

**SUSTAINABLE SUPPLY CHAIN MANAGEMENT
PRACTICES AND PERFORMANCE OF
HORTICULTURAL FIRMS IN KENYA**

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**DOCTOR OF PHILOSOPHY
(Supply Chain Management)**

**JOMO KENYATTA UNIVERSITY
OF
AGRICULTURE AND TECHNOLOGY**

2023

**Sustainable Supply Chain Management Practices and Performance of
Horticultural Firms in Kenya**

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**A Thesis Submitted in Partial Fulfilment of the Requirements for
the Degree of Doctor of Philosophy in Business Administration
(Supply Chain Management) in the Jomo Kenyatta University of
Agriculture and Technology**

2023

DECLARATION

This thesis is my original work and has not been presented for a degree in any other university .

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DEDICATION

I dedicate this work to my family for their continued support.

ACKNOWLEDGEMENT

I first take this grand opportunity to thank the almighty God for His help throughout the entire course. Secondly, I would like to thank my supervisors; Prof. Patrick Karanja Ngugi and Dr. David Kiarie Mburu for their guidance and advice. I also take this chance to thank my lecturers from Jomo Kenyatta University of Agriculture and Technology for their advice. I will not forget my family for their moral support throughout the study. Thank you all and may the Almighty God bless you.

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ABBREVIATIONS AND ACRONYMS

AFA	Agriculture and Food Authority
ASALs	Arid and Semi-Arid Lands
ASCU	Agricultural Sector Coordination Unit
EPA	Economic Partnership Agreement
FPEAK	Fresh Produce Exporters Association of Kenya
FAO	Food and Agriculture Organization
GSCM	Green Supply Chain Management
HCDA	Horticultural Crops Development Authority
ICARDA	International Centre for Agricultural Research in the Dry Areas
KHC	Kenya Horticulture Council
KS 1758:	Kenya Standard 1758: 2016
MOA	Ministry of Agriculture
SC	Supply Chain
SCM	Supply Chain Management
SSCM	Sustainable Supply Chain Management
TCE	Transaction Cost Economics
TRA	Theory of Reasoned Action

UNGCBSR United Nations Global Compact and Business for Social Responsibility

OPERATIONAL DEFINITION OF KEY TERMS

Firm Performance	It is the ability of a firm to successfully attain its short-term and long-term goals by increasing the sales revenue, profits and creating more wealth for the shareholders (Schermerhorn et al., 2014).
Green Distribution	This is the process of integrating environmental and social concerns into the inter-organisational practices of supply chain management. It entails adopting practices that are not just economically viable but also contribute to environmental and social welfare for future generations during movement of goods from production to the end users (Mwaura et al., 2016)
Green Packaging	It is the containment of the goods in a more environmentally friendly state and manner thus ensuring sustainability (Abdullah & Yaakub, 2014).
Green Purchasing	This is the process of procurement of goods and/or services that are less harmful to the environment and human health as compared to those serving the same purpose (Rasli, Qureshi, Isah-Chikaji, Zaman, & Ahmad, 2017).
Horticultural Industry	This is part of the large agricultural sector dealing with production/growing, processing, export and sale of fruits, flowers, vegetables and related products (Pertinez, 2017).
Reverse Logistics	It is the process of returning back the commodities from the consumer to the producer for the purpose of ensuring

proper disposal or enhancing quality through re-processing (Khor, Udin, Ramayah, & Hazen, 2016).

Sustainable Supply Chain This is the process of ensuring that the process used in supply chain are environmentally friendly and aimed at sustaining the human health and other living things as well as enhancing firm profitability through cost-saving and promoting the corporate social responsibility (Golicic & Smith, 2013).

Value Addition This is the process of enhancing the state of a product to increase its price and compatibility with the customers/users (Gopal & Thakkar, 2015).

ABSTRACT

The aim of this study was to assess the relationship between sustainable supply chain management practices and performance of horticultural firms in Kenya. As one of the country's economic backbone, the horticultural industry has been facing a decline in performance, orchestrated by among other factors, increased dynamisms and policy changes, unprecedented occurrence such as the Covid-19 pandemic and draught and increasing competition. The embrace of sustainable supply chain management practices in the sector has been meagrely documented, despite the emphasis for sustainable supply chain by global economies. This motivated this study. Specifically, the study sought to examine the relationship between green purchasing and performance of the horticultural industry; establish the relationship between reverse logistics and performance in the horticultural industry; the relationship between green packaging and performance of the horticultural industry; assess the relationship between green distribution and performance of the horticultural industry and analyse the moderating effect of value addition on the relationship between sustainable supply chain and performance of the horticultural industry. The study was informed by transaction cost economies theory, institutional theory, theory of reasoned action, diffusion innovation theory and stakeholder theory. The study adopted a descriptive research design while the target population was 289 horticultural firms in Kenya. A sampling formula was used to obtain the preferred sample size of 259 respondents. Questionnaire was used to collect the study data while the data was analysed through mixed analysis where both qualitative and quantitative techniques was used. Inferential analysis was used to establish the relationship between variables. The data was presented in form of tables and figures. The study found a positive relationship between green purchasing and performance in the horticultural firms in Kenya. Also, further reverse logistics had a positive influence on performance of the Horticultural firms in Kenya. The findings also showed that green packaging has positive influence on performance in the horticultural firms in Kenya. Green distribution had a positive influence on performance in the horticultural firms in Kenya. The study recommends that the management of the horticultural companies should improve on their green purchasing practices. This can be done by applying flexible sustainable supply chain management practices through research so as to understand the changing environmental needs and remain relevant in the market. The study also recommends that the companies should ensure that their reverse logistics are properly structured. This would ensure that customer needs are met, ensuring customer loyalty and making it difficult for competitors to imitate simple services that are geared towards value creation and the environment. The study recommends that the companies should involve all shareholders in green packing activities. This would ensure that they understand green packaging and challenges that come with the process so that they can fully embrace green packaging benefits. The study recommends that the horticultural firms should include green distribution as one of their strategies. This is because green packaging in essential if the company should be committed to in order to remain innovative, effective, competitive and efficient in today's ever changing dynamic marketing environment.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

In the wake of 21st century, businesses are faced with a wide range of dynamics most of which have threatened their continued performance and sustainability (OECD, 2019). From changes in technology, increased competition, globalization, to increased awareness and cultural diversity, modern businesses ought to be more diverse and properly managed for them to steer performance and competitiveness (Koberg & Longoni, 2019). One of the major processes in a modern firm that requires proper attention for enhanced performance and effectiveness is the supply chain. Sustainable supply chain has been emphasized across the globe as one of the major aspects of saving the World from the continued global warming and environmental unfriendly activities (United Nations Environmental Program – UNEP, 2018).

The horticultural industry on the other hand has been regarded as one of the major contributors to economic growth in most countries, as it translates to over \$300 billion of transactions every year (OECD, 2022). The performance of this sector particularly in the developing countries continues to draw intense attention as most of the industries players continue to face stiff competition from advanced economies that have a high production capacity (Harisha, Tulsiram, & Joshi, 2019). Going green in this industry has been a subject of concern as countries especially in the export markets continue to pose stringent measures to ensure health and safety of horticultural products (Naik & Suresh, 2018). With these rigid requirements on the horticultural industry, it remains integral to establish the extent to which the sector has embraced sustainable supply chain management practices and how this has influenced the sector's performance.

1.1.1 Sustainable Supply Chain Management Practices

Sustainable supply chain management practices have been a subject of debate in the global stage for the past two decades (Koberg & Longoni, 2019). As supply chain remains to shift the competitiveness of industries across the world, the need for this integral process being sustainable has been emphasized especially by the global multinationals and policy makers (Ghadimi, Wang, & Lim, 2019; Manavalan & Jayakrishna, 2019). According to Lis, Sudolska, and Tomanek (2020), sustainable supply chain management practices comprise of the steps taken in the supply chain process to ensure that the activities carried out in the handling and delivery of merchandise from one location to another is done sustainably. By sustainable, Kouhizadeh, Saberi, and Sarkis (2021) imply that the processes ought to safeguard the environment through utilizing natural resources sparingly, reducing any harm to the environment and creating awareness on the need for concerning the environment.

In USA, Davis-Sramek, Hopkins, Richey, and Morgan (2022) addressed sustainable supply chain management practices in terms of the strategies put in place by organizations to streamline their supply chain activities to be in line with the set environmental policies. To Davis-Sramek *et al.* (2022), sustainable supply chain management practices included green procurement, reverse logistics and green transportation processes. A firm that is sustainably carry out its supply chain practices engages suppliers who can supply them with environmental friendly products and materials (green purchasing/procurement) and ensures that its delivery processes are considerate of the environmental friendly measures (green distribution).

Africa, although considered as less developed regional therefore with minimal contribution to the global warming and environment pollution, has been the most affected by the impacts of environmental unfriendly practices (Saeed & Kersten, 2019; Saberi, Kouhizadeh, Sarkis & Shen, 2019). However, as African countries continue to adhere to Sustainable Development Goals (SDGs) including reduction of emissions and destruction of natural resources, the focus on sustainable supply chain management

practices has not been given adequate attention both in theory and in practice (Saber et al., 2019). While analysing the embrace of sustainable supply chain management practices in Nigeria, Eshiett, Eshiett, and Uwhubetine (2022) revealed that less than a quarter of the sectors were keen enough to integrate sustainable supply chain management practices. Moreover, Eshiett *et al.* (2022) noted that sustainable supply chain management practices in Nigeria were mainly considered as the activities aimed at streamlining the supply chain process to conform to the global dynamics and not fully considerate of the local environment the companies were operating in. On the other hand, Ikegwuru and Pokubo (2018) alluded that sustainable supply chain management practices such as green distribution and sustainable purchasing have been underemphasized in Sub-Saharan Africa, despite the region recording a surge in growth of industries.

In Kenya, sustainability has drawn a national debate, where policy makers, practitioners and academicians are focusing on how best the country can enhance environmental conservation while strengthening its industrialization (UNEP, 2019). However, despite the emphasis on sustainability, little attention has been drawn to the sustainable supply chain, whereas this is an expanse process in local organizations. According to Omweri and Ndolo (2021), Kenyan companies have been increasingly focusing on how to expand to global markets, but overlooked the essence of sustainable supply chain management practices, which is an essential driver to companies' entry to most of the advanced markets. Omai, Ngugi, and Kiarie (2018) illustrate that embrace of sustainable supply chain management practices by Kenyan companies would be a game-changer as the companies would have a command on global market, and strengthen the country's position in environmental conservation.

1.1.2 Firm Performance

Performance is the extent to which an organization can create a better position than its competitors (Porter, 1985; Schwab, 2014). To maximize the performance all members of the supply chain must continually work together to serve the end consumer (Ogreaan &

Herciu, 2010). Porter (1985) suggests that the way a company associates with other companies in its value chain can affect performance, especially when external assets are created distinct from other value chains. Aiginger (2016) contend that strategic options for sustainability may be the decisive factor that would allow companies to create the unique performance over product images and sales, market share and new market.

Firm performance has also been given its portion of attention among researchers and scholars although not as much as other aspects of organizational development such as performance, growth and sustainability (Mweria, 2015). However, the few studies carried out locally have proved performance to be a major aspect to determine the effectiveness, efficiency and future success of an organization. Onyango (2017) elucidated that performance explained how well a company was ready to block new entrants strategically and stand a chance to command a given market thus ensuring sustainability. Maruhe (2014) on the other hand contended that performance was the reason why most multinationals thrived in Kenya and that the companies steered their success through ensuring that all the aspects of performance such as cost leadership, differentiation, differentiation and other related strategies were upheld. While assessing the impact of supply chain on firm performance, Abdirahim (2013) established that market share, market penetration, flow of products and customer flow best explained the performance of a firm.

1.1.3 Horticultural Firms in Kenya

The horticulture industry in Kenya plays an important role in food security, employment creation, and poverty alleviation (Agricultural Sector Coordination Unit [ASCU], 2011). The sector contributes enormously to food security and household incomes to a majority of Kenyan producers who carry out one form of horticultural production or another and employs over six million Kenyans both directly and indirectly thus improving on their livelihoods (Ministry of agriculture, 2010a). However, the potential for horticultural production in the Arid and Semi-Arid Lands (ASALs) of Kenya has not been fully utilized to be of help to the communities living in those regions (Ministry of Agriculture,

2010b). This is because farming in Kenya is mainly rain fed and the arid and semi-arid regions lack sufficient rainfall to support sustainable rain fed farming (Ministry of Agriculture, 2010b).

Generally, the arid and semi-arid regions of the world are vulnerable to frequent and often severe droughts due to unreliable and erratic rainfall that these regions receive leading to massive crop failures and therefore lack of food security (HCDA, 2010). According to the Kenya Horticultural Council (2017), horticulture is ranked third after tourism and tea in foreign exchange earnings. It is noted that the horticultural sub-sector in the country has in the recent past recorded tremendous export-driven growth (FPEAK, 2015). According to Mwangi, Otunga and Kyalo (2015), horticultural industry is positively significant to wealth generation, poverty alleviation and promotion of gender equity particularly in the rural areas.

In the recent past, there has been a growing emphasis for the horticultural sub-sector to uphold value addition as a way of promoting the competitive advantage of the industry. As one of the largest horticulture exporter in Sub-Saharan African with a 16% EU market share, Kenya has been eyeing to further its presence in the global market as far as horticultural products are concerned. However, the highly relies on the ability of key industry players in the country to integrate the required changes such as responsible use of herbicides and value addition to safeguard the quality of the produce (Krishnan, 2018). According to Mutyambai *et al.* (2020), horticultural sector in Kenya has a great potential, but it depends on how well the stakeholders are committed to the turnaround of the sector. Statistics show that while the sector is still vibrant, its status is not as it was a while (5 years) ago.

1.2 Statement of the Problem

The Government of Kenya's Medium-Term Plan Three (2018-2022) underscores the pivotal role of the horticultural subsector comprising of cut flowers, vegetables, nuts and herbs to Kenya's export drive, economic growth and development at large (GOK,2018).

According to Wainainah (2015), Kenya ranks as the largest horticulture exporter in Sub-Saharan African with a 16% EU market share. The subsector contributes enormously to food security and household income (Research Solutions Africa, 2015).

Kenya's Vision 2030 lists limited value addition coupled with high production costs among other factors as making Kenyan agricultural exports less competitive in the global market (GOK, 2017). The performance of the horticultural subsector which is the fastest growing in the Kenyan agricultural sector (Kenya Horticulture Council- KHC, 2017) is affected by factors such as stringent production standards and trade regimes, climate change and variable weather, sluggish recovery in Europe, internal structural and institutional issues such as inefficiencies in supply chain (AFA, 2017). The introduction of tax by the EU in 2014 resulted in decline in quantity and earnings for vegetable exports compared to the 2013. Similarly, the performance of the sector was affected by government delay in signing the Economic Partnership Agreement (EPA) owing to disagreements between the government and EU over trade terms (Sparks, 2016). From the year 2008, Kenya's global market share fell from 1.28% in 2008 to 1.03% in 2017 according to a global competitiveness study commissioned by USAID. Moreover, the growth in agriculture value added declined from 5.5% in 2015 to 4.0% in 2016 and further declined to 1.6% in 2017 with underdeveloped value chains cited as a major challenge in the horticultural subsector (GOK, 2018).

Developed economies have seen their produce perform better in the market through proactive measures such as value addition whereby the produce is reproduced into more usable products thus making more returns and being more competitive in the market (Kaplinsky, 2010). Studies have revealed that through aspects of performance such as cost leadership and differentiation, products such as agricultural produce and minerals in countries such as China and Israel have been able to capture and penetrate the global market (Yeng, 2012; & Merillies, 2014). On the other hand, sustainable supply chain has been considered a key aspect in promoting performance through a well embraced way of differentiating organizational products from those of the competitors (ILO, 2013; VIETRADE, 2014). However, very little has been done to link sustainable supply chain

and performance in the horticultural industry which has been facing shrinking competitiveness in the global market over the recent past. This study seeks to fill the existing gaps by unveiling the relationship between sustainable supply chain management practices and performance of the horticultural firms in Kenya.

1.3 Objectives of the Study

1.3.1 General Objective

The main objective of this study was to establish the relationship between sustainable supply chain management practices and performance of the horticultural firms in Kenya.

1.3.2 Specific Objectives

The following were the specific objectives for the study.

1. To examine the relationship between green purchasing and performance of Horticultural firms in Kenya
2. To establish how reverse logistics relate with performance of the Horticultural firms in Kenya
3. To determine the extent to which green packaging relate with performance of the Horticultural firms in Kenya
4. To examine the relationship between green distribution and performance of the Horticultural firms in Kenya
5. To analyse the moderating effect of value addition on the relationship between sustainable supply chain management practices and performance of the Horticultural firms in Kenya

1.4 Research Hypotheses

The study sought to test the following null hypotheses.

1. **H₀:** There is no significant relationship between green purchasing and performance of the Horticultural firms in Kenya
2. **H₀:** Reverse Logistics have no significant relationship with performance of the Horticultural firms in Kenya
3. **H₀:** Green Packaging has no significant relationship with performance of the Horticultural firms in Kenya
4. **H₀:** There is no significant relationship between green distribution and performance of the Horticultural firms in Kenya
5. **H₀:** Value addition has no significant moderating effect on the relationship between sustainable supply chain management practices and performance of the Horticultural firms in Kenya

1.5 Significance of the Study

The aim of the study was to unveil the influence of sustainable supply chain management practices on the performance of Horticultural firms in Kenya. The study extensively bridges the gaps on the role played by sustainable supply chain management practices on the continued performance of the horticultural industry. The finding from the study will be significant to a number of parties as herein postulated including the management of the horticultural industry, the farmers, the policy makers as well as future scholars and academicians.

1.5.1 Horticultural Farmers

The farmers in the horticultural industry will benefit from the study findings in that they will identify the best ways to enhance value addition in their produce through which

they increase their returns. The study will point out the aspects of sustainable supply chain that can be adopted to enhance the value addition thus the farmers can adopt these strategies to enhance the quality of their produce.

1.5.2 Exporters of Horticultural Produce

Most of the horticultural produce in Kenya is exported to international markets such as UK and Canada. Through the research findings, the exporters and middle men who sell the produce to those markets will benefit from the findings in that they will identify the measures they may take into consideration so as to enhance the value of the produce thus making them more competitive in the market. The management of the firms involved in exportation will reap from the study findings through which they will find the best sustainable supply chain aspects to focus on so as to influence the performance and performance of the produce.

1.5.3 Government and Policy Makers

The findings will be significant to the government and policy makers in the agricultural, trade and exportation sectors. This is because they will identify the need for sustainable supply chain and how to make it effective in the horticultural industry. Recently, the government through the ministry of environment introduced a policy to ban the plastic bags and related substances. The findings will therefore enable them (policy makers) to find better criteria to have this policy adhered to especially in the horticultural firms.

1.5.4 Other Farmers

The study findings will inform the Kenyan farmers on the essence of value addition, and how they can strengthen their production and output of their firm inputs through value addition. The farmers could also gain knowledge on the best approach to ensure sustainability and environment friendly of their farming processes by emphasizing on

sustainable supply chain management practices such as green packaging and reverse logistics from their suppliers.

1.5.5 Academicians and Scholars

Horticultural firms and the overall agricultural sector has gained a lot of attention in the recent past as far as research is concerned. This means that this study is a great milestone towards contributing to the existing literature on the horticultural firms and more specifically with regard to sustainable supply chain. Future researchers and academicians will therefore borrow from the findings through which they can support their arguments or draw research gaps to fill in their endeavours.

1.6 Scope of the Study

The study aimed at establishing the influence of sustainable supply chain on performance of the horticultural firms in Kenya. The study therefore focused on horticultural firms in Kenya which is part of agricultural sector. The study addressed the sustainable supply chain management practices in terms of green purchasing, green distribution, reverse logistics and green packaging. This has been influenced by previous literature that have portrayed green distribution, green purchasing, green packaging and reverse logistics as the main components that define sustainable supply chain management practices as applied in the leading companies across the globe (Vermeulen, 2015; Walker & Jones, 2012; Meybeck, Burlingame, Dernini, Gitz, Raymond & Ryder, 2012). The study focused on horticultural companies in Kenya. These are organizations that are involved in farming and exportation of horticultural products in Kenya. There are 289 horticultural firms in Kenya where most of them have their offices or representatives in Nairobi. This justifies the geographical scope of the study which is Nairobi County, Kenya.

1.7 Limitations of the Study

The study was carried in the horticultural firms in Kenya ,and targeted firms dealing with horticultural products . Only the firms that are registered under the horticultural firms and specialize in the horticultural products were sampled. The companies that were partially dealing with the horticultural products but not registered as horticultural companies were not covered in the study. The generalizability of the study findings to other sectors may therefore be limited.

The study was constrained by a number of unresponsive respondents especially since it targeted the senior management personnel who felt that they should protect their business secrets especially on financial and competitiveness matters. This was mitigated by giving the respondents the assurance that the information was to be strictly confidential and only for the purposes of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The chapter reviews the available literature in regard to sustainable supply chain management practices and firm performance. Specifically, the chapter covers the theories that were used in the study, the conceptual framework and the review of empirical literature based on the objectives of the study. From the studies, critique of the literature and the research gaps has been identified. The chapter also covers the summary of the reviewed literature.

2.2 Theoretical Review

Theory has been defined as a natural or broad explanation of a phenomenon that has been observed and modified over time. The main objective of this section was to conceptualize how sustainable supply chain management practices affects the performance in the horticultural firms in Kenya through theories that support the variables in the study.

2.2.1 Transaction Cost Economics Theory

The Transaction Cost Economics (TCE) theory was first introduced by Williamson (1971). The theory focuses on minimizing the total transaction costs of producing and distributing a particular good or service. It specifies the conditions under which a firm should manage an economic exchange internally within its boundary or externally through inter organizational arrangement (Handley, de Jong, & Benton, 2019). This theory centres on the association of exchanges that happen at whatever point a decent or administration is exchanged from a supplier to a client over a mechanically distinct interface. At the point when exchanges happen inside an association, the exchange expenses can incorporate overseeing, observing faculty, getting data sources and capital

hardware. The exchange expenses of purchasing a similar decent or administration from an outer supplier can incorporate the expenses of source choice, contract the executives, execution estimation, and question goals.

TCE argues that a firm's make-or-buy decision is determined not only by the price of the purchased item but also its transaction costs (Williamson, 2010). These transaction costs can occur ex-ante or ex-post the transaction (Williamson, 2008). Ex-ante costs are typically related to information-seeking processes and the negotiation of contractual terms, whereas ex-post costs primarily stem from monitoring tasks and other processes that target the enforcement of contractual agreements (Akbar & Tracogna, 2018). Accordingly, the adequate governance mode for a transaction (i.e., market, hybrid and hierarchy) is the one which results in the lowest total costs (Williamson, 2009).

TCE rests on key assumptions of human behavior (i.e., bounded rationality and opportunism) and two main dimensions of transactions (i.e., asset specificity and uncertainty) (Sander, 2016; Williamson, 1985). Bounded rationality refers to the undoubted fact that decision makers' cognitive capabilities and rationality are constrained (Schmidt & Wagner, 2019). Opportunism refers to exchanging actors that have a tendency toward self-seeking interest with guile (Martynov & Schepker, 2017). Consequently, "attenuating the ex post hazards of opportunism through the ex-ante choice of governance is central to the transaction cost economics exercise" (Williamso, 2010). Opportunism is particularly problematic when the buyer has no transparency over its upstream supply network. The buyer then faces a safeguarding problem and becomes exploitable. Configurations of opportunism together with bounded rationality and the following key dimensions of transactions result in different governance modes, which aim at attenuating such negative effects (Handley et al., 2019). For instance, in situations in which asset specificity is based on idiosyncratic investments, opportunism becomes an important threat. Thus, low degrees of asset specificity should be governed through the market, high degrees through hierarchies and medium degrees by hybrid governance modes (Williams, 1998).

Similar to asset specificity, the configurations and interactions of environmental uncertainty (i.e., uncertain environments “in which the circumstances surrounding an exchange cannot be specified ex ante” (Akbar & Tracogna, 2018)) and behavioral uncertainty (i.e., uncertain environments in which “performance cannot be easily verified ex post” (Khanin & Turel, 2016)) require different LTSM governance modes. Initially, TCE has been widely used to explain sourcing phenomena and has also been applied to SSCM research more recently (Schmidt & Wagner, 2019). For instance, Sestu and Majocchi (2020) find that asset specificity moderates between a supplier’s sustainability commitment and customer pressure for sustainability. Other studies found that suppliers are more likely to engage in sustainable business practices when information-seeking costs are low (Zipkin, 2012). However, research continues to call for more TCE application in future studies (Sarkis et al., 2011).

TCE theory focuses on identifying whether it is cost-effective to carry-out an activity using the market exchanges (Khanin & Turel, 2016). Using the market has transaction costs -for instance contract design, monitoring and control- that need to be added to the accounting costs of using a contractor. Markets, hierarchies (using firm resources) or hybrids (e.g. long-term relations with exclusive suppliers) are alternative forms of governance of the firm (Williamson, 2005). For instance, when companies outsource processes that have detrimental effects on the environment, they need to account for increased monitoring and control costs to mitigate responsibilities and damaged reputation. The problem with the use of TCE to analyze GSCM practices is that TCE focus on the costs of one-to-one transactions while SC introduces a broader perspective in which transactions are grouped and managed as chains between organizations rather than as individual transactions (Hennart, 2015).

Along these lines are the association of exchanges, or administration structure, influences exchange costs. Transaction Cost Economics (TCE) offers a methodology through which to analyse how the governance of economic organization affects economic value (Deng & Zhang, 2020). The concept of transaction costs is of essence to the study of firm and market organization upon viewing firm and market as alternative

methods of coordinating production. With no transaction costs parties will cost fewer bargains to an efficient result whichever way property rights are assigned at the outset. Taken at face value, externalities and frictions of other kinds would vanish. In the context of this study, this theory can be interfaced with green purchasing and green distribution since through embracing green products and green distribution practices, firms tend to contain production costs hence improving the firm's performance.

2.2.2 Institutional Theory

Institutional theory was put forward by Meyer and Rowan (1977) in a bid to expound how institutions operate and what influences their decisions. The theory analyses the impact of outside weights on the firm (Lammers & Guth, 2013) and how undertakings receive arrangements and actualize procedures that are authentic inside their authoritative fields (DiMaggio, 1988). Further associations think about industry standards, firm custom, and the board trends, among different worries, to figure their systems (Roche & Teague, 2012). Institutional hypothesis offers a valuable research structure for the investigation of GSCM in regard to how outside elements constrain firms to actualize certain GSCM rehearses (Greenwood et al., 2008).

Willmott (2015) expressed that organizations have regulated ecological practices due to weight from outside and inward powers just as an attention to the results of resistance with natural goals. On the off chance that organizations have a genuine worry for the earth and there is social endorsement, at that point natural practices will be sent all the more quickly all through the inventory network (Willmott, 2015). Thus, firms are required to execute green systems on account of expanded outer weight for supportability (Lee et al., 2013) as mandatory ecological guidelines that are straightforwardly identified with GSCM further firms should look to their outside weights and plan countermeasures with assorted GSC since such practices can emphatically influence natural and financial execution, and SC readiness and flexibility.

Institutional Theory can be used to explain how changes in social values, technological advancements, and regulations affect decisions regarding 'green' sustainable activities and environmental management (Willmott, 2015). For example, Delmas and Toffel (2008) draw on Institutional Theory to examine how different organizational strategies lead to the adoption of environmental management practices. Key drivers in instigating green changes in rules include a core company within a supply chain (Cornelissen, Durand, Fiss, Lammers, & Vaara, 2015) and government regulation (Suddaby, 2015). Institutional Theory describes three forms of drivers that create isomorphism in organizational strategies, structures and processes. These drivers are coercive, normative, and mimetic. Coercive occurs from influences exerted by those in powerful positions, in this case within the horticultural supply chain. Coercive pressures are crucial to drive environmental management and hence sustainability (Suddaby, 2015).

Normative drivers ensure organizations conform in order to be perceived as partaking in legitimate actions (Suddaby, 2015). Suddaby found that normative pressures drive enterprises to be more environmentally aware, and argue that institutional research is needed to understand new social rules (e.g., ethical values and ecological thinking) and organizational responses to environmental issues. Normative drivers therefore exert influence because of a social obligation to comply, rooted in social necessity or what an organization or individual should be doing (Zhao, Fisher, Lounsbury, & Miller, 2017). Mimetic isomorphic drivers occur when enterprises imitate the actions of successful competitors in the industry, in an attempt to replicate the path to success and hence legitimacy (Chandler & Hwang, 2015); for example, dedicated sustainable milk supply for supermarkets. Institutions create expectations that determine legitimate actions for organizations (Meyer & Rowan), and also form the logic by which laws, rules, and taken-for-granted behavioral expectations appear natural and abiding (Zucker, 1977). According to Thornton (2004), institutional logics, once they become dominant, affect the decision of organizations by focusing the attention of executives toward the set of issues and solutions that are consistent with the dominant logic and away from those issues and solutions that are not.

Therefore, institutions can define what is appropriate or legitimate (i.e., what is acceptable behavior, Tlaiss, 2014), and thus render other actions unacceptable or even beyond consideration (Wang, Freeman, & Zhu, 2013). This will then affect how organizations make decisions. It is this that can provide insights into the role of different actors in the development of sustainable supply chains and their role in the achieving conformity. The institutional perspective allows for the focus on the role of conformity, regulatory and social pressures in driving organizational actions (Seo & Creed, 2002).

Inside the setting of GSCM, on-screen characters in the production network work in a manner that satisfies client and legitimate prerequisites, further weights from government organizations and national/worldwide controllers will impact the reception of naturally mindful conduct (Thornton & Ocasio, 1999; Scott, 2014). Reay and Hinings (2009) expressed that organizations have regulated natural practices in light of weight from outside and inner powers just as a consciousness of the outcomes of resistance with ecological objectives. This theory can interface Sustainable supply chain management practices like green packaging, green purchasing and green distribution which are the subject of this study since they entail environmentally, socially and ecologically responsible behaviour greatly influenced by the pressure to conform to existing standards.

2.2.3 Theory of Reasoned Action (TRA)

The TRA model, developed by Ajzen and Fishbein (1980), is a conviction frame of mind social goal model, which proposes that a person's impression of what others consider significant is influenced by their goal and that disposition assumes a noteworthy job in foreseeing conduct (Hussain, Rahman, Zaheer & Saleem, 2016). In this investigation, green obtaining is identified with a company's expectation to purchase an item that is less harmful to the earth and the general public on the loose.

TRA posits that it is one's behavioural intention that is the strongest predicting variable for a specific behaviour (Xiao, 2020). Behavioural intention does, in turn, consist of the

two conceptually independent determinants of intention: Attitude toward the behaviour and Subjective Norm. When these are evaluated as positive, the individual in question has a more positive intention to purchase and is thus more likely to perform the specific behaviour. In other words, the individual is more likely to perform a behaviour that is evaluated favourably by him/herself and among others. Attitude toward the behaviour and Subjective Norm have been proved to impact Behavioral Intention directly by the developers to TRA (Liu, Segev, & Villar, 2017). Although they have also tested other variables, none of these have proved to have a direct effect on behavioural intention, but instead only indirectly mediated by Attitude toward the behaviour and Subjective Norm.

The TRA research has consistently focused on the individual perspective when exploring adoption of usage and purchase behaviour (Ajzen, 1988; Hellberg, 2006). Yet, if one takes a broader view, the consumers' usage or purchase of a product or service is often set within a system where they can interact with one another and with other market actors. A prominent argument is that TRA also has ignored broader social structures operating in the society (Yzer, 2017). Social structures are argued to be important for consumers in their purchasing behaviour. It is therefore keen to recognize and add the perspective of the dynamic interplay between individuals as well as the social process with market actors as this is necessary to create a holistic picture for the TRA framework. The actual behaviour is therefore argued to be more than just an individual process, and the framework has therefore been criticized as being too consumer oriented (Yzer, 2017).

Bhattacharjee and Premkumar (2004) confirmed that customer's goal to purchase green items is incredibly impacted by uplifting disposition and the apparent green estimation of the items. An examination by Otieno *et al.* (2016) additionally discovered that purchaser's disposition impacts his or her green item buy goal. The theory has attracted criticism from a few authors, the most significant analysis being that the theory isn't falsifiable since a theory must be falsifiable to be a decent hypothesis, henceforth if the hypothesis of contemplated activity isn't falsifiable, then it is not a good theory regardless of how many researchers believe it to be useful. However, McGuire (2006)

and Ajzen and Fishbein, M. (2005) dispute this by indicating the TRA theory points to the real issues that enable an organization to implement certain decisions for better performance. The theory is useful in the study of reverse logistics as it explains a firm's deliberate decision to engage in activities that promote the environmental and social wellbeing of the society. The theory was used in this study to bring a more compounded understanding of how reverse logistics can be implemented as a deliberate action by the management to enhance its effectiveness and competitiveness. The theory therefore answers to the hypothesis that reverse logistics has a significant influence on the performance of horticultural firms in Kenya.

2.2.4 Diffusion of Innovation Theory

The Diffusion of Innovation Theory was developed by Rogers (1962). It seeks to explain how over time, an idea or product gains momentum and diffuses through a population or social system. The end result is that people, as part of a social system adopt a new idea, behaviour or product (Miller, 2015). Regarding the former, relative advantage, compatibility, divisibility, communicability, and simplicity of innovations facilitate their diffusion in society. Conversely, the latter indicates that certain characteristics of individuals (e.g., better education) lead them to adopt innovations earlier than others (Yuen, Cai, Qi, & Wang, 2021). This theory is appropriate for the implementation of GSCM practices by the food and beverage processing firms since this theory treats environmental management as an innovation for the firm.

Diffusion is the procedure by which an innovation is conveyed through specific channels after some time among the individuals from a social framework. It is an extraordinary kind of correspondence, in that the messages are worried about new thoughts (Rogers, 2003). Previously scholars have investigated the roles of attributes of environmental management in conjunction with environmental strategy adoption, specific managerial attitudes on the likelihood of adopting environmental strategies and suppliers in facilitating the use of green practices by service firms (Santacreu, 2015).

The innovation-decision procedure is the procedure through which the company's basic leadership unit goes from first information of an advancement to framing a demeanor toward the development, to a choice to embrace or reject, to usage of the new thought, and to affirmation of this decision (Sartipi, 2020). This can be conceptualized into five main steps: knowledge, persuasion, decision, implementation, and confirmation. In the context of this study adoption of SSCM practices like green distribution and reverse logistics are some of the innovative ways adopted by firms to add value as well as enhance performance in the current competitive world and are thus supported by this theory.

2.2.5 Stakeholder Theory

Stakeholder theory originated by Freeman (1984) is defined as any group of or individual who can affect or is affected by the achievement of the organization's objectives. Unlike agency theory in which the troughs are working and serving for the partners, partner scholars recommend that administrators in associations have a system of connections to serve that incorporate the providers, representatives and colleagues. This theory is utilized to clarify relationship between the board on contract and the executives (Fombrun, 2001; Freeman, 2016).

According to Howitt and McManus (2012), every stakeholder is given a significant state in settling on significant choices. Business and administrators who oversee them ought to make an incentive for clients, providers, networks and agents (Pajunen, 2006). The partner hypothesis contends about the significance of a firm giving exceptional consideration to the different partner bunches that are esteemed to have a stake in the tasks of an association. The portrayal of all partner bunches on board is in this way important for effective supply chain performance.

The stakeholder theory allows managers to understand and take care of stakeholders in an orderly manner (Porter & Kramer, 2011). It puts more emphasis on the importance of good relationship between managers and stakeholders for business survival. Managers

need to understand the success of projects is greatly influenced by the various stakeholders in an organisation (Harrison & Wicks, 2013). Organizations depend on stakeholders for their success. Every project manager should consider the stakeholders and identify them, their importance, role, determine the knowledge level they bring to the project and involving them in decision making (Hitt, Black & Porter, 2012). According to Harrison and Wicks (2013), performance should be measured as the total value created by the firm through its activities, which is the sum of the utilities created for each of a firm's legitimate stakeholders.

Freeman and McVea (2001) argue that firm's activities produce externalities impacting on stakeholders (any group or individual who can affect or is affected by the achievement of the organization's objectives). Stakeholders put pressure on companies to reduce perceived negative impacts and increase positive ones. Because corporate resources are limited, firms should prioritize the more salient stakeholders (Elias, Cavana & Jackson, 2002). Prioritizing takes into account attributes (power, legitimacy and urgency), purposes (what do they want), and methods (what do they do to succeed) (Freeman & Velamuri, 2005; Jones, Wicks & Freeman, 2017). Stakeholders theory has been applied to study the adoption of green purchasing practices (Sarkis et al., 2011), reverse logistics (Cots, 2011), life cycle analysis, SC greening, customer pressures for environmental performance improvements and regulatory requirements (Miles, 2017), but the theory shows limitations when the interests of salient stakeholders diverge.

To deal with the many challenges facing organizations, there is need to engage and understand all stakeholders involved as recent evaluation of projects has moved from the traditional measures of time, cost and scope to include stakeholders. Poor stakeholder management has led many projects to fail. All stake holders need to have a common understanding on project success criteria (Freeman, Harrison, & Wicks, 2007). In the context of this study involving stakeholder like customers and suppliers is key to the success of green distribution, green purchasing green packaging as well as reverse logistics and the stakeholder theory underpins this.

2.3 Conceptual Framework

A conceptual framework is a written visual presentation that explains either graphically or by narration, the main things to be studied; among them are the key factors, concepts or variables and presumed relationships among them. It provides a coherent, unified and orderly way of seeing related events or processes relevant to a study/research. Conceptual framework serves as springboard for theory development and shows the relationships of the stated hypothesis with central factors or key concepts. Creswell (2013) defined conceptual framework as a concise description of the phenomena under study accompanied by a graphical or visual depiction of the major variables of the study.

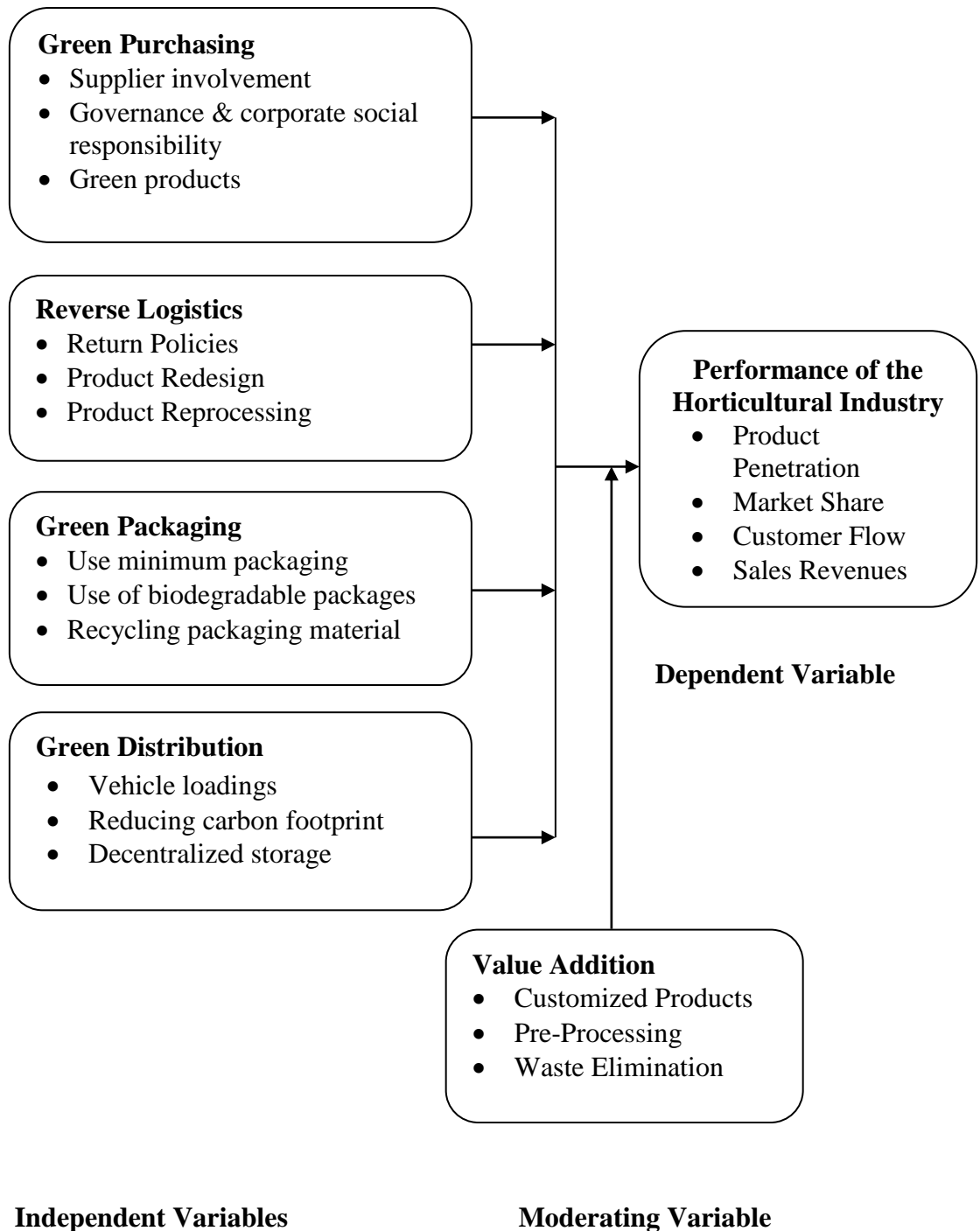


Figure 2.1: Conceptual Framework

2.3.1 Green Purchasing

Purchasing is one of the key strategic business processes used by many companies to perform series of activities (Olaore & Adebisi, 2013). Purchasing function plays a vital role in choosing the right product as purchased raw materials, components, parts and supplies can signify more than 50 percent of sales dollar (Wisner *et al.*, 2012; Olaore & Adebisi, 2013). Therefore, selecting the right suppliers is one of the important tasks of purchasing which directly reduces purchasing risk and maximises overall value to the buyer organisation (Rajan *et al.*, 2010). Additionally, purchasing can be served as a crucial link between the sources of supply and the organisational itself. As competitive pressures become more acute, buyer organisations are increasingly demanding their suppliers to fulfil stringent requirements in terms of quality, quantity, cost, product mix and delivery efficiency (Hasan, 2013) in order to gain a performance. Consequently, this demand has increased the strategic role of purchasing in today business setting.

Purchasing can contribute a significant environmental threat in terms of discarded packaging materials. Over time, the level of awareness on global warming and other environmental issues has increased significantly, making a concern for companies to green their purchasing. According to Wu (2008), green purchasing takes into account the environmental and social responsibility in purchasing process. The environmentally conscious purchasing initiatives include the procurement of products and services that meet environmental objectives such as reduced sources of wastages, recycling, reuse, resource reduction and substitution of materials (Min & Galle, 2011; Zsidin & Siferd, 2001; ElTayeb *et al.*, 2010). In a similar vein, ElTayeb *et al.*, (2010) and Yang and Zhang (2012) claimed that green purchasing is the practice of choosing suppliers that provide eco-friendly materials and services. Green purchasing aims to minimise negative environmental impacts in manufacturing process and transportation by using durable, recyclable and reusable materials (Sarkar, 2012). Companies that practised environmental strategy in purchasing benefitted from cost savings, better public image and decreased liability (Wisner *et al.*, 2012). Companies that are able to leverage their green supply base with lower cost, higher quality and concern about environment

aspects (Rao, 2008; Khan, Yu, Golpira, Sharif, & Mardani, 2021) to impact their total cost structure and product quality will have a performance in their markets.

GP refers to a set of procurement policies that encompass environmental concerns related to raw materials (extraction and acquisition), supplier selection, distribution, packaging, recycling, reuse, resource reduction, management systems and final destination of products. Although some authors such as Zhu *et al.* (2015) and Sharma, Saha, Sreedharan and Paul (2020) include in this construct the practices in supplier relationship managements, such as development and selection, our analysis observed a maturity of this relationship, justifying its treatment as a separate construct. In order to develop a GSCM, it is necessary to implement procurement strategies for environmentally sustainable products. Liang and Reiner (2013) confirm that environmentally sustainable procurement results in a reduction of waste and hazardous materials. In addition, GP practices play a significant role in helping organizations reduce pollution and waste through strategies such as recycling, demolition or sorting and use of biodegradable packaging (Wang & Dai, 2018). GP practices take place within framework of chain components, in the context of operations management. There are ample opportunities to investigate the various perspectives of transaction cost economics in GP studies, such as assessing the actual costs of decision-making processes related to those practices (Patel & Desai, 2019).

2.3.2 Reverse Logistics

Reverse logistics as a supply chain concept emerged alongside other green supply chain management practices in an attempt to enhance sustainability in organizational operations (Green et al., 2012). Since its emergence, scholars have conducted studies to relate reverse logistics with various components of supply chain management like supply chain performance and supply chain efficiency (Saber *et al.*, 2019). Studies have also related reverse logistics with aspects of organizational performance such as environmental performance, social performance and economic performance.

The essential reverse logistics activities can be divided into actions related to the product and the packaging. In relation to the product, activities of return of raw material to suppliers, as well as retailing, recovering, renewing, remanufacturing and recycling activities, can be identified. Regarding packaging, activities such as reusing, renewing, recovering and recycling can also be observed. This construct, due to the trust in the relationship with SC members, is appropriate for the organizational context of operations management (SC structure). The difficulties in implementing reverse logistics practices can be constrained due to broad complexities, which are associated with size and relationships among chain members (Reefke & Sundaram, 2017). The implication is that some activities, such as cooperation with suppliers and customers to return products, involve a dynamic network of relationships in the system. One opportunity is precisely to incorporate outsourcing into recyclers to harness the prevalence of Internet technology and develop a two-channel reverse chain by introducing online recycling channels (Zhu & Liu, 2010).

Reverse logistics can also be defined as the backward movement of products, components, materials, and equipment and technical systems (Fritz, 2019). In a production set up, faulty products are normally recalled for rework and surplus materials returned from the production floor. Sánchez-Flores *et al.* (2020) define reverse logistics as ‘the process of planning, implementing, and controlling the efficient, cost effective flow of materials (faulty goods, surplus goods, packaging materials and related information) back into the organization from the lower loop of supply chain. Amemba (2013) characterize switch coordination as 'the way toward arranging, executing, and controlling the proficient, savvy stream of crude materials, in-process stock, completed products and related data from the purpose of utilization to the point of cause to recapture esteem and ensuring proper disposal of wastes and excess materials.

2.3.3 Green Packaging

Packaging can be defined as all the activities of designing and producing the container for a product (Pathak, 2014). According to Manalili *et al.* (2014), packaging refers to the

technology and material for enclosing or protecting products for distribution, storage, sale, and use. Packaging is defined by two main factors: functionality and point of destination.

Green package, can also be called ecological package or environmental friendly package, is defined as environmental friendly package, which is completely made by natural plants, can be recycled or second use, be prone to degradation and promote sustainable development, even during its whole lifecycle, it is harmless to the environment as well as to the human body and livestock's health (Arikan, 2011). In short, green packaging is the appropriate packaging that can be reused, recycled or degraded, corrupted and does not cause pollution in humans and the environment during the product life cycle.

Green procurement is concerned with the natural effects of buying while manageable packaging additionally thinks about social and financial elements. This incorporates decreasing natural effects or outflows and improving social results by supporting nearby providers or network ventures giving administrations, manageable acquisition considers the financial, social and ecological effects of design; non-inexhaustible material use; assembling and generation strategies, coordination; administration conveyance; use; activity; upkeep; reuse; reusing choices; transfer; and providers' abilities to address these outcomes all through the production network (Villena & Gioia, 2020).

Recycling is an important step in green packaging in ensuring future generations' access to the necessary level of resources. Recycling factors of production or engaging in industrial symbiosis in which materials are sold to/received from other companies or bodies, for mutual gain, are ways to minimize organizations' negative impacts on the environment (Davila, 2012). In waste management, an institution can improve its waste resulting from packaging process through well design guidelines on how to recycle and dispose them. However, institutions can also incorporate all stakeholders in managing waste. During the time spent buying and obtainment, providers must consider a definitive attitude of the materials and segments that enter the firm, acquiring

administrators can solicit upstream individuals from the store network to submit squander decrease and give ecologically well-disposed item. Providers, for example transport administration providers and item providers, can affect firms' green obtaining exercises and drive green supply chain management.

Green packaging in many cases has to do with appropriate bundling that decreases natural harm. Green bundling demonstrates the impression of natural worries in money related terms which are inborn and transferable to the client. Green correspondence encourages a positive picture and passes on a business company's worry towards nature and the general population (Cañas, Mula & Campuzano-Bolarín, 2020). Bundling gives advantages to organizations just as for customers. For example, the outside of bundling fills in as a correspondence stage for a wide range of data. This incorporates data, for example, item fixings, value, utilization information and other data that is significant for buyers. Other than that, it serves in showcasing techniques as an instrument to build intrigue of things to purchaser bringing about less stock going unsold. Bundling does likewise control the size and amount of an item (Raj, Biswas & Srivastava, 2018).

2.3.4 Green Distribution

Distribution refers to the movement of a product from the production stage to the customer in the supply chain. Distribution determines the overall profitability of a firm as it directly affects both the supply chain cost and the customer experience. Expanded ecological mindfulness has driven more organizations to receive reasonable, or green, appropriation rehearses. These practices range from diminishing the measure of non-renewable energy sources and ozone harming substances utilized in assembling and circulation to expanded accentuation on the earth during conveyance. Fiorini and Jabbour (2017) characterize green inventory network the board (GSCM) as the reconciliation of natural reasoning into store network the board, including item structure, material sourcing and determination, fabricating forms, conveyance of the last item to the buyers, and end-of-life the board of the item after its valuable life.

Green distribution is an important activity that affects the performance of a green supply chain. Green distribution includes all activities to reduce/eliminate environmental damages and wastes during shipment (Hong *et al.*, 2018). The fuel consumed by the vehicle transporting the product, frequency of transportation operations, distance to the customers and packaging characteristics (weight, shape and material) affect the performance of green distribution (Sarkis, 2003).

Green Distribution is thus the integration of environmental concerns into the inter-organizational practices of supply chain management (Mwaura *et al.* 2016). It can likewise be characterized as the manageable conveyance of products and ventures. Manageable circulation practices incorporate those that decrease carbon dioxide, are monetarily reasonable and will realize a superior personal satisfaction for the world's future occupants. Green conveyance practices go from changing the manner in which dissemination focuses and vehicles are fuelled to actualizing more prominent straightforwardness with respect to nature and circulation rehearses. As natural concerns increment, the mix of ecological issues into the supply chain studies have become a thriving subfield (Carter *et al.*, 2020).

2.3.5 Value Addition

Value addition is any additional activity that in one way or the other changes the nature of a product thus adding to its value at the time of sale (Miles & Snow, 2013). Value adding is the process of changing or transforming a product from its original state to a more valuable state (Boland, 2009). Value addition can therefore be said to be a process of enhancing a product to gain more from it. In agriculture the role of value addition is to maximize production and economic value of a produce. It is production process phase that involves enhancing product quality for the consumer and hence brings about higher net value. According to Lambert *et al.* (2006), value addition is the variation between value of goods and services produced and the input costs used in their provision.

Value addition, according to Kim and Lalancette (2013), also refers to product improvement as a result of growth in knowledge, abilities, skills and other attributes the employees have gained due to experience in the respective field over time. The measurement of value addition provides additional pointers of company performance beyond production levels at one point in time. The value chain concept can analyse and describe a company's source of performance (Nang'ole *et al.*, 2011). Horizontally interdependent activities produce added value for the consumer. The costs of these activities and how these activities produce at the profit margin for the company are examined in the value chain analysis. Value addition is created at different stages and by different actors throughout the value chain. It may be related to quality, costs, delivery times, delivery flexibility, innovativeness, etc. The size of value addition is decided by the end-customer's willingness to pay. Opportunities for a company to add value depend on a number of factors such as market characteristics (size and diversity of markets) and technological capabilities of the actors.

2.3.6 Firm Performance

A firm performance has widely been recognized as the ability of a firm to stand a chance to command a given section of the market more than its competitors with the same products and a similar operating ground. It is that which sets an organization apart, that is, its distinct edge. That distinct edge comes from the organization's core competencies, which might be in the form organizational capabilities-the organization does something that others cannot do or does it better than others can do it (Barney & Clark, 2007; Selvam *et al.*, 2016). According to De wit and Meyer (2010), a firm has a performance when it has the means to edge out and outsmart rivals when contesting for the favour and following of customers. Schermerhorn, Davidson, Poole, Woods, Simon, and McBarron (2014) postulate that a performance comes from operating in successful ways that are difficult to imitate.

A performance is the 'how' of strategy. It actually defines in what ways the firm intends to achieve its long-term goals within the chosen scope. Since the firm faces actual and

potential competitors, it must have a compelling reason to expect that it will be able to compete effectively against them (Khan, & Ali, 2017). As the phrase “performance” suggests, a high performance firm must achieve advantage over its competitors. To be successful, a firm does not need to have an advantage over all of its competitors. This is because many markets have room for several firms that have parity to compete. However, a firm will genuinely do better if its source of performance is unique.

A firm that does something in a better manner than most of its actual or potential competitors has an advantage in that activity. However, this can be a performance only if being better at that activity contributes to the firm’s ability to meet its long-term goals (Eniola & Entebang, 2016). For example, a firm that is best in its industry at filing documents has an advantage in document filing. This will not provide it with a performance, however, unless document filing speed is somehow linked to the basis on which firms compete. Performance allows a firm to create superior value for its customers and profits for itself. A firm positions itself in the industry through its choice of low cost or differentiation. This decision is a central component of the firm’s competitive strategy.

2.4 Empirical Review

This sub-section presents the review of previous studies on the influence of sustainable supply chain on performance in the horticultural firms in Kenya. The review is made based on the variables of the study which are green purchasing reverse logistics, green distribution and green packaging. From the empirical review, the critique of the literature as well as the research gaps to be filled in this study will be identified.

2.4.1 Green Purchasing

Green purchasing stands to be among the major drivers of sustainable supply chain management. Studies have aimed at unveiling the connection between green purchasing and supply chain performance through value addition. Pak (2013) for instance carried

out a review of the literature and a framework for Green Supply Chain Management. The study focused on reviewing previous studies to unveil the relationship between green purchasing and value addition so as to promote supply chain performance. Studies from across the globe were used and the findings analysed based on the major findings of these studies. The study found that green purchasing was a major aspect in green supply chain that ensured the best products were acquired thus promoting value addition. Pak (2013) contemplated that through purchase of goods that are environmentally friendly and involving the suppliers in producing such goods, there is high capability of the firm to record increased supply chain performance and at the same time increase the value of the products.

Elsewhere, Min and HGalle (2011) carried out a study on the green purchasing practices of US firms. The aim of the study was to identify the major green purchasing activities carried out by the firms in United States. Interview guides were used to interview a total of 28 respondents who were drawn from the management of the procurement departments was used. The study established that involving suppliers was one of the major practices of promoting green purchasing through which sustainable supply chain was obtained. Min and HGalle (2011) contemplated that green purchasing was a major aspect in promoting value addition in the processing industry.

Seman (2012) completed an investigation on the variables affecting green store network the executives. The investigation completed a survey and research course to bring up the principal parts of green store network the executives connected in the current business condition. The examination built up that among the significant green production network the executives works on improving procurement performance through value addition was green purchasing. Seman (2012) described green purchasing as an essential driver of green supply chain through which the firm encourages and embraces purchase of environmentally friendly goods thus meeting the customer needs and adding value to the commodities through which performance is enhanced. Large and Thomsen (2011) also proposed green purchasing as a major driver of green supply chain management through

which the purchases are in line with the terms of green supply chain by observing the environmental friendliness.

2.4.2 Reverse Logistics

Reverse logistics is the process by which commodities are moved from the buyer/consumer to the producer through use of the distribution channel. In most cases, reverse logistics is termed as the ability of an unsatisfied customer or a customer who wants to have purchased commodities used elsewhere to use a given distribution channel to return the goods to the producer. This is one of the ways of promoting green and sustainable supply chain management by reducing waste and enabling the manufacturer to reproduce or re-use already sold goods or packages. Studies on reverse logistics and procurement performance and value addition have revealed varying results on the relationship between the two aspects. Rogers and Tibben-Lembke as cited by Wang, Zhou and Ren (2010) described reverse logistics as the process of planning, implementing, and controlling the efficient, economical flow of raw materials, work-in-progress, finished goods, and information from the consumption point to the point of origin in order to recapture value or for proper disposal of products.

Badenhorst (2013) carried out a framework for prioritizing practices to overcome cost-related problems in reverse logistics. The aim of the study was to analyse the prospects of reverse logistics in terms of costs so as to enhance the latter for better performance of the procurement process and promote value addition. The study established that reverse logistics was key in promoting value addition through which goods that needed to be reprocessed to enhance quality as well as enhance proper disposal were effectively taken back to the supplier. According to Badenhorst (2013), promoting reverse logistics played a significant role in achieving the green supply chain management but still required cost saving measures due to the processes and costs involved in returning the commodities to the supplier.

Jayant, Gupta and Garg (2012) did a study on the perspectives in reverse supply chain management. The study was based on literature review of previous studies on reverse logistics and sustainability of green supply chain and value addition. The study found that as a way of promoting the effectiveness of procurement process and meeting the customer needs, reverse logistics was necessary through which the customers could return their goods if not meeting the standards or in the right description. Jayant et al. (2012) contemplated that reverse logistics played a role in value addition where the customer is facilitated to return the goods to the supplier thus giving the supplier more room to handle quality and other related concerns.

Elsewhere, Udin (2012) did a study on the impact of reverse logistics product disposition towards business performance in Malaysian E&E Companies. The study aimed at establishing the effect of reverse logistics on business performance among Electrical and Electronic companies in Malaysia. The study adopted a descriptive research design and had a sample of 160 respondents. The study established that reverse logistics contributed to business performance through which both parties stood a chance to get the best out of the business by ensuring that whatever that is supplied is to the optimal requirement of the customer and that the supplier gets what is with the range of quality supplied (Udin, 2012).

2.4.3 Green Packaging

Doszhanov and Ahmad (2015) conducted a study on the impact of green brand dimensions and green perceived value. The study aimed at identifying the relationships between green brand dimension, green perceived value and customer's intention to use green products. Data was collected through structured survey questionnaire from 384 customers of three hypermarkets in Kuala-Lumpur. Data was analysed based on multiple regression analysis. The findings of the study portrayed that there are significant relationships between green brand awareness, green brand trust, green perceived value, and customer's intention to use green products. The awareness of customers about their green products, create green brand trust among customers, and enhance green perceived

value for customers to increase their intention to use green products (Doszhanov & Ahmad, 2015). Green packaging is mostly practiced in horticultural industries which study did not address.

Previous studies have been carried out on the relationship between recycling as a sustainable supply chain practice and value addition and procurement performance across the globe. As an aspect of environmental friendliness, recycling stands as a key prospect of ensuring sustainability in the supply chain process (Preuss, 2012). Swanson, Weissman, Davis, Socolof and Davis (2015) carried out a study on developing priorities for greener state government purchasing. The study aimed at unveiling the ways and strategies put by the government to enhance green purchasing in government corporations. The study focused on state owned entities in California. Cross-sectional research design was adopted and a sample size of 109 respondents was employed. The study established that one of the key aspects used by government in its purchasing to steer green procurement was recycling. According to Swanson et al. (2015), recycling serves to enhance the ability of the suppliers to save on costs while at the same time reducing the waste materials released to the environment. Through this, sustainability of supply chain is achieved thus promoting procurement performance and efficiency (Swanson *et al.*, 2015).

Hervani, Helms and Sarkis (2014) did a study on the performance measurement for green supply chain management. The focus of the study was to establish the extent to which green supply chain could be measured and on what merits. The study adopted an exploratory research design and had the manufacturing firms in Pakistan as the target population. The study established that the best approach to measure green supply chain management is recycling. According to Hervani *et al.*, (2014), recycling means that a company is saving what would have been lost and prolonging the release time of the wastes to the environment. Hervani *et al.* (2014) considered recycling as an aspect that every management that is determined towards enhancing green supply chain will adopt so as to enhance re-use and reduction of waste materials. To sustain green supply chain,

measures of preventing/blocking waste materials to be easily disposed to the environment is an important act to put into consideration (Hervani *et al.*, 2014).

Locally, Ogecha (2016) did a study on enhancing internal customer service and value addition through recycling. The study sought to establish the impact of recycling on customer service and on value addition while considering recycling as an aspect of green supply chain management. The study targeted supermarkets in Kenya and had a sample of 112 respondents. The findings revealed that recycling had a significant influence on value addition and customer service through meeting the customer needs and expectations. Ogecha (2016) pointed out that using a commodity in other duties after itself being used contributed to the value addition through enabling the organization to maintain or transfer designs of products or packages thus gaining more market propensity.

The study on the effect of green packaging on business performance in the manufacturing in Nairobi County, Kenya by Sambu (2016) looked to decide the impact of green bundling on execution of various firms. The examination embraced the illustrative research plan. An enumeration of 133 administrators working for 47 firms in Nairobi County was received. Information was accumulated from respondents utilizing surveys as information gathering instruments. The consequences of the examination uncovered that green bundling is key determinants of business execution in the assembling in Kenya. As per Sambu (2016), firm supervisors should bundle their items in recyclable materials.

Ramme and Heimann (2015) completed an investigation on the green bundling from an organization's point of view and deciding variables for bundling arrangements in the German natural product juice industry. The examination tried to decide the commonness of Green Packaging in the Baden-Württemberg natural product juice industry. The investigation examined the organizations' point of view on Green Packaging, a field of concentrate for which just restricted data is accessible. Along these lines, essential information for a subjective research approach is gathered. The investigation results

uncovered that the retail channels utilized by these organizations push back against returnable jugs in light of their taking care of expenses. Interviewees additionally communicated their feeling that customers' interest for Green Packaging does not do the trick to drive change in existing practices. Littler organizations centre their bundling choices around existing returnable glass bottles along these lines both limiting change over expenses and boosting green advertising potential. For bigger organizations it is conceivable to take on a pioneer job in the field of Green Packaging (Ramme and Heimann, 2015). The study however did not address on the value addition when green packaging is practiced.

2.4.4 Green Distribution

A study done by Hasan (2013) using case studies concludes that green distribution has an important part to play in the connection between natural development and upper hand. This examination reasoned that the advantages accomplished by organizations were expanded proficiency, diminished cost, improved hazard the board, improved administration, expanded deals and piece of the pie, income development and notoriety. The examination in any case, did not indicate whether green conveyance practices improved firm intensity or expanded piece of the overall industry. Be that as it may, the capacity to make new items helps construct an upper hand for associations. However numerous organizations will most likely be unable to win this picture advantage because of buyers' failure to recognize how green the items from the inventory network are (Delmas and Montiel, 2009).

As indicated by Al-Odeh and Smallwood (2012), factors like: fuel, methods of transport, framework, and operational practices are significant components to consider in creating green transportation. Vehicles controlled by fuel and diesel produce carbon dioxide, which causes a worldwide temperature alteration and corrosive downpour. Further, utilization of petroleum derivatives adds to the expanding shortage of these powers. Organizations would thus be able to receive manageable practices by utilizing armadas kept running by elective powers. Likewise, organizations can utilize exchange transport

techniques, for example, rail as opposed to utilizing organization armadas to transport materials.

Organizations can likewise execute new activities, for example, building circulation focuses nearer to where they convey or structure associations with neighbourhood vendors and merchants to diminish the miles they should drive. This will improve operational magnificence by lessening waste, upgrading the assets accessible. This ought to convert into greater benefits and focused position. The storeroom is another basic part of green appropriation. The storeroom ought to have the option to store various classifications of materials. Organizations should utilize economical practices when fuelling their storerooms. Rather than driving these storerooms with power, organizations can utilize hydro, wind or sunlight-based power further upgrading assets.

The structure and development of storerooms should meet the essentials of non-dirtied condition, while reinforcing support of good stickiness, erosion, waterproofing notwithstanding different variables (Zhang and Zheng, 2010). This won't just assistance create efficiencies however will likewise empower associations to contain costs. As associations rebuild to decrease their organization's natural impression, supply chains have progressively turned into a key region of core interest. Enhancements in transportation productivity and bundling ought to be at the highest point of the green store network activities list. When merchandise is made it needs to get to the market and the market must be educated about the item traits. This includes an appropriate conveyance framework.

As per Fritz (2019) green distribution comprises of green bundling and coordination. This examination which received a correlational research configuration was done to decide the impact of GSCM on ecological execution. The discoveries of this examination demonstrated a positive connection between green circulation and ecological execution. Be that as it may, this examination was done among tea preparing firms where the item has a set up market unlike food manufacturers who have to curve a niche in the market for their products.

2.4.5 Value Addition

Roheim *et al.* (2007) analyzed the value of brands and other value addition activities meant to target specific segments in the frozen fish market. They used purchased retail point scanner data of 687 frozen fish products, collected weekly over three years (2002-2005). The sales data included quantities sold and prices by brand, package size, and product promotions. The data was analyzed using hedonic pricing model and results appeared to indicate that consumers preferred “natural” fish that was less processed, and less value added, and they were ready to pay a premium for that. This is to be expected in markets where health and wellness concern override other factors influencing demand. The other observation is that traceability is gaining more value among dealers because quality of their products has a direct impact on their reputation.

Karantininis *et al.* (2008) investigated what determines innovation in the agro-food industry. They used the number of products launched and investments in innovation as a percentage of sales as proxies for innovation activity of the firm. They noted that number of products launched is a misleading indicator as it is heavily influenced by product proliferation and not innovation. They concluded that organization, stage in the value chain and market power are important to innovation, and that Wholesalers and retailers tend to have a larger number of new products (Model I), whereas manufacturing firms tend to invest more in research and development.

Punjabi (2007) observed that it has become clear worldwide that the most rapid growth in agriculture has been occurring on the part of post-production activities. This is being driven by growth of middle-income consumers even in low income countries and their demands for better quality value added products. Absence of agro-industry and agribusiness resulting in low levels of value addition of agricultural commodities has been one of the main causes of stagnation in rural incomes. A substantial agribusiness sector generating a high outflow of value-added commodities is always correlated with high agricultural GDP and high rural incomes.

Mapiye *et al.* (2007) analysed the potential for value addition of Nguni cattle products in the communal areas of South Africa. They concluded that development and research programmes aimed at reintroducing the Nguni breed in the rural areas should take a holistic and participatory approach in agro-processing and value-addition of Nguni cattle products. Increased value addition can be achieved by provision of appropriate incentives for the establishment of agro processing industries in the rural areas and promotion of partnerships between communal farmers and agribusiness.

2.4.6 Firm Performance

Several studies have been carried out across the globe on the impact, influences and other concerns of performance in an organization. Liao, Hu, and Ding (2017) carried out a study on the influence of supply chain collaboration value innovation, supply chain capability on performance in Taiwan's networking communication industry. The study sought to find out the link between value innovation as an aspect of supply chain capability on firm performance. The study targeted networking communication companies in Taiwan and had the cross-section approach as the research design. The findings revealed that performance was to a great extent determined by the innovativeness of an organization. According to Liao et al. (2017), performance defined how effective a company went as far as blocking the competitors and sustaining its operations in the market was concerned.

Elsewhere, Subba (2016) carried out a study on the impact of supply chain management practices on performance and organizational performance. The study aimed at unveiling how supply chain management practices steered performance as well as enhancing the firm performance. Crop production firms in South Africa were targeted and exploratory research design was used. The study established that through proper measures of supply chain management and ensuring that it was effectively done, the performance of the crop production companies was achieved. According to Subba (2016), through a well embraced and established performance, the performance of the firm is recorded in that more sales are achieved as well as capturing more operating market.

Kahare (2016) did a study on the factors determining performance of telecommunication companies in Kenya. The study aimed at unveiling the influence of product innovation, process innovation and market innovation on firm performance. The study used correlational research design while the target population for the study was 250 respondents. The study established that performance was a subject of product/service innovation, process innovation as well as market innovation. According to Kahare (2016), through properly embraced innovation that is focused on finding new markets and coming up with new product designs as well as seeking better and modern ways of doing processes/operations in an organization, the firm stands a better chance to command a bigger market and attract more customers through meeting their needs.

2.5 Critique of the Reviewed Literature

Sustainable supply chain management is a subject that has continuously received tremendous attention across the globe as far as research is concerned. The studies reviewed herein confirm this. However, despite the studies on this area, there are several cracks that see the need for a different study in the same prospect. These cracks are herein presented to pave way for the research gaps. The study by Swanson et al. (2015) on priorities of greener state through purchasing explains the need for green purchasing to enhance sustainable supply chain. The study however does not point out the key aspects of green purchasing used and at the time leaves the industry open thus not becoming specific as expected in such as study where some firms/industries are likely to adopt green purchasing than others.

Pak (2013) while reviewing framework and literature of green supply chain management only points out on the role of green purchasing whereas there are other aspects of green supply chain that should be a matter of concern. The study does not explain why only green purchasing was used thus leaving the credibility gap on the ability of the study to effectively fill the existing gap. Moreover, Pak (2013) only adopts secondary data sources which may not necessarily and reliably represent the real situation at the industry. This means a study using primary data is necessary to help fill such a gap. By

using the data that was used by a different study, it simply implies that the mistake done in the study is also more likely to re-occur in the present study.

Udin (2012) in a study on reverse logistics and firm performance in Malaysia failed to explain how reverse logistics were connected to the organizational performance without considering the supply chain management aspect despite this being a key area as far as reverse logistics is concerned. Udin (2012) argued that reverse logistics saved on costs but did not point out on which part did it save the costs whether on the consumer or the supplier side. This leaves confusion on whether the study focused on the supply or the consumer bearing in mind that these are the two major parties in a reverse logistics.

2.6 Research Gaps

The reviewed studies focused on one or two dimensions of sustainable supply chain (reverse logistics, green packaging, green purchasing and green distribution). This means that the studies did not have a chance to compare how the four aspects contributed to performance (Castillo et al., 2018; Pasquali et al., 2021; Krishnan, 2018). This study combines all these aspects to give concrete findings on how each of them contributes to performance of the horticultural industry both individually and when combined. Majority of the studies used secondary data sources by conducting empirical analysis or literature and framework review. This indicates that the studies may not present the actual situation at the ground level hence the need for a study that will employ primary data. The studies had conflicting findings and arguments with some scholars arguing that sustainable supply chain management practices had no link with performance and procurement performance while others establishing a relationship between the two aspects (Saeed & Kersten, 2019; Esmailian et al., 2020). There should therefore be a study to settle matters and clear the doubt by unveiling the relationship between sustainable supply chain management on performance.

2.7 Summary of the Literature Reviewed

This chapter covered the literature reviewed in the relationship between sustainable supply chain and performance. Theories were reviewed to support the study variables including transaction cost economic theory, institutional trade theory, theory of reasoned action, diffusion theory of innovation as well as stakeholder theory. The theories are well analysed and reviewed in the study to throw more weight on the study variables. Conceptual framework is also covered in this study where the variables under the study are operationalized and the direction of the variables shown to provide a direction for the study. The variables under consideration are green purchasing, reverse logistics, green packaging, green distribution which are the independent variables and value addition as the moderating variable and performance as the dependent variable. The chapter also looks into the empirical review where the previous studies are reviewed to point out the research gaps.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the methodology that was used in the study. It gives a detailed description of the methodological approach and explains the philosophical thrust of the framework influencing the procedures in the research. The chapter describes the research design, study population, sampling technique and sample characteristics, data collection, as well as data analysis procedures.

3.2 Research Philosophy

Paradigms are the basic belief systems that guide the investigation, not only in choices of methods but in ontologically and epistemologically fundamental ways (Saunders et al., 2007). They posit that epistemology is the branch of philosophy that studies knowledge. Epistemology is concerned with determination of the nature and extent of human knowledge and attempts to address the distinction of adequate and inadequate knowledge. There are two major philosophical schools of thought that guide research in social sciences that is, positivism and phenomenology.

The study used positivism paradigm as the research philosophy. The paradigm uses a quantitative approach which involves data collection and the analysis of numerical data (Veal, 2005). It relies on numerical evidence to draw the results or to test hypotheses. The advantage of the paradigm in a quantitative research is that it is possible to measure the reactions of a large number of subjects as representative of some wider population to a limited set of questions, which facilitates comparison and statistical aggregation of the data (Ridenour & Newman, 2008).

Using positivism paradigm is preferred since it helps in administration to a large and geographically spread population, greater uniformity of data which facilitates analysis;

and greater population coverage which provides for greater validity through a larger and more representative sample.

3.2.1 Research Design

Research design refers to the procedural framework within which the research is conducted (Cooper & Schindler, 2003). Research design is characterized by procedures and methods for arriving at results and findings, and tools for proving or disproving such knowledge (Saunders, Lewis & Thornhill, 2007). The research methodological approaches a researcher chooses to conduct research could be affected by the researcher's philosophical perspectives and paradigm. The study applied a descriptive and cross-sectional research designs. Descriptive research design entails explanation of a phenomenon, estimating a proportion of a population with similar characteristics and ascertaining the relationship that occurs amid the variables under study (Myers, 2013). The cross-sectional on the other hand explains the relationship between several different variables (independent variables) and the dependent variable. This study utilized both designs where the descriptive design helped describe both qualitatively and quantitatively the existing scenario in sustainable supply chain management practices and the state of firm performance of the horticultural firms while cross-sectional design helped in expounding on the relationship between sustainable supply chain management practices and firm performance in the horticultural firms. Combining the two designs has been found to yield more profound and extensive findings (Nili, Mary & Gable, 2014).

3.3 Target Population

The target population for the study comprised of the horticultural companies in Kenya. There are 289 registered horticultural firms in Kenya (Kenya Horticultural Council, 2021). These companies are involved in farming, purchasing and exportation of horticultural products. Supply chain managers in these companies were targeted as the units of observation. The focus on supply chain managers are most informed of the supply chain operations in their respective companies. The supply chain managers

oversee all the supply chain operations of the companies and they are the key decision makers in sustainable supply chain. Therefore, they were the units of observation for the study.

3.4 Sampling Frame

Sampling frame is necessary for the selection of the sampling units. Cooper and Schindler (2003) indicate that sampling frame is a list of elements from which the sample is actually drawn and is closely related to the population. The sampling frame in the study comprised of the heads of the supply chain section in the 289 horticultural companies in Kenya. These were selected since they are considered to be well knowledgeable on all aspects of supply chain and operations of their firms hence provided the necessary data for the study.

3.5 Sampling Technique and Sample Size

Sampling is the process of obtaining a sample size that is representative of the targeted population. The sampling process which includes sampling frame, the sampling technique and sample size for the study is herein indicated.

3.5.1 Sample Size

Hoinville *et al.* (1985) posit that the sample size is almost always a matter of judgment rather than calculation. According to Saunders (2019), sampling is a process rather than an event, which seeks to first establish the appropriate sample size, then come up with a technique to pick the respondents equivalent to the sample size from the target population. In this study, the appropriate sample size was obtained using Yamane's (1967) sampling formula. The formula is as shown below:

$$n = \frac{N}{1+N*e^2}$$

. Where:

n is the sample size

N is the target population (289)

e is the error margin (0.02)

$$n = \frac{289}{1+289*0.02^2}$$

$$n = 259$$

The sample size for the study was therefore 259 supply chain managers from the horticultural companies in Kenya. Since the appropriate sample size for the study has been established, a technique for identifying these respondents from the target population is necessary (Saunders, 2019). The study used a simple random sampling, which is a probability sampling to obtain the respondents for the study. The respondents were randomly selected through simple random sampling from the 289 registered horticultural companies.

3.6 Data Collection Instruments

The study mainly utilized primary data. During the data collection, both qualitative and quantitative data was required, which justifies the need to have primary data. Primary data was collected from the supply chain managers or their representatives. Primary research was done using a semi-structured questionnaire. According to Sekaran *et al.* (2011), questionnaires can be administered in person, mailed to the respondents, and distributed electronically. Self-administered questionnaires are an effective way of collecting data since complete responses can be collected in a short time frame. Further, any doubts from respondents on any question can be clarified immediately. It also

affords the researcher an opportunity to introduce research topic and motivate respondents to offer their frank answers. The survey was carried out for a period of five months due to low response rate; several initiatives were taken to improve the response rate including repeated follow-up calls as well as giving assurance of mailing the results of study to respective companies for future reference (Sundram et al., 2016).

3.7 Pilot Testing

Bryman (2012) states that a relatively small sample of 10 to 20 respondents can be chosen from the population during piloting which is not included in the sample chosen for the main study. According to Kothari (2014), 10% of study sample size is appropriate for pilot test. The study used 10% of the sample size (259) to carry out the pilot test and the results were included in the main study. This helped the researcher to identify any ambiguous and unclear questions. Feedback received was used to fine tune the questionnaire before embarking on the actual data collection. The researcher also used research experts to review the instrument to ascertain face validity.

3.7.1 Reliability Test

Reliability is the extent to which data collection techniques or analysis procedures yielded consistent findings (accuracy and precision of a measurement procedure). It establishes if the measure is able to yield the same results on other occasions and if similar observations are reached by other observers and transparency in the raw data. Reliability was used to check the internal consistency of the data measuring instrument.

Cronbach's coefficient alpha which determines the internal consistency or the average correlation of items within the test was used after collection of data to test the findings. Alpha values range from zero- no internal consistency to one -complete internal consistency. Blumberg, Cooper and Schindler (2011) suggested that if values were too low, either too few items were used or the items had little in common, it is concluded

there was no internal consistency. Flick (2014) posits that reliability of over 0.70 is considered acceptable.

3.7.2 Validity Test

Validity is the ability of the research instrument to measure what it is supposed to measure (Creswell, 2013; O’Leary, 2014). Validity ensures that the instrument is able to obtain data that is intended to be collected, by ensuring that the respondents understand the questions as they are intended to understand them. In this study, face validity, content validity, and construct validity were tested. For face validity, which is the general outlook of the questions, experts’ opinion was used. This is where two experts in the field of supply chain management and the supervisors were given the questionnaire to review and give their recommendations on the clarity of the questions. Their input was considered and utilized to improve the questionnaire. For content validity, which is the extent to which the questions in a questionnaire address the thematic area of the study, extant literature on sustainable supply chain practices was reviewed and the questions (items) used to address the variables in the reviewed literature were compared and systematically used to improve the questions on the questionnaire. According to Saunders (2019), this helps in ensuring that the questions used in the questionnaire address the subject area of the study for them to adequately give information that answers the research questions. Construct validity which is the extent to which each of the items used in a questionnaire contribute to the general theme of the study (Rudestam & Newton, 2015), was ensured by carrying out Principal Component Analysis where the weight of every question on the questionnaire is determined through factor loadings. Factor loadings exceeding 0.6 imply that the question is adequately contributing to the thematic area of the study, thus it can be retained, while questions with a factor loading less than 0.6 are excluded from the questionnaire.

3.8 Data Collection Procedure

A data collection procedure is the collection of steps put across to obtain data from the sampled respondents in a study. In this study, data collection procedure comprised of delivering the questionnaire to the respondents' area of work and agreeing upon the time for picking the questionnaire when dully filled. To ensure the respondents were assured of the purpose of the study, a research permit was obtained from the National Commission for Technology and Innovation (NACOSTI) as well as an introduction letter from Jomo Kenyatta University of Agriculture and Technology. These were attached on the questionnaire. The respondents were explained on the purpose of the study and their consent sought. Once the respondents were done filling the questionnaires, the questionnaires were picked and sorted for data analysis process.

3.9 Data Analysis and Presentation

The study used both descriptive and inferential statistics to analyse data. Descriptive statistics such as frequency distribution and measures of central tendency was used to analyse the demographic data. First, preliminary analysis was performed, where screening of the data to check for errors by inspecting the frequencies of each variable, including all the individual items that make up the scales was carried out. Descriptive statistics were used to analyse the quantitative data. The main descriptive statistics used included mean scores, standard deviations and percentages. According to Kinmond (2012), descriptive statistics are essential in describing the findings and enabling the researcher to understand the views of the respondents and their implication in the study. Qualitative data was analysed using thematic content analysis. This data was used to augment the descriptive analysis and give more inference to the descriptive analysis (Ernst & Albers, 2017).

Inferential analysis was also carried out to ascertain the statistical relationship between the independent variables and the dependent variables. This was carried out to test the hypotheses of the study. Regression model was used as shown below:

3.9.1 Simple Regression Models

Simple regression models were used to test the individual hypotheses of the study. A simple regression model utilizes one independent (predictor variable) against the predicted variable (dependent variable).

H₀₁: There is no significant relationship between green purchasing and performance of the Horticultural firms in Kenya

$$Y = \beta_0 + \beta_1 X_1 + e \dots\dots\dots (i)$$

Where:

Y = Performance of Horticultural Firms in Kenya

β_0 = constant

β_1 = regression coefficient for the independent variable

X₁ = Green Purchasing

e = the error term

H₀₂: Reverse Logistics have no significant relationship with performance of the Horticultural firms in Kenya

$$Y = \beta_0 + \beta_2 X_2 + e \dots\dots\dots (ii)$$

Where:

Y = Performance of Horticultural Firms in Kenya

β_0 = constant

β_2 = regression coefficient for the independent variable

X₂ = Reverse Logistics

e = the error term

H₀₃: Green Packaging has no significant relationship with performance of the Horticultural firms in Kenya

$$Y = \beta_0 + \beta_3 X_3 + e \dots\dots\dots (iii)$$

Where:

Y = Performance of Horticultural Firms in Kenya

β₀ = constant

β₃ = regression coefficient for the independent variable

X₃ = Green Packaging

e = the error term

H₀₄: There is no significant relationship between green distribution and performance of the Horticultural firms in Kenya

$$Y = \beta_0 + \beta_4 X_4 + e \dots\dots\dots (iv)$$

Where:

Y = Performance of Horticultural Firms in Kenya

β₀ = constant

β₄ = regression coefficient for the independent variable

X₄ = Green Distribution

e = the error term

3.9.2 Multiple Regression Model

A multiple regression model was used to test the combined effect of the sustainable supply chain management practices on the performance of horticultural firms in Kenya. The multiple regression model seeks to establish whether the variables have a strong impact on the dependent variable when combined.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e \dots\dots\dots (v)$$

Where:

Y = Performance of Horticultural Firms in Kenya

β₀ is the constant coefficient

β₁ - β₄ is the regression coefficient for the independent variables

X₁ = Green Purchasing

X_2 = Reverse Logistics

X_3 = Green Packaging

X_4 = Green Distribution

e is the error term

3.9.3 Testing for Moderating Effect

H_{A5}: Value addition has a significant moderating effect on the relationship between sustainable supply chain management practices and performance of the Horticultural firms in Kenya

$$Y = \beta_0 + (\beta_1 X_1 * Z) + (\beta_2 X_2 * Z) + (\beta_3 X_3 * Z) + (\beta_4 X_4 * Z) + e \dots\dots\dots(v)$$

Where:

Y = Performance of Horticultural Firms in Kenya

β_0 is the constant coefficient

$\beta_1 - \beta_4$ is the regression coefficient for the independent variables

X_1 = Green Purchasing

X_2 = Reverse Logistics

X_3 = Green Packaging

X_4 = Green Distribution

Z = Moderating Variable (Value Addition)

e is the error term

3.9.4 Data Presentation

Mean and standard deviations were used as measures of central tendencies and dispersion respectively. The purpose of conducting descriptive statistics was to deduce, summarize data, analyse items and constructs. This provided insights into the characteristics of the samples. Descriptive statistics provided a basis for inferential statistics using correlation and multiple regressions. The analysed data was presented in

form of tables, pie-charts and bar graphs. Qualitative data was presented in prose form to support the quantitative data.

3.10 Diagnostic Tests

Diagnostic tests were carried out to ensure the assumptions of the regression model are met in the dataset before carrying out hypotheses testing. According to Ernst and Albers (2017), diagnostic tests or test of assumptions ensures that the data is compatible with the assumptions of regression model, thus ensuring that the results from the model are authentic and accurate.

3.10.1 Normality Test

An assessment of the normality of data is a prerequisite for many statistical tests because normal data is an underlying assumption in parametric testing. Before analysis of the data, the model was tested for normality. This test was performed to validate the model and the methodology used in the study. As previous studies have revealed, normal distributions take the form of a symmetric bell-shaped curve. The quantile-quantile plot (Q-Q plot) was used to test for normality in the study. The plot enables the researcher to identify whether the data is normally distributed or not. This compare ordered values of a variable with quantiles of a specific theoretical normal distribution. If two distributions match, the points on the plot form a linear pattern passing through the origin with a unit slope.

3.10.2 Test for Autocorrelation

One of the basic assumptions in linear regression model is that the random error components or disturbances are identically and independently distributed. This is what is called autocorrelation. In a regression model, therefore, it was assumed that the correlation between the successive disturbances is zero. In this study, the DW statistic was used to test for autocorrelation where Ordinary Least Square (OLS) residuals with values ranging from 0 to 4 was adopted. If the D value is 4 then there is negative

autocorrelation, 2 means no autocorrelation and 0 means positive autocorrelation. In the event of autocorrelation, there is need to transform the model so that the error term is serially independent, and then apply OLS to the transformed model to give the usual Best Linear Unbiased Estimator (BLUE).

3.10.3 Linearity Test

According to Cuestas and Regis (2013) linearity refers to a situation where a dependent variable has a linear relationship with one or more independent variables and, thus, can be computed as the linear function of the independent variable(s). In this study, linearity test was carried out where the Goodness of Fit test was applied. This helped in summarizing the discrepancy between the observed values and the projected values under a statistical model. If the F significance value for the nonlinear component is below the critical value (ex., $< .05$), then there is significant nonlinearity (David, 2012).

3.10.4 Test for Multicollinearity

According to Damodar (2010), linear regression analysis assumes that independent variables are not correlated with each other meaning there is no linear relationship among the explanatory variables. On that matter therefore, Multicollinearity is the existence of a perfect relationship between two variables which are both predictors in a given model. As noted by Joshi, Kulkarni and Deshpande (2012) this relationship in many cases makes it extremely difficult to estimate the individual coefficients of the variables. In this study, multicollinearity test was carried out by the use of Variance Inflation Factor (VIF). This method involves giving the estimation of the increase in variance of the coefficients after the correlation of the predictors (Independent variables). If no factors are correlated, the VIFs are 1 but if the VIF is greater than 1, the regressors may be moderately correlated. A VIF between 5 and 10 indicates high correlation that may be problematic and that would require the researcher to remove highly correlated predictors from the model.

3.11 Operationalization of the Variables

The variables in the study were operationalized as shown in table 3.2. This enabled easier and better answering of the research questions when collecting the data for the study. According to Babbie (2002), operationalizing the variables in a study enables the researcher to identify the appropriate questions to ask the respondents when collecting data thus obtaining a reliable data for the study.

Table 3.1: Summary of Operationalization of Variables

Variable/ Elements	Operationalization of the variable	Measure
Green Purchasing <ul style="list-style-type: none"> • Supplier involvement & training • Governance and CSR • Green products 	Range of questions enquiring on green purchasing being used to promote sustainable supply chain and hypothesized relationship with performance.	Likert type scale 1) strongly disagree 5) strongly agree Dummy data of 0 and 1 also used
Reverse Logistics <ul style="list-style-type: none"> • Returns • Redesign • Reprocessing 	Range of statements describing reverse logistics relationship with performance.	Likert type scale 1) strongly agree to 5) strongly disagree Dummy data of 0 and 1 also used
Green Packaging <ul style="list-style-type: none"> • Minimum packaging • Recycling • Use of biodegradable packaging 	Range of statements describing influence of green packaging on performance	Likert type scale 1) strongly agree to 5) strongly disagree Dummy data of 0 and 1 also used
Green distribution <ul style="list-style-type: none"> • Vehicle loading • Reducing carbon footprint • Decentralized storage 	Range of statements describing the aspects of green distribution and the interplay with performance	Likert type scale 1) strongly disagree 5) strongly agree Dummy data of 0 and 1 also used
Value addition <ul style="list-style-type: none"> • Customized Products • Pre-Processing • Waste Elimination 	Range of questions describing the value addition in Sustainable supply chain and performance.	Likert type scale 1) strongly disagree 5) strongly agree Dummy data of 0 and 1 also used

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSION

4.1 Introduction

The chapter entails analysis of data, presentation and interpretation of the findings and discussion as regards the objective of this study. The purpose of the study was to find out the influence of green purchasing, reverse logistics, green packaging and green distribution on performance of the horticultural firms in Kenya and analyse how value addition moderate the relationship between sustainable supply chain management practices and performance of the horticultural firms in Kenya. The first section in this chapter is the questionnaire's response rate. This is followed by the presentation of the results of reliability analysis and demographic information of heads of supply chain section in horticultural firms in Kenya. The fourth section presents the descriptive statistics of the dependent variable, independent variables and the moderating variable. The fifth section details results of the inferential statistics covering correlation analysis, diagnostic tests and multiple regression analysis as well as moderating effect analysis. The results are presented in tables and figures.

4.2 Response Rate

The sample size of the study comprised of 259 horticultural firms in Kenya. The research assistants dropped the questionnaires and agreed with the heads of the supply chain section when to return and pick them. Out of 259 questionnaires which were distributed, 221 were duly filled and returned. The drop-off and pick-up-later method yielded the high response rate of 85.3%. According to Orodho (2003) response rate is the ratio of the interviewed respondents to the sample size intended to be covered by the study. According to Nulty (2011), a response rate of 75 per cent is adequate for analysis, for making conclusions and making inferences about a population. In addition, Fincham (2010) indicates that a response rate of 60% and above is acceptable for analysis.

Further, Kothari (2012) indicates that a response rate of 50% should be considered average, 60% to 70% adequate while a response rate of above 70% should be regarded as excellent. This implies that the response rate of 85.3% was adequate for analysis, drawing conclusions and reporting.

Table 4.1: Response Rate

Questionnaires	Frequency	Percent
Returned	221	85.3%
Unreturned	38	14.7%
Total	259	100.0%

4.3 Pilot Study Results

According to Singpurwalla (2013), conducting a pre-test enables a researcher to assess the validity of data extraction tool through elimination or ambiguous questions. A pilot survey of 26 respondents who were not part of the main study, comprising of 10% of the sample size was carried out to test the reliability and validity of the research instrument intended to be used in the research study. The data collected from the pilot study was not used in the final analysis.

4.3.1 Reliability of the Research Instrument

Reliability is the extent to which data collection techniques or analysis procedures will yield consistent findings (accuracy and precision of a measurement procedure). It establishes if the measure is able to yield the same results on other occasions and if similar observations are reached by other observers and transparency in the raw data. Reliability was used to check the internal consistency of the questionnaire.

Cronbach's coefficient alpha which determines the internal consistency or the average correlation of items within the test were used after collection of data. Alpha values range from zero – no internal consistency to one – complete internal consistency. Blumberg, Cooper and Schindler (2011) suggested that if values were too low, either too few items

were used or the items had little in common, it is concluded there was no internal consistency. Flick (2014) posits that reliability of over 0.70 is considered acceptable.

The findings shown in Table 4.2 revealed that the Cronbach's Alpha coefficient for the first variable (green purchasing) was 0.851 with six (6) number of items (questions). This is within the threshold of 0.70 hence the questions under the variable – green purchasing were ruled to be reliable.

The Cronbach's Alpha coefficient for the variable reverse logistics was 0.911 with seven (7) items/questions. The coefficient met the threshold of 0.70 hence all the items under the variable were adopted in the questionnaire. Green packaging had a Cronbach's Alpha coefficient of 0.920 which also was considered reliable since it met the threshold of 0.70.

Green distribution had a Cronbach's Alpha coefficient of 0.596 with five items while value addition had a Cronbach's Alpha coefficient of 0.613 with 5 items/questions. The two variables had the least number of questions and their Cronbach's Alpha coefficients did not meet the 0.70 threshold. This means that an action was required to enhance their reliability. According to Creswell (2011), when the number of items are low, there is a high probability for the instrument to be unreliable. Therefore, more questions were added on the two items to enhance their reliability. The overall reliability of the instrument was 0.929 which was within the threshold hence the questionnaire was generally ruled to be reliable.

Table 4.2: Reliability Results

Variables	Cronbach's Alpha	Number of Items	Decision
Green Purchasing	0.851	10	Meets the threshold. Adopt all the items
Reverse Logistics	0.911	10	Meets the threshold. Adopt all the items
Green Packaging	0.920	9	Meets the threshold. Adopt all the items
Green Distribution	0.896	9	Meets the threshold. Adopt all the items
Value Addition	0.613	9	Does not meet the threshold.
Performance	0.706	9	Meets the threshold
Overall Reliability	0.929	41	Meets the threshold

N = 26

4.3.2 Validity of the Research Instrument

Validity is the ability of the research instrument to measure what it is supposed to measure (Creswell, 2013). There are several types of validity tests that can be conducted on an instrument namely construct, content, face and criterion related validity. The respondent rate of question flow and the right interpretation of the questions in the questionnaire indicated how valid are the instrument for the study. This was established during the pretesting session. The pre-testing enabled assessing the clarity so as to establish the items and affirm their adequacy and discard or modify those items found to be inadequate in measuring the variables. This way, the quality of the questions adopted in the questionnaire was improved thus increasing the validity. Construct validity refers to the suitability of the scale used for the purpose of operationalizing the theoretical construct and measuring it. Content on the other hand is the degree to which the items on a test are representative of the universe of behaviour that the test was designed to sample (Trochim, Donnelly & Arora, 2016).

To verify content validity, a thorough literature review was conducted to identify necessary items to measure the variables of the study as shown in the conceptual framework. The questionnaire was further subjected to supervisors and two experts in the field of supply management scrutiny in order to ascertain face validity, coherence and comprehensiveness of the suitability of the survey items. This was meant to assess the clarity of the instrument items so that those items found to be inadequate in measuring the variables were either discarded or modified to improve the quality of the research instrument thus increasing its validity.

Principle Component Analysis (PCA) was used to test for the Construct validity. This type of validity is the ability of the research instrument to measure what it purports to measure. According to Young (2013), construct validity of an instrument can be tested by correlating the questions or components with others and arguing from the pattern of correlations that the measure is associated with these variables in theoretically predictable ways. In this study, the correlation of the components of the piloted questionnaire was done using Principal Component Analysis (PCA) method of factor extraction and the KMO and Bartlett's Test. The findings on KMO and Bartlett's Test are as shown in Table 4.3. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy shows that the sampling adequacy was between 0.556 and 0.810. According to Shrestha (2021), KMO values are between 0 and 1. The closer the value is to 1, the more adequate the sampling. The rule of the thumb according to Costales, Catulay, Costales and Bermudez (2022) is that the KMO value should be 0.50 and above. This is an implication that the questionnaire met the adequate sampling. The Bartlett's Test of Sphericity showed a significance value of 0.000 an indication that there was a significant correlation among the variables.

Table 4.3: KMO and Bartlett's Test for Construct validity

Variable	Bartlett's Test of Sphericity {Approx. Chi-Square(Sig./P-value)}	Kaiser-Meyer-Olkin Measure of Sampling Adequacy
Green Purchasing	71.532 (0.000)	.742
Reverse Logistics	117.041(0.000)	.810
Green Packaging	176.908(0.000)	.786
Green Distribution	32.624(0.000)	.613
Value Addition	56.050(0.000)	.595
Firm Performance	74.616 (0.000)	.556

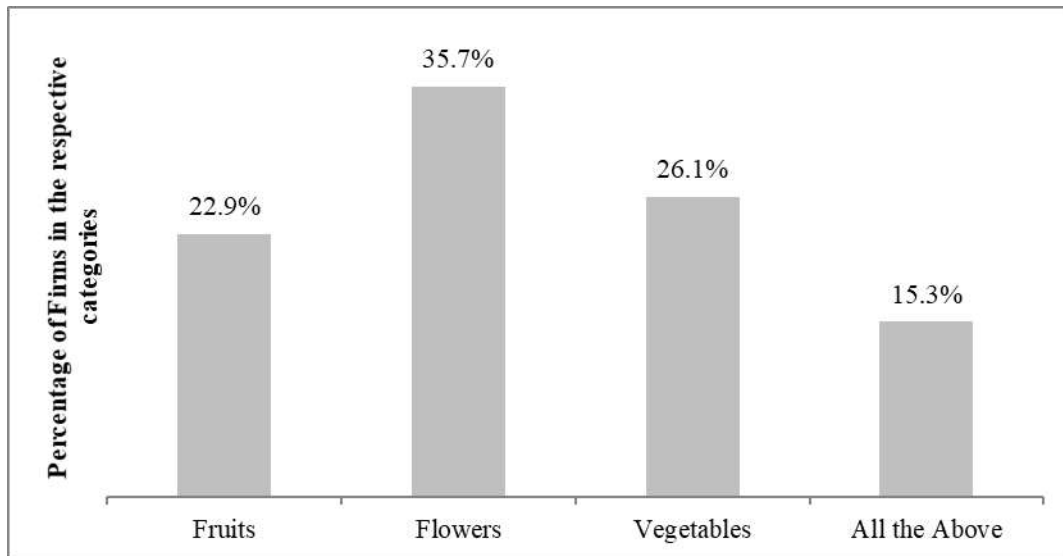
4.4 Analysis of the Demographic Information

This section sought to determine the demographic information of the respondents. The respondent comprised of heads of supply chain section in horticultural firms in Kenya. The demographic information consisted of the broad category of the horticultural produce that the firms dealt with, the specific category of the produce, the number of markets the companies sold their horticultural produce and the respondents' level of experience in the horticultural firms.

4.4.1 Distribution of the Firms by the Category of Horticultural Produce

The study sought to establish the distribution of the horticultural firms based on the category of produce that they dealt with. According to the Horticultural Association of Kenya (2022), the horticultural subsector has companies dealing with production and sale of horticultural produce mainly categorized into vegetables, fruits and flowers. From the findings as shown in Figure 4.1, it was established that most of the firms (35.7%) were dealing with production and sale of flowers, 26.1% were dealing with vegetables, 22.9% of the firms dealt with fruits while 15.3% dealt with a combination of flowers, fruits, and vegetables. According to the Kenya Directorate of Horticulture (2019), the flower industry had an economic value of Kshs.113.2 billion which is 74% of the sub-sector as of 2018, followed by vegetables with Kshs.27.7 billion (18%) and fruits with an economic value of Kshs.12.8 billion (8%). This compares with the study

findings that portray the flowers sub-sector with the highest number of companies,



followed by vegetables and fruits.

Figure 4.1: Category of Horticultural Produce

4.4.2 Distribution of the Firms by Number of Specific Horticultural Produce

The study sought to establish the number of specific horticultural produce that the firms dealt with. From the broader categories in the industry (fruits, vegetables, & flowers), firms narrow down to specific produce such as avocados, macadamia, ornaments, specific types of flowers and vegetables, etc. From the findings as shown in Figure 4.2, it was established that most of the firms had less than 3 specific horticultural products (39.1%), 32.4% of the firms were dealing with between 3 and 5 products, 17.2% were dealing with between 6 and 10 products while 11.3% of the firms were dealing with more than 10 specific horticultural products. The findings imply that most of the firms have diversified to have more than one product, an indication that they could have

multiple markets that would require effective supply chain processes to ensure seamless flow of the produce to the markets.

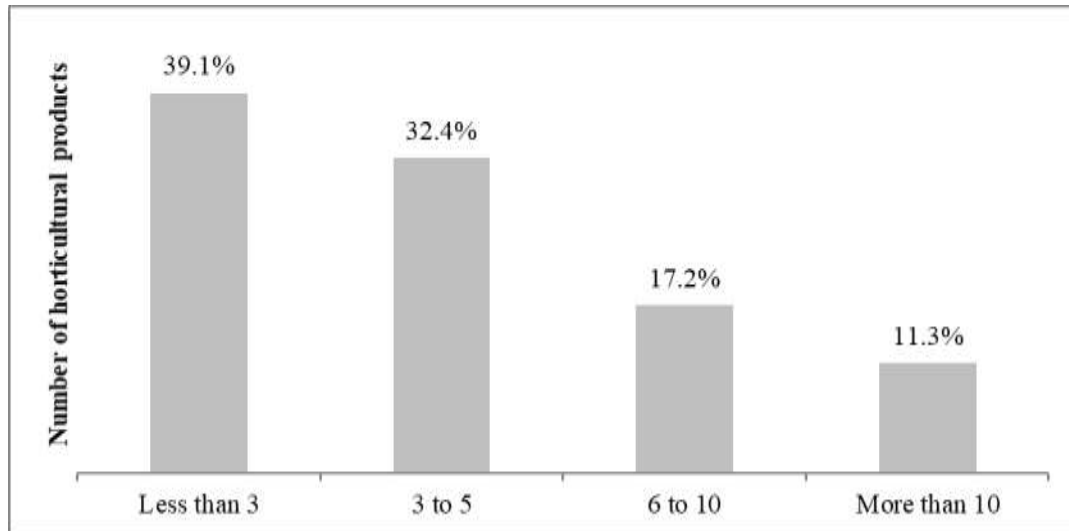


Figure 4.2: Number of Specific Horticultural Produce

4.4.3 Distribution of the Firms by the Number of Markets for their Produce

The study sought to establish the number of markets that the horticultural firms surveyed soled their produce. The findings as shown in Figure 4.3 revealed that 45.8% of the firms were operating in between 2 and 5 markets, 28.5% were dealing with only one market, 16.4% were selling their produce to between 6 and 10 markets while 9.3% of the horticultural firms surveyed were selling their produce in more than 10 markets. The findings imply that most of the firms have expanded their markets to strengthen their competitiveness. According to Zheng, Li, Liu, Jia, and Lev (2021), firms selling their products in several international markets require extensive supply chain processes to ensure the product is effectively supplied and availed to the customers in the right quantity, quality and time.

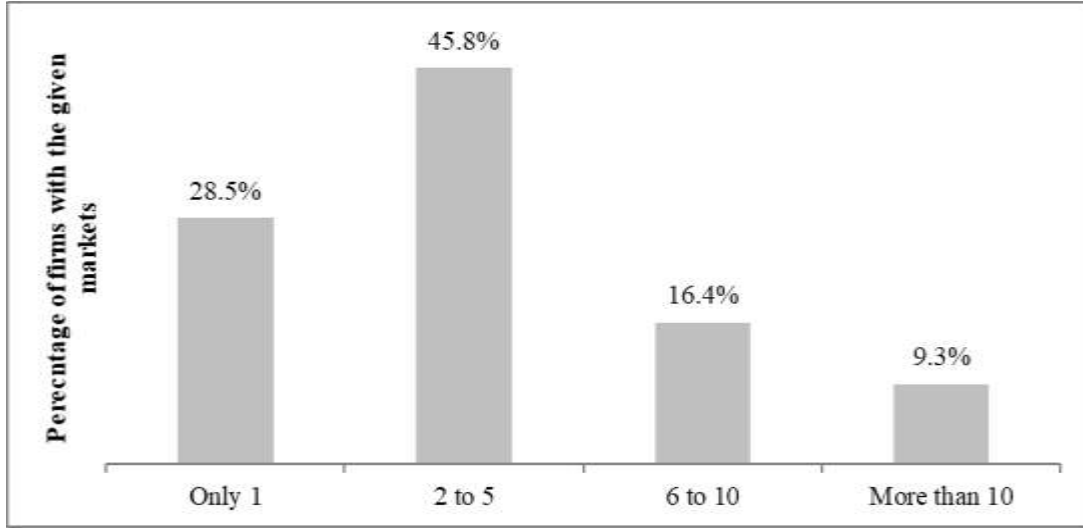


Figure 4.3: Number of Markets for the Horticultural Firms

4.4.4 Respondents' Duration of Working in Horticultural Firms

The heads of supply chain section were asked to specify the duration they had been working in their horticultural firms. The results were shown in Figure 4.4, from the findings, 49.1% of the heads of supply chain section indicated that they had been working in their horticultural firms for over 10 years, 41.7% indicated they been working between 6 and 5 years and 9.2% indicated they have been working for between 1 to 5 years. These findings indicate that most of the heads of supply chain section in horticultural firms in Kenya had been working in their organizations for over 10 years. This is an indication they had gained considerable experience about the supply chain section in the industry, hence they were in a position to give reliable information to the study.

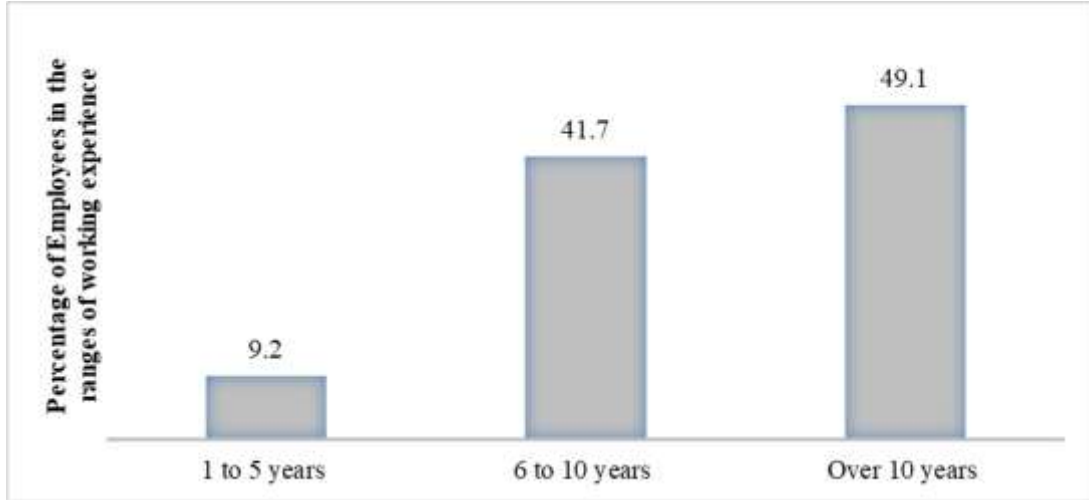


Figure 4.4: Length of time working in the organization

4.5 Descriptive Analysis of the Findings

In this section, the study presents findings mainly on Likert scale questions for each study variable. The heads of supply chain section in the horticultural industry were asked to give the level of agreement in regard to various statements relating to the study objectives. The question was on a 5-point Likert's scale. To measure the indicators of independent variables, a five-point Likert scale was used. Where 1 was strongly disagree, 2 was disagree, 3 was moderate, 4 was agree and 5 was strongly Agree. The mean (M) value of 0.5-1.4 was interpreted as strongly disagree, 1.5-2.4 as disagree, 2.5-3.4 as uncertain, 3.5-4.4 as agree and 4.5-5 as strongly agree. On the other hand, a standard deviation (SD) value greater than two means that the respondents had differing opinions while a value less than 2 is low and indicates that the respondents and similar opinions. The results provided were analysed and the findings interpreted using percent, means and standard deviation values.

4.5.1 Green Purchasing

The head of supply chain section were asked to indicate their level of agreement with the following statement relating to the influence of green purchasing on performance of the

Horticultural firms in Kenya. Table 4.4 presents the findings obtained. From the findings, the study revealed that majority of the respondents agreed that their firm cooperates with suppliers for eco-design of inputs as shown by mean of 3.982 and standard deviation of 1.370. Their firms have reduced the purchase of hazardous materials as shown by mean of 3.948 and standard deviation of 1.263. Their firm conducts governance and corporate social responsibility seminars as shown by mean of 3.915 and standard deviation of 3.915.

Respondent further agreed that their firm conducts environmental audits for supplier's internal management as shown by mean of 3.889 and standard deviation of 1.381. The respondents further agreed that their respective firms purchased environmentally friendly materials as shown by mean of 3.777 and standard deviation of 1.275 and their firm has reduced purchase of items that are difficult to dispose of as shown by mean of 3.698 and standard deviation of 1.331.

The study revealed that horticultural firms had promoted green purchasing in the supply chain processes through asking potential suppliers to provide the organization with the most environmentally sound product, with the highest quality, at the lowest price, request to suppliers for the most energy-efficient product at the same or lower price than a traditional alternative, developing a code of conduct that includes green, spelling out the expected behaviours in terms of labour, products, emissions and handling of waste, educating the supplier on the importance of going green , sponsoring training programs for supplier and explaining to them exactly what the company is looking for in supplier, keeping tabs on suppliers, either by encouraging them to respond to audit mechanisms and practicing what their organization taught.

The respondents were further asked to comment on the effectiveness of embracing green purchasing in their respective firms and the extent this contributed to the firms' performance. From the findings, it was established that most of the participants commented that green purchasing was not adequately embraced although their respective firms were in the framework of putting across key measures to ensure their

suppliers observe environmental friendly measures. One of the respondents noted the following:

“Generally our company has been trying to integrate green purchasing where we specify to our suppliers that they have to comply with our environmental sustainability policies. However, this is an idea that has been in the pipeline, but I believe it is the high time we embrace sustainability right from purchasing”

The respondents also indicated that embrace of green purchasing would be essential for their respective firms to save on costs and strengthen their performance. One of the respondents indicated the following:

“I strongly believe that if we integrate green purchasing to the right perspective and ensure all our suppliers comply we can compete and perform better. Most of the customers in the modern era want to have products that embrace sustainability. If we start by purchasing the right products including the fertilizers we use and other farm inputs, I think we can be more competitive, save costs and perform better”

The findings concur with Pak (2013) who found that green purchasing was a major aspect in green supply chain that ensured the best products were acquired thus promoting value addition. Pak (2013) contemplated that through purchase of goods that are environmentally friendly and involving the suppliers in producing such goods, there is high capability of the firm to record increased supply chain performance and at the same time increase the value of the products. Min and HGalle (2011) established that involving suppliers was one of the major practices of promoting green purchasing through which sustainable supply chain was realised. The findings also concur with those by Khan et al. (2022) who established that through continuous investment in green purchasing, firms stands a better chance to perform and provide more customer-centric products. According to Sharma et al. (2020), through green purchasing, companies are

able to have eco-friendly inputs and this promotes the entire of their supply chain as far as sustainability is concerned.

Table 4.4: Descriptive Statistics on Green Purchasing

Statement	N	1 %	2 %	3 %	4 %	5 %	Mean	Std. Dev
Our firm cooperates with suppliers for eco-design of inputs.	221	2.7	2.1	2.7	79.7	12.8	3.982	1.370
Our firm purchases environmentally friendly materials.	221	4.8	4.8	7.5	74.9	8.0	3.777	1.275
Our firm conducts environmental audits for supplier's internal management.	221	2.7	2.7	5.9	80.7	8.0	3.889	1.381
Our firm conducts governance and corporate social responsibility seminars.	221	2.7	4.8	2.7	78.6	11.2	3.915	1.343
Our firm has reduced purchase of items that are difficult to dispose of.	221	2.1	5.3	14.4	77.5	0.5	3.698	1.331
Our firm has reduced the purchase of hazardous materials	221	2.7	2.7	5.9	74.9	13.9	3.948	1.263
The suppliers are approved based on their ability to supply green products	221	22.7	12.9	5.9	40.7	18.0	3.109	1.881
The company carries out frequent CSR by enlightening the suppliers, customers and community on green purchasing	221	12.3	14.8	2.7	48.6	21.2	3.215	1.343
Green purchasing has been instrumental in enabling the company save on operational costs	221	22.1	15.3	14.4	37.5	10.5	3.098	1.731

4.5.2 Reverse Logistics

This section sought to determine from the heads of supply chain sections the level of agreement with statements relating to the relationship between reverse logistics and firm performance in the horticultural firms in Kenya. Table 4.5 presents the findings obtained. From the findings, the respondents were in agreement that redesigning defective merchandise had been emphasised in their firm to meet customer demands and avoid wastage as shown by mean of 3.988 and standard deviation of 1.475. According to Saxena et al. (2023), redesigning the merchandise so as to allow proper handling and encourage returns is an essential way of promoting a sustainable supply chain that is considerate of the environmental conservation.

Further, their firms had a supply chain framework that provided for product returns as shown by mean of 3.961 and standard deviation of 1.476, and that they were realizing cost savings because of reverse logistics activities as shown by mean of 3.955 and standard deviation of 1.546. They agreed that the company had laid out proper measures to ensure reprocessing and rebranding of returned goods as shown by mean of 3.994 and standard deviation of 1.343 and had embraced a mainstream to allow our stakeholders to return goods that did not their standard or needed to be remanufactured as shown by mean of 3.856 and standard deviation of 1.525. Moreover, their organization had a well-organized channel for reverse logistics as shown by mean of 3.836 and standard deviation of 1.426 and had enhanced systems for screening of defective and unwarranted returned merchandise as shown by mean of 3.830 and standard deviation of 1.441.

The study established that additional measures had been taken by the firm that could enhance reverse logistics in the supply chain processes included: knowing why returns happen in the first place, having a transparent monitoring systems in place, tracking all aspects of reverse logistic, collaboration with retailer and wholesalers, rethinking transport and logistics, having clearly established return plans, investing in the right technology for reverse logistics and having a return labels on the original packaging.

The respondents were further asked to comment on how effective and committed their firms were in embracing reverse logistics. Most of them noted that through their subsidiaries and other distribution channels, they encouraged their customers who had returns to utilize them so as to save on costs and enhance customer satisfaction. One of the respondents indicated the following:

“For reverse logistics, I would agree that we have not been badly off. You see, our industry has a lot of dynamics and most customers are very specific on what they want. For us to ensure their satisfaction, we ensure that we allow returns in case the quality of say our flowers or fruits do not meet their requirements in terms of quality”

The findings concur with Badenhorst (2013) who established that reverse logistics was key in promoting value addition through which goods that needed to be reprocessed to enhance quality as well as proper disposal were effectively taken back to the supplier. Further, promoting reverse logistics played a significant role in achieving the green supply chain management but still required cost saving measures due to the processes and costs involved in returning the commodities to the supplier. Jayant, Gupta and Garg (2012) found that as a way of promoting the effectiveness of procurement process and meeting the customer needs, reverse logistics was necessary through as customers could return goods not meeting their standards or right description.

Table 4.5: Descriptive Statistics on Reverse Logistics

Statement	N	1 %	2 %	3 %	4 %	5 %	Mean	Std. Dev.
Our firm has a supply chain framework providing for product Returns.	221	1.1	2.7	2.7	85.6	8.0	3.96	1.47
We have embraced a mainstream to allow our stakeholders to return goods that do not their standard or need to be remanufactured	221	2.7	4.8	1.1	87.2	4.3	3.85	1.52
The organization has enhanced systems for screening of defective and unwarranted returned merchandise	221	3.7	2.1	5.9	83.4	4.8	3.83	1.44
We are realizing cost savings because of our reverse logistics activities	221	2.1	1.1	2.1	88.8	5.9	3.95	1.54
Our organization has a well-organized channel for reverse logistics	221	3.2	3.2	5.3	82.9	5.3	3.83	1.42
The company has laid out proper measures to ensure reprocessing and rebranding of returned goods	221	2.1	2.1	3.7	78.6	13.4	3.99	1.34
Redesigning defective merchandise has been emphasised in our firm to meet customer demands and avoid wastage	221	1.1	1.1	3.2	86.1	8.6	3.98	1.47
The management intends to have more robust policies to enhance the effectiveness of returns management	221	23.7	12.1	5.9	43.4	14.8	3.43	1.44
The redesign products in our company have been effectively accepted by the customers	221	22.1	11.1	2.1	48.8	15.9	3.75	1.04
There has been an increase in performance as a results of the embrace of reverse logistics	221	23.2	13.2	5.3	42.9	15.3	3.63	1.03

4.5.3 Green Packaging

In this section the respondents indicated their level of agreement with statement relating to the influence of green packaging on performance in the horticultural firms in Kenya. Table 4.6 presents the findings obtained. From the findings, the study found that majority of the respondents agreed that the company had put appropriate measures to reduce the packaging material used so as to reduce wastage as shown by mean of 4.007 and standard deviation of 1.251, and that the storage of the merchandise in the firm was put at one central place to avoid repackaging as shown by mean of 3.975 and standard deviation of 1.169. They further agreed that through adherence to green packaging prospects the company had enhanced efficiency and cost saving thus enhancing value addition as shown by mean of 3.903 and stand deviation of 1.345.

The findings further revealed that most of the respondents agreed that the material used in packaging was produced in a manner that itself was environmental friendly and non-hazardous as shown by mean of 3.902 and standard deviation of 1.235. Moreover, the respondents averred that the process of packaging was mainstreamed towards avoid emissions or any other polluting means as shown by mean of 3.837 and standard deviation of 1.207, and that the customers were encouraged to adopt to the biodegradable materials when seeking for repackaging of their orders as shown by mean of 3.836 and standard deviation of 1.426. In addition, they agreed that their firms encouraged recycling of materials used in packaging as shown by mean of 3.831 and standard deviation of 1.300, and that they encouraged their suppliers to use biodegradable materials as shown by mean of 3.817 and standard deviation of 1.142.

The study revealed that horticultural firms' commitment and goodwill to enhance green packaging in the procurement operations was through: using recyclable materials for environmentally friendly packaging, using unique, innovative, or high-tech materials, going natural for environment-friendly packaging, creating custom packaging boxes to preserve space and materials throughout the distribution process, incorporating packaging into the product and arranging our products in different ways.

From the qualitative data obtained through open-ended questions, the respondents were asked to comment on the extent to which they embraced green packaging and whether it contributed to their firms' performance. The findings revealed that most of the respondents were of the opinion that their embrace of green packaging was moderate, although the industry required more embrace of green packaging. One of them noted the following:

“If you have walked around you could see that nowadays we use cartons for packaging our produce. This is unlike the polythene bags that were used there before. We also have reusable and recyclable packages which are most preferred by our customers. Yes, I agree that green packaging is a good move to attract customers and stimulate performance especially in the horticultural industry”

The findings concur with Doszhanov and Ahmad (2015) study which portrayed that there are significant relationships between green brand awareness, green brand trust, green perceived value, and customer's intention to use green products. Ogecha (2016) Found that recycling had a significant influence on value addition and customer service through meeting customer needs and expectations. According to Wandosell et al. (2021), green packaging should be upheld as an essential enabler to sustainability and continued competitiveness and performance.

Table 4.6: Descriptive Statistics on Green Packaging

Statement	N	1	2	3	4	5	Mean	Std. Dev
		%	%	%	%	%		
The company has put appropriate measures to reduce the packaging material used so as to reduce wastage	221	3.2	2.1	3.2	73.8	17.6	4.007	1.251
We encourage our suppliers to use biodegradable materials	221	4.8	4.8	8.6	69.0	13.4	3.817	1.142
The material used in packaging is produced in a manner that itself is environmentally friendly and non-hazardous	221	3.2	3.2	6.4	73.8	13.4	3.902	1.235
The suppliers of the packaging materials are effectively involved so as to enable them produce environment friendly materials	221	5.9	3.2	9.6	70.1	10.7	3.764	1.168
The storage of the merchandise in our firm is put at one central place to avoid repackaging	221	4.8	2.1	4.8	69.0	19.8	3.975	1.169
The customers are encouraged to adopt to the bio-degradable materials when seeking for repackaging of their orders	221	3.2	3.2	5.3	82.9	5.3	3.836	1.426
Our firm encourages recycling of materials used in packaging	221	3.2	3.2	8.6	77.0	8.0	3.831	1.300
The process of packaging is mainstreamed towards avoid emissions or any other polluting means	221	4.8	2.1	9.6	72.2	11.2	3.837	1.207
Through adherence to green packaging prospects the company has enhanced efficiency and cost saving thus enhancing value addition	221	3.2	4.8	2.1	78.6	11.2	3.903	1.345

4.5.4 Green Distribution

In this section the respondents were requested to indicate their level of agreement with statements relating to the influence of green distribution on performance of the horticultural firms in Kenya. Table 4.7 presents the findings obtained. From the findings

in Table 4.6, the respondents were in agreement that vehicles were effectively loaded to reduce the number of trips during distribution as shown by mean of 4.021 and standard deviation of 1.265, and that the vehicles used in distributions were put in good condition to ensure they deliver efficiently and less pollution as shown by mean of 3.91 and standard deviation of 3.961 and standard deviation of 1.149. Further, they concurred that they had put measures to ensure the warehouses and distribution centres are decentralized near the customers as shown by mean of 3.955 and standard deviation of 1.199, and that the trips were properly arranged to ensure same-route customers were supplied in one trip as shown by mean of 3.836 and standard deviation of 1.313. In addition, they agreed that measures had been put by the organization to ensure the distribution means used observed carbon print as shown by mean of 3.816 and standard deviation of 1.214. According to Yildiz and Sezen (2019), through green distribution, organizations enhance their lead time and delivery time, thus effectively contributing to customer satisfaction. This simultaneously contributes to performance as the organizations not on make more sales, but also saves on operational costs which maximize the profit revenues. Moreover, Chin, Tat, and Sulaiman (2015) support the findings by indicating that through continuous embrace of green distribution, the seamless flow of materials is enhanced, while at the same time ensuring the that company is significantly contributing to sustainable practices that are integral for environmental conservation.

The study further sought to assess the opinions of the respondents in regard to the extent to which they embraced green distribution and whether it contributed to their respective firms' performance. From the findings, the respondents commented that their distribution systems were not as effective, but indicated that their respective firms were committed to ensuring greener distribution processes. The following were comments from a respondent:

“Our company sometimes tries to reduce emissions so as to conserve the environment. This also helps the company save on operational costs. However, I feel we still have a long way to go to embrace more sustainable distribution

methods and practices. In future, we plan to tap more green energy including solar energy both in our warehouses and trucks.”

The study revealed that most horticultural firm were committed to ensuring green distribution achieved through: clean idle truck policies, speed management policies, using eco-friendly tyres, using the best additives available, engine shutdown policies, adoption of solar energy at the warehouse and waste recycling programs. Hasan (2013) concluded that green distribution has an important part to play in the connection between natural development and upper hand. Al-Odeh and Smallwood (2012), indicated the factors like fuel, methods of transport, framework, and operational practices are significant components to consider in creating green transportation. Sánchez-Flores *et al.* (2020) found a positive connection between green circulation and ecological execution. The authors alluded that when companies commit their resources and skills to the embrace and support of green distribution, they save more costs and are more aligned to the climatic needs of the society and environment, which is essential for sustainability.

Table 4.7: Descriptive Statistics on Green Distribution

Statement	N	1 %	2 %	3 %	4 %	5 %	Mean	Std. Dev
We have put measures to ensure the warehouses and distribution centres are decentralized near the customers	221	3.2	4.8	3.2	71.1	17.6	3.955	1.199
The vehicles used in distributions are put in good condition to ensure they deliver efficiently and less pollution	221	1.1	4.8	8.0	69.0	17.1	3.961	1.149
The company has significantly reduces its carbon print from its distribution systems in the past five years	221	4.8	3.2	7.5	73.8	11.2	3.816	1.214
Vehicles are effectively loaded to reduce the number of trips during distribution	221	3.2	1.1	3.2	74.3	17.6	4.021	1.265
The trips are properly arranged to ensure same-route customers are supplied in one trip	221	3.2	3.2	8.0	77.5	8.0	3.836	1.313
The vehicle loadings are arranged based on the customers' location to save on offloading time	221	13.7	22.1	5.9	43.4	14.8	3.830	1.441
The management ensures embrace of green and sustainable distribution means such as use of solar-powered refrigerators to reduce carbon footprint	221	21.6	10.7	9.3	38.8	19.9	3.715	1.116
The embrace of green distribution has enabled the company save more on the cost of operation	221	17.9	23.7	8.3	33.2	16.9	3.413	1.518
The overall performance of the company has been determined by the level of sustainability of our distribution	221	20.8	18.2	4.1	37.2	19.7	3.517	1.394

4.5.5 Value Addition

Respondents indicated their level of agreement with statement relating to moderating effect of value addition on the relationship between sustainable supply chain

management practices and performance of the Horticultural firms in Kenya. Table 4.8 presents the findings obtained. From the finding, the study found that majority of the respondents agreed that their companies customized their products based on the customers' preferences as shown by mean of 3.988 and standard deviation of 1.182, and that more of their customers preferred tailor-made products that require less adjustments to meet their final need as shown by mean of 3.909 and standard deviation of 1.359. According to Goshime, Kitaw, and Jilcha (2019), value addition is instrumental in supporting the dynamic needs of the customers, thus enhancing their satisfaction, a key recipe to a performing organization.

Moreover, they agreed that their respective companies pre-processed their products before they were sold to the market and that the customers who required pre-processed goods agreed to pay extra price for the product as shown by mean of 3.902 and standard deviation of 1.235, and that through pre-processing the companies were able to extend the shelf-life of the products as shown by mean of 3.850 and standard deviation of 1.220. Further, they concurred that their respective companies ensured all their products were free from excessive wastes before they are sent to the customer as shown by mean of 3.738 and standard deviation of 1.168.

The respondents were asked to comment on the extent to which their respective companies had embraced value addition and its role in ensuring better sustainable supply chain practices. From the findings, most of the respondents commented that value addition was deemed integral in their respective firms based on the nature of their business. They added that for their companies to have more market and get more prices for their produce, value addition was instrumental. One of the respondents noted the following:

“Horticultural industry is one industry that can only survive through value addition. We always try our best to add value to products like vegetables and fruits. This enhances their shelf life while enabling us to charge more prices thus

making additional profits. However, if we can tie this with sustainable supply chain, I believe we can generate a lot from value addition.”

Another respondent noted the following:

“I agree that value addition would be integral in enabling our firm to minimize wastage and enhance customer satisfaction by supplying more value-added products. However, as far as we’re concerned, I think we have not been effectively focusing on value addition, especially in line with supply chain. However, I believe we still have a chance to bring more innovations that will strengthen value addition to our products”

The study revealed that horticultural firms enhance value addition to achieve its competitiveness and enhance performance, through creation more superior products than competitors, having environmentally friendly products of higher quality, creating customized products for different market segments and having unique products that are hard to imitate in the market. The findings concur with Karantininis *et al.* (2008) concluded that organization, stage in the value chain and market power are important to innovation, and that Wholesalers and retailers tend to have a larger number of new products (Model I), whereas manufacturing firms tend to invest more in research and development. Mapiye *et al.* (2007) indicated that increased value addition can be achieved by provision of appropriate incentives for the establishment of agro processing industries in the rural areas and promotion of partnerships between communal farmers and agribusiness.

Table 4.8: Descriptive Statistics on Value Addition in the Horticultural Industry

Statement	N	1 %	2 %	3 %	4 %	5 %	Mean	Std. Dev
Our company customizes the products based on the customers' preferences	221	6.5	3.2	9.6	70.1	10.2	3.738	1.168
More of our customers prefer tailor-made products that require less adjustments to meet their final need	221	4.8	1.1	4.8	69.5	19.8	3.988	1.182
The company pre-processes its products before they are sold to the market	221	3.2	3.2	6.4	73.8	13.4	3.902	1.235
Customers who require pre-processed goods agree to pay extra price for the product	221	4.8	1.1	9.6	72.7	11.2	3.850	1.220
Through pre-processing we are able to extend the shelve-life of the products	221	3.2	4.8	1.1	79.7	11.2	3.909	1.359
More waste in our products is eliminated through valued addition process	221	24.8	11.1	4.8	39.5	19.8	3.788	1.182
The company ensures all its products are free from excessive wastes before they are sent to the customer	221	33.2	13.2	6.4	43.8	13.4	3.802	1.235
Our company has continually enhanced the quality of its products through value addition	221	24.8	21.1	9.6	32.7	11.2	3.650	1.220
Value addition has been instrumental in enhancing the satisfaction of our customers	221	17.9	18.2	4.8	37.4	21.7	3.507	1.108

4.5.6 Performance of Horticultural Firms in Kenya

In this section the study sought to determine from the head of supply chain section the competitive position of their horticultural firms. The study findings revealed that most of heads of supply chain section in horticulture firms in Kenya considered their organization as market leader as shown by 42.1%, 31.2% considered their organization as market challenger, 16.3% considered their organizations as market niche and 10.4%

considered their organization as market followers. This is an indication that most of the horticultural firms in Kenya were market challengers and market followers.

From the findings the study revealed that major source of performance for horticultural firms was: quality of the products, adherence to environmental laws in their operations, market segmentation through products for each market, packaging products that differentiated them from the competitors, having collaboration with suppliers who observe environmental laws and involvement in environmental corporate social responsibility activities. The findings concur with Liao, Hu, and Ding (2017) who revealed that performance was to a great extent determined by the innovativeness of an organization. Subba (2016) established that through proper measures of supply chain management and ensuring that it was effectively done, the performance of the crop production companies was achieved.

The study collected secondary data on indicators of performance in horticultural firms in Kenya from 2014 to 2021. The findings obtained were as presented in Table 4.9. From the findings on gross profits as shown in Figure 4.6, it is evident that the gross profit in the horticultural firms in Kenya has been increasing over the years. From 2014 to 2015 there was a slight increase in the gross profits. In 2019, the profits increased to the highest (KES 593Million) in seven years, but declined drastically to KES 419Million in 2020, a decline that could be largely be attributed to the COVID-19 pandemic. However, in 2021, an increase in gross profits of KES 520Million was recorded, an indication that the industry was recovering from the Covid-19 effects. The number of customers in the horticultural firms in Kenya had been rising from 2014 to 2019, but a decline was recorded in 2020. There is an increase in the customer base to 43 million in 2021, an indication that the industry could be on the right trajectory in recovering from the distress brought about by the pandemic.

The study further sought to assess the opinions of the respondents in respect to their level of agreement on the statements regarding the performance of horticultural industry in Kenya. The findings as shown in Table 4.10 revealed that majority of the respondents

disagreed that their respective companies' products were available in more markets than they were three years ago (Mean = 2.18; Standard Deviation = 1.24) and that the companies had increased variety of products sold to their markets over the last five years (Mean = 1.89; Standard Deviation = 0.96). The respondents further disagreed that their respective companies' products had been easily sold in new markets than the previous years (Mean = 2.08; Standard Deviation = 1.35) and that the number of customers in the companies had significantly grown for the past three years. The respondents further disagreed that there were more orders for their products than there were in the previous years and that the sales revenue had significantly grown in the previous years (Mean = 2.24; Standard Deviation = 1.18). The findings compare with what was observed on the statement of the problem where most of the firms in the horticultural manufacturing industry have been unable to record a growth in their revenues, profits and market share over the past decade.

Table 4.9: Descriptive Statistics on Performance of Horticulture Firms

Statements	SD (%)	D (%)	N (%)	A (%)	SA (%)	Mean	Std. Dev.
Our company's products are now available in more markets that they were three years ago	36.4%	39.6%	14.0%	6.9%	3.1%	2.18	1.24
The company has increased variety of products sold to its markets over the last five years	43.9%	38.9%	10.8%	2.5%	3.8%	1.89	0.96
The company's products have been easily sold in new markets that it was three years ago	26.4%	43.8%	8.9%	10.1%	7.8%	2.08	1.35
The number of customers in our company has significantly grown for the past three years	54.8%	27.4%	2.5%	5.1%	10.2%	2.16	1.18
There are more orders for our products that it was three years ago	29.6%	45.1%	5.7%	5.2%	14.4%	2.24	1.42
The sales revenue has significantly grown in the past three years	33.1%	29.9%	19.1%	3.2%	14.6%	2.39	1.34
Our company is likely to expand due to the increase in its profits	38.3%	30.0%	7.0%	12.7%	12.0%	2.18	1.08

4.6 Factor Analysis

Factor analysis is essential for establishing the factor loadings (strength) of each question in a research question. This enables the researcher to remove the questions that have less contribution to the research objectives and retain only the key relevant questions. Factor analysis has been systematically done as per the variables in the study. The threshold for the factor loadings as indicated by Carreon et al. (2011), should be over 0.40. Any item/factor (question) that has a factor loading of below 0.40 should be deleted from the research instrument or rephrased for clarity purpose. In this study, the 0.40 threshold was used and any item that had a factor loading of less than the 0.40 threshold was deleted before further analysis (inferential analysis) was done.

4.6.1 Factor Analysis on Green Purchasing

Factor analysis was carried out to reduce the number of questions in the variable as a way of ensuring that only factor with stronger variance of the variable were used in the inferential analysis. This was done using Principal Component Analysis (PCA). As the findings in Table 4.10 portray, the least scored item had a factor loading of 0.834 while the highest scored item had a factor loading of 0.514. This implies that all the factors met the 0.40 threshold, hence at this level, none of the items was removed.

Table 4.10: Factor Loadings for Green Purchasing

Factors	Factor Loadings
Our firm cooperates with suppliers for eco-design of inputs.	.780
Our firm purchases environmentally friendly materials.	.834
Our firm conducts environmental audits for suppliers' internal management.	.514
Our firm conducts governance and corporate social responsibility seminars.	.710
Our firm has reduced purchase of items that are difficult to dispose of.	.517
Our firm has reduced the purchase of hazardous materials.	.489
The suppliers are approved based on their ability to supply green products	.613
The company carries out frequent CSR by enlightening the suppliers, customers and community on green purchasing	.506
Green purchasing has been instrumental in enabling the company save on operational costs	.697
The management has put key measures to ensure effective adoption of green purchasing	.645

Extraction Method: Principal Component Analysis

Further the factor analysis results showed the total variance explained by each of the items under the green purchasing. The findings as shown in Table 4.11 revealed that two components had eigenvalue of greater than 1 which were 3.852 and 2.472 respectively. The component had a cumulative variance of 63.234%, thus implying that it was computed to represent the variable. These components were; “Our firm purchases environmentally friendly materials” with a factor loading of 0.834 and “Our firm cooperates with suppliers for eco-design of inputs” with a factor loading of 0.780.

Table 4.11: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.852	38.519	38.519	3.852	38.519	38.519
2	2.472	24.715	63.234	2.472	24.715	63.234
3	.856	8.557	71.791			
4	.801	8.008	79.799			
5	.577	5.771	85.570			
6	.451	4.512	90.083			
7	.374	3.739	93.822			
8	.302	3.023	96.844			
9	.269	2.692	99.536			
10	.046	.464	100.000			

Extraction Method: Principal Component Analysis

4.6.2 Factor Analysis for Reverse Logistics

The factor analysis as shown in Table 4.12 revealed that the factor loadings ranged from 0.444 (Redesigning defective merchandise has been emphasized in our firm to meet customer demands and avoid wastage) to 0.827 (We have embraced a mainstream to allow our stakeholders to return goods that do not their standard or need to be remanufactured). Since all the factors met the threshold of 0.40, none was removed at this stage.

Table 4.12: Factor Loadings for Reverse Logistics

Factors	Factor Loadings
Our firm has a supply chain framework provides for product Returns.	.616
We have embraced a mainstream to allow our stakeholders to return goods that do not their standard or need to be remanufactured	.827
The organization has enhanced systems for screening of defective and unwarranted returned merchandise	.622
We are realizing cost savings because of our reverse logistics activities	.626
Our organization has a well-organized channel for reverse logistics	.696
The company has laid out proper measures to ensure reprocessing and rebranding of returned goods	.498
Redesigning defective merchandise has been emphasized in our firm to meet customer demands and avoid wastage	.444
The management intends to have more robust policies to enhance the effectiveness of returns management	.611
The redesign products in our company have been effectively accepted by the customers	.698
There has been an increase in performance as a results of the embrace of reverse logistics	.695

Extraction Method: Principal Component Analysis

The findings on the total variance explained are as shown in Table 4.13. As the results portray, only two components had Eigenvalues greater than 1. The first component had an Eigenvalue of 4.334, while the second component had an Eigenvalue of 2.019. The two components had a cumulative variance of 63.523%. Thus, they were the only items computed to represent the reverse logistics variable. From the factor loadings, the factors are the “We have embraced a mainstream to allow our stakeholders to return goods that do not their standard or need to be remanufactured” with a factor loading of 0.827 and “The redesign products in our company have been effectively accepted by the customers” with a factor loading of 0.698.

Table 4.13: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.334	43.335	43.335	4.334	43.335	43.335
2	2.019	20.188	63.523	2.019	20.188	63.523
3	.944	9.435	72.959			
4	.632	6.325	79.284			
5	.562	5.623	84.906			
6	.439	4.391	89.297			
7	.366	3.661	92.958			
8	.312	3.117	96.075			
9	.269	2.690	98.766			
10	.123	1.234	100.000			

Extraction Method: Principal Component Analysis.

4.6.3 Factor Analysis for Green Packaging

To reduce the number of items representing the green packaging variable, factor analysis through Principal Component Analysis was carried out. The findings as shown in Table 4.14 revealed that the factor loadings ranged from 0.631 (The company has put appropriate measures to reduce the packaging material used so as to reduce wastage) to 0.821 (The process of packaging is mainstreamed towards avoid emissions or any other polluting means). All the factor loadings met the 0.40 threshold.

Table 4.14: Factor Loadings for Green Packaging

Factors	Factor Loadings
The company has put appropriate measures to reduce the packaging material used so as to reduce wastage	.631
We encourage our suppliers to use biodegradable materials	.739
The material used in packaging is produced in a manner that itself is environmentally friendly and non-hazardous	.782
The suppliers of the packaging materials are effectively involved so as to enable them produce environment friendly materials	.709
The storage of the merchandise in our firm is put at one central place to avoid repackaging	.723
The customers are encouraged to adopt to the bio-degradable materials when seeking for repackaging of their orders	.654
Our firm encourages recycling of materials used in packaging	.717
The process of packaging is mainstreamed towards avoid emissions or any other polluting means	.821
Through adherence to green packaging prospects the company has enhanced efficiency and cost saving thus enhancing value addition	.809

Extraction Method: Principal Component Analysis

Factor analysis also included the analysis of the variance explained by each of the items. As the findings on Table 4.15 show, only two components had Eigenvalues of greater than 1. The first component had an Eigenvalue of 5.152 while the second component had an Eigenvalue of 1.433. The two explained a total variance of 73.164%. They were computed and represented the Green packaging variable.

Table 4.15: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.152	57.244	57.244	5.152	57.244	57.244
2	1.433	15.920	73.164	1.433	15.920	73.164
3	.665	7.385	80.549			
4	.441	4.896	85.445			
5	.389	4.319	89.764			
6	.313	3.474	93.237			
7	.220	2.441	95.679			
8	.196	2.182	97.861			
9	.192	2.139	100.000			

Extraction Method: Principal Component Analysis

4.6.4 Factor Analysis for Green Distribution

Factor analysis was carried out to minimize the number of items and retain only those that had greater variance on the variable. The findings as shown in Table 4.16 revealed that the factor loadings ranged from 0.873 (The company has significantly reduces its carbon print from its distribution systems in the past five years) to 0.761 (The trips are properly arranged to ensure same-route customers are supplied in one trip). This means that all the items met the 0.40 threshold.

Table 4.16: Factor Loadings for Green Distribution

Factors	Factor Loadings
We have put measures to ensure the warehouses and distribution centres are decentralized near the customers	.802
The vehicles used in distributions are put in good condition to ensure they deliver efficiently and less pollution	.818
The company has significantly reduces its carbon print from its distribution systems in the past five years	.873
Vehicles are effectively loaded to reduce the number of trips during distribution	.809
The trips are properly arranged to ensure same-route customers are supplied in one trip	.761
The vehicle loadings are arranged based on the customers' location to save on offloading time	.787
The management ensures embrace of green and sustainable distribution means such as use of solar-powered refrigerators to reduce carbon footprint	.747
The embrace of green distribution has enabled the company save more on the cost of operation	.671
The overall performance of the company has been determined by the level of sustainability of our distribution	.649

Extraction Method: Principal Component Analysis.

Total variance explained by each of the items under the variable was further used to assess which factor could be retained and those to be deleted. As the results in Table 4.17 reveal, 3 components had the Eigenvalue of greater than 1. The Eigenvalue for the components were 4.10, 1.184 and 1.050 respectively. The three components explained a cumulative variance of 70.374%. The items were used to represent green distribution in the inferential analysis.

Table 4.17: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.100	45.555	45.555	4.100	45.555	45.555
2	1.184	13.151	58.706	1.184	13.151	58.706
3	1.050	11.668	70.374	1.050	11.668	70.374
4	.992	11.021	81.395			
5	.764	8.487	89.882			
6	.442	4.910	94.793			
7	.196	2.179	96.972			
8	.154	1.711	98.683			
9	.119	1.317	100.000			

Extraction Method: Principal Component Analysis

4.6.5 Factor Analysis on Value Addition

Factor analysis was conducted to narrow down the number of items for inferential statistics and compute only those with the highest factor loading. Factor analysis was carried out using Principal Components Method (PCM) approach. The results of the factor loadings as shown on Table 4.18 revealed that the highest scored item had a factor loading of 0.801 while the lowest had a factor loading of 0.727. According to Yong and Pearce (2013), a threshold of 0.40 is acceptable for a given factor to be retained in an analysis. This was the threshold used in this study. Therefore, since all the items met the threshold, none of the items was removed.

Table 4.18: Factor Loadings for Value Addition

Factors	Factor Loadings
Our company customizes the products based on the customers' preferences	.745
More of our customers prefer tailor-made products that require less adjustments to meet their final need	.800
The company pre-processes its products before they are sold to the market	.727
Customers who require pre-processed goods agree to pay extra price for the product	.799
Through pre-processing we are able to extend the shelve-life of the products	.801
More waste in our products is eliminated through valued addition process	.224
The company ensures all its products are free from excessive wastes before they are sent to the customer	.714
Our company has continually enhanced the quality of its products through value addition	.627
Value addition has been instrumental in enhancing the satisfaction of our customers	.716

Extraction Method: Principal Component Analysis

An analysis of variance was carried out to ascertain whether indeed all the questions under performance of firms in the horticultural firms in Kenya variable met the threshold for ensuing analysis. In this study, the eigenvalue was used. According to McDonald (2014), a threshold of eigenvalue of 1 is recommended where components with values of greater than 1 are retained. As the findings on Table 4.19 reveal, three components had eigenvalue of more than 1, explaining a total variance of 68.524%. This implies that instead of having all the other 9 items, having only 3 would stand in for the others, with only a 31.5% remainder. Therefore, the items with the highest factor loading “Value addition in the products by our company has contributed to the company’s performance” with a factor loading of 0.801, “The company is committed towards having non-hazardous products across all its product lines in the market” with a factor loading of

0.800 and “The company has increased its internal efficiency as a result of focusing on sustainable supply chain management” with a factor loading of 0.799 were retained.

Table 4.19: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.917	43.527	43.527	3.917	43.527	43.527
2	1.218	13.531	57.059	1.218	13.531	57.059
3	1.032	11.466	68.524	1.032	11.466	68.524
4	.966	10.731	79.255			
5	.758	8.425	87.681			
6	.485	5.390	93.071			
7	.328	3.647	96.719			
8	.183	2.038	98.756			
9	.112	1.244	100.000			

Extraction Method: Principal Component Analysis

4.6.6 Summary of Hypotheses Testing

The summary of hypotheses testing is as shown in Table 4.34. The summary has been derived from the linear regression models for each of the hypotheses and the optimal model where the moderating variable (value addition) has been included. The summary shows that all the null hypothesis were rejected. This is an indication that the sustainable supply chain practices (green purchasing, reverse logistics, green distribution and green packaging) have a significant influence on the performance of horticultural firms in Kenya both when regressed individually and when combined.

Table 4.20: Summary of Hypothesis Testing

H _A	Hypothesis	Regression Model Equation	Decision
H _{O1}	There is no significant relationship between green purchasing and performance of the Horticultural firms in Kenya	$Y = 1.070 + 0.548X_1$	Reject the null hypothesis
H _{O2}	Reverse Logistics have no significant relationship with performance of the Horticultural firms in Kenya	$Y = 0.959 + 0.632X_2$	Reject the null hypothesis
H _{O3}	Green Packaging has no significant relationship with performance of the Horticultural firms in Kenya	$Y = 0.814 + 0.679X_3$	Reject the null hypothesis
H _{O4}	There is no significant relationship between green distribution and performance of the Horticultural firms in Kenya	$Y = 0.754 + 0.685X_4$	Reject the null hypothesis
H _{O5}	Value addition has no significant moderating effect on the relationship between sustainable supply chain management practices and performance of the Horticultural firms in Kenya	<u>Unmoderated:</u> $Y = 1.506 + 0.218 X_1 + 0.228 X_2 + 0.327 X_3 + 0.604 X_4$ <u>Moderated:</u> $Y = 0.909 + 0.398X_1*Z + 0.097X_2*Z + 1.020X_3*Z + 1.043X_4*Z$	Reject the null hypothesis

4.7 Diagnostic Tests

Diagnostic tests were performed to test the assumptions of linear regression. The assumptions tested were normality, multicollinearity, homoscedasticity and autocorrelation.

4.7.1 Normality Test

Multiple regressions assume that the residuals are normally distributed. This assumption can best be checked with a histogram and a fitted normal curve or a Q-Q-Plot. Normality was tested by use of Shapiro Wilk Test. The null hypothesis for this test is that the population is normally distributed. Thus, if the p-value is less than the chosen alpha

level (0.05), then the null hypothesis is rejected and there is evidence that the data tested are not from a normally distributed population.

From the findings all variables had p-values greater than 0.05, hence the null hypothesis was accepted. This shows that they were all normally distributed and hence the data meets the regression analysis assumption of normality.

Table 4.21: Tests of Normality

Variables	Shapiro-Wilk		
	Statistic	df	Sig.
Green Purchasing	.856	221	.247
Reverse Logistics	.874	221	.179
Green Packaging	.971	221	.127
Green Distribution	.809	221	.195
Performance	.947	221	.142

The results from the Q-Q plots on the other hand revealed that all the variables had their plots fit along a straight line an indication that the data was normally distributed. This confirmed the Shapiro-Wilk that the population in the study was normally distributed.

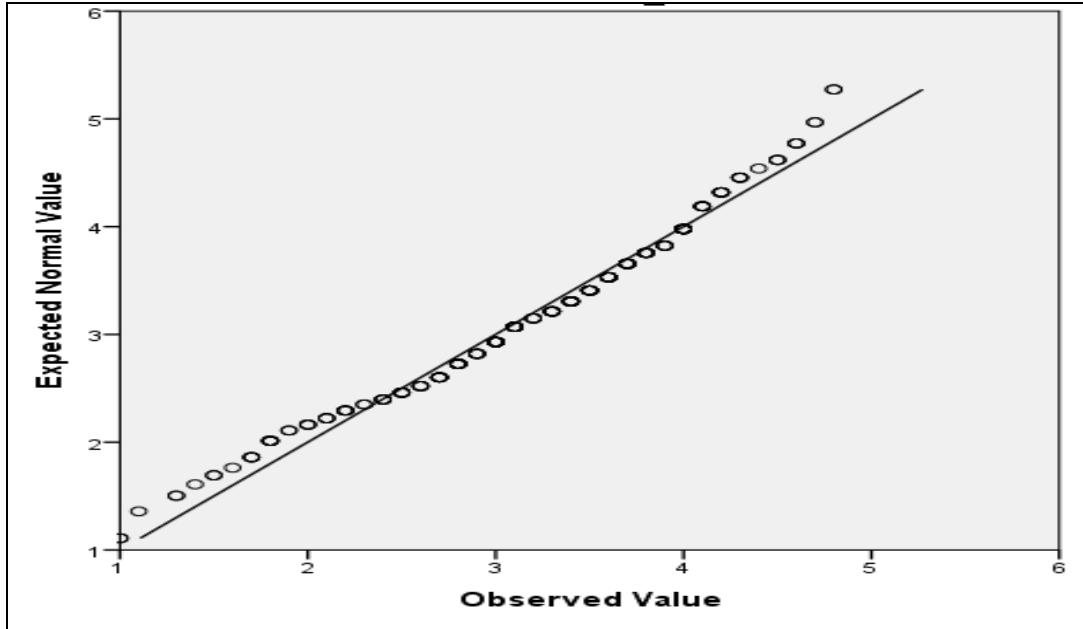


Figure 4.5: Q-Q Plot for Normality Test

4.7.2 Multicollinearity

Variance Inflation Factor (VIF) was used, which measures multicollinearity in the regression model. The general rule of thumb is that VIF exceeding 4 warrant further investigations, if there are two or more variables that would have a VIF around or greater than 5, one of these variables must be removed from the regression model (Bryman& Cramer, 2018).

The VIF values found in Table 4.21 show that, there was no multicollinearity among the independent variables, since all the values are below 5. This implies that the results of the multiple regression equation are not misleading, since the independent variables in the multiple regression equation are not highly correlated amongst themselves.

Table 4.22: Multicollinearity Test Statistics

Variables	Tolerance	VIF
Green Purchasing	0.373	2.681
Reverse Logistics	0.251	3.984
Green Packaging	0.573	1.745
Green Distribution	0.296	3.378

4.7.3 Test for Homoscedasticity

Heteroscedasticity is a situation where the variability of a variable is unequal across the range of values of a second variable that predicts it (Vinod, 2008). In this study Heteroscedasticity was tested by performing the Breuch-pagan / cook-weisberg test. Breusch-Pagan / Cook-Weisberg test the null hypothesis that the error variances are all equal versus the alternative that the error variances are a multiplicative function of one or more variables (Vinod, 2008). Homoscedasticity would be evident when the value of “Prob > Chi-squared” is greater than 0.05 (Park, 2008).

Table 4.22 shows that the constant variance ($\text{Chi}^2 = 2.6874$) is insignificant ($P = 0.541$). Therefore, there is no instance of heteroscedasticity in the data and therefore multiple regression findings were not misleading.

Table 4.23: Breusch-Pagan / Cook-Weisberg test for heteroscedasticity

Ho: Constant variance			
Statistics	Df	Stat value	p-value
Chi-squared	228	2.6874	0.5412

4.8 Correlation Analysis

The study computed correlation analysis to test the relationship between the independent and dependent variables. The study specifically computed pearson product moment correlation analysis and multiple regression analysis. Correlational analysis determines the strength of the relationship between the study variables. Pearson “R” correlation was used to measure strength and the direction of linear relationship between the

independent variables and dependent variable. The association was considered to be small if $\pm 0.1 < r < \pm 0.29$; medium if $\pm 0.3 < r < \pm 0.49$; and strong if $r \geq \pm 0.5$.

4.8.1 Correlation Results for Green Purchasing and Performance

From the findings in Table 4.24, green purchasing is seen to have a strong positive relationship with performance in the Horticultural firms in Kenya ($r = 0.518$). The relationship between the green purchasing and performance was found to be significant ($p=0.000 < 0.05$). This means that green purchasing among horticultural firms would influence their level of performance.

Table 4.24: Correlation Results on Green Purchasing

		Firm Performance	Green Purchasing
Firm Performance	Pearson Correlation	1	.518**
	Sig. (2-tailed)		.000
	N	221	221
Green Purchasing	Pearson Correlation	.518**	1
	Sig. (2-tailed)	.000	
	N	221	221

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

4.8.2 Correlation Results for Reverse Logistics and Performance

The findings also show that reverse logistics and performance in the Horticultural firms in Kenya are strongly related ($r = 0.672$). The findings further show that the relationship between reverse logistics and performance is significant ($p=0.000 < 0.05$). This means that the level of reserve logistics among horticultural firms influence their level of performance.

Table 4.25: Correlation Analysis on Reverse Logistics

		Firm Performance	Reverse Logistics
Firm Performance	Pearson Correlation	1	.672**
	Sig. (2-tailed)		.000
	N	221	221
Reverse Logistics	Pearson Correlation	.672**	1
	Sig. (2-tailed)	.000	
	N	221	221

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

4.8.3 Correlation Results for Green Packaging and Performance

Green packaging and performance in the horticultural firms in Kenya is seen to have a significant relationship ($P=0.000<0.05$). In addition, the relationship between these green packaging and performance was found to be positive and strong ($r= 0.679$). This suggests that the level of performance in the horticultural firms in Kenya is dependent on green packaging.

Table 4.26: Correlation Analysis on Green Packaging

		Firm Performance	Green Packaging
Firm Performance	Pearson Correlation	1	.679**
	Sig. (2-tailed)		.000
	N	221	221
Green Packaging	Pearson Correlation	.679**	1
	Sig. (2-tailed)	.000	
	N	221	221

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

4.8.4 Correlation Results for Green Distribution and Performance

Green distribution is seen to have a strong positive relationship with performance of the horticultural firms in Kenya ($r = 0.724$). Green distribution and performance are also seen to have a positive significant relationship ($p=0.000<0.05$). This implies that the

level of performance of the horticultural firms in Kenya is dependent on their green distribution.

Table 4.27: Correlation Analysis on Green Distribution

		Firm Performance	Green Distribution
Firm Performance	Pearson Correlation	1	.724**
	Sig. (2-tailed)		.000
	N	221	221
Green Distribution	Pearson Correlation	.724**	1
	Sig. (2-tailed)	.000	
	N	221	221

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

4.9 Hypothesis Testing

4.9.1 Green Purchasing and Performance of Horticultural Firms

H₀₁: There is no significant positive relationship between green purchasing and performance of the Horticultural firms in Kenya

The linear regression model was used to evaluate the statistical relationship between green purchasing and firm performance of the horticultural firms in Kenya. The model summary results are as shown in Table 4.28. From the analysis, the R-square for the model is 0.269. This is an implication that green purchasing influence up to 26.9% of the variation in performance of the horticultural firms in Kenya.

The Analysis of Variance (ANOVA) results are as shown in Table 4.28. The F-value for the model is 80.420 at a significant level of $0.000 < 0.05$. From the F-value, the model can statistically predict the relationship between green purchasing and performance of the horticultural firms in Kenya.

Table 4.28 shows the regression coefficient for the model. The Beta Coefficient for the green purchasing is 0.548. This implies that green purchasing influence up to 54.8% of the performance of firms in the horticultural firms in Kenya. The P-value for the variable is $0.000 < 0.05$. From the results it can be deduced that green purchasing exert a significant influence on the performance of horticultural firms in Kenya. According to Foo, Kanapathy, Zailani, and Shaharudin (2019), through embrace of green purchasing, companies recording superior performance as this contributes to cost-saving and customer satisfaction.

Table 4.28: Regression Model Results on the Relationship between Green Purchasing and Performance of Horticultural Firms

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.518 ^a	.269	.265	.65622

a. Predictors: (Constant), Green Purchasing

Analysis of Variance (ANOVA)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	34.631	1	34.631	80.420	.000 ^b
	Residual	94.306	219	.431		
	Total	128.937	220			

a. Dependent Variable: Firm Performance

b. Predictors: (Constant), Green Purchasing

Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.070	.213		5.022	.000
	Green Purchasing	.548	.061	.518	8.968	.000

a. Dependent Variable: Firm Performance

4.9.2 Reverse Logistics and Performance of Horticultural Firms

H₀₂: Reverse Logistics have no significant positive influence on performance of the Horticultural firms in Kenya

The regression model analysis through linear regression was carried out to establish the extent to which reverse logistics influenced the performance of firms in the horticultural firms in Kenya. The model summary as shown in Table 4.29 revealed that the R-square for the model was 0.452. This is an indication that 45.2% of the variation in firm performance in the horticultural firms in Kenya is due to reverse logistics.

The ANOVA test results are as shown in Table 4.29. As the results portray, the F-value for the model was 180.710 at a significant level of $0.000 < 0.05$. This is an implication that the model can reliably predict the relationship between reverse logistics and firm performance in the horticultural firms in Kenya.

The regression results for the model are as shown in Table 4.29. Analysis of the model yielded the Beta coefficient for the reverse logistics 0.632. This implies that reverse logistics influence 71.4% of the performance of firms in the horticultural firms in Kenya. The relationship between reverse logistics and firm performance of horticultural firms in Kenya is significant at $P=0.000 < 0.05$. To this effect, the null hypothesis is rejected. The findings compare with those by Soomro et al. (2020) who established that reverse logistics is integral in promoting the firm's ability to save on costs and streamline their supply chain processes for better performance. Sheng et al. (2019) also found reverse logistics to significantly contribute to organization performance by strengthening the supply chain systems towards meeting customer needs.

Table 4.29: Regression Model Results on the Relationship between Reverse Logistics and Performance of Horticultural Firms

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.672 ^a	.452	.450	.56796

a. Predictors: (Constant), Reverse Logistics

ANOVA Test

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	58.293	1	58.293	180.710	.000 ^b
1 Residual	70.644	219	.323		
Total	128.937	220			

a. Dependent Variable: Firm Performance
b. Predictors: (Constant), Reverse Logistics

Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.959	.152		6.306	.000
	Reverse Logistics	.632	.047	.672	13.443	.000

a. Dependent Variable: Firm Performance

4.9.3 Green Packaging and Performance of Horticultural Firms

H₀₃: *Green Packaging has no significant positive influence on firm performance in the Horticultural firms in Kenya*

The linear regression model was also used to explain the relationship between green packaging and firm performance of horticultural firms in Kenya. A model summary, Analysis of Variance (ANOVA) and regression coefficients were used. As the model summary in Table 4.30 shows, the R-square (R²) for the model is 0.461. This is an

indication that 46.1% of the variation in firm performance of horticultural firms in Kenya is as a result of green packaging.

The Analysis of Variance (ANOVA) results are as shown in Table 4.30. From the model, the F-value is 187.596 at a significance level of $0.000 < 0.05$. The model shows that a significant relationship exists between green packaging and the performance of horticultural firms in Kenya, hence the model is statistically significant.

The regression coefficient for the model is shown in Table 4.30. The findings revealed that the Beta coefficient of green packaging was 0.679. This is an indication that green packaging would influence the performance of firms in the horticultural firms in Kenya by 67.9%. The P-value for the model was 0.000 which is less than the standard p-value of 0.05. This implies that green packaging significantly influences the performance of firms in the horticultural firms in Kenya. The null hypothesis is therefore rejected. The findings compare with those by Masudin (2019) who indicated that through green packaging, the firm performance is enhanced as this contributes to reduced packaging materials, more customer-friendly packaging and biodegradable packaging that are lesser toxic to the environment while strengthening customer satisfaction. Further, Pishkar et al. (2020) indicated that green packaging is instrumental in shaping the way organizations showcase their commitment to sustainability and continued focus on environmental friendly practices, and this is integral in attracting more customers for competitiveness and performance.

Table 4.30: Regression Model Results on the Relationship between Green Packaging and Performance of Horticultural Firms

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.679 ^a	.461	.459	.56313

a. Predictors: (Constant), Green Packaging

ANOVA Test

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	59.489	1	59.489	187.596	.000 ^b
	Residual	69.448	219	.317		
	Total	128.937	220			

a. Dependent Variable: Firm Performance
b. Predictors: (Constant), Green Packaging

Regression Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.814	.160		5.100	.000
1 Green Packaging	.679	.050	.679	13.697	.000

a. Dependent Variable: Firm Performance

4.9.4 Green Distribution and Performance of Horticultural Firms

H₀₄: There is no significant positive influence of green distribution on firm performance in the Horticultural firms in Kenya

The study sought to establish how green distribution influences performance of horticultural firms in Kenya. A linear regression model was used to test for the relationship between the two variables where the main outputs were model summary,

ANOVA test and regression coefficients. The model summary results as show in Table 4.31 revealed that the R^2 for the model was 0.525 an indication that 52.5% of the variation in firm performance in the horticultural firms in Kenya could be explained by the green distribution.

Table 4.31 shows the ANOVA test results. As the findings portray, the F-statistic for the model was 241.799 at a significance level of $0.000 < 0.05$. This implied that the model could statistically significantly explain the relationship between green distribution and firm performance in the horticultural firms in Kenya.

The regression coefficients for the model are as shown in Table 4.31. As the findings portray, the Beta coefficient for green distribution was 0.685 at a significance level of 0.000. This is an implication that a unit change in the green distribution leads up to 68.5% increase in the performance of horticultural firms in Kenya. The P-value for the model is 0.000 which is less than the standard p-value of 0.05, thus the null hypothesis is rejected. According to Ha, Kim, and With (2022), green distribution allows a firm to differentiate itself from competitors by offering sustainable and eco-friendly products or services. In today's environmentally conscious market, consumers are increasingly inclined to support businesses that demonstrate a commitment to sustainability. By adopting green distribution practices, a firm can attract environmentally conscious consumers and gain a competitive advantage in the marketplace. According to Jafarzadeh et al. (2020), as sustainability becomes more important to consumers, businesses that offer green products or services have the opportunity to tap into new markets and attract environmentally conscious customers who prioritize sustainability in their purchasing decisions. This expanded customer base can lead to increased sales and revenue for the firm.

Table 4.31: Regression Model Results on the Relationship between Green Distribution and Performance of Horticultural Firms

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.724 ^a	.525	.523	.52897

a. Predictors: (Constant), Green Distribution

ANOVA Test

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	67.658	1	67.658	241.799	.000 ^b
	Residual	61.279	219	.280		
	Total	128.937	220			

a. Dependent Variable: Firm Performance

b. Predictors: (Constant), Green Distribution

Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.754	.145		5.202	.000
	Green Distribution	.685	.044	.724	15.550	.000

a. Dependent Variable: Firm Performance

4.9.5 Overall Regression Model

Model summary was used to determine the amount of variation in the dependent variable that could be explained by changes in the independent variable. In this study, the amount of variation in firm performance in the horticultural firms in Kenya as a result of changes in green purchasing, reverse logistics, green packaging and green distribution was sought. From the findings on Table 4.32, the value of adjusted R² was

0.753, an indication that 75.3% variation in firm performance in the horticultural firms in Kenya can be explained by changes in green purchasing, reverse logistics, green packaging and green distribution. The remaining 24.7% suggest that there are other factors that can be used to explain firm performance in the horticultural firms in Kenya that were not discussed in this study. The findings further showed that the variables under investigation (green purchasing, reverse logistics, green packaging and green distribution) were strongly and positively related as indicated by correlation coefficient value (R) of 0.872.

ANOVA is used to test the significance of the model. In this study, significance of the model was tested at 95% confidence interval. Results are as presented in Table 4.32. From the findings, the significance of the model was 0.000. This suggests that the model developed was significance since its p-value (0.000) was less than the selected level of significance (0.05). From the ANOVA table, the f-calculated value (768.111) was greater than the f-critical value ($F_{4,182}=2.421$) obtained from the f-distribution tables. The findings therefore suggest that the model was significant and therefore, green purchasing, reverse logistics, green packaging and green distribution can be used to predict firm performance in the horticultural firms in Kenya.

The study used the coefficients findings to test the research hypothesis. If the P-value is less than 0.05, we reject the H_0 but if it is more than 0.05, the H_0 is not rejected. From the findings in Table 4.32, the following regression equation was fitted:

$$Y = 1.506 + 0.604X_1 + 0.327X_2 + 0.228X_3 + 0.218X_4$$

From the regression equation, it can be observed that when the variables green purchasing, reverse logistics, green packaging and green distribution are held to a constant zero. Firm Performance in the horticultural firms in Kenya would be 1.506.

The first research hypothesis was there a significant positive relationship between green purchasing and firm performance in the horticultural firms in Kenya. The findings

showed that green purchasing has positive influence on firm performance in the horticultural firms in Kenya ($\beta=0.218$). The influence was further found to be significant since the p-value (0.009) was less than the selected level of significance (0.05). Since the p-value is less than 0.05 we accept the alternative hypothesis that there is a significant positive relationship between green purchasing and firm performance in the Horticultural firms in Kenya.

The second research hypothesis was reverse logistics have a significant positive influence on firm performance in the Horticultural firms in Kenya. The findings showed that reverse logistics has a positive influence on performance in the Horticultural firms in Kenya ($\beta=0.228$). Further, the influence of reverse logistics is seen to be significant since the p-value (0.000) was less than the selected level of significance (0.05). Since the p-value was less than the selected level of significance, we accept the alternative hypothesis that reverse logistics have a significant positive influence on firm performance in the Horticultural firms in Kenya.

The third research hypothesis tested was green packaging has a significant positive influence on firm performance in the horticultural firms in Kenya. The findings showed that green packaging has positive influence on firm performance in the horticultural firms in Kenya ($\beta = 0.327$). The influence was further found to be significant since the p-value (0.005) was less than the selected level of significance (0.05). Since the p-value is less than 0.05 we accept the alternative hypothesis that green packaging has a significant positive influence on firm performance in the Horticultural firms in Kenya.

The fourth hypothesis tested was there a significant positive influence of green distribution on firm performance in the horticultural firms in Kenya. The findings showed that green distribution have a positive influence on firm performance in the horticultural firms in Kenya ($\beta=0.604$). Further, the influence of green distribution on firm performance is seen to be significant since the p-value (0.000) was less than the selected level of significance (0.05). Since the p-value was less than the selected level of

significance, we accept the alternative that there is a significant positive influence of green distribution on firm performance in the horticultural firms in Kenya.

The findings are in line with those by Ncube et al. (2020) who argued that sustainable supply chain management (SSCM) practices play a crucial role in shaping firm performance, whereby through integration of sustainability principles into their supply chain operations, firms can achieve several benefits that positively impact their overall performance. Further, Sun et al. (2022) established that the combined effect of sustainable supply chain practices significantly contributes to organizational performance by enabling cost reduction and efficiency through resource optimization, waste reduction, and energy efficiency throughout the supply chain. According to Cricelli et al. (2021), through integration of measures such as lean manufacturing, green logistics, and improved inventory management, firms can reduce costs associated with energy consumption, raw material usage, transportation, and waste disposal. These cost savings contribute to improved profitability and overall performance.

Table 4.32: Multiple Regression Model on the Combined Relationship between Sustainable Supply Chain Management Practices and Firm Performance

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.872 ^a	.760	.753	.08102

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

Analysis of Variance

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	20.166	4	5.041	768.111	.000 ^b
1 Residual	1.195	223	.007		
Total	21.361	227			

Regression Coefficients

Model	Un standardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.506	.173		8.705	.000
Green Purchasing	.218	.083	.213	2.626	.009
1 Reverse Logistics	.228	.044	.208	5.178	.000
Green Packaging	.327	.114	.277	2.874	.005
Green Distribution	.604	.079	.656	7.660	.000

4.9.6 Optimal Model

To analyse the moderating effect of value addition on the relationship between sustainable supply chain and firm performance in the horticultural firms in Kenya, the study computed the moderated regression analysis.

The model summary for moderated regression analysis was used to show the amount of variation in firm performance in the horticultural firms in Kenya as a result of changes in moderated sustainable supply chain management practices (green purchasing*value addition, reverse logistics*value addition, green packaging*value addition and green distribution*value addition).

The value of adjusted R square is 0.864. This suggests that 86.4% variation in performance of the horticultural firms in Kenya can be explained by changes in moderated green purchasing, moderated reverse logistics, moderated green packaging, moderated green distribution. The remaining 13.6% suggests that there are other factors that can be used to explain variation in performance in the horticultural industry that were not discussed in this study. The moderated variables were also strongly and positively related with performance in the horticultural industry as indicated by correlation coefficient value (R) of 0.931 which is greater than the un-moderated value (0.872) shown in model 1. This means that the moderating variable (value addition) positively affect the relationship between sustainable supply chain and firm performance in the Horticultural firms in Kenya.

The ANOVA for moderated regression analysis was used to determine whether the moderated model was significant. Significance of the model was tested at 5% level of significance. From the findings in Table 4.33, the significance of the models was 0.000 which is less than the selected level of significance 0.05. This therefore suggests that the moderated model was significant. The findings further show that the F-calculated value (295.552) was greater than the F-critical value ($F_{4,182}=2.421$); this suggests that the moderated variables can be used to predict performance in the horticultural firms in Kenya. Since the model was significant it suggested that value addition was a significant moderating the relationship between sustainable supply chain and firm performance in the horticultural firms in Kenya.

The coefficients findings of the moderated regression analysis were used to test the final research hypothesis: Value addition has a significant positive moderating effect on the relationship between sustainable supply chain and firm performance in the Horticultural firms in Kenya. From the findings in Table 4.33, the following regression equation was fitted.

$$Y = 0.909 + 1.043X_3 * M + 1.020X_4 * M + 0.398X_1 * M + 0.097X_2 * M$$

From the modelled regression equation above, it can be seen that when moderated green purchasing, moderated reverse logistics, moderated green packaging, moderated green distribution are held to a constant zero, firm performance in the horticultural firms in Kenya would be 0.909. The findings also show that moderated green purchasing has positive influence (.398) on firm performance in the horticultural firms and this influence is significant with a p-value of 0.000. Moderated reverse logistic is also seen to have a positive (.097) influence on firm performance in the horticultural firms. The influence is significant with a p-value of 0.016. The findings also show that moderated green packaging has positive influence on performance in the horticultural firms (1.020). The influence was significant with p-value of 0.000. Lastly, the findings showed that green distribution had positive (1.043) influence on firm performance in the horticultural firms with significance value of 0.000.

These findings show that all the moderated variables had positive influence on firm performance in the horticultural firms and their influence was significant since each variable had a p-value less than the selected level of significance (0.05). This therefore suggests that we accept the alternative hypothesis that value addition has a significant positive moderating effect on the relationship between sustainable supply chain and firm performance of the horticultural firms in Kenya.

The findings compare with those by Pishkar et al. (2020) who indicated that through value addition, firms are able to strengthen the ability of sustainable supply chain management to contribute to enhanced product and service quality. Sustainable supply chain management practices aim to improve product and service quality by incorporating sustainable attributes (Sheng et al., 2019). By adding sustainable value to products and services, firms can differentiate themselves in the market, attract environmentally conscious customers, and enhance customer satisfaction and loyalty. Value is added by ensuring the resilience of the supply chain, minimizing risks, and creating a foundation for long-term success.

Table 4.33: Optimal Model on the Moderating effect of Value Addition

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.872 ^a	.760	.753	.08102
2	.931 ^b	.867	.864	.12513

Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	20.166	4	5.041	768.111	.000 ^b
	Residual	1.195	223	.007		
	Total	21.361	227			
2	Regression	18.511	4	4.628	295.552	.000 ^c
	Residual	2.850	223	.016		
	Total	21.361	227			

Regression Coefficients

Model	Un standardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.506	.173		8.705	.000
Green Purchasing	.218	.083	.213	2.626	.009
1 Reverse Logistics	.228	.044	.208	5.178	.000
Green Packaging	.327	.114	.277	2.874	.005
Green Distribution	.604	.079	.656	7.660	.000
(Constant)	.909	.336		2.707	.007
Green Purchasing* Value addition	.398	.106	.261	3.763	.000
Reverse Logistics* Value addition	.097	.040	.072	2.442	.016
2 Green Packaging* Value addition	1.020	.083	.860	12.288	.000
Green Distribution* Value addition	1.043	.086	.437	12.201	.000

4.9.7 Revised Conceptual Framework

A revised conceptual framework tells the retained variables after the optimal conceptual framework. It also shows how the variables relate after the model, including the flow of the variables based on their level of significance. As shown in Figure 4.7, the revised conceptual framework shows that green distribution has the strongest relationship with performance when moderated by value addition. This is followed by green packaging, green purchasing and lastly, reverse logistics.

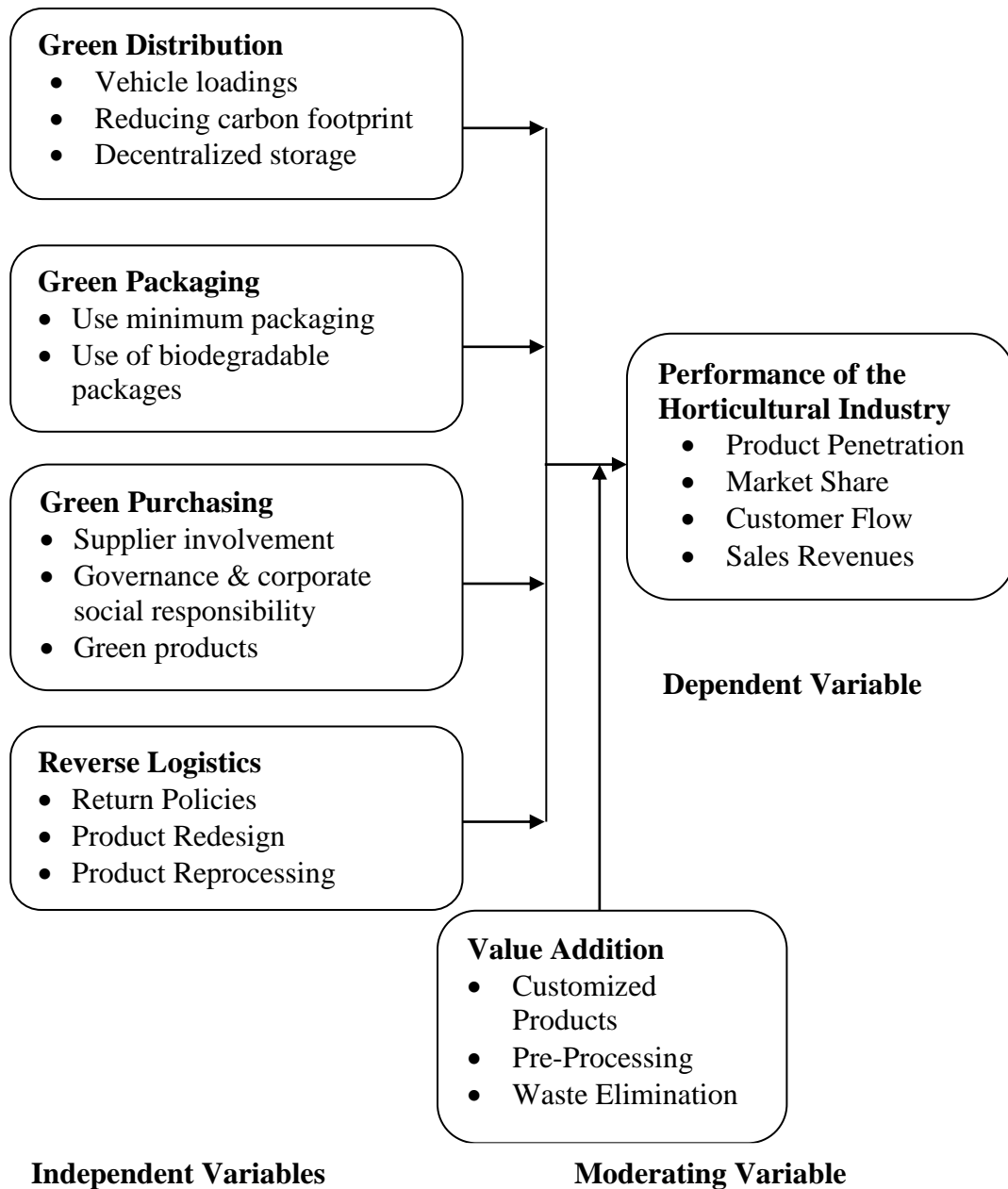


Figure 4.6: Revised Conceptual Framework

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter summarizes the findings from chapter four, draws conclusions and makes recommendations. The study objective was to establish the influence of sustainable supply chain management on firm performance in the Horticultural firms in Kenya. Specifically, the study sought to determine the relationship between green purchasing, reverse logistics, green packaging and green distribution on firm performance in the Horticultural firms in Kenya and the moderating effect of value addition on the relationship between sustainable supply chain and firm performance.

5.2 Summary of Findings

The study sought to examine the influence of sustainable supply chain management practices on the performance of horticultural industry in Kenya. Specifically, the study sought to examine the effect of green purchasing, reverse logistics, green packaging, and green distribution on the performance of horticultural firms in Kenya.

5.2.1 Green Purchasing and Performance of Horticultural Firms

The study established that green purchasing had a strong positive relationship with firm performance in the Horticultural firms in Kenya. Further, the relationship between the green purchasing and performance was found to be significant. The study also revealed that the horticulture firms cooperate with suppliers for eco-design of inputs, the firms have reduced the purchase of hazardous materials and the firm conducts governance and corporate social responsibility seminars. Further, firm's conducts environmental audits for supplier's internal management, firm's purchases environmentally friendly materials and have reduced purchase of items that are difficult to dispose of.

The study also revealed that horticultural firms have promoted green purchasing in the supply chain processes through asking potential suppliers to provide the organization with the most environmentally sound product, with the highest quality, at the lowest price. They also request suppliers for the most energy-efficient product at the same or lower price than a traditional alternative, have developed codes of conduct that includes green, and spelt out the expected behaviours in terms of labour, products, emissions and handling of waste. In addition, they have educated the suppliers on the importance of going green, sponsored training programs for supplier and explained to them exactly what the company was looking for in suppliers, and kept tabs on suppliers, either by encouraging them to respond to audit mechanisms and practicing what their organizations taught.

5.2.2 Reverse Logistics and Performance of Horticultural Firms

The study found that reverse logistics and firm performance in the Horticultural firms in Kenya are strongly related. The findings further showed that the relationship between reverse logistics and performance is significant. It was also established that redesigning defective merchandise has been emphasised in horticulture firms to meet customer demands and avoid wastage. In addition, firms have a supply chain framework that provides for product returns, are realizing cost savings because of reverse logistics activities, and have laid out proper measures to ensure reprocessing and rebranding of returned goods. It was established that firms had embraced a mainstream to allow stakeholders to return goods that did not their standard or needed to be remanufactured and had a well-organized channel for reverse logistics as well as enhanced systems for screening of defective and unwarranted returned merchandise.

The study also established that additional measures taken by the firm to enhance reverse logistics in the procurement processes were: knowing why returns happen in the first place, having a transparent monitoring systems in place, tracking all aspects of reverse logistic, collaboration with retailer and wholesalers, rethinking transport and logistics,

having clearly established return plan, investing in the right technology for reverse logistics and having return labels on the original packaging.

5.2.3 Green Packaging and Performance of Horticultural Firms

The study found that green packaging and firm performance in the horticultural firms in Kenya have a significant relationship. In addition, the relationship between green packaging and firm performance was found to be positive and strong. Further, horticultural firms have put appropriate measures to reduce the packaging material used so as to reduce wastage, and the storage of the merchandise in firms is put at one central place to avoid repackaging. Moreover, through adherence to green packaging prospects the company has enhanced efficiency and cost saving thus enhancing value addition while the material used in packaging is produced in a manner that itself is environmentally friendly and non-hazardous. The study established that the process of packaging was mainstreamed towards avoiding emissions or any other polluting means, and the customers were encouraged to adopt to the bio-degradable materials when seeking for repackaging of their orders. To add to this, the study revealed that firms encouraged recycling of materials used in packaging and they encouraged their suppliers to use biodegradable materials.

The study also revealed that horticultural firms had commitment and goodwill to enhance green packaging in the procurement operations through: using recyclable materials for environmentally friendly packaging, using unique, innovative, or high-tech materials, going natural for environment-friendly packaging, creating custom packaging boxes to preserve space and materials throughout the distribution process, incorporating packaging into the product and arranging products in various innovative ways.

5.2.4 Green Distribution and Performance of Horticultural Firms

The study established that green distribution had a strong positive relationship with firm performance in the horticultural firms in Kenya. Green distribution and performance

also had a positive significant relationship. The study also found that vehicles were effectively loaded to reduce the number of trips during, and distribution vehicles used were kept in good condition to ensure they delivered efficiently with less pollution. Further, the firms had put measures to ensure the warehouses and distribution centres were decentralized near the customers, and the trips properly arranged to ensure same-route customers were supplied in one trip, and measures are put by the organization to ensure the distribution means used observed carbon print. The study also revealed that most horticultural firm were committed to ensuring green distribution was achieved through clean idle truck policies, speed management policies, having econ friendly tires, using the best additives available, engine shutdown policies, adoption of solar energy at the warehouse and waste recycling programs.

5.2.5 The Moderating Effect of Value Addition

The study found that horticultural firms were committed towards having non-hazardous products across all its product lines in the market. Value addition in the products by companies had contributed to the company's performance, since the firms had started focusing on sustainable supply chain management, the operational costs had been contained to some percentage. Further findings were that the companies had increased internal efficiency as a result of focusing on sustainable supply chain management and had ensured access and availability of customized products across all supply chains. The study also revealed that horticultural firms enhance value addition to achieve competitiveness and performance, through creation of superior products than competitors, having environmentally friendly products that are of higher quality, creating customized products for different market segments and having unique products that are hard to imitate in the market.

5.3 Conclusion of the Study

The study revealed that there was significant relationship between green purchasing and performance of the horticultural firms in Kenya. The findings also showed that green

purchasing has positive influence on firm performance in the horticultural firms in Kenya. The study accepted the alternative hypothesis that there is a significant positive relationship between green purchasing and firm performance in the Horticultural firms firm in Kenya. The study concludes that green purchasing is positively related to firm performance in the horticultural firms in Kenya.

Reverse logistics had a significant positive influence on firm performance in the Horticultural firms in Kenya. The findings also showed that reverse logistics has a positive influence on firm performance in the Horticultural firms in Kenya. The study accepted the alternative hypothesis that reverse logistics have a significant positive influence on firm performance in the Horticultural firms in Kenya. The study concludes that reverse logistics is positively related to firm performance in the horticultural firms in Kenya.

The findings showed that green packaging has a significant positive influence on firm performance in the horticultural firms in Kenya. The findings also showed that green packaging has positive influence on firm performance in the horticultural firms in Kenya. The study accepted the alternative hypothesis that green packaging has a significant positive influence on firm performance in the Horticultural firms in Kenya. The study concludes that green packaging is positively related to performance in the horticultural firms in Kenya.

The study found that there was a significant positive influence of green distribution on firm performance in the horticultural firms in Kenya. The findings showed that green distribution have a positive influence on firm performance in the horticultural firms in Kenya. Further, the influence of green distribution on firm performance was seen to be significant. From the findings, the study concludes that green distribution is positively related to firm performance in the horticultural firms in Kenya.

5.4 Recommendations

The management of the horticultural companies is mandated to ensure effective performance of the companies by promoting key and essential measures that ensure cost-saving, enhanced customer satisfaction and increased quality of products. This would be mainly achieved by embrace of sustainable supply chain management practices, where most of these practices uphold minimization of costly and environmentally unfriendly materials and processes.

Green purchasing entails adoption of methods and strategies that promote sustainability of the materials and inputs purchased to aid production processes. The management of the horticultural companies should improve on their green purchasing practices. This can be done by involving and training the suppliers for them to have better mastery on what is expected of them, adopting green products and having effective governance systems that are aligned to the green and sustainable goals of the industry.

The study also recommends that the companies should ensure that their reverse logistics are properly structured. This would ensure that customer needs are met, ensuring customer loyalty and making it difficult for competitors to imitate simple services that are geared towards value creation and the environment.

The study recommends that the companies should involve all shareholders in green packing activities. This would ensure that they understand green packaging and challenges that come with the process so that they can fully embrace green packaging benefits. The study recommends that the horticultural firms should include green distribution as one of their strategies. This is because green packaging is essential if the company should be committed to in order to remain innovative, effective, competitive and efficient in today's ever changing dynamic marketing environment.

The management of the horticultural industry is mandated to ensure that there is effective distribution of their produce across their varied markets. It is recommended

that the management at their various capacities in decision making upholds green distribution in all their distribution practices. This includes having appropriate vehicle loadings, reducing the carbon footprint by using vehicles with lower emissions for distribution and having decentralized warehouses to minimize the transportations.

This study recommends that policy formulation on sustainable supply chain management that should be met by the horticultural companies to enhance their performance. To attain effective use of the various sustainable supply chain management practices, it requires clear policies to be formulated, implemented, and monitored to ensure they remain relevant to the business.

5.5 Areas for Further Study

This study focus was on the influence of sustainable supply chain management on firm performance in the Horticultural firms in Kenya. The study recommends that another study should be conducted on influence of sustainable supply chain management on organizational performance in supermarkets and manufacturing firms.

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APPENDICES

Appendix I: Introduction Letter

Mary Mumbi

Jomo Kenyatta University of Agriculture and Technology (JKUAT)

P.O Box 62000-00100

NAIROBI

Dear Respondent,

RE: DATA COLLECTION BY MARY MUMBI

My name is Mary Mumbi Kariuki, a PhD candidate from Jomo Kenyatta University of Agriculture and Technology. In partial fulfilment of the requirements for the award of Doctor of Philosophy in business administration in Supply Chain Management, I am conducting academic research on *Sustainable Supply Chain and firm Performance in the Horticultural firms in Kenya*. This letter is to humbly request you to respond to the questions in the attached questionnaire to enable me carry out this research. This is an academic exercise and you are assured of anonymity and confidentiality.

Thank you in advance for your willingness to generously contribute to this research.

Yours truly,

Mary

Mumbi

Appendix II: Questionnaire

Kindly answer the following questions as honestly and accurately as possible. The information given will be treated with a lot of confidentiality and response in this survey will purely be used for academic purpose only.

SECTION A: DEMOGRAPHIC INFORMATION

1. Which of the following categories of horticultural produce does your firm deal with?
 - a) Fruits
 - b) Flowers
 - c) Vegetables
 - d) All the above
 - e) Any other (Specify)
2. How many specific horticultural produce does your firm deal with (e.g. avocado, macadamia, e.tc)
 - a) Less than 3
 - b) 3-5
 - c) 6-10
 - d) 10 and above
3. How many markets does your firm sell their produce to (both local and international)?
 - a) Only 1
 - b) 2 – 5
 - c) 6 – 10
 - d) 10 and above
4. For how long have you been working for your Organization?
 - a) Less than 1 year
 - b) 1-5 years

c) 6-10 years []

d) Over 10 years []

SECTION B: GREEN PURCHASING

Please indicate the level of agreement on the following statements on green purchasing and performance. Use a Likert scale of 1-5 where 1 is strongly disagree, 2 disagree, 3 uncertain, 4 agree and 5 Strongly agree.

Statement	1	2	3	4	5
1. Our firm largely cooperates with suppliers for eco-design of inputs.					
2. Our firm deliberately purchases environmentally friendly materials.					
3. Our firm conducts environmental audits for suppliers' internal management.					
4. Our firm conducts governance and corporate social responsibility seminars.					
5. Our firm has greatly reduced purchase of items that are difficult to dispose of.					
6. Our firm has reduced the purchase of hazardous materials.					
7. The suppliers are approved based on their ability to supply green products					
8. The company carries out frequent CSR by enlightening the suppliers, customers and community on green purchasing					
9. Green purchasing has been instrumental in enabling the company save on operational costs					
10. The management has put key measures to ensure effective adoption of green purchasing					

In your opinion, how effective has green purchasing been upheld in your organization and how has it contributed to your firm's performance?

.....

.....

SECTION C: REVERSE LOGISTICS

Please indicate your level of agreement with the following statements on reverse logistics and performance in your company. Use a Likert's scale of 1-5 where 1 is strongly disagree, 2 is disagree, 3 is uncertain, 4 is agree and 5 is strongly agree

Statement	1	2	3	4	5
1. Our firm has largely a supply chain framework provided for product returns					
2. We have increasingly embraced a mainstream to allow our stakeholders to return goods that do not meet their standards or need to be remanufactured					
3. The organization has enhanced systems for screening of defective and unwarranted returned merchandise					
4. We are realizing cost savings because of our reverse logistics activities					
5. Our organization has a well-organized channel for reverse logistics					
6. The company has laid out proper measures to ensure reprocessing and rebranding of returned goods					
7. Redesigning defective merchandise has been emphasised in our firm to meet customer demands and avoid wastage					
8. The management intends to have more robust policies to enhance the effectiveness of returns management					
9. The redesign products in our company have been effectively accepted by the customers					
10. There has been an increase in performance as a results of the embrace of reverse logistics					

Are there additional measures that according to you the firm can take to enhance reverse logistics in the procurement processes? Please state a few.....

.....

.....

SECTION D: GREEN PACKAGING

Please indicate your level of agreement with the following statements on green packaging and performance in your company. Use a Likert's scale of 1-5 where 1 is strongly disagree, 2 is disagree, 3 is uncertain, 4 is agree and 5 is strongly agree

Statement	1	2	3	4	5
1. The company has put appropriate measures to reduce the packaging material used so as to reduce wastage					
2. We encourage our suppliers to use biodegradable materials					
3. The material used in packaging is mainly produced in a manner that itself is environmental friendly and non-hazardous					
4. The suppliers of the packaging materials are effectively involved so as to enable them produce environment friendly materials					
5. The storage of the merchandise in our firm is put at one central place to avoid repackaging					
6. The customers are largely encouraged to adopt to the bio-degradable materials when seeking for repackaging of their orders					
7. Our firm encourages recycling of materials used in packaging					
8. The process of packaging is mainstreamed towards avoid emissions or any other polluting means					
9. Through adherence to green packaging prospects the company has enhanced efficiency and cost saving thus enhancing value addition					

How would you describe the organization's commitment and goodwill to enhance green packaging in the procurement operations?

.....

SECTION E: GREEN DISTRIBUTION

Please indicate your level of agreement with the following statements on green distribution and performance in your company. Use a Likert's scale of 1-5 where 1 is strongly disagree, 2 is disagree, 3 is uncertain, 4 is agree and 5 is strongly agree.

Statement	1	2	3	4	5
1. We have put measures to ensure the warehouses and distribution centres are decentralized near the customers					
2. The vehicles used in distributions are put in good condition to ensure they deliver efficiently and less pollution					
3. The company has significantly reduced its carbon print from its distribution systems in the past five years					
4. Vehicles are effectively loaded to reduce the number of trips during distribution					
5. The trips are properly arranged to ensure same-route customers are supplied in one trip					
6. The vehicle loadings are arranged based on the customers' location to save on offloading time					
7. The management ensures embrace of green and sustainable distribution means such as use of solar-powered refrigerators to reduce carbon footprint					
8. The embrace of green distribution has enabled the company save more on the cost of operation					
9. The overall performance of the company has been determined by the level of sustainability of our distribution					

Do you think your organization has done its best to ensure green distribution is achieved? Please explain.....

.....

SECTION F: VALUE ADDITION

Please indicate your level of agreement with the following statements on value addition in your company. Use a Likert’s scale of 1-5 where 1 is strongly disagree, 2 is disagree, 3 is uncertain, 4 is agree and 5 is strongly agree.

Statement	1	2	3	4	5
1. Our company customizes the products based on the customers’ preferences					
2. More of our customers prefer tailor-made products that require less adjustments to meet their final need					
3. The company pre-processes its products before they are sold to the market					
4. Customers who require pre-processed goods agree to pay extra price for the product					
5. Through pre-processing we are able to extend the shelve-life of the products					
6. More waste in our products is eliminated through valued addition process					
7. The company ensures all its products are free from excessive wastes before they are sent to the customer					
8. Our company has continually enhanced the quality of its products through value addition					
9. Value addition has been instrumental in enhancing the satisfaction of our customers					

In your opinion, do you think whatever your company has done to enhance value addition is adequate to achieve its competitiveness and enhance performance?

..... Please explain

SECTION G: FIRM PERFORMANCE

What do you think is the competitive position of your organization in relation to other players in the industry?

Market leader (Position 1) [] Market challenger (Position 2) []

Market niche (Position 3) [] Market follower (Position 4) []

What do you think is the major source of performance for your organization?

.....

Please indicate the following as recorded in your organization for the years given

Unit of Measure		2014	2015	2016	2017	2018	2019	2020	2021
Gross Profits									
Market Share (%)	Vegetables								
	Fruits								
	Flower								
Number of Customers									
Sales Revenues									

Please indicate your level of agreement with the following statements on the performance of your firm. Use a Likert's scale of 1-5 where 1 is strongly disagree, 2 is disagree, 3 is uncertain, 4 is agree and 5 is strongly agree.

Statement	1	2	3	4	5
1. Our company's products are now available in more markets that they were three years ago					
2. The company has increased variety of products sold to its markets over the last five years					
3. The company's products have been easily sold in new markets that it was three years ago					
4. The number of customers in our company has significantly grown for the past three years					
5. There are more orders for our products that it was three years ago					
6. The sales revenue has significantly grown in the past three years					
7. The company is likely to expand due to the increase in its profits					

Appendix III: Reliability for Individual Items

Green Purchasing

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Our firm cooperates with suppliers for eco-design of inputs.	32.2398	20.892	.491	.695
Our firm purchases environmentally friendly materials.	32.2715	20.635	.510	.691
Our firm conducts environmental audits for suppliers' internal management.	32.1493	21.919	.469	.702
Our firm conducts governance and corporate social responsibility seminars.	32.2398	22.047	.498	.700
Our firm has reduced purchase of items that are difficult to dispose of.	32.2986	22.601	.412	.710
Our firm has reduced the purchase of hazardous materials.	32.0543	22.842	.348	.717
The suppliers are approved based on their ability to supply green products	32.8643	20.772	.308	.730
The company carries out frequent CSR by enlightening the suppliers, customers and community on green purchasing	32.7783	20.919	.313	.728

Green purchasing has been instrumental in enabling the company save on operational costs	32.5656	21.047	.372	.713
The management has put key measures to ensure effective adoption of green purchasing	32.5792	20.981	.372	.714

Reverse Logistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Our firm has a supply chain framework provides for product Returns.	33.6471	18.457	.529	.709
We have embraced a mainstream to allow our stakeholders to return goods that do not their standard or need to be remanufactured	33.7557	17.558	.606	.695
The organization has enhanced systems for screening of defective and unwarranted returned merchandise	33.7828	17.698	.558	.700
We are realizing cost savings because of our reverse logistics activities	33.6833	18.372	.495	.711
Our organization has a well-organized channel for reverse logistics	33.7738	17.549	.583	.697

The company has laid out proper measures to ensure reprocessing and rebranding of returned goods	33.6290	18.534	.423	.718
Redesigning defective merchandise has been emphasised in our firm to meet customer demands and avoid wastage	33.6199	19.346	.387	.725
The management intends to have more robust policies to enhance the effectiveness of returns management	34.0045	17.041	.328	.739
The redesign products in our company have been effectively accepted by the customers	34.4932	16.978	.283	.754
There has been an increase in performance as a results of the embrace of reverse logistics	34.1493	17.582	.276	.748

Green Packaging

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
The company has put appropriate measures to reduce the packaging material used so as to reduce wastage	30.7664	25.692	.554	.900

We encourage our suppliers to use biodegradable materials	30.9486	24.058	.655	.894
The material used in packaging is produced in a manner that itself is environmental friendly and non-hazardous	30.8505	24.062	.773	.885
The suppliers of the packaging materials are effectively involved so as to enable them produce environment friendly materials	30.9907	23.164	.774	.884
The storage of the merchandise in our firm is put at one central place to avoid repackaging	30.8551	22.744	.780	.883
The customers are encouraged to adopt to the bio-degradable materials when seeking for repackaging of their orders	30.9486	24.547	.740	.888
Our firm encourages recycling of materials used in packaging	30.9393	24.621	.733	.888
The process of packaging is mainstreamed towards avoid emissions or any other polluting means	30.9720	24.459	.641	.895
Through adherence to green packaging prospects the company has enhanced efficiency and cost saving thus enhancing value addition	30.8972	26.421	.437	.908

Green Distribution

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
We have put measures to ensure the warehouses and distribution centres are decentralized near the customers	29.0773	12.336	.636	.427
The vehicles used in distributions are put in good condition to ensure they deliver efficiently and less pollution	29.0591	12.549	.702	.425
The company has significantly reduces its carbon print from its distribution systems in the past five years	29.1864	11.814	.732	.397
Vehicles are effectively loaded to reduce the number of trips during distribution	28.9818	12.767	.693	.433
The trips are properly arranged to ensure same-route customers are supplied in one trip	29.1500	13.041	.633	.448
The vehicle loadings are arranged based on the customers' location to save on offloading time	29.8636	15.808	.054	.588
The management ensures embrace of green and sustainable distribution means such as use of solar-powered refrigerators to reduce carbon footprint	29.4136	16.298	-.055	.631

The embrace of green distribution has enabled the company save more on the cost of operation	29.7364	16.606	-.117	.669
The overall performance of the company has been determined by the level of sustainability of our distribution	29.5682	16.265	-.089	.663

Value Addition

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Our company customizes the products based on the customers' preferences	29.9539	17.952	.630	.606
More of our customers prefer tailor-made products that require less adjustments to meet their final need	29.7235	18.016	.654	.604
The company pre-processes its products before they are sold to the market	29.7880	18.844	.650	.615
Customers who require pre-processed goods agree to pay extra price for the product	29.8341	18.787	.660	.613
Through pre-processing we are able to extend the shelve-life of the products	29.8295	18.577	.666	.610

More waste in our products is eliminated through valued addition process	30.1290	20.946	.113	.723
The company ensures all its products are free from excessive wastes before they are sent to the customer	30.0876	21.302	.116	.715
Our company has continually enhanced the quality of its products through value addition	30.0507	21.030	.189	.695
Value addition has been instrumental in enhancing the satisfaction of our customers	30.2074	21.137	.093	.729

Appendix IV: List of Horticultural Firms in Kenya

Source: Horticulture Kenya (2021)

1. AAA Growers Ltd
2. Africalla
3. Afrifresh Horticultures Ltd
4. Afriherbs Kenya Ltd
5. Afriagrismark Enterprise Limited
6. Agrico East Africa Ltd
7. Alice Bananas
8. All Fresh Growers Ltd
9. Al-Shariff Gardens Ltd
10. Ankel Foods Ltd
11. Antrix International Ltd
12. Aquila Development Co. Ltd.
13. Arabian Sourcing Ltd
14. Avocado Ranch
15. Avocat Fresh Ltd
16. Bahati Spring Farm
17. Balaji Flowers Ltd
18. Baraka Roses
19. Batian Flowers Ltd
20. Bayer East Africa Ltd
21. Beautyline Kenya Limited
22. Bella Speciality Farm Ltd
23. Benvar Estates Ltd
24. Bilashaka Flowers
25. Biofarms Ltd
26. Biologica Fresh Ltd
27. Black Petals Ltd.
28. Bonny Fruits,
29. Branana Flowers
30. Breeding Botanicals Kenya Ltd
31. Brookfield Flower Garden
32. Brookveg Limited
33. Cadogold Ltd
34. Celtic Investments
35. Cenacle Kenya Ltd
36. Chalar Farms Ltd
37. Chamberlink ventures ltd
38. Charles Mwangi Export Company
39. Charm Flowers Ltd
40. Cheap Fresh Farm Produce,
41. Chemtrade Ltd
42. Clover Flowers Ltd
43. Coast Prime Foods Ltd
44. Colour Crops
45. Complex Food Agro Ltd
46. Credible Blooms ltd
47. Dairaan Ltd
48. Datura E.A. Ltd
49. Del Monte Kenya Ltd
50. Desire Flora (K) Ltd.
51. Dhamiri Ltd
52. Dial a Home Services Ltd
53. Dnv- GI Kenya Ltd
54. Domus Flower Farms Ltd
55. Dubasia Trading Company Ltd
56. Dümme Orange – Fides Kenya Ltd
57. EAG Fresh Produce Ltd
58. East African Growers Ltd

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|-----|---------------------------------|------|--|
| 59. | Eastern Greens & Livestock LTD | 95. | Garden Fresh Ltd, |
| 60. | Eatmo Worldwide Ltd | 96. | Gardenveg Exporters Ltd |
| 61. | Emmanuel Horticulture | 97. | Gatoka Flowers Ltd |
| 62. | Enkasiti Flower Growers Ltd | 98. | Gemstone Flowers Ltd |
| 63. | Envisage Ltd | 99. | Gillan Nurseries |
| 64. | Equator Kenya Ltd | 100. | Glo-Mountain International |
| 65. | Equatorial Blooms | 101. | Go for Green Ltd |
| 66. | Equinox Flowers | 102. | Grandiflora (K) Ltd. |
| 67. | Everblue Investment co. Ltd | 103. | Green Blade Growers Ltd |
| 68. | Everflora Ltd | 104. | Green Wood Joinex Ltd |
| 69. | Everfresh Produce Ltd | 105. | Greengrowers Ltd |
| 70. | Evergreen Herbs Ltd | 106. | Greenlands Agro |
| 71. | Exotic Penina Fields Group | 107. | Producers Ltd |
| 72. | Fairfield Ltd | | Greenstep Exporters Fresh Ltd |
| 73. | Fairly Flowers Kenya Limited | | Groove Ltd. |
| 74. | Fantasy Flora Ltd | | Gully Fruits |
| 75. | Farm Fresh Herbs Ltd | 108. | Hadithi Plants Ltd |
| 76. | Fides Kenya Ltd | 109. | Halisi Fresh Ltd |
| 77. | Finlay Flowers Ltd | 110. | Hamer Kenya Ltd |
| 78. | Flamingo Horticulture Kenya Ltd | 111. | Hamwe Ltd-Naivasha |
| 79. | FleurAfrica | 112. | Harte & Evfra Exporters Ltd |
| 80. | Flora Delight Ltd | 113. | Harvest Flowers Kenya |
| 81. | Flower Nation Ltd | 114. | Harvest Ltd |
| 82. | Fontana Ltd | 115. | Harvesters Fruit Shop, |
| 83. | Forever Green Growers Ltd | 116. | Healthy Fresh Fruits, |
| 84. | Fresh An Juici | 117. | Highland Plants Ltd |
| 85. | Fresh Emerald Consult Ltd | 118. | Hillside Fresh Ltd |
| 86. | Fresh Marvels Ltd | 119. | Homegrown Kenya Ltd |
| 87. | Freshpak horticultures ltd | | Horizon Trading Ltd |
| 88. | Frigoken Ltd | | Hub Imports and Exports Ltd |
| 89. | Fruitful Farms Ltd | | Husseins Coconuts, |
| 90. | Fruits Base, | | Ibis Farm |
| 91. | Fruits Center, | | Imani Flowers Ltd |
| 92. | Fruity Fruits Ltd | | Immediate Communications Ltd |
| 93. | Fruve Produce Ltd | | International Safety & Quality Group Ltd |
| 94. | Gandicam Enterprises Ltd | | Interveg Exports EPZ Ltd |
| | | | Irungu fruits and pudding vendor, |

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|--|--|
| 120. Isinya Roses Ltd (Porini Farm) | 149. Kijabe Limited |
| 121. Jade Fresh Ltd | 150. Kimica Fish Farm |
| 122. Jefer Enterprises Ltd | 151. Kimman Roses Ltd |
| 123. Jenny Fresh Point Ltd | 152. Kingfisher Farm |
| Jim's Vegetable Growers & exporters ltd | 153. Kisima Farm |
| 124. Jomaleki Merchants | 154. Kneppers Rozen |
| Jotsen Hortiveges | 155. K-net Flowers Ltd |
| Jowa Blooms | 156. Kongoni River Farm –Star
Flowers |
| Jungle Nuts Ltd | 157. Lake Flowers Ltd |
| Kaa fresh fruits | 158. Lama Fresh Produce Ltd |
| 125. Kaiview Ecological
Horticultures Ltd | 159. Lathyflora Ltd |
| 126. Kakuzi PLC | Lauren International Flowers Ltd |
| 127. Kamau Fresh Fruits, | Lelo Fruit & Vegetables |
| 128. Kanavo Ltd | Lemotit Farm |
| 129. Kandia Fresh Produce Suppliers
Ltd | Limbua Group Ltd |
| 130. Kandubu Blooms Ltd | Livewire Ltd. |
| 131. Karen Farm Fresh | Lolomarik Farm |
| 132. Karen Roses Ltd | Longnot Horticulture Ltd |
| 133. Kariki Group | Lowland Vegetable Growing Co Ltd |
| 134. Kariobangi Fruits Paradise | Lowland Vegetable Growing Co.ltd |
| 135. Keitt Exporters Ltd | Maasai Flowers Ltd |
| 136. Keitt Fresh Ltd | Maaskant Flowers Limited |
| 137. Kendeutsche Agents Ltd | Magana Flowers Kenya Limited |
| 138. Kenfloraa Ltd | Magnolia Enterprises |
| 139. Kengrow Ventures | Majili Bud Ltd |
| 140. Kensalt Ltd | 160. Makindu Growers & Packers
Ltd |
| 141. Kenya Cuttings Ltd | 161. Mama Ivy Fruits, |
| 142. Kenya Flower Council | 162. Mama Njeri Fruits Shop,
Mara Farming Ltd |
| 143. Kenya Fresh Produce Exporters
Ltd | Maridadi Flowers Ltd. |
| 144. Kenya Highland Nurseries | 163. Marvel Greens Ltd |
| 145. Kenya Horticultural Exporters
(1977) Ltd | 164. Mavuno Organics (K) Ltd |
| 146. Kenya Vineyards Ltd | 165. Mavuno organics Ltd |
| 147. Keringet Flowers Ltd | 166. Mboga Tuu Ltd |
| 148. Keystone Farms Ltd | 167. Mbula Banana Enterpris
Meadowland LTD |

Meru Greens Horticulture EPZ Ltd
 Merybery Trading Company Ltd
 168. Mirimo Import and Export
 Mitchell Cotts Freight (K) Ltd
 Miyonga Fresh Greens Enterprises
 169. Morop Flowers Ltd.
 170. Mosi Flowers
 171. Mount Kenya Alstroemeria
 Mt. Elgon Orchards Ltd
 Mucho Mangoes Ltd
 Mugwimi Fruits,
 Mully Children's Family (MCF)
 Mumi Flora T/A Baraka Roses Ltd
 Mwangi fruits vendor,
 Mwanzi Ltd
 Mweiga Blooms Ltd
 172. Mwihoko Flowers
 173. Myaflower (K) Ltd
 174. Myner Exports Ltd
 175. Mzurrie Flowers
 176. NakitaKinale Flowers
 177. Ndung'u fruit vendor,
 New Holland Chips
 Ngong Veg Ltd
 Nini Flower Farm Ltd
 NIRP International S.A.
 Njoro Gardens Ltd
 Novamont Kenya Ltd
 Oasis Green Growers Ltd
 178. Olivado Fresh EPZ Ltd
 179. Omka Exports Ltd
 180. One Acre Fund
 Oscar's Fruit Parlor,
 181. Panda Flowers Ltd
 Panocal International Ltd
 182. Penta Flowers
 Penta Tancom Ltd.
 183. Phija Kenya Ltd
 Piga Hatua Banana Traders,
 184. Pino Agencies
 185. PJ Dave Flora Limited
 Plantation Herbs Ltd
 186. Primarosa Zuri Flowers Ltd
 187. Prime F;Ora Limited
 188. Profresh Ltd
 189. Proven Fruits & Vegetables,
 Nairobi
 190. Pudding Base
 191. Q-Star Farms Ltd
 192. Raayan Exporters Ltd
 193. Rainforests Farmland Kenya Ltd
 194. Reactcert Africa Ltd
 195. Reap Horticultural Exporters Ltd
 196. Red Ice Flowers
 197. Red Lands Roses Ltd
 Redlands Roses Ltd
 198. Rhema Agro Ltd
 Rim Agriculture Services Ltd
 199. Rimi Flora Ltd
 200. Riverdale Blooms Ltd
 201. Romwa Ventures Ltd
 Rosebunk International Ltd
 Royal Flora Holland Kenya Ltd
 202. Roypack Enterprises
 Rozzika Garden Centre Ltd
 Rukia Burale Amin Enterprises
 Sabaki Tropical Fruit Ltd,
 Sahara Estates Ltd
 Saipei Foods Ltd
 Samro Fruits Parris,
 Sand Pro Growers Ltd
 Saruni Blossoms
 Sasini Avocado Ltd
 203. Seasons Orchards Ltd
 204. Seiyan Farm Products Ltd
 205. Selecta Kenya GmbH & Co.

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|---|---|
| 206. Shabangu Farms Ltd | 241. The Fresh Approach Ltd |
| 207. Shabikie Blooms Ltd | 242. Thermopak Ltd |
| 208. Shades Horticulture Ltd | 243. Thorny Acres Ltd |
| 209. Shalimar K Ltd | 244. Timaflor Limited |
| 210. Shree Ganesh Fruits & Vegetables Ltd, | 245. Timbari Flowers & Horticulture Ltd |
| 211. Sian Agriflora Ltd. / Sian Roses | 246. Total Fresh Exporters Ltd |
| 212. Sian Exports Kenya Ltd | 247. Transebel Limited |
| 213. Simba Fresh Produce Ltd | 248. Tripple F Agencies |
| 214. Simbi Roses Ltd | 249. Tropical Dynasty Kenya Ltd |
| 215. Siraji Farm | 250. Tropiken Blooms Ltd |
| 216. Six Square Ltd | 251. Tulaga Flowers Ltd |
| 217. Society of Crop Agribusiness Advisors of Kenya (SOCAA) | 252. Ubuntu Online Ltd |
| 218. Soleil Global Ltd. | 253. Uhoreru Ltd |
| 219. Solidaridad | 254. Uhuru Flowers Ltd |
| 220. Spintex Enterprises Ltd | 255. Ujamaa Fresh Produce Growers Limited |
| 221. Spisa Kenya Ltd | 256. Umati Capital (K) Ltd |
| 222. Spring Fresh Growers and Exporters | 257. Uniflora Services Ltd |
| 223. Spring Green Ltd | 258. Unitra Enterprises |
| 224. Stella Rasmussen GmbH | 259. Urban Acres Fresh Produce Ltd |
| 225. Subati Flowers Ltd | 260. Urban Fresh Ventures Ltd |
| 226. Sulski Fruit Parlor, | 261. Utee Estate Limited |
| 227. Sunculture Kenya Ltd | 262. Valentine Growers Co Ltd |
| 228. Sunland Roses Ltd | 263. Van Den Berg (K) Ltd |
| 229. Sunmango ltd | 264. Veg Tech Ltd |
| 230. Sunripe 1976 Ltd | 265. Vegpro Kenya Ltd |
| 231. Sutton Hoo Ltd | 266. Vert Ltd. |
| 232. Syanfeng Africa Freshness Ltd | 267. Viano Bien Ltd |
| 233. Syanfeng Africa Freshness Ltd | 268. Victoria Import & Exports Co. Ltd |
| 234. Tahir Agri-Techs Ltd | 269. Vine fresh (E.A.) Ltd |
| 235. Tambuzi Ltd | 270. Waamo Group Ltd |
| 236. Taste Kenya Exporters Ltd | 271. Wamu Investments Ltd |
| 237. Tawi Village | 272. Waridi Limited |
| 238. Terra firm E.A. Ltd | 273. Waves Logistics Limited |
| 239. Terrasol Ltd | 274. Waxbills Ltd |
| 240. The Flower Hub | 275. Wildfire Flowers Ltd |

- 276. Wildwood Horticulture
- 277. Wilfay Investments Ltd
- 278. Wilham (K) Ltd
- 279. Wilmar Flowers Ltd
- 280. Winchester Farm Ltd
- 281. Windsor Flowers Ltd
- 282. Xpressions Flora Ltd.
- 283. Zahara Flowers Ltd
- 284. Zanemu Vegetables & Fruits
Growers & Packers
- 285. Zedgee Ltd
- 286. Zena Roses Ltd
- 287. Zuriel Fresh Farm Ltd
- 288. Zuurbier & Co
- 289. Zwei Enterprises