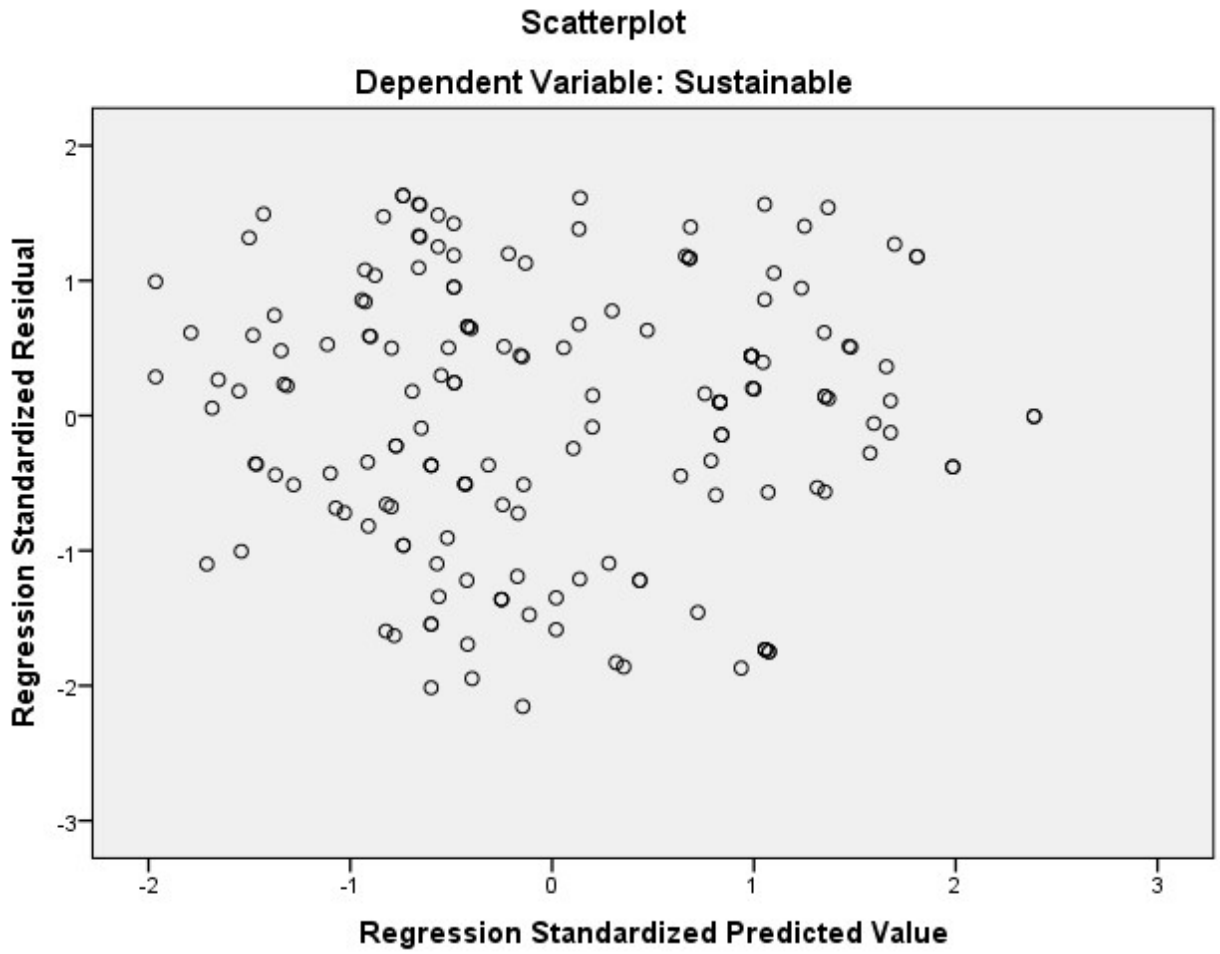


Figure 3.1 Scatter Graph for Linearity Test

3.8.4 Autocorrelation test

Autocorrelation is the degree to which a time series resembles a delayed version of itself over succeeding time periods (Escudero, 2009). Regression makes the premise that no error related to one observation is related to any other observation's error. The likelihood of autocorrelation was examined using Durbin Watson (DW) statistics. The DW statistic always ranges from 0 to 4. There is no autocorrelation in the sample if the value is 2,

there is positive autocorrelation if the value is approaching 0, and there is negative autocorrelation if the value is near 4, (Brook, 2008).

Table 3.7

Model Summary[b] for autocorrelation

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.642[a]	.412	.394	.70807	.697

a. Predictors: (Constant), Quality, Material, sourcing, Transport, Reverse

b. Dependent Variable: Sustainable

Table 3.7 reveals that the Durbin Watson was 0.697 which indicates that there is positive autocorrelation hence the results can be use for analysis.

3.8.5 Homoscedastic Test

Homoscedasticity describes a situation in which the error term (that is, the "noise" or random disturbance in the relationship between the independent variables and the dependent variable) is the same across all values of the independent variables. Homoscedasticity is used to test whether data are missing completely at random (McDonald, 2024). The impact of violating the assumption of homoscedasticity is a matter of degree, increasing as homoscedasticity increases. The program SPSS version 26.0 was used in this study to check the residuals of regression for homoscedasticity. If

the expected chi-square value is significant at $p>0.05$, homoscedasticity is assumed to exist, (Muigai, 2016). There is no homoscedasticity if it is not substantial.

3.9 Ethical Considerations

A letter identifying the researcher as a postgraduate student at the university was acquired from the board of graduate studies and used to apply for a research permit from NACOSTI. The respondents were informed of the study's objectives and assured that the information they contribute was only utilized for academic research.

Additionally, responders were guaranteed of anonymity, confidentiality, and the freedom to leave the data collection process at any time without being charged. The researcher correctly referenced information obtained from peer-reviewed publications, books, articles, theses, and other research resources in order to avoid plagiarism and maintain copy rights.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the findings on the response rate; background information of the respondents; descriptive findings of the study variables; inferential analysis to test the Hypotheses and discussions of the findings based on the study objectives.

4.2 General and Demographic Information

The section presents the general and demographic information of respondents;

4.2.1 Response Rate

Response rate is the number of fully completed questionnaires returned divided by the total number of questionnaires distributed to the entire sampled respondents and is presented as a percentage (Orodho, 2003). The researcher distributed 188 questionnaires to all the sampled population who entailed Production managers, ICT managers, Procurement Managers, Leaf Base Managers, Factory Unit Managers, and Directors in Region 5 KTDA factories in Kenya where 169 questionnaires out of 188 were returned giving a response rate of 89.9%. According to Kothari (2011) a response rate of 50% is average, 60-70% is adequate while above 70% is considered to be excellent response rate. The response rate of 89.9% achieved is considered excellent hence the information can be used for analysis and generates valid conclusions.

The response rate was actualized due to the fact that the approach used to distribute the questionnaires was that of drop-and-pick method where the researcher issued the questionnaire and waited for the respondent to filling it before collecting the duly filled questionnaire. Table 4.1 shows that 169 (89.9%) questionnaires were fully filled and returned while 19 (10.1%) of the distributed questionnaires were not returned.

Table 4.1

Response Rate

Response rate	**Frequency**	**Percentage (%)**
Returned questionnaires	169	89.9
Unreturned questionnaires	19	10.1
Total	**188**	**100**

4.2.2 Demographic Data

Respondents were asked to indicate their gender, highest qualifications, staff category and length of working in the organization and their responses are discussed below.

4.2.2.1 Gender of respondents

Respondents were asked to indicate their gender and the findings are as per Table 4.2

Table 4.2

Gender of respondents

Gender	Frequency	Percent
Male	97	57.4
Female	72	42.6
Total	**169**	**100.0**

Table 4.2 reveals that majority of the respondents who were 97 representing 57.4% were male while 72 representing 42.6% were female. This implies that both gender participated in the study and that KTDA adheres to two third gender rule as espoused in the Kenyan Constitution 2010.

4.2.2.2 Highest qualification

Respondents were asked to indicate the highest qualification they have attained and the findings are as per Table 4.3.

Table 4.3

Highest Qualifications

Qualification	Frequency	Percent
Certificate	73	43.2
Diploma	47	27.8
Degree	37	21.9
Postgraduate	12	7.1
Total	**169**	**100.0**

Table 4.3 indicates that majority of the respondents who were 73 representing 43.2% had attained a certificate as their highest qualifications, 47 respondents representing 27.8% had diploma as their highest qualification, 37 respondents representing 21.9% had degree as their highest qualification while 12 respondents representing 7.1% had a postgraduate qualifications as their highest qualifications. This implies that all the respondents were educated and knowledgeable enough to respond to the questionnaire hence their response is a true picture of inbound logistics, quality management system and sustainable procurement performance among KTDA tea factories in Kenya.

4.2.2.3 Staff category

Respondents were asked to indicate the staff category they were in and the findings are as per Table 4.4.

Table 4.4

Staff Category

Staff category	Frequency	Percent
Production Manager	14	8.3
ICT Manager	15	8.9
Procurement Manager	16	9.5
Leaf Base Manager	15	8.9
Factory Unit Manager	14	8.3
Director	95	56.2
Total	**169**	**100.0**

Table 4.4 reveals that majority of the respondents were directors who were 95 representing 56.2%, procurement managers were 16 representing 9.5%, leaf base managers and ICT managers were each 15 representing 8.9% while production managers and unit managers each were 14 representing 8.3%. This implies that all staff who are

involve in procurement at KTDA factories were represented hence the information collected is a true picture of inbound logistics quality management system and sustainable procurement performance hence this findings can be used to conclusively come up with appropriate recommendations.

4.2.2.4 Length of working in the organization

Respondents were asked to indicate the length of working in the organization and their responses are as per Table 4.5.

Table 4.5

Length of working in the organization

Duration of working	**Frequency**	**Percent**
Less than 5 years	87	51.5
6 to 10 years	46	27.2
11 to 15 years	16	9.5
16 to 20 years	16	9.5
Over 20 years	4	2.4
Total	**169**	**100.0**

The findings as per Table 4.5 reveals that majority of the respondents who were 87 representing 51.5% had worked in the organization for less than 5 years. Respondents who were 46 representing 27.2% had worked for the organization for between 6 to 10 years. Respondents who were 16 representing 9.5% had worked for the organization for 11 to 15 years and the same number had worked for the organizations for between 16 and 20 years while the respondents who had worked for the organization for more than 20 years were 4 representing 2.4%. This implies that the respondents had worked for the organization long enough to adequately respond to the study hence their responses can be relied upon as a representation of inbound logistics, quality management system and sustainable procurement performance of KTDA factories.

4.3 Descriptive Statistics and Discussion of Variable

These sections give the descriptive statistical findings of the study which are presented in form of frequency and percentages. The findings are discussed based on the study variables;

4.3.1 Suppliers sourcing strategy of KTDA tea factories

The first objective was to determine the relationship between suppliers sourcing strategy and sustainable procurement performance among KTDA factories in Kenya. Respondents were asked to respond to the statements on suppliers sourcing strategies adopted by sustainable procurement performance on a scale of 1-5 where: [1]-strongly disagree, [2]-disagree, [3]-Undecided, [4]-Agree and [5]-Strongly agree. A mean of between 0.0 and 2.5 meant disagreed while a mean of between 2.6 and 5.0 meant agree. The findings are as per Table 4.6.

Table 4.6

Suppliers sourcing strategy adopted by KTDA tea factories

Sourcing strategy	1	2	3	4	5	N	M	SD
The company during sourcing for suppliers evaluate their efficiency of quality, delivery and cost so as to make a saving.	5 (3.0%)	6 (3.6%)	3 (1.8%)	111 (65.7%)	44 (26.0%)	169	4.08	0.83
Our company have adopted suppliers sourcing strategies with economic advantages and that which create positive social impact	6 (3.6%)	8 (4.7%)	3 (1.8%)	127 (75.1%)	25 (14.8%)	169	3.92	0.82
Our suppliers sourcing strategies are aligned to organizational sustainability initiatives with those of the suppliers/customers so as to save and reduce costs;	5 (3.0%)	6 (3.6%)	3 (1.8%)	98 (58.0%)	56 (33.1%)	169	4.15	0.86
We consider results-oriented supplier during sourcing for suppliers	3 (1.8%)	7 (4.1%)	4 (2.4%)	111 (65.7%)	44 (26.0%)	169	4.10	0.77
We review suppliers' knowledge of the various supplier sustainability initiatives before awarding the tenders	5 (3.0%)	8 (4.7%)	3 (1.8%)	113 (66.9%)	40 (23.7%)	169	4.04	0.84
Suppliers' overall performance regarding corporate sustainability is one of the key indicators we check during sourcing of suppliers	3 (1.8%)	8 (4.7%)	5 (3.0%)	110 (65.1%)	43 (23.4%)	169	4.07	0.79
Overall						**169**	**4.06**	**0.82**

The findings as per Table 4.6 reveals that majority of the respondents who were 155 (91.7%) agreed that their organization during sourcing for suppliers evaluate their efficiency of quality, delivery and cost so as to make a saving. Respondents who were 11 (6.6%) disagreed that their organization during sourcing for suppliers evaluates their efficiency of quality, delivery and cost so as to make a saving while 3 (1.8%) respondents were undecided. The mean of 4.08 and standard deviation of 0.83 implies that the KTDA factories during sourcing for suppliers evaluate their efficiency of quality, delivery and cost so as to make a saving.

Respondents who were 152 (89.9%) agreed that their organization had adopted suppliers sourcing strategies with economic advantages and that which create positive social impact. Respondents who were 14 (8.3%) disagreed that their organization had adopted suppliers sourcing strategies with economic advantages and that which create positive social impact while 3 (1.8%) respondents were undecided. The findings reveals that KTDA factories have adopted suppliers sourcing strategies with economic advantages and that which create positive social impact as revealed by a mean of 3.92 and standard deviation of 0.82.

Respondents who were 154 (91.1%) agreed that their suppliers sourcing strategies were aligned to organizational sustainability initiatives with those of the suppliers/customers so as to save and reduce costs. Respondents who were 11 (6.6%) disagreed that their suppliers sourcing strategies were aligned to organizational sustainability initiatives with those of the suppliers/customers so as to save and reduce costs. Respondents who were 3 (1.8%) were undecided. Suppliers sourcing strategies adopted by KTDA were aligned to

organizational sustainability initiatives with those of the suppliers/customers so as to save and reduce costs as revealed by a mean of 4.15 and standard deviation of 0.86.

Majority of respondents 155 (91.7%) agreed that they consider results-oriented supplier during sourcing for suppliers. The respondents who were 10 (5.9%) disagreed that consider results-oriented supplier during sourcing for suppliers, while 4 (2.4%) respondents were undecided. A mean of 4.10 and a standard deviation of 0.77 implies that KTDA factories considers results-oriented supplier during sourcing for suppliers.

Majority of the respondents who were 153 (90.6%) agreed that they review suppliers' knowledge of the various supplier sustainability initiatives before awarding the tenders while respondents who were 13 (7.7%) disagreed that they review suppliers' knowledge of the various supplier sustainability initiatives before awarding the tenders while agreed that 3 (1.8%) respondents were undecided. KTDA review suppliers' knowledge of the various supplier sustainability initiatives before awarding the tenders as revealed by a mean of 4.04 and standard deviation of 0.84. Suppliers' overall performance regarding corporate sustainability is one of the key indicators checked during sourcing of suppliers. This is as per the respondents who were 153 (90.5%) who agreed and 11 (6.5%) disagreed while 5 (3.0%) respondents were undecided. Suppliers' overall performance regarding corporate sustainability is one of the key indicators KTDA check during sourcing of suppliers as revealed by a mean of 4.07 and a standard deviation of 0.79.

The mean of 4.08 and standard deviation of 0.83 implied that the KTDA factories during sourcing for suppliers evaluate their efficiency of quality, delivery and cost so as to make a saving. This agrees with Guide (2013), who noted that supplier sourcing entails

identifying, evaluating, selecting, and engaging with a suitable supplier who can provide quality goods and services, allowing the organization to get the best value in terms of both product and cost. This shows that KTDA managed factories continuously evaluate and manage their suppliers so as to mitigate supply risks by ensuring efficiency of quality delivery and cost in order to promote more sustainable business activities.

The findings revealed that KTDA factories have adopted suppliers sourcing strategies with economic advantages and that which create positive social impact as revealed by a mean of 3.92 and standard deviation of 0.82. The findings concur with Luthra, et al (2017) who established that the criterion for supplier selection entails; environmental costs, product quality, cost, Occupation, Health and Safety programs, and environmental capabilities. This revealed that KTDA factories through its suppliers sourcing strategies have actualized economical and social advantages.

Suppliers sourcing strategies adopted by KTDA were aligned to organizational sustainability initiatives with those of the suppliers/customers so as to save and reduce costs as revealed by a mean of 4.15 and standard deviation of 0.86. This agrees with the findings of Ghadge et al (2018), who found that firms' sustainable procurement improves consumer. This shows that KTDA factories suppliers sourcing strategies are aligned to sustainability. A mean of 4.10 and a standard deviation of 0.77 implied that KTDA factories considers results-oriented supplier during sourcing for suppliers. This is in agreement with Koberg & Longoni (2019), who established that collaboration and supplier evaluation are efficient ways to raise sustainability.

According to Alikhani et al., (2019), making decisions without taking sustainability criteria or risk factors into account is detrimental. This is true since the findings revealed that KTDA review suppliers' knowledge of the various supplier sustainability initiatives before awarding the tenders as revealed by a mean of 4.04 and standard deviation of 0.84. The findings show that KTDA consider sustainability during sourcing of suppliers.

Suppliers' overall performance regarding corporate sustainability is one of the key indicators KTDA check during sourcing of suppliers as revealed by a mean of 4.07 and a standard deviation of 0.79. These findings agree with Koberg and Longoni (2019) who reported that supplier assessment alone is insufficient in achieving sustainable performance and that businesses should adopt a collaborative approach.

4.3.2 Transportation strategy of KTDA tea factories

The second objective was to examine the relationship between transportation strategy and sustainable procurement performance among KTDA factories in Kenya. Respondents were asked to respond to the statements on Transportation strategies adopted by KTDA tea factories. The responses were on a Likert scale of 1-5 where: [1]-strongly disagree, [2]-disagree, [3]-Undecided, [4]-Agree and [5]-Strongly agree. A mean of between 0.0 and 2.5 meant disagreed while a mean of between 2.6 and 5.0 meant agree. The findings are presented in Table 4.7.

Table 4.7

Descriptive results Transportation strategy

Transportation strategy	SD	D	U	A	SA	N	M	SD
The growth of transportation have necessitated our organization to device new transportation strategies	4 (2.4%)	10 (5.9%)	4 (2.4%)	116 (68.6%)	35 (20.7%)	169	3.99	0.83
The rapid growth of transportation need experienced by our organization have contributed to increase logistic costs and prices of goods/services	3 (1.8%)	9 (5.3%)	5 (3.0%)	103 (60.9%)	49 (29.0%)	169	4.10	0.83
Our transportation strategies necessitate utilization of transport resources in the most efficient and environmentally friendly way	4 (2.4%)	9 (5.3%)	3 (1.8%)	98 (58.0%)	55 (32.5%)	169	4.13	0.87
Our organizational transport strategies involve determination of transportation mode; feedback and reporting on the choice of transport.	4 (2.4%)	10 (5.9%)	3 (1.8%)	96 (56.8%)	56 (33.1%)	169	4.12	0.89
Our ability as an organization to move items from/to a supplier improves the efficiency of inbound logistics in terms of speed and cost.	3 (1.8%)	11 (6.5%)	4 (2.4%)	101 (59.8%)	50 (29.6%)	169	4.09	0.86
Our transportation solutions enable consolidation of many orders so as to create large volumes hence lower transport costs per volume.	5 (3.0%)	10 (5.9%)	3 (1.8%)	104 (61.5%)	47 (27.8%)	169	4.05	0.89
Overall						**169**	**4.04**	**0.86**

Table 4.7 reveals that 151 (89.3%) agreed that the growth of transportation have necessitated their organization to device new transportation strategies. Respondents who were 14 (8.3%) disagreed that the growth of transportation has necessitated their organization to device new transportation strategies. Respondents who were 4 (2.4%) were undecided. The mean of 3.99 and a standard deviation of 0.83 imply that growth of transportation have necessitated KTDA factories to device new transportation strategies.

Respondents who were 152 (89.9%) agreed that the rapid growth of transportation need experienced by their organization have contributed to increase logistic costs and prices of goods/services. Respondents who were 12 (7.1%) disagreed that the rapid growth of transportation need experienced by their organization has contributed to increase logistic costs and prices of goods/services while 5 (3.0%) respondents were undecided. The findings implies that rapid growth of transportation need experienced by KTDA factories have contributed to increase logistic costs and prices of goods/services as revealed by a mean of 4.10 and a standard deviation of 0.83.

Majority of respondents who were 153 (90.5%) agreed that transportation strategies necessitate utilization of transport resources in the most efficient and environmentally friendly way. Respondents who were 13 (7.7%) disagreed that transportation strategies necessitate utilization of transport resources in the most efficient and environmentally friendly way. Respondents who were 3 (1.8%) were undecided. Transportation strategies of KTDA factories necessitate utilization of transport resources in the most efficient and environmentally friendly way as revealed by a mean of 4.13 and a standard deviation of 0.87.

Respondents who were 152 (89.9%) agreed that their organizational transport strategies involve determination of transportation mode; feedback and reporting on the choice of transport. Respondents who were 14 (8.3%) disagreed that their organizational transport strategies involve determination of transportation mode; feedback and reporting on the choice of transport while 3 (1.8%) respondents were undecided. The transport strategies adopted by KTDA factories involve determination of transportation mode; feedback and reporting on the choice of transport as shown by a mean of 4.12 and a standard deviation of 0.89.

Respondents who were 151 (89.4%) agreed that their ability as an organization to move items from a supplier to a user offers location and time utilities for a buyer and improves the efficiency of inbound logistics in terms of speed and cost. Respondents who were 14 (8.3%) disagreed that their ability as an organization to move items from a supplier to a user offers location and time utilities for a buyer and improves the efficiency of inbound logistics in terms of speed and cost while 4 (2.4%) were undecided. The mean of 4.09 and a standard deviation of 0.86 imply that the ability of KTDA factory to move items from a supplier to a user offers location and time utilities for a buyer and improves the efficiency of inbound logistics in terms of speed and cost.

Majority of respondents who were 151 (89.3%) agreed that their transportation solutions enable consolidation of many orders so as to create large volumes hence lower transport costs per volume. Respondents who were 15 (9.9%) disagreed that their transportation solutions enable consolidation of many orders so as to create large volumes hence lower transport costs per volume while 3 (1.8%) respondents were undecided. The mean of 4.05 and a standard deviation of 0.89 imply that transportation solutions of KTDA factories

enable consolidation of many orders so as to create large volumes hence lower transport costs per volume.

The mean of 3.99 and a standard deviation of 0.83 imply that growth of transportation and more home deliveries have necessitated KTDA factories to device new transportation strategies. This is contrary to Beirão et al., (2016), who noted that rapid transportation development has negative effects on the performance aspect as it results in high cost of logistic. The findings concur with Moen (2016), who established that through transportation buyer gains control over the transport firm in the supply chain enhancing transparency and altering the dynamic between the parties.

The findings implies that rapid growth of transportation need experienced by KTDA factories have contributed to increase logistic costs and prices of goods/services as revealed by a mean of 4.10 and a standard deviation of 0.83. This is contrary to the findings of Kadlubek (2015), who reported that sustainable transportation and logistics processes lead to sustainability. The findings concur with Beirão et al., (2016), who established that transportation results in highest logistic cost. This shows that KTDA factories transportation needs has led to increase in logistic cost and this has affected the price of their tea products.

Transportation strategies of KTDA factories necessitate utilization of transport resources in the most efficient and environmentally friendly way as revealed by a mean of 4.13 and a standard deviation of 0.87. This contradicts Beirão et al., (2016), who established that transportation has negative effects on the environment and economic but agrees with the

findings of Kadlubek (2015), who found that sustainable transportation and logistics processes lead to sustainability.

The transport strategies adopted by KTDA factories involve determination of transportation mode; feedback and reporting on the choice of transport as shown by a mean of 4.12 and a standard deviation of 0.89. The findings agrees with Jony Prothan et at., (2017), findings which established that organizations involved in the physical movement of goods need a variety of transportation services, and that the best option is chosen based on the type of item that needs to be moved. The findings showed that KTDA factories determine the transportation mode, feedback and reports as a strategy to improve on their transportation.

The mean of 4.09 and a standard deviation of 0.86 imply that the ability of KTDA factory to move items from a supplier to a user offers location and time utilities for a buyer and improves the efficiency of inbound logistics in terms of speed and cost. This agrees with the findings of Musau et al., (2017), who concluded that transportation management enhances performance of the supply chains and that of Mukolwe and Wanyoike (2015), who noted that that the practices used for distribution and transport management equal flow of goods and raw materials positively influence operational efficiency. This shows that KTDA factories move items from a supplier cost effectively in a timely manner.

The mean of 4.05 and a standard deviation of 0.89 imply that transportation solutions of KTDA factories enable consolidation of many orders so as to create large volumes hence lower transport costs per volume. This agrees with Sethanan et at., (2012), who establish that firms with similar inbound logistics chains will have varying levels of efficiency

depending on their management. This suggests that efficiency in the supply chain may be defendant on how inbound logistics aims is managed.

4.3.3 Material handling strategy of KTDA tea factories

The third objective was to evaluate the relationship between material handling strategy and sustainable procurement performance among KTDA factories in Kenya. Respondents were asked to respondent to the statements on material handling strategies adopted by KTDA tea factories. Their responses were on a Likert scale of 1-5 where: [1]-strongly disagree, [2]-disagree, [3]-Undecided, [4]-agree and [5]-Strongly agree. A mean of between 0.0 and 2.5 meant disagreed while a mean of between 2.6 and 5.0 meant agree. The findings are presented in Table 4.8.

Table 4.8

Descriptive results on Material handling strategy

Material Handling strategy	SD	D	U	A	SA	N	M	SD
KTDA have procedures on how goods are moved to the manufacturing area.	5 (3.0%)	10 (5.9%)	3 (1.8%)	99 (58.6%)	52 (30.8%)	169	4.08	0.91
We ensure that the goods are well protected in warehouse as well as during their distribution	4 (2.4%)	10 (5.9%)	3 (1.8%)	97 (54.9%)	55 (32.5%)	169	4.12	0.88
Our organization material handling system and processes have enabled us meets the need of our customers through improve customer service	4 (2.4%)	11 (6.5%)	3 (1.8%)	92 (54.4%)	59 (34.9%)	169	4.13	0.91
The manufacturing, distribution, and delivery of our company's products have all experienced decreased overall handling costs.	3 (1.8%)	9 (5.3%)	3 (1.8%)	95 (56.2%)	59 (34.9%)	169	4.17	0.85
The requirements, strategic performance targets, and functional specifications of the organization's sustainability goal are outlined in our material handling plan.	4 (2.4%)	9 (5.3%)	4 (2.4%)	107 (63.3%)	45 (26.6%)	169	4.07	0.85
Our material handling equipment is standardized and capable of carrying out a variety of duties in a variety of working environments, minimizing pointless movement that reduces production.	3 (1.8%)	9 (5.3%)	5 (3.0%)	109 (64.5%)	43 (25.4%)	169	4.06	0.81
Overall						**169**	**4.11**	**0.87**

Table 4.8 reveals that majority of the respondents who were 151 (89.4%) agreed that KTDA have procedures on how goods are moved to the manufacturing area. The respondents who were 15 (8.9%) disagreed that KTDA have procedures on how goods are moved to the manufacturing area. The respondents who were 3 (1.8%) were undecided. This implies that KTDA have procedures on how goods are moved to the manufacturing area as revealed by a mean of 4.08 and a standard deviation of 0.91.

Respondents who were 152 (87.4%) agreed that KTDA factories ensure that the goods are well protected in warehouse as well as during their distribution. The respondents who were 14 (8.3%) disagreed that KTDA factories ensure that the goods are well protected in warehouse as well as during their distribution while respondents who were 3 (1.8%) were undecided. The finding implies that KTDA factories ensure that the goods are well protected in warehouse as well as during their distribution as revealed by a mean of 4.12 and a standard deviation of 0.88.

Respondents who were 151 (89.3%) agreed that their organization material handling system and processes have enabled them meets the need of their customers through improve customer service. Respondents who were 15 (8.9%) disagreed that organization material handling system and processes have enabled them meets the need of their customers through improve customer service. Respondents who were 3 (1.8%) were undecided. The findings imply that KTDA factories material handling system and processes have enabled them meets the need of their customers through improve customer service as shown by a mean of 4.13 and a standard deviation of 0.91.

Respondents who were 154 (91.1%) agreed that manufacturing, distribution, and delivery of KTDA factory products have all experienced decreased overall handling costs. The respondents who were 12 (7.1%) disagreed that manufacturing, distribution, and delivery of KTDA factory products have all experienced decreased overall handling costs while 3 (1.8%) respondents were undecided. The findings implies that manufacturing, distribution, and delivery of KTDA factory products have all experienced decreased overall handling costs as attested by a mean of 4.17 and a standard deviation of 0.85.

Respondents who were 153 (89.9%) agreed that the requirements, strategic performance targets, and functional specifications of the organization's sustainability goal are outlined in their material handling plan. Respondents who were 13 (7.7%) disagreed that the requirements, strategic performance targets, and functional specifications of the organization's sustainability goal are outlined in their material handling plan. Respondents who were 4 (2.4%) were undecided. The findings implies that the requirements, strategic performance targets, and functional specifications of the KTDA factory sustainability goal are outlined in their material handling plan and shown by a mean of 4.07 and a standard deviation of 0.85.

Respondents who were 152 (89.9%) agreed that material handling equipment is standardized and capable of carrying out a variety of duties in different working environments, minimizing movement that reduces production. Respondents who were 12 (7.1%) disagreed that that material handling equipment is standardized and capable of carrying out a variety of duties in different working environments, minimizing movement that reduces production while 5 (3.0%) respondents were undecided. This reveals that KTDA factory material handling equipment is standardized and capable of carrying out a

variety of duties in different working environments, and reduces production as revealed by a mean of 4.06 and a standard deviation of 0.81.

The mean of 4.08 and a standard deviation of 0.91 imply that KTDA have procedures on how goods are moved to the manufacturing area. This concurs with Al-Odeh & Smallwood (2012), who established that all material handling techniques, tools, controls, and software should be standardized and capable of performing a variety of tasks in a variety of operating environments and that unnecessary movement that decreases productivity be reduced, combined, shortened, or eliminated from material handling procedures. This shows that KTDA factories have procedures of handling material as they are moved to manufacturing area.

KTDA factories ensure that the goods are well protected in warehouse as well as during their distribution as revealed by a mean of 4.12 and a standard deviation of 0.88. This findings agrees with Mathien & Suresh (2015) who found that green material management practices have a positive impact on procurement performance since it raises the function's and the company's level of compliance with environmental regulations, increasing customer loyalty, using less material, which lowers costs, and encouraging returns for recycling and reusing, which results in cheap sources of raw material.

The mean of 4.13 and a standard deviation of 0.91 imply that KTDA factories material handling system and processes have enabled them meets the need of their customers through improve customer service. This concurs with Vieira (2011), who established that internal customers recognized that the materials handling management system increases service agility and reliability while decreasing costs, resulting in an increase in overall

satisfaction. Thus KTDA factories material handling systems have enabled them meet the need of their customers. The findings also agree with Kisioya & Moronge (2019), findings which shows that most material handling procedure indicators have a positive impact on the success of the business.

Manufacturing, distribution, and delivery of KTDA factory products have all experienced decreased overall handling costs as attested by a mean of 4.17 and a standard deviation of 0.85. This agrees with the findings of Brutus & Chiyem (2015) who established that the organization's use of material management helps them to be profitable, and having enough storage space and stops production from being interrupted. The findings concurs with Aminazahra & Chege (2020), results which demonstrated that the performance is significantly impacted by the material planning control system and that material distribution had a substantial impact on the organization's financial success.

The requirements, strategic performance targets, and functional specifications of KTDA factory sustainability goal are outlined in their material handling plan as shown by a mean of 4.07 and a standard deviation of 0.85. The findings agrees with Egwuatu (2022), who discovered that material planning strategy has a significant relationship with organizational productivity since it had a positive significant relationship with organizational productivity. This shows that KTDA factories material handling strategies have strategic performance targets and functional specifications.

The mean of 4.06 and a standard deviation of 0.81 imply that KTDA factory material handling equipment is standardized and capable of carrying out a variety of duties in a variety of working environments, minimizing pointless movement that reduces

production. The findings concur with Kathurima, Ombul, & Iravo (2016) who found that automating material handling systems has a good and considerable impact on performance. The findings contradict Abdinasir (2020), findings which established that material handling process were manual in nature and were not automated. This shows that KTDA factories material handling strategies are standardize and capable of carrying out variety of duties in different working environments.

4.3.4 Reverse Logistic strategy of KTDA tea factories

The fourth objective was to examine the relationship between reverse logistic strategy and sustainable procurement performance among KTDA factories in Kenya. Respondents were asked to respond to the statements on reverse logistic strategies adopted by KTDA tea factories. Their responses were on a Likert scale of 1-5 where: [1]-strongly disagree, [2]-disagree, [3]-Undecided, [4]-Agree and [5]-Strongly agree. A mean of between 0.0 and 2.5 meant disagreed while a mean of between 2.6 and 5.0 meant agree. The findings are as per Table 4.9.

Table 4.9

Descriptive results on reverse logistic strategy of KTDA tea factories

Reverse Logistic strategy	SD	D	U	A	SA	N	M	SD
Our company has policies and procedures that govern returning its goods, components, and raw materials from consumption sites.	19 (11.2%)	17 (10.1%)	4 (2.4%)	89 (52.7%)	40 (23.7%)	169	3.67	1.26
Our organization have adopted reverse flow of products from consumer which prevent wastage and minimize environmental costs of business activities.	14 (8.3%)	21 (12.4%)	5 (3.0%)	82 (48.5%)	47 (27.8%)	169	3.75	1.22
Our product are either repaired, remanufactured or recycled by reusing materials from used products or components.	14 (8.3%)	18 (10.7%)	4 (2.4%)	83 (49.1%)	50 (29.6%)	169	3.81	1.20
Our company strictly manages return flows in accordance with organizational objectives and integrated business operations to achieve a competitive advantage and reduce environmental effect.	11 (6.5%)	13 (7.7%)	5 (3.0%)	71 (42.0%)	69 (40.8%)	169	4.02	1.16
With the help of the reverse logistics idea, our company manages trash in an ethical and ecological way.	9 (5.3%)	13 (7.7%)	6 (3.6%)	77 (45.6%)	64 (37.9%)	169	4.03	1.09
Overall						**169**	**3.86**	**1.19**

The findings from Table 4.9 reveals that majority of respondents who were 129 (76.3%) agreed that their organization has policies and procedures that govern returning its goods, components, and raw materials from consumption sites. Respondents who were 36 (21.3%) disagreed that their organization has policies and procedures that govern returning its goods, components, and raw materials from consumption sites. Respondents who were 4 (2.4%) were undecided. The findings implies that KTDA factories have policies and procedures that govern returning its goods, components, and raw materials from consumption sites since it had a mean of 3.67 and a standard deviation of 1.26.

Respondents who were 129 (76.3%) agreed that their organization has adopted reverse flow of products from consumer which prevent wastage and minimize environmental costs of business activities. Respondents who were 35 (20.7%) disagreed that their organizations have adopted reverse flow of products from consumer which prevent wastage and minimize environmental costs of business activities while 5(3.0%) respondents were undecided. The findings imply that KTDA factories have adopted reverse flow of products from consumer which prevent wastage and minimize environmental costs of business activities as revealed by a mean of 3.75 and a standard deviation of 1.22.

Respondents who were 133 (78.6%) agreed that their product are repaired, remanufactured or recycled by reusing materials from used products or components. Respondents who were 32 (19.0%) disagreed that their product are repaired, remanufactured or recycled by reusing materials from used products or components. Respondents who were 4 (2.4%) were undecided. The findings shows that KTDA factory

product are repaired, remanufactured and recycled by reusing materials from used products or components for it had a mean of 3.81 and a standard deviation of 1.20.

Respondents who were 140 (80.8%) agreed that their organization strictly manages return flows in accordance with organizational objectives and integrated business operations to achieve a competitive advantage and reduce environmental effect. Respondents who were 24 (14.2%) disagreed that their organization strictly manages return flows in accordance with organizational objectives and integrated business operations to achieve a competitive advantage and reduce environmental effect. Respondents who were 5 (3.0%) were undecided. The findings implies that KTDA factories manages return flows in accordance with organizational objectives and integrated business operations to achieve a competitive advantage and reduce environmental effect for it had a mean of 4.02 and a standard deviation of 1.16.

Respondents who were 141 (83.4%) agreed that with the help of the reverse logistics idea, their organization manages trash in an ethical and ecological way. Respondents who were 21 (13.0%) disagreed that with the help of the reverse logistics idea, their organization manages trash in an ethical and ecological way while 6 (3.6%) respondents were undecided. The finding shows that KTDA factories manages trash in an ethical and ecological way as revealed by a mean of 4.03 and a standard deviation of 1.09.

The findings that KTDA factories does not have policies and procedures that govern returning its goods, components, and raw materials from consumption sites as revealed by mean of 3.67 and a standard deviation of 1.26, concurs with Muttimos (2014), who found that reverse logistics solutions, such as recycling, reuse, and returns, were proven

to have a significant positive impact on corporate performance. The findings also agree with Kabergey and Richu (2015) who found a correlation between operational performance and reverse logistics and suggests that reverse logistics should be used by businesses to achieve a competitive advantage. The findings showed that KTDA factories have policies and procedures that govern reverse logistics.

The mean of 3.75 and a standard deviation of 1.22 shows that KTDA factories have not adopted reverse flow of products from consumer which prevent wastage and minimize environmental costs of business activities. The findings agree with Nimawat & Namdev (2012), who observed that reverse logistics plays a role in product returns, source reduction, recycling, materials substitution, material reuse, waste disposal, repair, and remanufacturing. The findings agree with Khadija (2016), who noted that corporations use recycling and repackaging as efficient reverse logistics solutions.

KTDA factory product were repaired, remanufactured or recycled by reusing materials from used products or components for it had a mean of 3.81 and a standard deviation of 1.20. This is concurs with Job, Njihia, Maalu, & Iraki (2021), who showed that process innovation considerably mitigated the association between reverse logistics and increasing internal operational competency. The findings agree with Khadija (2016), who found that corporations use recycling and repackaging as efficient reverse logistics solutions. The findings shows that KTDA factory product were repaired, remanufactured or recycled by reusing materials from used products and components

KTDA factories strictly manages return flows in accordance with organizational objectives and integrated business operations to achieve a competitive advantage and reduce environmental effect for it had a mean of 4.02 and a standard deviation of 1.16. This agrees with Wanja & Achuora (2017), who noted that reverse logistics greatly impacts an organization's operational effectiveness. The findings also agree with Panya & Marendi (2021), who discovered that the organizational performance is directly and significantly impacted by reverse logistics methods.

The finding shows that with the help of the reverse logistics idea, KTDA factories manages trash in an ethical and ecological way as revealed by a mean of 4.03 and a standard deviation of 1.09. The findings agree with Benard, Onyango, Muma et al., (2014), findings which indicated a positive correlation between environmental performance and reverse logistics.

4.3.5 Quality management system and sustainable procurement

The fifth objective was to determine the moderating effect of quality management system on the relationship between inbound logistics strategy and sustainable procurement performance among KTDA factories in Kenya. Respondents were asked to respond to the statements on quality management system adopted by KTDA tea factories. Their responses were on a Likert scale of 1-5 where: [1]-strongly disagree and [5]-Strongly agree. A mean of between 0.0 and 2.5 meant disagreed while a mean of between 2.6 and 5.0 meant agree. The findings are presented in Table 4.10.

Table 4.10

Descriptive results on quality management system of KTDA tea factories

Quality Management System	SD	D	U	A	SA	N	M	SD
By employing a quality management system, our firm has found long-term success.	4 (2.4%)	10 (5.9%)	3 (1.8%)	98 (58.0%)	54 (32.0%)	169	4.11	0.88
Our organization continuously realize improve performance because of quality management system in place	3 (1.8%)	11 (6.5%)	4 (2.4%)	88 (52.1%)	63 (37.3%)	169	4.16	0.89
Our quality management system has streamlined procurement processes	3 (1.8%)	11 (6.5%)	4 (2.4%)	98 (58.0%)	53 (31.4%)	169	4.12	0.87
Our product have value addition and are of low costs as well as adaptable to the needs of the customer because of the quality management in place	3 (1.8%)	8 (4.7%)	4 (2.4%)	117 (69.2%)	37 (21.9%)	169	4.05	0.77
Our organization's quality management system ensures that the management and acquisition of material resources have a significant and direct impact on the quality of the products.	4 (2.4%)	9 (5.3%)	3 (1.8%)	97 (57.4%)	56 (33.1%)	169	4.14	0.87
Our organization follows the total quality concept's guiding principles in its management and purchase of material resources.	5 (3.0%)	8 (4.7%)	4 (2.4%)	110 (65.1%)	42 (24.9%)	169	4.04	0.85
Overall						**169**	**4.10**	**0.86**

The findings in Table 4.10 reveals that majority of the respondents who were 152 (90.0%) agreed that by employing a quality management system, the organization has found long-term success. Respondents who were 14 (8.3%) disagreed that by employing a quality management system, the organization has found long-term success. The respondents who were 3 (1.8%) were undecided. The findings imply that by employing a quality management system, KTDA Factories has found long-term success as revealed by a mean of 4.11 and a standard deviation of 0.88. Respondents who were 151 (89.4%) agreed that their organization continuously realize improve performance because of quality management system in place. Respondents who were 14 (8.3%) disagreed that their organization continuously realizes improve performance because of quality management system in place while 4 (2.4%) were undecided. The findings showed that KTDA factories continuously realize improve performance because of quality management system in place as revealed by a mean of 4.16 and a standard deviation of 0.89.

Majority of the respondents who were 151 (89.4%) agreed that their quality management system has streamlined procurement processes. Respondents who were 14 (8.3%) disagreed while 4 (2.4%) respondents were undecided. The findings showed that quality management system has streamlined procurement processes of KTDA factories since it had a mean of 4.12 and a standard deviation of 0.87. Majority of the respondents who were 154 (91.1%) agreed that their products have value addition and are of low costs as well as adaptable to the needs of the customer because of the quality management in place. The respondents who were 11 (7.5%) disagreed that their products have value addition and are of low costs as well as adaptable to the needs of the customer because of

the quality management in place. The undecided respondents were 4 (2.4%). The findings revealed that KTDA factories product have value addition and are of low costs as well as adaptable to the needs of the customer because of the quality management in place as shown by a mean of 4.05 and a standard deviation of 0.77.

Majority of the respondents who were 153 (90.5%) agreed that their organization's quality management system ensures that the management and acquisition of material resources have a significant and direct impact on the quality of the products. The respondents who were 13 (7.7%) disagreed that their organization's quality management system ensures that the management and acquisition of material resources have a significant and direct impact on the quality of the products. Respondents who were 3 (1.8%) were undecided. KTDA factories quality management system ensures that the management and acquisition of material resources have a significant and direct impact on the quality of the products as revealed by a mean of 4.14 and a standard deviation of 0.87.

Majority of the respondents who were 152 (90.0%) agreed that their organization follows the total quality concept's guiding principles in its management and purchase of material resources. Respondents who were 13 (7.7%) disagreed that their organization follows the total quality concept's guiding principles in its management and purchase of material resources and the respondents who were undecided were 4 (2.4%). The findings implies that KTDA factories follows the total quality concept's guiding principles in its management and purchase of material resources as shown by a mean of 4.04 and a standard deviation of 0.85. The findings implies that by employing a quality management system, KTDA Factories has found long-term success as revealed by a mean of 4.11 and a standard deviation of 0.88 The findings showed that KTDA factories continuously

realize improve performance because of quality management system in place as revealed by a mean of 4.16 and a standard deviation of 0.89.

The findings concurs with Siva et al., (2016), who highlighted the importance of quality management for organizational sustainability through better business collaboration and more efficient processes upstream and downstream to organizations. The findings agree with Wilcock & Boys (2014), who established that quality management system that adheres to ISO 9000 and ISO 9000: 2005 standards, ISO 9001: 2008 standards, and ISO 9004: 2009 standards can help a business succeed over the long term.

The findings showed that quality management system has streamlined procurement processes of KTDA factories since it had a mean of 4.12 and a standard deviation of 0.87. The findings agree with Siongok (2016) who discovered that procurement performance is influenced by its quality control system such as planning for quality control, developing quality control policies, implementing quality control practices, and reporting on quality control all affect how goods and services are effectively procured. The findings revealed that KTDA factories product have value addition and are of low costs as well as adaptable to the needs of the customer because of the quality management in place as shown by a mean of 4.05 and a standard deviation of 0.77. The findings concurs with Jovanović & Filipović (2016), who established that standard implementation has a considerable impact on the performance of the firm between certified and non-certified firms since firms gain greatly.

KTDA factories quality management system ensures that the management and acquisition of material resources have a significant and direct impact on the quality of the products as revealed by a mean of 4.14 and a standard deviation of 0.87. The findings agree with Siongok & Noor (2016) who concluded that quality control system had an impact on procurement performance and that successfully acquired goods and services depends on a number of factors, including quality control planning, quality control rules development, quality control practices implementation, and quality control reporting. The findings implies that KTDA factories follows the total quality concept's guiding principles in its management and purchase of material resources as shown by a mean of 4.04 and a standard deviation of 0.85. The findings agrees with Wanyoike (2016), who found that management show commitment to quality by providing quality management practices with a strategic direction that is consistent with the company's aims.

4.3.6 Sustainable Procurement Performance

The dependent variable was sustainable procurement and respondents were asked to respond to statements on sustainable procurement performance. Their responses were on a Likert scale of 1-5 where: [1]-strongly disagree, [2]-disagree, [3]-Undecided, [4]-Agree and [5]-Strongly agree. A mean of between 0.0 and 2.5 meant disagreed while a mean of between 2.6 and 5.0 meant agree. Their responses are presented in Table 4.11.

Table 4.11

Descriptive results on sustainable procurement performance of KTDA tea factories

Sustainable procurement	SD	D	U	A	SA	N	M	SD
Our company chooses suppliers based on their competence as well as their technical and eco-design capabilities, environmental performance, and their capacity to create eco-friendly products.	4 (2.4%)	9 (5.3%)	4 (2.4%)	97 (57.4%)	55 (32.5%)	169	4.12	0.87
Our organization choose suppliers that commit to sustainability practices and regularly monitor their compliance with regulation.	3 (1.8%)	15 (8.9%)	3 (1.8%)	92 (54.4%)	56 (33.1%)	169	4.08	0.93
Our suppliers abide by the organizational ethical standards, which involve employment and working conditions as well as compliance with national laws in their respective countries.	3 (1.8%)	14 (8.3%)	4 (2.4%)	91 (53.9%)	57 (33.7%)	169	4.09	0.92
Environmental costs, product quality, product price, workplace health and safety systems, and environmental skills are some of the factors that our firm considers when choosing suppliers.	3 (1.8%)	10 (5.9%)	3 (1.8%)	113 (66.9%)	40 (23.7%)	169	4.05	0.81
Strategies adopted by our organization in the management of product have enabled us achieve return on investment as indicated by the high number of satisfied customers	4 (2.4%)	11 (6.5%)	3 (1.8%)	106 (62.7%)	45 (26.6%)	169	4.05	0.87
Our organization have tremendously reduced its operating cost which have led to increased payout to farmers	4 (2.4%)	12 (7.1%)	4 (2.4%)	107 (63.3%)	42 (24.9%)	169	4.01	0.88
Overall						**169**	**4.07**	**0.88**

The findings in Table 4.11 showed that respondents who were 152 (89.9%) agreed that their factories chooses suppliers based on their competence as well as their technical and eco-design capabilities, environmental performance, and their capacity to create eco-friendly products. Respondents who were 13 (7.7%) disagreed that their factories chooses suppliers based on their competence as well as their technical and eco-design capabilities, environmental performance, and their capacity to create eco-friendly products. Undecided respondents were 4 (2.4%). The findings imply that Our KTDA factory chooses suppliers based on their competence as well as their technical and eco-design capabilities, environmental performance, and their capacity to create eco-friendly products as revealed by a mean of 4.12 and a standard deviation of 0.87.

The findings reveal that 148 (87.5%) respondents agreed that their organization choose suppliers that commit to sustainability practices and regularly monitor their compliance with regulation. The respondents who were 18 (10.7%) disagreed that their organization chooses suppliers that commit to sustainability practices and regularly monitor their compliance with regulation. The respondents who were 3 (1.8%) were undecided. The findings show that KTDA factories choose suppliers that commit to sustainability practices and regularly monitor their compliance with regulation since it had a mean of 4.08 and a standard deviation of 0.93.

Respondents who were 148 (87.5%) agreed that their suppliers abide by the organizational ethical standards, which involve employment and working conditions as well as compliance with national laws in their respective countries. The respondents who were 17 (10.1%) disagreed that their suppliers abide by the organizational ethical standards, which involve employment and working conditions as well as compliance with

national laws in their respective countries. Undecided respondents were 4 (2.4%). The findings revealed that KTDA factory suppliers abide by the organizational ethical standards, which involve employment and working conditions as well as compliance with national laws in their respective countries for it had a mean of 4.09 and a standard deviation of 0.92.

Respondents who were 153 (90.6%) agreed that environmental costs, product quality, product price, workplace health and safety systems, and environmental skills are some of the factors that KTDA factories considers when choosing suppliers. Respondents who were 13 (7.7%) disagreed that environmental costs, product quality, product price, workplace health and safety systems, and environmental skills are some of the factors that KTDA factories considers when choosing suppliers. Respondents who were undecided were 3 (1.8%). The findings had a mean of 4.05 and a standard deviation of 0.81 which implies that environmental costs, product quality, product price, workplace health and safety systems, and environmental skills are some of the factors that KTDA factories considers when choosing suppliers.

Majority of the respondents who were 151 (89.3%) agreed that strategies adopted by KTDA factories in the management of product have enabled them achieve return on investment as indicated by the high number of satisfied customers. Respondents who were 15 (8.9%) disagreed that strategies adopted by KTDA factories in the management of product have enabled them achieve return on investment as indicated by the high number of satisfied customers. Undecided respondents were 3 (1.8%). The findings showed that strategies adopted by KTDA factories in the management of product have

enabled them achieve return on investment as indicated by the high number of satisfied customers since it had a mean of 4.05 and a standard deviation of 0.87.

Respondents who were 149 (88.2%) agreed that their organization have tremendously reduced its operating cost which has led to increased payout to farmers. Respondents who were 16 (9.5%) disagreed that their organization have tremendously reduced its operating cost which have led to increased payout to farmers. Respondents who were 4 (2.4%) were undecided. The findings showed that KTDA factories have tremendously reduced its operating cost which have led to increased payout to farmers for it had a mean of 4.01 and a standard deviation of 0.88.

The findings showed that KTDA factory chooses suppliers based on their competence as well as their technical and eco-design capabilities, environmental performance, and their capacity to create eco-friendly products as revealed by a mean of 4.12 and a standard deviation of 0.87. This findings concurs with Kim & Chai's (2017) who noted that adoption of Eco-Products among Consumers, suppliers are the ones driving the adoption of eco-design, source reduction, and environmental management systems.

KTDA factories choose suppliers that commit to sustainability practices and regularly monitor their compliance with regulation since it had a mean of 4.08 and a standard deviation of 0.93. The findings agree with Odhiambo (2014) who postulated that in order to meet the regulatory need and enhance performance in the procurement process, companies need to adopted ecological procurement techniques. The findings revealed that KTDA factory suppliers abide by the organizational ethical standards, which involve employment and working conditions as well as compliance with national laws in for it

had a mean of 4.09 and a standard deviation of 0.92. The findings agree with Wanja (2020), who comes to the conclusion that using sustainable procurement practices considerably improves procurement performance, ultimately improving company performance.

The findings had a mean of 4.05 and a standard deviation of 0.81 showed that environmental costs, product quality, product price, workplace health and safety systems, and environmental skills are some of the factors that KTDA factories considers when choosing suppliers. The findings concurs with Kiswili & Ishmael (2016), who postulated that it is critical that companies realize the strategic value of sustainable procurement

The findings showed that strategies adopted by KTDA factories in the management of product have enabled them achieve return on investment as indicated by the high number of satisfied customers since it had a mean of 4.05 and a standard deviation of 0.87. The findings agrees with Tatrai (2015) who noted that in order to meet the needs for goods, services, labor, and utilities in a way that maximizes value for money and promotes positive outcomes for the organization as a whole as well as for the economy, environment, and society, organizations need to adopt sustainable procurement.

The findings showed that KTDA factories have tremendously reduced its operating cost which have led to increased payout to farmers for it had a mean of 4.01 and a standard deviation of 0.88. This agrees with Upadhyay et al., (2022), who found that, compared to traditional techniques, procurement strategies have the potential to improve corporate performance in terms of profitability. Kaur & Singh (2018) discovered that the best

outcomes require sustainable transportation and procurement, both of which significantly increased the supply chain business operations' high carbon emissions.

4.4 Inferential Statistics

This section discusses the findings of the inferential statistic obtained from the study.

4.4.1 Correlation analysis

The study sought to establish the significance, direction and strength of the relationship between sustainable procurement, which was the dependent variable, and suppliers sourcing strategy, transportation strategy, material handling strategy, reverse logistic strategy, which were the independent variables. This was achieved through performing a Pearson's correlation analysis whose range is −1 to 1. -1 indicates a perfect negative relationship, 0 indicates that there is no relationship between the variables while +1 indicates a perfect positive relationship (Sekaran & Bougie, 2013). According to Creswell and Guetterman (2019), an absolute Pearson's correlation value of above 0.5 indicates a strong linear relationship between the variables while a value below 0.5 indicates a weak linear relationship. The sign of the Pearson's correlation coefficient value indicates the direction of the relationship. Finally, the resultant p-value less than 0.05 at 95% confidence level indicated that the linear relationship between variables of interest is statistically significant (Saunders et al., 2019). The correlation analysis findings are presented in Table 4.12.

Table 4.12

Correlations results

		Supplier Sourcing Strategy	Transportation Strategy	Material Handling Strategy	Reverse Logistic Strategy	Quality Management System	Sustainable Procurement Performance
Suppliers Sourcing Strategy	Pearson Correlation	1					
	Sig. (2-tailed)						
Transportation Strategy	Pearson Correlation	.757**	1				
	Sig. (2-tailed)	.000					
Material Handling Strategy	Pearson Correlation	.252**	.568**	1			
	Sig. (2-tailed)	.001	.000				
Reverse Logistic Strategy	Pearson Correlation	.613**	.855**	.694**	1		
	Sig. (2-tailed)	.000	.000	.000			
Quality Management System	Pearson Correlation	.726**	.749**	.430**	.779**	1	
	Sig. (2-tailed)	.000	.000	.000	.000		
Sustainable Procurement Performance	Pearson Correlation	.545**	.352**	.078**	.254**	.526**	1
	Sig. (2-tailed)	.000	.000	.316	.001	.000	

**. Correlation is significant at the 0.01 level (2-tailed). N= 169

According to the results in Table 4.12, Pearson correlation coefficient of 0.545 shows that suppliers sourcing strategies had a positive significant correlation with sustainable procurement performance ($r = 0.545$, $p < 0.05$). Transportation strategy had a positive significant correlation with sustainable procurement performance ($r = 0.352$, $p < 0.05$). The study established that material handling strategy had a positive but insignificant relationship with sustainable procurement performance ($r = 0.078$, $p > 0.05$). The results indicated that reverse logistic strategy had a positive significant relationship with sustainable procurement performance ($r = 0.254$, $p > 0.05$). Quality management system had a positive significant relationship with sustainable procurement performance ($r = 0.526$, $p > 0.05$).

The study findings showed that suppliers sourcing strategies, transportation strategy, material handling strategy, reverse logistic and quality management system strategy had a positive correlation with sustainable procurement performance. There is need therefore for organizations to embrace suppliers sourcing strategies, transportation strategy, material handling strategy, reverse logistic strategies and quality management system for them to enjoy the benefits of sustainable procurement performance which include cost minimization on their operations.

The findings that transportation had significant correlations with sustainability concur with Muchori (2015), whose correlation results indicate a relationship between the cost of transportation and freight logistics. The findings of Geoffrey and Muturi (2018) which showed a substantial correlation of 0.96, implying that an improvement in material handling systems will improve performance by about 0.9, concurs with this study findings that material handling strategy had a positive but insignificant relationship with sustainable procurement performance.

The findings that reverse logistic strategy had a positive significant relationship with sustainable procurement performance agrees with Mbovu and Kiarie (2018), who found that there was a correlation between independent factors and dependent variables. Quality management system had a positive significant relationship with sustainable procurement performance. The findings contradicts Ikay & Aslan (2011), finding which showed that there was no statistically significant performance difference between certified and noncertified firms hence certification for quality had no effect on performance.

4.5 Test of Hypotheses

The study tested the following research hypotheses using correlation coefficient (r), coefficient of determination (r square), f-statistics and coefficient t-test significance value.

4.5.1 Relationship between suppliers sourcing strategy and sustainable procurement performance

The first objective was to determine the relationship between suppliers sourcing strategy and sustainable procurement performance among KTDA factories in Kenya. Simple regression model was used to test the hypothesis **H_o1:** *There is no statistically significant relationship between supplier's sourcing strategy and sustainable procurement performance among KTDA factories, Kenya*.

Table 4.13

Model Summary for suppliers sourcing strategy and sustainable procurement performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.545[a]	0.297	0.293	0.76485

a. Predictors: (Constant), suppliers sourcing strategy

Table 4.13 revealed that suppliers sourcing strategy had positive significant relationship with sustainable procurement performance as shown by the value of (R = 0.545). The results showed that 29.7% of sustainable procurement performance is explained by

supplier sourcing strategy (R Square = 0.297). However, other factors not in the study attributed to 70.3% variation in sustainable procurement performance.

ANOVA analysis was used to test suppliers sourcing strategy and sustainable procurement performance. The hypothesis was tested using 5% significant level.

Table 4.14

ANOVA results for suppliers sourcing strategy and sustainable procurement performance

Model		**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig.**
1	Regression	41.243	1	41.243	70.500	.000[b]
	Residual	97.695	167	.585		
	Total	138.938	168			

a. Dependent Variable: Sustainable Procurement Performance

b. Predictors: (Constant), Sourcing Strategy

Table 4.14 on ANOVA revealed that there existed significant relationship between suppliers sourcing strategy and sustainable procurement performance ($F_{(1,167)} = 70.500$, $p < 0.05$). The findings showed that the significance value is 0.000 which is below 0.05. This implies that there is a statistically significant relationship between suppliers sourcing strategy and sustainable procurement performance. ANOVA results shows that the model used was suitable for data analysis meaning that the model suits the data in explaining the relationship between sourcing strategy and sustainable procurement performance.

Table 4.15

Coefficients results for suppliers sourcing strategy and sustainable procurement performance

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.883	0.158		11.955	0.000
	Sourcing Strategy	0.407	0.048	0.545	8.396	0.000

a. Dependent Variable: Sustainable Procurement Performance

As presented on Table 4.15, it was established that there exists a significant positive relationship between suppliers sourcing strategy and sustainable procurement performance $\beta = 0.407$. The results were statistically significant ($p < 0.05$). The beta coefficient of 0.407 means that when suppliers sourcing strategy increases by an additional unit, sustainable procurement performance procurement performance of KTDA factories increases by 0.407. From the coefficient of determination findings, the regression model now becomes:

$$Y = 1.883 + 0.407 X_1 \quad \text{..... (4.1)}$$

Where Y = Sustainable Procurement Performance, X_1 = Suppliers Sourcing Strategy

The study findings showed that suppliers sourcing strategy significantly influence sustainable procurement performance. The findings agree with Torabi, Baghersad, and Mansouri (2015), in Iran supplier selection should be taken into account when choosing a supply portfolio. It also agrees with China, Li, Fang, and Song (2019), who demonstrated that managers can analyze suppliers more successfully by identifying their performance gaps and ranking them more precisely when various uncertainties are taken into account.

The study concludes that the hypothesis **H_o1:** "*There is no statistically significant relationship between supplier's sourcing strategy and sustainable procurement performance among KTDA factories, Kenya,*" is **rejected** since the findings showed that there exists a significant positive relationship between supplier's sourcing strategy and sustainable procurement performance ($\beta = 0.407$, $p < 0.05$).

4.5.2 Relationship between transportation strategy and sustainable procurement performance

The second objective was to examine the relationship between transportation strategy and sustainable procurement performance among KTDA factories in Kenya. Simple regression model was used to test the hypothesis stated below;

H_o2: *There is no statistically significant relationship between transportation strategy and sustainable procurement performance among KTDA factories, Kenya*.

Multiple regression model was used to determine the relationship between transportation strategy and sustainable procurement performance among KTDA factories in Kenya. The findings are presented in Table 4.16.

Table 4.16

Model Summary for transportation strategy and sustainable procurement performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.352[a]	.124	.118	.85386

a. Predictors: (Constant), Transportation Strategy

Table 4.16 revealed that transportation strategy had positive significant relationship with sustainable procurement performance (R = 0.352). The results showed that 12.4% of sustainable procurement performance is explained by transportation strategy. However, other factors not included in the study attributed to 87.6% variation of sustainable procurement performance. This shows that the model fit well with the research data.

ANOVA analysis was used to test transportation strategy and sustainable procurement performance. The hypotheses were tested at 5% significant level.

Table 4.17

ANOVA results for transportation strategy and sustainable procurement performance

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	17.182	1	17.182	23.567	.000[b]
	Residual	121.756	167	.729		
	Total	138.938	168			

a. Dependent Variable: Sustainable Procurement Performance

b. Predictors: (Constant), Transportation Strategy

Table 4.17 on ANOVA revealed that there existed significant relationship between transportation strategy and sustainable procurement performance ($F_{(1,167)} = 23.567$, $p < 0.05$). The findings showed that the significance value is 0.000 which is below 0.05. These findings showed that the model was fit for the data.

Table 4.18

Coefficients results for transportation strategy and sustainable procurement performance

Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**T**	**Sig.**
		B	Std. Error	Beta		
1	(Constant)	2.360	.168		14.060	.000
	Transport	.246	.051	.352	4.855	.000

a. Dependent Variable: Sustainable Procurement Performance

As presented on Table 4.14, it was established that there exists a significant positive relationship between transportation strategy and sustainable procurement performance ($\beta = 0.246$, $p < 0.05$). The beta coefficient of 0.246 means that when transportation strategy increases by an additional unit, sustainable procurement performance procurement performance of KTDA factories increases by 0.246.

From the coefficient of determination findings, the regression model now becomes:

$Y = 2.360 + 0.246 X_2$……..…….….. (4.2)

Where Y = Sustainable Procurement Performance, X_2= Transportation Strategy

The study findings showed that transportation strategy significantly influence sustainable procurement performance. This concurs with the findings of JonyProthan, et al., (2017), who found that organizations involved in the physical movement of goods need a variety of transportation services, and that the best option is chosen based on the type of item that needs to be moved. The study also agrees with Ashuro (2022) who concluded that transportation management and procurement accounted for 65.3% of the total variability in the operational performance. The study also agrees with the findings of Musau, Namusonge, and Makokha (2017) who acknowledge that the importance of transportation management in the supply chain, in that it enhance the performance of the supply chains.

The study therefore concludes that the hypothesis **H_o2:** "*There is no statistically significant relationship between transportation strategy and sustainable procurement performance among KTDA factories, Kenya*," is **rejected** since the findings showed that there exists a significant positive relationship between transportation strategy and sustainable procurement performance ($\beta = 0.246$, $p < 0.05$).

4.5.3 Relationship between material handling strategy and sustainable procurement performance

The third objective was to evaluate the relationship between material handling strategy and sustainable procurement performance among KTDA factories in Kenya. Simple regression model was used to test the hypothesis stated below;

H_o3: *There is no statistically significant relationship between material handling strategy and sustainable procurement performance among KTDA factories, Kenya*.

A simple regression model was used to determine the relationship between material handling strategy and sustainable procurement performance among KTDA factories in Kenya. The findings are presented in Table 4.19.

Table 4.19

Model Summary for material handling strategy and sustainable procurement performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.078[a]	.006	.000	.90937

a. Predictors: (Constant), Material handling strategy

Table 4.19 revealed that material handling strategy had positive significant relationship with sustainable procurement performance. The results showed that 0.6% of sustainable procurement performance is explained by material handling strategy (R Square = 0.006). However, other factors not in the study attributed to 99.4% variation of sustainable procurement performance.

ANOVA analysis was used to test material handling strategy and sustainable procurement performance. The hypotheses were tested using 5% significant level.

Table 4.20

ANOVA results for material handling strategy and sustainable procurement performance

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	.836	1	.836	1.011	.016[b]
	Residual	138.102	167	.827		
	Total	138.938	168			

a. Dependent Variable: Sustainable Procurement Performance

b. Predictors: (Constant), Material handling strategy

Table 4.20 on ANOVA revealed that there existed insignificant relationship between material handling strategy and sustainable procurement performance ($F_{(1,167)} = 1.011$, $p < 0.05$). The findings showed that the significance value is 0.016 which is less than 0.05. These findings implied that the model was suitable to measure the study variables.

Table 4.21

Coefficients results for material handling strategy and sustainable procurement performance

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.920	.202		14.441	.000
	Material	.067	.066	.078	1.005	.316

a. Dependent Variable: Sustainable Procurement Performance

As presented on Table 4.20, it was established that there exists a positive insignificant relationship between material handling strategy and sustainable procurement performance ($\beta = 0.067$, $p > 0.05$). The beta coefficient of 0.067 means that when material handling strategy increases by an additional unit, sustainable procurement performance procurement performance of KTDA factories increases by 0.067.

From the coefficient of determination findings, the regression model now becomes:

$$Y = 2.920 + 0.067 X_3 \ldots\ldots (4.3)$$

Where Y = Sustainable Procurement Performance, X_3= Material Handling Strategy

The study findings showed that material handling strategy insignificantly influence sustainable procurement performance. The findings agrees with Vieira (2011), findings established that internal customers recognized that the new materials handling management system increased service agility and reliability while decreasing costs, resulting in an increase in overall satisfaction.

The study findings concurs with Ifeyinwa (2022), who discovered that material planning strategy has a significant relationship with organizational productivity since material handling had a positive significant relationship with organizational productivity. The findings also agree with Ronald, Nathan, and Jaya (2020), findings which showed a positive and substantial association between material estimation and project success. The study echoes the Kathurima, Ombul, and Iravo (2016) that automating material handling systems has a good and considerable impact on performance hence KTDA factors should automate its material handling processes.

The study therefore fails to reject the null hypothesis **H_o3:** "*There is no statistically significant relationship between material handling strategy and sustainable procurement performance among KTDA factories, Kenya*" since the findings showed that there exists insignificant positive relationship between material handling strategy and sustainable procurement performance ($\beta = 0.067$, $p > 0.05$).

4.5.4 Relationship between reverse logistic strategy and sustainable procurement performance

The fourth objective was to examine the relationship between reverse logistic strategy and sustainable procurement performance among KTDA factories in Kenya. Simple regression model was used to test the hypothesis below;

H_o4: *There is no statistically significant relationship between reverse logistic strategy and sustainable procurement performance among KTDA factories, Kenya*.

Simple regression model was used to examine the relationship between reverse logistic strategy and sustainable procurement performance among KTDA factories in Kenya. The findings are presented in Table 4.22.

Table 4.22

Model Summary for reverse logistic strategy and sustainable procurement performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.254[a]	.064	.059	.88225

a. Predictors: (Constant), Reverse Logistic Strategy

Table 4.22 revealed that reverse logistic strategy had positive significant relationship with sustainable procurement performance (R = 0.254). The results showed that 6.4% of sustainable procurement performance is explained by reverse logistic strategy (R Square = 0.064). However, other factors not in the study attributed to 93.6% variation of sustainable procurement performance. ANOVA analysis was used to test reverse logistic strategy and sustainable procurement performance. The hypotheses were tested using 5% significant level.

Table 4.23

ANOVA results for reverse logistic strategy and sustainable procurement performance

Model		**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig.**
1	Regression	8.952	1	8.952	11.501	.001[b]
	Residual	129.986	167	.778		
	Total	138.938	168			

a. Dependent Variable: Sustainable Procurement Performance

b. Predictors: (Constant), Reverse Logistic Strategy

Table 4.23 on ANOVA revealed that there existed a significant relationship between reverse logistic strategy and sustainable procurement performance ($F_{(1,167)} = 11.501$, $p < 0.05$). The findings showed that the significance value is 0.001 which is less than 0.05. This study finding revealed that the model was suitable for the study.

Table 4.24

Coefficients results for reverse logistic strategy and sustainable procurement performance

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.424	.213		11.356	.000
	Reverse Logistic Strategy	.211	.062	.254	3.391	.001

a. Dependent Variable: Sustainable Procurement Performance

As presented on Table 4.24, it was established that there exists a significant positive relationship between reverse logistic strategy and sustainable procurement performance ($\beta = 0.211$, $p < 0.05$). The beta coefficient of 0.211 means that when reverse logistic strategy increases by an additional unit, sustainable procurement performance procurement performance of KTDA factories increases by 0.211.

From the coefficient of determination findings, the regression model now becomes:

$Y = 2.424 + 0.211\ X_4$……..….. (4.4)

Where Y = Sustainable Procurement Performance, X_4 = Reverse Logistic Strategy

The study findings showed that reverse logistic strategy significantly influence sustainable procurement performance. That finding agrees with those of Afum, Sun, & Kusi (2019) who established that reverse logistics improves the performance of the

supply chain. The findings concur with that of Gikonyo, Ngugi, & Paul (2022) which showed that green logistics through reverse logistics has a significant influence on the productivity of an enterprise. The findings of Samson (2018), that reverse transportation had a substantial impact on performance agree with the study findings. This means that KTDA factories need to embrace reverse logistic strategy for them to enjoy the benefits of sustainable procurement performance.

The study therefore concludes that the hypothesis **H_o4:** "*There is no statistically significant relationship between reverse logistic strategy and sustainable procurement performance among KTDA factories, Kenya*," is **Rejected** since the findings showed that there exists a significant positive relationship between reverse logistic strategy and sustainable procurement performance for it had β of 0.211 and that results were statistically significant since p was 0.001 was less than 0.05.

4.5.5 Inbound logistic strategies and sustainable procurement performance

The study sought to determine the relationship between inbound logistics strategy and sustainable procurement performance among KTDA factories in Kenya. Multiple regression model was used to determine the relationship between inbound logistics strategy and sustainable procurement performance among KTDA factories in Kenya. The findings are presented in Table 4.25.

Table 4.25

Model Summary for inbound logistics strategy and sustainable procurement performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.555[a]	.308	.291	.76564

a. Predictors: (Constant), Suppliers Sourcing Strategy, Transportation Strategy, Material Handling Strategy, Reverse Logistic Strategy

Table 4.25 revealed that inbound logistic strategy indicate by suppliers sourcing strategy, transportation strategy, material handling strategy and reverse logistic strategy had positive significant relationship with sustainable procurement performance (R = 0.555). The results showed that 30.8% of sustainable procurement performance is explained by inbound logistic strategy (R Square = 0.308). However, other factors not in the study attributed to 69.2% variation of sustainable procurement performance.

ANOVA analysis was used to test the relationship between inbound logistics strategy and sustainable procurement performance. The hypothesis was tested using 5% significant level.

Table 4.26

ANOVA results for the relationship between inbound logistics strategy and sustainable procurement performance

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	42.802	4	10.700	18.254	.000[b]
	Residual	96.136	164	.586		
	Total	138.938	168			

a. Dependent Variable: Sustainable procurement performance

b. Predictors: (Constant), Suppliers Sourcing Strategy, Transportation Strategy, Material Handling Strategy, Reverse Logistic Strategy

Table 4.26 on ANOVA revealed that inbound logistics strategy had a significant relationship with sustainable procurement performance ($F_{(4,168)} = 10.700$, $p < 0.05$). The findings showed that the significance value is 0.000 which is less than 0.05. This implies that model was fit for the data.

Table 4.27

Coefficients results for the relationship between inbound logistics strategy and sustainable procurement performance

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.009	0.216		9.295	0.000
	Suppliers sourcing strategy	0.407	0.048	0.545	8.396	0.000
	Transportation strategy	0.246	0.051	0.352	4.855	0.000
	Material handling strategy	0.067	0.066	0.078	1.005	0.316
	Reverse logistic strategy	0.211	0.062	0.254	3.391	0.001

a. Dependent Variable: Sustainable procurement performance

As presented on Table 4.27, it was established that there exists a significant positive relationship between suppliers sourcing strategy and sustainable procurement performance ($\beta = 0.407$, $p < 0.05$). The beta coefficient of 0.407 means that when suppliers sourcing strategy increases by an additional unit, sustainable procurement performance procurement performance of KTDA factories increases by 0.407.

The findings also revealed that there exists significant relationship between transportation strategy and sustainable procurement performance ($\beta = 0.246$, $p < 0.05$). The beta coefficient of 0.246 means that when transportation strategy increases by an additional unit, sustainable procurement performance procurement performance of KTDA factories increase by 0.246.

The findings showed that there existed non significant positive relationship between material handling strategy and sustainable procurement performance ($\beta = 0.067$, $p > 0.05$). The beta coefficient of 0.067 imply that when material handling strategy increases by an additional unit, sustainable procurement performance procurement performance of KTDA factories increases by 0.067.

The study findings showed that there exists significant relationship between reverse logistics strategy and sustainable procurement performance ($\beta = 0.211$, $p < 0.05$). The beta coefficient of 0.211 means that when reverse logistic strategy increases by an additional unit, sustainable procurement performance procurement performance of KTDA factories increase by 0.211.

From the coefficient of determination findings, the moderator regression model now becomes:

$$Y = 2.09 + 0.407 X_1 + 0.246 X_2 + 0.067 X_3 + 0.211 X_4 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4.5)$$

Where Y = Sustainable Procurement Performance, X_1 =Suppliers Sourcing Strategy, X_2= Transportation Strategy, X_3 = Material Handling Strategy, X_4 = Reverse Logistic Strategy

4.5.6 Moderating effect of quality management system on the relationship between inbound logistics strategy and sustainable procurement performance

The fifth objective was to determine the moderating effect of quality management system on the relationship between inbound logistics strategy and sustainable procurement performance among KTDA factories in Kenya. The hypothesis which was tested was:

H_o5: *There is no statistical significant moderating effect of quality management on the relationship between inbound logistics strategy and sustainable procurement performance among KTDA factories, Kenya.*

Multiple regression model was used to determine the moderating effect of quality management system on the relationship between inbound logistics strategy and sustainable procurement performance among KTDA factories in Kenya. The findings are presented in Table 4.28.

Table 4.28

Model Summary for moderating effect of quality management system on the relationship between inbound logistics strategy and sustainable procurement performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.642[a]	.412	.394	.70807

a. Predictors: (Constant), Suppliers Sourcing Strategy, Transportation Strategy, Material Handling Strategy, Reverse Logistic Strategy

b. Quality Management System

Table 4.28 revealed that quality management as a moderator on the relationship between inbound logistic strategy indicate by Supplier sourcing strategy, Transportation strategy, Reverse logistic strategy and material handling strategy had positive significant relationship with sustainable procurement performance. The results showed that R Square changed from 30.8% as per Table 4.25 to 41.2% in Table 4.28 as a result of the moderator effect of QMS and that change was significant. This implies that quality management system enhances inbound logistics which leads to sustainable procurement performance.

ANOVA analysis was used to test moderating effect of quality management system on the relationship between inbound logistics strategy and sustainable procurement performance. The hypotheses were tested using 5% significant level.

Table 4.29

ANOVA results for moderating effect of quality management system on the relationship between inbound logistics strategy and sustainable procurement performance

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	57.216	5	11.443	22.824	.000[b]
	Residual	81.722	163	.501		
	Total	138.938	168			

a. Dependent Variable: Sustainable Procurement Performance

b. Predictors: (Constant), Suppliers Sourcing Strategy, Transportation Strategy, Material Handling Strategy, Reverse Logistic Strategy

c. Quality Management System

Table 4.29 on ANOVA revealed that quality management system had a significant moderating effect on the relationship between inbound logistics strategy and sustainable procurement performance ($F_{(5,167)} = 11.443$, $p < 0.05$). The findings showed that the significance value is 0.000 which is less than 0.05. This implies that model was fit for the data.

Table 4.30

Coefficients results for moderating effect of quality management system on the relationship between inbound logistics strategy and sustainable procurement performance

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.424	0.213		11.356	0.000
	Suppliers sourcing strategy	0.489	0.079	0.654	6.197	0.000
	Transportation strategy	0.344	0.107	0.063	0.409	0.003
	Material handling strategy	0.138	0.086	0.026	0.269	0. 304
	Reverse logistic strategy	0.239	0.120	0.112	0.775	0.001
	Quality Management system	0.243	0.063	0.287	3.876	0.000

a. Dependent Variable: Sustainable procurement performance

As presented on Table 4.30, it was established that there exists a significant positive relationship between suppliers sourcing strategy and sustainable procurement performance ($\beta = 0.489$, $p < 0.05$). The beta coefficient of 0.489 means that when suppliers sourcing strategy increases by an additional unit, sustainable procurement performance procurement performance of KTDA factories increases by 0.489.

The findings also revealed that there exists significant positive relationship between transportation strategy and sustainable procurement performance ($\beta = 0.344$, $p < 0.05$). The beta coefficient of 0.344 means that when transportation strategy increases by an additional unit, sustainable procurement performance procurement performance of KTDA factories increase by 0. 344.

The findings showed that there existed there exists significant positive relationship between material handling strategy and sustainable procurement performance ($\beta = 0.138$, $p < 0.05$). The beta coefficient of 0.138 means that when material handling strategy increases by an additional unit, sustainable procurement performance procurement performance of KTDA factories increases by 0.138. The study findings showed that there exists a significant positive relationship between reverse logistics strategy and sustainable procurement performance ($\beta = 0.239$, $p < 0.05$). The beta coefficient of 0.239 means that when reverse logistic strategy increases by an additional unit, sustainable procurement performance procurement performance of KTDA factories increase by 0.239.

The findings showed that there exists a significant positive relationship between quality management and sustainable procurement performance ($\beta = 0.243$, $p < 0.05$). The beta coefficient of 0.243 means that when quality management increases by an additional unit, sustainable procurement performance procurement performance of KTDA factories increases by 0.243. From the coefficient of determination findings, the moderator regression model now becomes:

$$Y = 2.424 + 0.489 X_1 + 0.344 X_2 + 0.138 X_3 + 0.239 X_4 + 0.243 X_5 \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (4.6)$$

Where Y = Sustainable Procurement Performance, X_1 =Suppliers Sourcing Strategy, X_2= Transportation Strategy, X_3 = Material Handling Strategy, X_4 = Reverse Logistic Strategy, X_5= Quality Management System

The study findings agree with Siongok (2016), who noted that procurement performance is influenced by its quality control system. The study findings contradict Daoud (2021) study which could not establish the extent to which ISO 9001 could influence the relationship between QMS practices.

The study findings disagree with the findings of Ikay & Aslan (2011), who established that there was no statistically significant performance difference between quality management certified organization and noncertified organization was found, according to the results.

The study therefore concludes that the hypothesis **H_o5:** "*There is no statistical significant moderating effect of quality management on the relationship between inbound logistics strategy and sustainable procurement performance among KTDA factories, Kenya*." is **Rejected** since the findings showed that their exist a significant moderator effect of quality management System on the relationship between inbound logistic strategy and sustainable procurement performance ($\beta = 0.243$, $p < 0.05$).

Table 4.31

Summary of Test of Hypotheses

Hypothesis	Results	Conclusion
H_o1: There is no statistically significant relationship between supplier's sourcing strategy and sustainable procurement performance among KTDA factories, Kenya.	**Positive statistically significant relationship between** supplier's sourcing strategy and sustainable procurement performance **($\beta = 0.407$, $p < 0.05$)**	**H_{01}** Reject
H_o2: There is no statistically significant relationship between transportation strategy and sustainable procurement performance among KTDA factories.	**Positive significant relationship between** transportation strategy and sustainable procurement performance **($\beta = 0.246$, $p < 0.05$)**	**H_{02}** Reject
H_o3: There is no statistically significant relationship between material handling strategy and sustainable procurement performance among KTDA factories, Kenya	**Positive insignificant relationship between** material handling strategy and sustainable procurement performance **($\beta = 0.067$, $p > 0.05$)**	**H_{03}** Fail to reject
H_o4: There is no statistically significant relationship between reverse logistic strategy and sustainable procurement performance among KTDA factories, Kenya	**Positive statistically significant relationship** between reverse logistic strategy and sustainable procurement performance **($\beta = 0.211$, $p < 0.05$)**	**H_{04}** Reject
H_o5: There here is no statistical significant moderating effect of quality management on the relationship between inbound logistics strategy and sustainable procurement performance among KTDA factories, Kenya.	**Positive significant moderating effect of quality management System** on the relationship between inbound logistic strategies and sustainable procurement performance (**$\beta = 0.243$, $p < 0.05$**).	**H_{04}** Reject

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary, conclusion of the findings from the study and the recommendations given to KTDA factories for sustainable procurement performance.

5.2 Summary

The study sought to establish the relationship between inbound logistic strategies, quality management system and sustainable procurement performance among selected Kenya Tea Development Factories in Kenya. The study specifically sought to; determine the relationship between suppliers sourcing strategy and sustainable procurement performance among KTDA factories in Kenya, examine the relationship between transportation strategy and sustainable procurement performance among KTDA factories in Kenya, evaluate the relationship between material handling strategy and sustainable procurement performance among KTDA factories in Kenya, examine the relationship between reverse logistic strategy and sustainable procurement performance among KTDA factories in Kenya, determine the moderating effect of quality management system on the relationship between inbound logistics strategy and sustainable procurement performance among KTDA factories in Kenya.

5.2.1 Suppliers sourcing strategies on sustainable procurement performance

The first objective was to determine the relationship between suppliers sourcing strategy and sustainable procurement performance among KTDA factories in Kenya. The

descriptive findings revealed that supplier's sourcing strategy had an overall mean of 4.06 and standard deviation of 0.82. The correlation findings reveal that suppliers sourcing strategies had a positive significant correlation with sustainable procurement performance ($r = 0.545$, $p < 0.05$). The findings showed that the KTDA factories during sourcing for suppliers evaluate their efficiency of quality, delivery and cost so as to make a saving; they have adopted suppliers sourcing strategies with economic advantages and that which create positive social impact; their suppliers sourcing strategies were aligned to organizational sustainability initiatives with those of the suppliers/customers so as to save and reduce costs; they considers results-oriented supplier during sourcing for suppliers; they review suppliers' knowledge of the various supplier sustainability initiatives before awarding the tenders; and that suppliers' overall performance regarding corporate sustainability was one of the key indicators checked during sourcing of suppliers.

5.2.2 Transportation strategies on Sustainable Procurement Performance

The second objective was to examine the relationship between transportation strategy and sustainable procurement performance among KTDA factories in Kenya. The descriptive findings showed that transportation strategy had an overall mean of 4.04 and a standard deviation of 0.86. Transportation strategy was found to have a positive significant correlation with sustainable procurement performance ($r = 0.352$, $p < 0.05$). The findings further show that the growth of transportation and more home deliveries have necessitated KTDA factories to device new transportation strategies; rapid growth of transportation need experienced by KTDA factories have contributed to increase logistic costs and prices of goods/services; transportation strategies of KTDA factories

necessitate utilization of transport resources in the most efficient and environmentally friendly way; transport strategies adopted by KTDA factories involve determination of transportation mode; feedback and reporting on the choice of transport; KTDA factory to move items from a supplier to a user offers location and time utilities for a buyer and improves the efficiency of inbound logistics in terms of speed and cost; KTDA factories enable consolidation of many orders so as to create large volumes hence lower transport costs per volume.

5.2.3 Material handling strategies on sustainable procurement performance

The third objective was to evaluate the relationship between material handling strategy and sustainable procurement performance among KTDA factories in Kenya. The descriptive findings showed that material handling strategy had an overall mean of 4.11 and a standard deviation of 0.87. The study established that material handling strategy had a positive but insignificant relationship with sustainable procurement performance ($r = 0.078$, $p > 0.05$). The findings revealed that KTDA have procedures on how goods are moved to the manufacturing area; KTDA factories ensure that the goods are well protected in warehouse; KTDA factories material handling system and processes have enabled them meets the need of their customers through improve customer service; manufacturing, distribution, and delivery of KTDA factory products have all experienced decreased overall handling costs; the requirements, strategic performance targets, and functional specifications of KTDA factory sustainability goal are outlined in their material handling plan; KTDA factory material handling equipment is standardized and capable of carrying out a variety of duties in a variety of working environments, minimizing pointless movement that reduces production.

5.2.4 Reverse Logistic strategies on sustainable procurement performance

The fourth objective was to examine the relationship between reverse logistic strategy and sustainable procurement performance among KTDA factories in Kenya. The descriptive findings showed that reverse logistic strategy had an overall mean of 3.86 and a standard deviation of 1.19. The results indicated that reverse logistic strategy had a positive significant relationship with sustainable procurement performance (r = 0.254, p > 0.05). The findings also report that KTDA factories have policies and procedures that govern returning its goods, components, and raw materials from consumption sites; KTDA factories have adopted reverse flow of products from consumer which prevent wastage and minimize environmental costs of business activities; KTDA factory product were repaired, remanufactured or recycled by reusing materials from used products or components; KTDA factories strictly manages return flows in accordance with organizational objectives and integrated business operations to achieve a competitive advantage and reduce environmental effect; with the help of the reverse logistics idea, KTDA factories manages trash in an ethical and ecological way.

5.2.5 Moderating effect of Quality Management System on the relationship between inbound Logistic Strategies and Sustainable Procurement Performance

The fifth objective was to determine the moderating effect of quality management system on the relationship between inbound logistics strategy and sustainable procurement performance among KTDA factories in Kenya. The descriptive findings revealed that quality management system had an overall mean of 4.10 and a standard deviation of 0.86. The study revealed that quality management system had a positive significant moderating

effect on the relationship between inbound logistics strategy and sustainable procurement performance. The results showed that R Square changed from 30.8% to 41.2% as a result of the moderator effect of QMS and that the change was significant. The findings showed that KTDA Factories have adopted quality management system in their procurement processes; KTDA factories quality management system ensures that the management and acquisition of material resources have a significant and direct impact on the quality of the products; KTDA factories follows the total quality concept's guiding principles in its management and purchase of material resources.

5.3 Conclusions

The study makes the following conclusions;

5.3.1 Suppliers sourcing strategy on sustainable procurement performance

The study concludes that for KTDA factories suppliers sourcing strategies have a positive significant correlation with sustainable procurement performance. The study concludes that KTDA factories evaluate their suppliers for efficiency, quality delivery and to save on cost; they have adopted suppliers sourcing strategies for economic advantages and positive social impact; their suppliers sourcing strategies were aligned to organizational sustainability initiatives with those of the suppliers and customers; they considered results-oriented supplier during sourcing for suppliers; they review suppliers' knowledge of the various supplier sustainability initiatives before awarding them tenders; and that suppliers' overall performance regarding corporate sustainability was the key indicators checked during sourcing of suppliers.

5.3.2 Transportation strategy on sustainable procurement performance

The study concludes that transportation strategy had a positive significant correlation with sustainable procurement performance. The concludes that the growth of transportation and more home deliveries necessitated KTDA factories to device new transportation strategies; rapid growth of transportation need experienced by KTDA factories contributed to increase logistic costs and prices of goods/services; transportation strategies of KTDA factories necessitated utilization of transport resources in the most efficient and environmentally friendly way; transport strategies adopted by KTDA factories involved determination of transportation mode, feedback and reporting on the choice of transport; KTDA factory move items from a supplier to user offers location and that KTDA factories enabled consolidation of many orders so as to create large volumes hence lower transport costs per volume.

5.3.3 Material handling strategy on sustainable procurement performance

The study concluded that material handling strategy had a positive but insignificant relationship with sustainable procurement performance. The study concludes that KTDA have procedures on how goods are moved to the manufacturing area; they ensure that goods are well protected in the warehouse; KTDA factories material handling system and processes enabled them meets the need of their customers through improve customer service; manufacturing, distribution and delivery of products experienced decreased overall handling costs; the requirements, strategic performance targets, and functional specifications of sustainability goal were outlined in material handling plan; KTDA factory material handling equipment was standardized and capable of carrying out a

variety of duties in a variety of working environments, minimizing pointless movement that reduced production.

5.3.4 Reverse Logistic strategy on sustainable procurement performance

The study concludes that reverse logistic strategy had a positive significant relationship with sustainable procurement performance. The study also concludes that KTDA factories had policies and procedures that govern returning goods, components, and raw materials from consumption sites; they adopted reverse flow of products from consumer which prevent wastage and minimize environmental costs of business activities; their products were repaired, remanufactured or recycled by reusing materials from used products or components; they strictly managed return flows in accordance with organizational objectives and integrated business operations to achieve a competitive advantage and reduce environmental effect; and that they managed trash in an ethical and ecological way.

5.3.5 Moderating Effect of Quality Management System on the relationship between inbound Logistic Strategies and Sustainable Procurement Performance

The study concludes that quality management system had a positive significant moderating effect on the relationship between inbound logistics strategy and sustainable procurement performance. The study conclude that KTDA Factories have adopted quality management system in their procurement processes; KTDA factories quality management system ensures that the management and acquisition of material resources have a significant and direct impact on the quality of the products; KTDA factories

follows the total quality concept's guiding principles in its management and purchase of material resources.

5.4 Recommendations

The study recommends that KTDA factories should; align suppliers sourcing strategies need to organizational sustainability goal by considering results-oriented supplier during sourcing for suppliers; adopt transportation strategies that will enable them reduce on logistic costs and prices of goods/services; develop procedures and policies on material handling with sustainability goal well outlined; manage return flows in accordance with organizational objectives so as to prevent wastage and minimize environmental costs in an ethical and ecological way; employ quality management system by following total quality concept's guiding principles in the management and purchase of material resources; chose suppliers based on their competence and commitment to sustainability practices and regularly monitor their compliance with regulation.

5.5 Suggestions for Further Study

The study sought to establish the relationship between inbound logistic strategies, quality management system and sustainable procurement performance among selected Kenya Tea Development Factories in Kenya. Further studies may be done by incorporating other logistic strategies other than; suppliers sourcing strategy, transportation strategy, material handling, reverse logistic strategy since the current study variables could only explain 30.8% of sustainable procurement performance. Further studies can also be done in other KTDA managed factories in other regions so as to compare the results.

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APPENDICES

Appendix I: List of Factories

S/NO	FACTORY	COUNTY LOCATED
1	TOROR FACTORY	KERICHO
2	TEGAT FACTORY	KERICHO
3	MOMUL FACTORY	KERICHO
4	LITEIN FACTORY	KERICHO
5	CHELAL FACTORY	KERICHO
6	KAPKATET FACTORY	KERICHO
7	MOGOGOSIEK FACTORY	BOMET
9	KOBEL FACTORY	BOMET
10	KAPSET FACTORY	BOMET
11	ROROK FACTORY	BOMET
12	BOITO FACTORY	BOMET
13	KAPKOROS FACTORY	BOMET
14	MOTIGO FACTORY	BOMET
15	TIRRGAGA FACTORY	BOMET
16	OLENGURUONE FACTORY	NAKURU

Appendix II: Research Questionnaire

Dear Sir/Madam,

I am undertaking academic research on "Inbound Logistic Strategies, Quality Management System and Sustainable Procurement Practice among Region 5 Kenya Tea Development Agency (KTDA) Factories, Kenya". I kindly request you to complete the questionnaire with utmost sincerity. The collected data will be handled with care, kept private, and only used for study.

Joyce Cheruto Rotich

University of Kabianga

SECTION A: BACKGROUND INFORMATION

1. How old are you?.....
2. Gender
    a) Male { }
    b) Female { }
3. Highest professional qualifications attained:

a) Certificate ☐

b). Diploma ☐

c). Degree certificate ☐

d). Post-Graduate ☐

e). others …….

4. Staff category from the following,

Production managers ☐

ICT managers ☐

Procurement Manager ☐

Leave Base Manager ☐

Unit Manager ☐

Director ☐

Others …….

5. Length service (Years).

a. Below 5 ☐

b. 6 - 10 ☐

c. 11 – 15 ☐

d. 16- 20 ☐

e. Over 20 ☐

Section B: Suppliers sourcing strategies on sustainable procurement performance

Below are statements on the effect of suppliers sourcing strategies on sustainable procurement performance. Kindly tick (√) the appropriate choice in the column provided on a scale of 1-5 where: [1]-strongly disagree, [2]-disagree, [3]-Undecided, [4]-Agree and [5]-Strongly agree.

	Sourcing strategies	1	2	3	4	5
ST 1	The company during sourcing for suppliers evaluate their efficiency of quality, delivery and cost so as to make a saving.					
ST 2	Our company have adopted suppliers sourcing strategies with economic advantages and that which create positive social impact					
ST 3	Our suppliers sourcing strategies are aligned to organizational sustainability initiatives with those of the suppliers/customers so as to save and reduce costs;					
ST 4	We consider results-oriented supplier during sourcing for suppliers					
ST 5	We review suppliers' knowledge of the various supplier sustainability initiatives before awarding the tenders					
ST 6	Suppliers' overall performance regarding corporate sustainability is one of the key indicators we check during sourcing of suppliers					

In your opinion, which suppliers sourcing strategies have been adopted by your organization:_____

_____

_____

_____

Section C: Transportation strategies on SPP

Below are statements on the effect of Transportation strategies on sustainable procurement performance. Kindly tick (√) the appropriate choice in the column provided on a scale of 1-5 where: [1]-strongly disagree, [2]-disagree, [3]-Undecided, [4]-Agree and [5]-Strongly agree.

	Transportation strategies	**SD**	**D**	**U**	**A**	**SA**
TS 1	The growth of transportation and more home deliveries have necessitated our organization to device new transportation strategies					
TS 2	The rapid growth of transportation need experienced by our organization have contributed to increase logistic costs and prices of goods/services					
TS 3	Our transportation strategies necessitate utilization of transport resources in the most efficient and environmentally friendly way					
TS 4	Our organizational transport strategies involve determination of transportation mode; feedback and reporting on the choice of transport.					
TS 5	Our ability as an organization to move items from a supplier to a user offers location and time utilities for a buyer and improves the efficiency of inbound logistics in terms of speed and cost.					

TS 6	By merging many orders to create greater volumes, our transportation solutions enable consolidation and lower transport costs per unit.					

In your opinion, which transport strategies have been adopted by your organization:_____

_____

_____

_____

Section D: Material handling strategies on sustainable procurement performance

Below are statements on the effect of material handling strategies on sustainable procurement performance. Kindly tick (√) the appropriate choice in the column provided on a scale of 1-5 where: [1]-strongly disagree, [2]-disagree, [3]-Undecided, [4]-Agree and [5]-Strongly agree.

	Material Handling strategies	**SD**	**D**	**U**	**A**	**SA**
MS 1	KTDA have procedures on how goods are moved to the manufacturing area.					
MS 2	We ensure that the goods are well protected in warehouse as well as during their distribution					
MS 3	Our organization material handling system and processes have enabled us meets the need of our customers through improve customer service					
MS 4	The manufacturing, distribution, and delivery of					

	our company's products have all experienced decreased overall handling costs.					
MS 5	The requirements, strategic performance targets, and functional specifications of the organization's sustainability goal are outlined in our material handling plan.					
MS 6	Our material handling equipment is standardized and capable of carrying out a variety of duties in a variety of working environments, minimizing pointless movement that reduces production.					

In your opinion, which material handling strategies have been adopted by your organization:_____

_____

_____

_____

Section E: Reverse Logistic strategies on sustainable procurement performance

Below are statements on the effect of reverse logistic strategies on sustainable procurement performance. Kindly tick (√) the appropriate choice in the column provided on a scale of 1-5 where: [1]-strongly disagree, [2]-disagree, [3]-Undecided, [4]-Agree and [5]-Strongly agree.

	Reverse Logistic strategies	SD	D	U	A	SA
RS 1	Our company has policies and procedures that govern returning its goods, components, and raw materials from consumption sites.					
RS 2	Our organization have adopted reverse flow of products from consumer which prevent wastage and minimize environmental costs of business activities.					
RS 3	Our product are either repaired, remanufactured or recycled by reusing materials from used products or components.					
RS 4	Our company strictly manages return flows in accordance with organizational objectives and integrated business operations to achieve a competitive advantage and reduce environmental effect.					
RS 5	With the help of the reverse logistics idea, our company manages trash in an ethical and ecological way.					

In your opinion, which reverses logistic strategies have been adopted by your organization:_____

_____

_____

Section F: Quality management system

Below are statements on the moderating effect of quality management system on sustainable procurement performance. Kindly tick (√) the appropriate choice in the column provided on a scale of 1-5 where: [1]-strongly disagree, [2]-disagree, [3]-Undecided, [4]-Agree and [5]-Strongly agree.

	Quality Management System	**SD**	**D**	**U**	**A**	**SA**
QMS 1	By employing a quality management system, our firm has found long-term success.					
QMS 2	Our organization continuously realize improve performance because of quality management system in place					
QMS 3	Our quality management system has streamlined procurement processes					
QMS 4	Our product have value addition and are of low costs as well as adaptable to the needs of the customer because of the quality management in place					
QMS 5	Our organization's quality management system ensures that the management and acquisition of material resources have a significant and direct impact on the quality of the products.					
QMS 6	Our organization follows the total quality concept's guiding principles in its management and purchase of material resources.					

Section G: Sustainable Procurement Practices

Below are statements on sustainable procurement performance. Kindly tick (√) the appropriate choice in the column provided on a scale of 1-5 where: [1]-strongly disagree, [2]-disagree, [3]-Undecided, [4]-Agree and [5]-Strongly agree.

	Sustainable procurement	**SD**	**D**	**U**	**A**	**SA**
SP 1	Our company chooses suppliers based on their competence as well as their technical and eco-design capabilities, environmental performance, and their capacity to create eco-friendly products.					
SP 2	Our organization choose suppliers that commit to sustainability practices and regularly monitor their compliance with regulation.					
SP 3	Our suppliers abide by the organizational ethical standards, which involve employment and working conditions as well as compliance with national laws in their respective countries.					
SP 4	Environmental costs, product quality, product price, workplace health and safety systems, and environmental skills are some of the factors that our firm considers when choosing suppliers.					
SP 5	Strategies adopted by our organization in the management of product have enabled us achieve return on investment as indicated by the high number of satisfied customers					
SP 6	Our organization have tremendously reduced its operating cost which have led to increased payout to farmers					

Thank you for your cooperation

Appendix III: Map of Study Area



Appendix IV: Research Permit

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **535133**

Date of Issue: **17/September/2023**

RESEARCH LICENSE



This is to Certify that Ms.. JORCE ROTICH CHERUTO of University of Kabianga, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Bomet, Kericho on the topic: INBOUND LOGISTIC STRATEGIES, QUALITY MANAGEMENT SYSTEM AND SUSTAINABLE PROCUREMENT PERFORMANCE AMONG KENYA TEA DEVELOPMENT AGENCY FACTORIES IN KENYA for the period ending : 17/September/2024.

License No: **NACOSTI/P/23/29524**

535133

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

See overleaf for conditions

Appendix V: Authorization Letter from Board of Graduate Studies

UNIVERSITY OF KABIANGA
ISO 9001:2015 CERTIFIED
OFFICE OF THE DIRECTOR, BOARD OF GRADUATE STUDIES

REF: PHD/BSA/011/2020 DATE: 8TH AUGUST, 2023

Joyce Cheruto Rotich
MMHT Department,
University of Kabianga,
P.O Box 2030- 20200,
KERICHO.

Dear Ms. Cheruto
RE: CLEARANCE TO COMMENCE FIELD WORK/DATA COLLECTION

I am pleased to inform you that the Board of Graduate Studies has considered and approved your PhD research proposal entitled **"Inbound Logistic Strategies, Quality Management System and Sustainable Procurement Performance Among KTDA Factories in Kenya"** Subsequently the Board has also approved the following supervisors for appointments.

1. Dr. Pauline Keitany, PhD
2. Dr. Peninah Langat, PhD

You may now proceed to commence field work/data collection on condition that you obtain a research permit from NACOSTI and /or an ethical review permit from a relevant ethics review board.

You are also required to publish two (2) articles in a peer reviewed journal, with all your supervisors, before your oral defense of thesis and to submit through your supervisors, and HoD, progress reports every three months, to the Director, Board of Graduate Studies.

Please note that it is the policy of the University that you complete your studies within three years from the date of registration. Do not hesitate to consult this office in case of any difficulties encountered in the course of your studies.

I wish you all the best in your research and hope that your study will yield original contribution for the betterment of humanity.

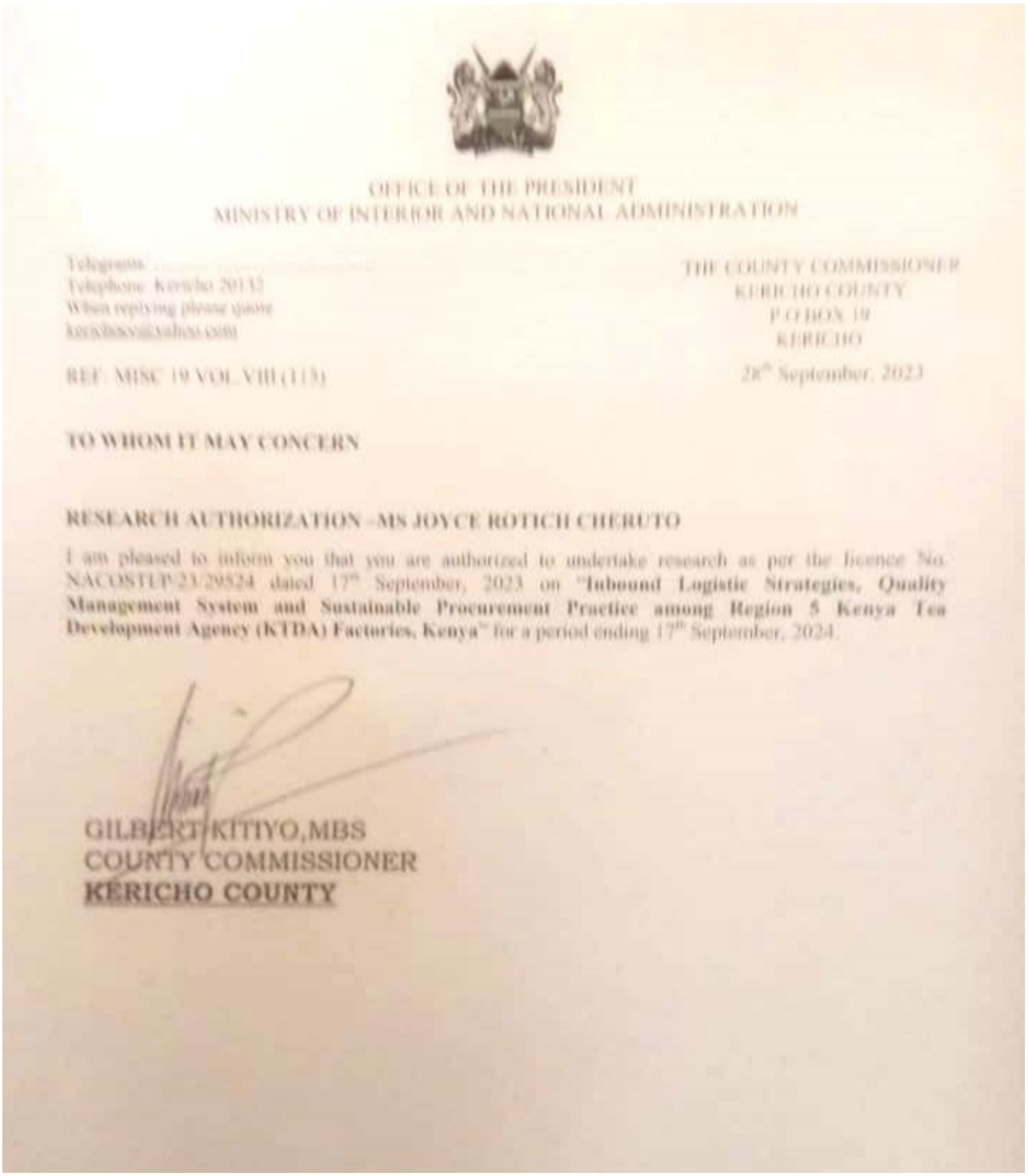
Yours Sincerely,

08 AUG 2023

Dr. Ronald K. Rop
DIRECTOR, BOARD OF GRADUATE STUDIES.
RKR/hk

cc 1. Dean, SBE
2. HOD, MMHT
3. Supervisors

Appendix V: Authorization Letter from County Government of Kericho



OFFICE OF THE PRESIDENT
MINISTRY OF INTERIOR AND NATIONAL ADMINISTRATION

Telegrams
Telephone: Kericho 20132
When replying please quote
kericho@yahoo.com

THE COUNTY COMMISSIONER
KERICHO COUNTY
P.O.BOX 19
KERICHO

REF: MISC 19 VOL VIII (113)

28th September, 2023

TO WHOM IT MAY CONCERN

RESEARCH AUTHORIZATION –MS JOYCE ROTICH CHERUTO

I am pleased to inform you that you are authorized to undertake research as per the licence No. NACOSTI/P/23/29524 dated 17th September, 2023 on "**Inbound Logistic Strategies, Quality Management System and Sustainable Procurement Practice among Region 5 Kenya Tea Development Agency (KTDA) Factories, Kenya**" for a period ending 17th September, 2024.

GILBERT KITIYO,MBS
COUNTY COMMISSIONER
KERICHO COUNTY

Appendix VI: First Publication

Appendix VII: Second Publication