

**SUSTAINABLE SUPPLY CHAIN MANAGEMENT PRACTICES
AND FIRM PERFORMANCE OF OIL AND GAS COMPANIES
IN KENYA**

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DECLARATION

This thesis is my authentic work and has never been offered to any Universities or College for the purpose of examination.

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DEDICATION

This work is devoted to the M Gas Limited Fraternity who accorded me the time to go on and monetary sustenance while pursuing this study. May Allah bless you all.

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ABBREVIATIONS AND ACRONYMS

EPRA	Energy and Petroleum Regulatory Authority
GST	General Systems Theory
ISO	International Organization for Standardization
KPC	Kenya Pipeline Corporation
OE	Operational Efficiency
SSC	Sustainable Supply Chain
SSCM	Sustainable Supply Chain Management
SSCMP	Supply Chain Management
SSCMP	Sustainable Supply Chain Management Practices

ABSTRACT

Sustainable supply-chain management practices (SSCMPs) has undergone transition from a mere fringe to mainstream because of the need to have consideration on a number of economic, environmental and social matters in the firm's operations. Research into SSCM has tremendously gained consideration in managing SC, management of operations, ethics, business, and discourses of sustainable development. The research aimed at assessing the impact of SSCM practices and Kenyan oil and Gas Company's performance. The study was aided by three specific objectives namely; to establish the sustainable supply-chain management (SSCM) of Kenyan oil and gas companies, to analyze the relationship between SSCM practices and firm performance of Kenyan oil and gas companies and to assess challenges facing the implementation of the SSCM practices. The paper was anchored towards stakeholder theory and general systems theory. To achieve the goal of the research, descriptive cross-sectional survey design was adopted. The research targeted 63 oil and gas firms in Nairobi where the study used a census because of relatively small population size. The respondents were supply chain managers or their equivalents. A questionnaire was used as a data collection instrument. The data gathered was analysed using descriptive statistics and regression analysis as inferential statistics. The study established that social supply chain practices and information sharing and management had insignificant and positive effect on firms' performance; internal environmental management had a significant and positive effect on firm' performance; strategic supply chain integration and partnership had a significant and positive correlation with firms' performance; responsible eco-design had a positive and significant effect on firms' performance. It was also established that the R^2 value of 58% infers that 58.2% of variation in firms' performance is accredited to the adoption of independent variables: social SCP, internal environment management, strategic supply chain integration and partnership, responsible eco-design and information sharing and management. It was established that financial constraints is the major challenge that the firms are facing in the implementation of the SSCM practices. It was concluded that sustainable SCM practices have a positive and substantial effect on firms' performance. The study recommends that the management of oil and gas firms need to adopt managing and sharing information to boost timeliness, minimize cost and enhance flexibility. It was ascertained that managing and sharing information are embraced by the entities to handle clients, vendors and internal processes. Future studies ought to be carried out in a different context away from the oil and gas firms.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Sustainable supply-chain management practices (SSCMPs) has undergone transition from a mere fringe to mainstream because of the need to have consideration on a number of economic, environmental, social and economic matters in the firm's operations (Adegoke, Mingbao, Abredu, Ndafira, Amoateng & Owusu-Gyan, 2021). The SSCMPs seek to integrate principles pertaining to sustainability in the form of social, ecological and financial concerns into the practices of supply chain management (SCM). A focus into SSCM has tremendously gained consideration in the managing SC, management of operations, ethics, business, and discourses of sustainable development (Mamdouh, Kadry & El-Ahmady, 2018). The SSCM makes clear the extent to which organizations and their shareholders may in unison manage procedures associated with inter/intra-organizational dynamic forces to realize superior performance of the firm (Owie, 2019). Development of the sustainable practices is critical for the company's future and also future generations' benefit. Practices that are sustainable lead firms to grow sustainably, mutually responsibly and profitably.

This study's theoretic lenses are stakeholder theory and general systems theory. Stakeholder theory clearly shows the concerns of an organization's external and internal interested parties (Freeman, 1984). Stakeholder theory recommends that an organization's significance creation should comprise economic and ethical concerns (Freeman, Parmar & Wicks, 2004). Additionally, stakeholder theory encompasses the harmonization of a company's undertakings in a multifaceted and active ecology as pointed out by Freeman (1984). The stakeholder theory draws into the notion of the sustainability phenomenon being investigated which encompasses social, economic and environmental aspects by firms in SCM. Bertalanffy (1972) notes that the General Systems Theory

(GST) is around visualizing and discovering structured bodies in a comprehensive image instead of segregating particular portions in the wider arrangement of exploring a phenomenon. The general system theory is about the entirety of an automatic structure that has numerous interfaces amid diverse representatives, incorporating diverse perspectives to reach a mutual goal. The overall systems lens permits for the surpassing of limitations or amalgamated disciplines (Boulding, 1956). This theory's use in this research work will be for the universal examination of sustainable practices in SCM by practitioners of supply chain in companies.

The Kenyan economic survey (2022) pointed out a noticeable rise in demand for products of petroleum within the economy of Kenya, the country's major part being Nairobi and that of countries that are neighbouring. The cause has been growth of aviation, rail transport, power generation and manufacturing, road transport, industrial and agricultural sectors growth which have been the triggers. Kenya made a great step after oil that is commercial was explored in Turkana County at south Lokichar basin. Consequently, many Kenyan oil and gas companies have been trading in petroleum products from Lokichar, whereas others carry on importing. The Kenya Bureau of statistics argues that Kenya has received over fourteen million dollars from three hundred and twenty four thousand crude oil exported barrels from the time of its invention in the year 2012. Additionally, many Kenyans have profited from this product that is valuable, consequently creating many job opportunities. Petroleum products permeate virtually all sectors of the economy, exemplifying the strategic importance of the oil and gas industry as far as economic growth is concerned. It is therefore an imperative for firms in this sector to be sustainable.

1.1.1 Sustainable Supply Chain Management Practices

The SSCMP is viewed as the strategic, crystal clear incorporation and success of an entity's social, ecological and financial goals in the systematic synchronization of crucial cross-company operational procedures aimed at enhancing the longer-term performance of the economy of the distinct corporation and its supply chain. The practices of SSCM summarize how industries scheme and realize sustainability in the course of management of supply and decisions for making purchases (Panya, Ochiri, Achuora & Gakure, 2021). The SSM practices definition is entrenched in the SSCM definition. In writings, the practices of SSCM have been well-defined in varied ways comprising the specific management undertakings associated to the chain of supply wish to make them sincerely sustainable chain. Nevertheless, numerous other writers considered the SSCM as management of supply chain, the attention of which is to sustain strength involving social, economic and environmental activities to realize further longer-term growth that is sustainable (Emamisaleh, Rahmani & Iranzadeh, 2018).

Supply chain sustainability entails various dissimilar priorities: stewardship of the ecology, resource preservation, carbon footprint minimization, monetary savings and feasibility and social responsibility. Generally, the practices in SSCM may be separated into practices that are external and internal. SSCM practices that are internal may comprise the restructure of merchandises with biodegradable constituents, or the set-up of distribution and production processes that are more energy efficient (Das, 2018). Furthermore, a number of writers realized that practices that are internal can comprise reduction of waste, clean energy use, process redesign to reduce pollution, consumption of energy, use of water and ISO 14001 implementation (Baig, Abrar, Batool, Hashim & Shabbir, 2020). SSCM practices that are external relate to features external to an organization's boundaries, like selection of suppliers and their support. Such practices that are external can

include supplier selection grounded on their performance with regard to sustainability and appraising them centered on their performance with respect to the environment.

Basically, supply chain that is sustainable ought to execute such practices of business and processes, which bring into line with the three sustainability pillars that include economic, environmental and social, to generate an equilibrium amongst them. Unsustainable chains of supply are results of failing to the above. (Alzubi & Akkerman, 2022). The practices of SSCM comprise practices regarding the environment, employees' and community social practices, practices that relate to operations and integration of the supply chain among others (Mukhsin & Suryanto, 2022). Initiatives pertaining to the environment entail practices like the commitment of senior management to SSCM that is eco-friendly, the support of middle management, cooperation, complete quality management of the environment, conservational audits and compliance, ISO 14001 accreditation or similar systems for environmental management, design of green products, production that is not pollutant, and green packaging that is reusable, ISO 14001 certification for suppliers among others (Bilala & Odari, 2021). This study will use social supply chain practices, internal environmental management, strategic supply chain integration and partnership, responsible eco-design and information sharing and management as measures of the SSCMPs.

1.1.2 Firm Performance

In general terms performance refers to both financial and non-financial goals realized by the firm (Kosgei & Gitau, 2019). Firm performance describes how the firm is able to meet its established goals by leveraging the resources that are in place. It is one of the goals that drive existence of the firm. Performance, according to McCahery, Sautner and Starks (2020), is a degree to which the organization's management has made use of resources accessible to them within a specified period

of time to build shareholders' worth. The performance of a firm is deemed to be the level of achievement that companies attain in allotting input resources to boost productivity, replicating the degree of resource use (capital, human and material resources) to realize definite objectives. Measurements of performance are intended to stand for the course of info analysis and recording on performance, and they are there to shed more light on whether a firm or an operation meets the performance objectives that were set. A series of dimensions are fronted by entities for instance financial efficiency, output resources, flexibility, customer service and delivery that is timely (Abidi & Klumpp, 2013).

Balasubramanian and Shukla (2017) established that performance measures for the economy might be impacted in a positive manner during the implementation of sustainable environmentally friendly practices in supply chain management. Nonetheless, Zailani *et al.*, (2012) distinguished between diverse measures of performance, comprising the following: economic, organizational, environmental, operational, marketing, financial performances and competitiveness. A number of scholars followed a more combined viewpoint. An example of Rao and Holt (2005) who categorized marketing economic and financial performances within economic performance. Additionally, Zhu and Sarkis (2004) regarded cost saving to be a portion of economic performance. The other writers like Shi *et al.*, (2012), envisioned additional particular metrics like operational performance comprise of flexibility, productivity, quality and efficiency. Green *et al.*, (2012) in addition regarded the quality of products in operational performance, which falls under competitiveness in its classification.

Operational efficiency (OE) is a key indicator of an entity's performance that has been extensively acknowledged in literature (Liu, Wu, Zhong & Liu, 2020). OE lies in the ability of the firm to save on its costs and time. OE covers some sub-indicators like timely delivery and flexibility, cost

as well as efficiency (Gill, Singh, Mathur & Mand, 2014). Delivery is the ability of the enterprise to avail the product to customers. Flexibility measures the ability of the entity of responding to market demands (Ameke, 2016). Market share is another key firms' performance measurement indicator as it measures the product and customer base, as compared to the sales and revenues generated (Gill, Singh, Mathur & Mand, 2014). Efficiency is reflected in how the firm utilizes the existing resources to create value. Ndolo (2015) argued that operational performance of the firm is informed by such factors as skills and proficiency of the employees among other issues. This study will measure firm performance using operational efficiency and market share.

1.1.3 The Oil and Gas Companies in Kenya

The industry involved in oil and gas is divided into three segments: midstream, upstream and downstream. These firms are engaged in export, import to neighbouring nations and circulation of products of petroleum to the Kenyan territory end user. Majority of the Kenyan neighbour nations like DRC, Rwanda, Uganda, Burundi and the Republic of South Sudan carry on to their reliance on petroleum distribution infrastructure and networks in Kenya. These countries' local incorporated firms make most of the decisions on the supply chain. Petroleum firms have increased in number, which implies increase in competition for both the obtainable distribution infrastructure and for the end users. A number of companies are deemed integrated unlike many which are segmented. This implies that it can be a combination midstream, upstream and downstream endeavours. In addition, companies can be state owned, public or private (KPRL Entitlement Statement for May, 2013).

Companies that are deemed as upstream directs their efforts on investigation and production of natural gas and crude oil through processes that involve drilling to recuperate these resources both

under water and underground. Turkana County is home to a good number of exploration blocks. The following are examples of upstream players: Total, Tullow oil and Africa oil. After getting resources, companies in the midstream take care of the resources' storage and transportation to different geographical regions dealing with refinery. Companies in the midstream depend greatly on companies that are in upstream to produce for them to be in business. The ferrying takes place pipelines, tanker ships or tracking fleets. One example of midstream companies include the Kenya Pipeline Corporation (KPC) involved in the transportation of petroleum products to hinterland from Mombasa. Conversely, Kenya Pipeline Corporation cross cuts between downstream and midstream since presently we do not have a midstream firm in Kenya. KPC ought to be the representative of the government in case there is a midstream in Kenya. The energy ministry and the mining and petroleum ministry classify KPC as a midstream firm and put storage and pipeline under operations that are midstream (Kenyan Economic Survey, 2021)

Companies that are downstream operate in raw materials refining; raw materials gotten in the upstream operation. These are involved with transforming natural gas and crude oil into kerosene, lubricants, petrol, gasoline, diesel, jet fuel, heating oil, among others. The government in February 2019 announced that it won't put up local crude oil refinery to refine the oil from Turkana oil fields but in its place decided to export crude oil as well as import refined petroleum for internal usage. Insufficient crude oil to merit a refinery's construction is the reason behind non-construction of the same. The firms depend on crude oil acquisition profit margins accrued and sale of the crude oil into a product that is finished. Recently there have been identified a number of problems that impact on the chain of supply of the companies. They comprise issues with quality which are becoming compelling since new requirements of fuel call for highly multifarious processing and a very expensive investment. An attractive return is not always guaranteed in such

investments. Compliance rules and regulations with regards to the environment have become progressively severe. This in turn results in existing facilities operations and new ones construction costly, sophisticated and challenging. The demand of fuel in Kenya is small as a result leaving suppliers with left-over provisions which they cannot supply. Vivo energy has a largest market shareholding from over the sixty oil companies presently registered. Vivo's market share is at 28%, with Total being the second at 23.1%. Ola energy, Rubis, National Oil Corporation and Engen are among other prominent oil marketing companies (Kenyan Economic Survey, 2022)

1.2 Research Problem

Sustainable SCM concepts is crucial for environmental and social operational issues considerate organizations, to alleviate the related undesirable results (Alzubi & Akkerman, 2022). Operational sustainability focused organizations have earned abundant paybacks in terms of better performance. SSCMPs implementing firms may in its decision embrace the following: assessing suppliers for performance with regard to the environment, collaboratively operate with vendors on ecological innovative design and offer trainings and figures to generate an ability for suppliers' environment management. The oil and gas firms deal handle products like petroleum that create a lot of environmental pollution. These firms also deal in extraction of gases from underground which also contribute towards environment damage. The practices in supply chain management that are not sustainable within the organizations are a main underwriting factor to a number of adverse environmental and social happenings. Millions of individuals, children included die and are annually abused because of environmental pollution, trafficking and forced labor owing to the management practices (Alghababsheh & Gallear, 2021).

The available studies from an international scope entail Mukhsin and Suryanto (2022) who appraised the bearing of SSCM on performance of a company facilitated by the Indonesian competitive advantage. Study results show that SSCM affects competitive advantage; performance of the company was also seen to be impacted by SSCM. Mamdouh, Kadry and El-Ahmady (2018) focused on Egypt to link practices in SSCM to performance, where significant nexus was registered. Das (2018) sought to establish how practices in SSCM impacted on the performance of firms by use of Indian organizations' learnt lessons. It was realized that the practices in the construction environmental management have insignificant relationship with operational performance and do not bring about in competitiveness. On the other hand, when mutually facilitated through performance in the environment and performance in operations, practices in the management of the environment bring about competitiveness.

Locally in Kenya, Mulwa (2015) did an assessment of SSCM practices and the Nairobi's United Nations Agencies' performance; the results revealed that partner involvement, having a supplier network that is diverse, making sure that a sustainability policy is in place for every supplier, employees' proper conditions for working, workers safety and health and ethically procuring, manufacturing and dissemination were immensely adopted. Bilala and Odari (2021) did a study with focus on practices in SSCM and their role on manufacturing firms' performance by use of a case of Unilever Kenya Limited. Observations of the paper were that ecological designs, cleaner manufacturing and eco packing are substantial forecasters of manufacturer's performance. The recommendation were on employing of inventive workers to support eco design and cleaner production inventions. Omai, Ngugi and Kiarie (2018) did an assessment of practices in supply chain on SSC performance in Kenyan apparel and textile industry. The outcomes revealed that manufacturing that is modularity-based, management of the relationship in the supply chain,

integration of the chains and the responsiveness of supply chain had a positive effect on performance of supply chain in Kenyan apparel and textile industry in the apparel and textile sector with integration of SC and modularity being the strongest.

The reviewed investigations generate shortcomings as a number of them were conducted in other nations like Indonesia, Egypt and India away from Kenya. Other studies like Bilala and Odari (2021) utilized case studies where a single firm was involved. There are other studies Mukhsin and Suryanto (2022) covered competitive advantage as a mediator. Thus, to fill the shortcomings, the current study aimed at answering the questions that follow: What are practices in SSCM of gas and oil companies in Kenya? What correlation exists amongst practices in SSCM and performance of Kenyan oil and gas firms? What are the challenges of implementing the sustainable SCM practices?

1.3 Research Objectives

There will be general and specific objectives in this study as shown.

1.3.1 General Objective

The study's general objective was to find out the impact of SSCM practices and the firm's performance in Kenyan oil and gas companies.

1.3.2 Specific Objectives

This research was directed by the subsequent specific objectives denoted below:

- i. To establish the sustainable supply-chain management (SSCM) practices of Kenyan oil and gas companies

- ii. To analyze the relationship between SSCM practices and firm performance of Kenyan oil and gas companies
- iii. To assess challenges facing the implementation of the SSCM practices

1.4 Value of the Study

The outcome may offer support for skilled professionals by revealing exceptional understandings and viewpoints about SSCM and challenges. The insights could help to come up with all-inclusive approaches for executing SSCM practices and alleviating challenges concerning achievement of performance targets that were set. This research work may have the latency to contribute to reducing the gap in the writings concerning SSCM and the deficiency of research addressing perceptions of SSCM from the emerging and developing economies' perspectives.

The deficiency in the literature regarding the sustainability of supply chain from the standpoints of experts in economies that are non-developed and gap between theory and practice in SSCM accentuates the hitches in executing sustainability practices in economies that are non-developed. The examination of less-researched areas in SSCM might offer discernments for coming up with significant theoretical structures that are presently missing in the field. This examination may perhaps offer underexplored visions into supply-chains' sustainability from the perception of an emergent economy for all-inclusive theoretical improvement to increase the discipline's understanding and link the gap between practice and theory. The discoveries of this investigation might be consistent with offering perceptions into appropriate supply-chain theories that are sustainable such as systems and stakeholder theories in order gain a superior understanding of different circumstantial dynamics. This study's findings might offer theoretic perceptions that

supply-chain specialists can make use of in an inflexible way in efficiently executing SSCM practices.

The conclusions from this suggested study might impact supply-chain practitioners positively. At the local level, understanding of the distinctive viewpoints of participants and the milestones encountered in implementing SSCM practices may aid in developing strategies to mitigate those barriers. This stride may prompt contemplations for environmental and social concerns at the native surroundings where the entities and their SC allies function in. At the nationwide level, the discoveries of this research work may work as a reference point for participants in diverse businesses throughout the nation to work together and come up with universal sustainable models for alleviating milestones associated with sustainability in SCM in all stakeholders' benefit and interest.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This segment reviews literature guided and informed by the variables. The review of literature revolves around the theories and past empirical work. Gaps from reviewed studies and the conceptual framework are also included

2.2 Theoretical Literature Review

The stakeholder theory and the general system theory will be made use of to anchor this research study.

2.2.1 Stakeholder Theory

Stakeholder theory was established by Freeman (1986) and its main argument is that the management of firms needs to consider the views of different parties like suppliers, lenders, and shareholder among others. Stakeholders are individuals who have interest in the company and who may be affected by the actions in the firm, or they can also affect the normal functioning of the business (Schonebeck & Pöllinger, 2020). From a supply chain point of view, suppliers are part of the stakeholders who determine the overall influence on prosperity of the firm. Effective stakeholder management is crucial for SSC innovation and this calls the firm to understand the interests of the stakeholders (Shah & Bookbinder, 2022). A clear understanding of the stakeholder interest is influenced by communication and exchange of knowledge. Effective management of the stakeholders requires high degree of collaboration between the firm and the stakeholders (Tseng, Ha, Lim, Wu & Iranmanesh, 2022). There are three key attributes that can provide the

basis of differentiating the stakeholders: urgency, legitimacy and power. These attributes lead to categorization of stakeholders as either primary or secondary (Barro, 2009).

This theory operates on a number of premises, first assumption is that there exist groups in and out of the firm that are impacted by the firm, have interest in the success of the business or influence the firm in some ways (Siems & Seuring, 2021). The theory assumes that it is possible to bring in balance the interests of different stakeholders (Tseng et al., 2022). It is also assumed that effective management of the stakeholders and their interests can lead to better performance of the firm. The theory assumes that firms exist to create value (Menke, Hüsemann & Siems, 2021). This theory is pertinent to this work as it links up the instrumental role of suppliers as key stakeholders who have potential to impact on success of the firm.

2.2.2 General Systems Theory

The proponent of the general systems theory is Bertalanffy (1972) and it argues that businesses are made up of components that collectively work together for achievement of a specific goal. Within a supply-chain perspective, this theory requires partners to have good working relationship for better performance of their organizations. This collaboration and partnership in supply chains as established by this system theory lead results into information flow and sharing and it require high degree of integration (Helou & Caddy, 2006). The theory indicates that supply chain systems in organizations should work together in unity so as to realize superior performance. The system theory advocates that supply chain in an organization should be evaluated and examined as a whole with placing more emphasis on the component parts (Caddy & Helou, 2007). The basis of this theory lies in the fact that existing sustainable supply chains are interdependent and highly inter-

related. Supply chains systems in an organization do not exist in isolation but require each party to link with each other for mutual benefits in terms of sustainability (Mishra & Garg, 2013).

Theory has been criticized for placing much focus on relationships as opposed to objects that are not related and on processes and how they are connected as opposed to structures, the whole as opposed to mere parts among other premises (Baporikar, 2020). Despite these limitations, the GST will be embraced in underpinning the central role of integration, partnership and data sharing within supply chain. Supply chains are made up of parties that can be viewed as components of the larger system. Enhanced operational performance will require these components to partner and collectively work together.

2.3 Sustainable Supply Chain Management Practices

Social supply-chain is one the three pillars of sustainability in addition to financial and ecological dimension. Social supply chain practices aim at incorporating socially established data, interactions, and networks for enhanced relationship management with all the concerned parties. These efforts are meant to bring about maximization in market values (Awan, 2019). It focuses on supplier communities for effective decision making at business level and improved supply chain (Alghababsheh & Gallear, 2021). According to Pinto (2019), social supply chain brings about performance enhancement of the firm. This dimension place more attention on the effects of the supply chain activities to the larger society that firms operate in. Internal environmental management is viewed as the need to enhance performance of the entity in regard to its internal surroundings. The internal environment of the firm is comprised of aspects within the firm covering the existing staff and the management as well as the prevailing culture at the corporate level (Afum, Mensah-Williams, Agyabeng-Mensah, Baah & Dacosta, 2021). It also covers the

vision and mission of the firm as well as the core values that inform how staff carry out activities and coexist in the firm. While the firm may not have direct control and influence on external environment, it can shape the external surrounding (Passetti, Cinquini & Tenucci, 2018).

Strategic supply chain integration and partnership have been viewed as critical in sustainable firm's supply-chain activities. This is characterized by cost reduction, control of inventories and accuracies in forecasting (Sabet, Yazdani & De-Leeuw, 2017). Supply chain integration allows the firm to operationally and strategically collaborate with the external and internal allies in the supply-chain. Strategic integration of supply-chain and partnership facilitates coordination of activities while allowing firms to interlink their business activities and processes. Eco-design is a philosophy that aimed at introducing ecological issues in the design phase of the products including services. Its underlying goal is to bring about minimization in environmental impact on a life term basis. Sustainable eco-design allows firms to carry out an analysis of their product lifecycles from the point of design to that of recycling so that a prediction of its impact on business surrounding at every successive stage is determined. It allows firms to reduce the environmental impact as the product moves in the lifecycle with key focus on the raw material in use, pollution arising from manufacturing of products, the amount of energy utilized and the resultant waste once disposal has been done (Chang, Talpur, Chang & Hashmi, 2020).

Information sharing and management has been seen among the keyways of enhancing performance of SC (Baihaqi & Sohal, 2013). Through information sharing, firms are in position to effectively coordinate their actions with other associates in the supply-chain (Sheikhi, Goodarzi, Nowrozinejad & Sheikhi, 2018). Kumar and Pugazhendh (2012) observed that information sharing can contribute to an increase in efficiency through its ability to reduce inventories and smoothening the production. Accordingly, Damiani, Frati and Tchokpon (2011) shared that

information sharing helps to reduce uncertainties in supply chain which contribute towards enhancement of trust and in turn leading to better firms' performance. Information integration embodies knowledge and information sharing amongst participants in the supply-chain, including forecasting of sales, production plans, status of the inventory and the development plans for products (Lee, 2020). It allows administration to scrutinize the organizational processes in entirety and not in a disjointed, functionally isolated way. Supply chain participants may be interconnected by IT for some logistical undertakings as management of inventory, fulfilment of orders, planning of production, planning of delivery and coordination. IT tools implemented include bar-coding, electronic data interchange, electronic messaging, the internet and the global network management.

2.4 Sustainable Supply Chain Management Practices and Firm Performance

Chang, Talpur, Chang and Hashmi (2020) did a study in Pakistan among small and medium enterprises with emphasis on SSCMPs and firm level performance. The study operationalized the SSCMPs into practices that are external and internal and the analysis was informed by Structural Equal Modeling (SEM). It emerged that organizations could get lessons from outcomes to line up their position toward advancements that are sustainable as a competitive advantage. The study done among manufacturing firms in Jordan by Alzubi and Akkerman (2022) was an appraisal of SSCMPs in the developing countries' context. In total ninety two answers were scrutinized to experiment the projected hypotheses by use of regression analyses for the purpose of testing the single-variable hypotheses, and SEM to test the Multi-variable hypotheses. The outcomes demonstrated that an uptake of Sustainable SCM is in its early steps for Jordanian producers. Consciousness of sustainability is fairly little, and Jordanian corporations typically do not appear to regard the impact on the environment of their manufacturing operations.

Raza, Zhang, Liu, Zhu, Hassan, Gul and Hussain (2021) did an analysis of the SSMPs and sustainability performance. Data was gathered from 436 supply management experts done using a survey tool from 6 companies in China involved in manufacturing and logistics. The hypothesized indirect and direct connections were tested by use of structural equation modeling. The outcome reveals that strategies in SSM affect positively the sustainability performance. The connection between the practices in SSM and SP is facilitated by NC and SCRM. The study conducted within the context of Ghana by Adegoke, Mingbao, Abredu, Ndafira, Amoateng and Owusu-Gyan (2021) focused on the analysis of SSCMPs and performance at organizational level. The analytical model used in the study was SEM and the results were that Environmental Management Practices (EMP) findings in Enhanced Suitable Environmental Performance (SENP) and Sustainable Economic Performance (SECP). The performance of an organization has a great correlation with SECP and SENP.

Locally in Kenya, Bilala and Odari (2021) did an inquiry on the SSCMPs and their implication on performance of manufacturing entities with emphasis on Unilever Kenya. The variables adopted include cleaner production and eco-design and green packing. The Ecological Modernization and resource-based theory offered theoretical base. Results showed cleaner production, eco-design and green packing are major prognosticators of performance of manufacturing firms. Mohammed, Lagat and Ngeno (2019) focused on the SSCPs and performance of manufacturing entities. Study data gathered from 281 manufacturing organizations in Kenya was used to test research hypotheses. From the SEM model, findings revealed that ecologically SSC techniques ($\beta_1 = .303$, $p < .05$), socially SSC practice ($\beta_2 = .492$, $p < .05$) and economically SSC practice ($\beta_1 = .626$, $p < .05$), positively impacted the outcome of manufacturing entities.

2.5 Challenges Facing Sustainable Supply Chain Management Practices

The gas and oil entities are faced with numerous barriers as they aim at attaining sustainable strategies in supply-chain management. Most gas and oil firms usually encounter various shortfalls such as force from superior contestants, the necessity to work autonomously, resource scarcity and numerous operative hitches such as in areas of management of inventory and the capacity of organizations. An example is where some oil and gas companies experience performance shortfalls because integration of the supply-chain is intricate (Ebrahim, Ahmed & Taha, 2018). Based on Abonyi (2015), some entities have regulated scope and segregation and thus are barred from obtaining economies of scale in the buying of crucial inputs like tools, raw commodities, funds, and consulting services. Subsequently, a number of entities are normally not capable to recognize latent markets; and are incapable of exploring current market opportunities that need huge capacities, dependable quality and sufficiently well heightened standards, to make sure the constant distribution of petroleum commodities to shoppers (Udin et al., 2016). As an outcome of resources that are inadequate, organizations are always not able to profit from the chances presented by worldwide value chains caused by their low linkages to international transport webs and their feeble capacity to produce (Arvis, Panzer, Mustra, Ojala & Naula, 2007).

The practices in management of supply-chain that are sustainable demand that companies additionally broaden business activities' scope, which may turn out to be more challenging as the life-cycles of products shorten, increase in the variety of products, and advancement in technology goes on at a relatively high speed and there is an upsurge in demand to satisfy the client as observed by Bozarth, Barbara and Donald (2017). Furthermore, companies deficiency in technical manpower, RnD, finance and education, which are influences that commonly drive diverse companies into a sustained negative path as opined by Cocca and Alberti (2010). Being a core

driver of the growth of an economy, oil and gas organizations ought to build themselves tactically to accord them competitiveness as well as the capacity to mitigate domestic, universal and internationalization challenges and to present best commodities or services performance and design (Raymont & Croteau, 2016).

The practices in sustainable SCM implementation in oil and gas companies is most often triggered by forces from customers or by big businesses who focuses on the uptake of a pull technique instead of the traditional push method (Bozarth, Barbara & Donald, 2017). Accordingly, companies involuntarily widen the visualization of their SC tactic to refocus their processes on the skills that are basic. The firms may confront more complex situations in executing their supply-chain tactics due to the swelling necessities in implementing supply-chain strategies, organizations may face more tests in carry out their sustainable supply-chain strategy to contest effectually (Thakkar, Kanda & Deshmukh, 2018). For the purpose of success, organizations need to comprehend the significance of sustainable supply-chain execution, be attentive and fine-tune according to the customer needs to reserve their share of the market, attention on the environment and to guarantee their advancement (Thakkar et al., 2018). Nonetheless, the requisite for individuality and autonomy by entities, together with a little propensity to assign duties and consult, might be hurdles to the institutionalization of triumph elements like managerial practices that are participatory and a decision support use.

2.6 Summary of Literature and Knowledge Gaps

The study has reviewed writings which present a number of gaps that are summarized as shown in Table 2.1.

Table 2.1: Summary of Literature Review and Knowledge Gaps

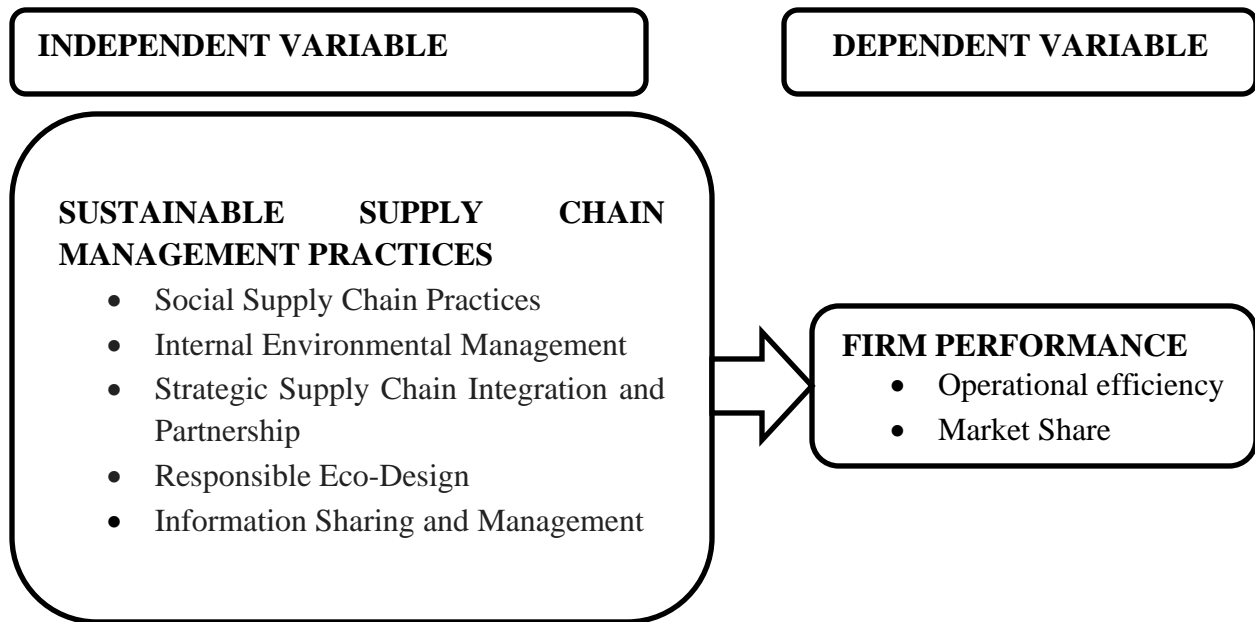
Author(s)	Study	Key Finding	Knowledge Gap	Focus of present study
Alzubi and Akkerman (2022)	An appraisal of SSCMPs in the context of developing countries	Practices in SSCM uptake is still in its early steps for Jordanian manufacturers	The study exclusively dwelt on SSCMPs and couldn't associate the same to performance	The present work seeks to establish the SSCMPs-firm performance nexus
Bilala and Odari (2021)	SSCMPs and their implication on performance of manufacturing entities with emphasis on Unilever Kenya	Eco-design, cleaner manufacturing and eco-packaging substantially predicts manufacturing firm's performance	Case study methodology was adopted	The present study will be done covering over 60 registered oil companies in Kenya
Raza et al., (2021)	SSMPs and sustainability performance.	SSM practices positively affect sustainability performance	The study covered sustainability performance as the dependent variable	Firm performance will be used as the dependent variable
Chang et al., (2020)	SSCMPs and performance at firm level	Firms could get lessons from the outcomes to support their position on sustainable progresses as a competitive advantage	The study was done in Kenya	The current research to be carried out in Kenya
Mohammed et al., (2019)	SSCPs and performance of manufacturing entities	SSCPs impact positively on the manufacturing firms' outcome	The study covered manufacturing firms	Oil marketing organizations will be the focus of the current research

2.7 Conceptual Framework

Sustainable SCM practices are the independent variables and entail social supply chain practices, internal environment management, Strategic Supply Chain Integration and Partnership, responsible eco-design and information sharing and management. Firm performance made up the dependent variable and was measured via operational efficiency and market share. It is

hypothesized that implementing sustainable SCM practices will enhance firm performance. This relationship is diagrammatically illustrated in the subsequent conceptual model

Figure 2:1: Conceptual Model



Source: Researcher (2022)

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This section presented a discussion of the study design, the target population, collection of data and analysis of the information in this research.

3.2 Research Design

The paper adopted descriptive cross-sectional survey research design. Descriptive survey design helps to provide a description of the practices in sustainable supply chain and performance as far as the oil and gas firms in Kenya are concerned. Descriptive cross-sectional survey research assisted the investigator to gather data by observing, depiction, and recording, analyzing and generating reports on circumstances prevailing at that instant from the populace (Cooper & Schindler, 2006). The use of the cross-sectional descriptive design was justified since it helped the researcher to pronounce the sustainable SCM strategies adopted by the oil and gas entities and how it will influence firms' performance.

3.3 Population of the Study

There are sixty-three (72) oil and gas companies operating in Kenya (appendix I) according to Energy and Petroleum Regulatory Authority report (2022) resulting from the cost and time constraints; the research focused on sixty-three (63) firms in Nairobi County and these will form the populace of the study. Thereby the population being quite minimal, census was used. Therefore, all the mentioned 63 oil and gas firms were included in the study.

3.4 Data Collection

Primary information was gathered aided by a structured questionnaire with the reason for structuring the questionnaire was to generate standardized responses that can easily be keyed in the analytical tool. The questionnaire was segmented into 4 parts, with Part “A” covered general information, Par B with information on sustainable SCM practices, Par C with information on firm performance and Par D with information on challenges. A 5 point scale of Likert where 1 denoted strongly disagree and 5 being strongly agree was adopted in design of the questionnaire. The respondents were one SC managers or their equals from each of the oil and gas institution. Since they were believed to be well conversant with SCM activities and hence have a sound understanding of issues associated to sustainable supply-chain management and their impact on firms’ performance.

3.5 Data Analysis

The gathered data after being scrutinized was analysed by Statistical Package for Social Sciences (SPSS) version 24 utilized means and standard deviations as descriptive statistics and regression analysis as inferential statistics. While descriptive statistics was critical in analysis of the first and third objective, the second objective was analyzed through regression analysis and the findings presented through tables. The regression equation that was adopted during analysis is:

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

Where:

Y = Firm performance (operating efficiency, market share)

β_0 = constant

$\beta_0, \beta_1 \dots$ = beta coefficients

X₁ = Social Supply Chain Practices

X₂ = Internal Environmental Management

X₃ = Strategic Supply Chain Integration and Partnership

X₄ = Responsible Eco-Design

X₅ = Information Sharing and Management

ε = Error term

3.6 Operationalization of the Variable

Table 3. 1 Operationalization of Variables of the Study

Variable	Sub-Variable	Scale of measurement
Dependent Variable	Operational efficiency	Ordinal scale
Firm performance	Market Share	Nominal scale
Independent Variable	Social SC practices Internal Environmental Management Strategic SC Integration and Partnership Responsible Eco-Design Information Sharing and Management	Ordinal scale
Sustainable SCM practices		

CHAPTER FOUR: DATA ANALYSIS AND DISCUSSION

4.1 Introduction

The intention of the study was to ascertain the impact of Sustainable Supply Chain Management practices on performance of Oil and Gas Companies in Kenya. This chapter analyses the findings with regards to demographic information, extent of adoption as well as the correlation between performance of Oil and Gas companies in Kenya and Sustainable SCM practices.

4.2 Response Rate

The researcher circulated 63 questionnaires to the targeted participants out of which 41 were duly answered up and obtained. This equates to a response frequency of 65.1% which was adequate as supported by Mugenda and Mugenda (2003) who assert that satisfactory presentation of the outcome should exceed the response frequency of 60%. The companies' policies in regards to secrecy of organizational information, busy schedule of the managers and the state's instruction of social distancing by the period the information was being gathered could be amongst the aspects that could be accredited to this response frequency.

Table 4. 1 Response Rate

	Frequency	Percentage
Obtained Questionnaires	41	65.1
Unanswered Questionnaires	22	34.9
Total Questionnaires	63	100

Source; Research Data (2022)

4.3 Validity and Reliability Results

This segment presents the study's instrument's validity and reliability outcomes. A pilot test was conducted prior to determining validity and reliability with respondents who were not included in

the actual study. This section therefore is a summary of how validity and reliability of the instrument was determined.

4.3.1 Reliability Results

The questionnaires were piloted among 10 respondents picked from other companies. The reason for piloting the questionnaire was to ascertain its reliability. Properly answered questionnaires from the pilot study was coded into SPSS and the values of Cronbach Alpha Coefficients were generated so as to establish reliability and the outcome are summarised in table.

Table 4. 2 Reliability Results

Variable	Cronbach's Alpha	No. of Items
Sustainable Supply Chain Management	.989	20

Source: Research Data (2022)

From Table 4.2, sustainable supply chain management practices had cumulatively 20 items represented by Cronbach Coefficient value of 0.989. Based on Cronbach (1951), the coefficient values exceeding 0.7 infers that the instrument can be relied on. Hence, it can be concluded that the distributed questionnaires that was used in obtaining data could be relied on.

4.4 General Information of Respondents

The study assessed the respondents' general information that entailed their position and years of experiences.

4.4.1 Work Position

The study aimed at determining the position that the participants held in their oil and Gas Companies in Kenya.

Table 4. 3 Work Position

Work Position	Frequency	Percent	Valid Percent
Supply Chain Manager	19	46.3	47.0
Procurement Officer	7	17.1	17.0
Operation Manager	5	12.2	12.0
Logistics manager	5	12.2	12.0
Marketing Manager	5	12.2	12.0
Total	41	100.0	100.0

Research Data (2022)

From the results, majority of the study's participants 47% were supply chain managers, 17% were procurement managers, 12% were operation managers, 12% were logistics managers and 12% were marketing managers. This shows that most respondents of the study were supply managers, although it is deduced most of the respondents were top level managers thus were knowledgeable about the focus of the study.

4.4.2 Work Experience

The research aimed at determining the period that managers and officers had worked in the Oil and Gas Companies.

Table 4. 4 Work Experience

Experience	Frequency	Percent	Valid Percent
1-5 Years	5	12.2	12.0
6-10 Years	7	17.1	17.0
11-15 Years	16	39.0	39.0
Over 15 Years	13	31.7	31.0
Total	41	100.0	100.0

Research Data (2022)

From the outcome, most of the study participants 39% had worked between 11-15 years, 31% for over 15 years, 17% between 6-10 years and 12% between 1-5 years. This implies that participants of the study had worked in the Oil and Gas entities for quite a lengthy period hence were knowledgeable on the variables of the study.

4.5 Implementation of Sustainable Supply Chain Management Practices

The dimension of sustainable SCM practices analysed. In this regard, the researcher formulated various statements on the different SSCMP and the managers and officers had to state the extent of their satisfaction on the scale of 1-5 1 being strongly disagree and 5 representing strongly agree.

The study generated mean and standard deviation which are subsequently presented

4.5.1 Social Supply Chain Practices

The first dimension of sustainable supply chain management was social supply chain and Table 4.5 gives a breakdown of the results.

Table 4. 5 Social Supply Chain Practices

Statement	Mean	Standard Dev
We participate in the social development activities of the community in our firm	4.26	.980
Our competitive strategies are pegged on clients and social needs	4.43	.558
We regularly quantity client's satisfaction levels to monitor any deviations that may have a social impact	4.40	.651
We invite the communities to participate in the design and operations of our firm	4.37	.646

Research Data (2022)

From Table 4.5, Our competitive strategies are pegged on clients and social needs (M=4.43). We regularly quantity client’s satisfaction levels to monitor any deviations that may have a social impact (M=4.40). We invite the communities to participate in the design and operations of our firm (M=4.37). We participate in the social development activities of the community in our firm (M=4.26). The values of standard deviations are low implying that participants converged on their expression social supply chain practices.

4.5.2 Internal Environment Management

The second dimension of sustainable supply chain management practices was internal environment management. Table 4.6 gives a breakdown of the outcome.

Table 4. 6 Internal Environment Management

Statement	Mean	Standard Dev
All employees are allowed to access pertinent information they may need in executing their duties	4.51	.507
Workers frequently interrelate with each other via means like meetings, calls and email	4.37	.646
The requisite resources in executing duties are shared among the diverse departments	4.20	.632
The entity uses a database to monitor its employees performance in the supply chain	4.29	.667

Research Data (2022)

From Table 4.6, All employees are allowed to access pertinent information they may need in executing their duties (M=4.51). Workers frequently interrelate with each other via means like meetings, calls and email (M=4.37). The entity uses a database to track its employees’ performance in the supply chain (M=4.29). The requisite resources in executing duties are shared among the

diverse departments (M=4.20). The values of standard deviations are low, showing that respondents converged on their expression on internal environment management.

4.5.3 Strategic Supply Chain Integration and Partnership

The third dimension of sustainable SCMP was strategic supply chain and partnership. In this regard, the researcher formulated various statements on internal environment management and respondents had to indicate the extent of their satisfaction on the scale of 1-5. The study generated deviations and mean with their breakdown tabulated in 4.7.

Table 4. 7 Strategic Supply Chain Integration and Partnership

Statement	Mean	Standard Dev
We have strategic vendors for diverse commodities and service requirements	4.46	.561
We share information with our clients and vendors pertaining commodities usage and other details concerning the products	3.89	1.157
We habitually interact with our vendors and clients in mutual information swapping platforms pertaining operating activities	4.26	.611
Our information systems are interconnected with those of our vendors and clients	3.46	.561

Research Data (2022)

From Table 4.7, We have strategic vendors for diverse commodities and service requirements (M=4.46). We habitually interact with our vendors and clients in mutual information swapping platforms with regard to operating activities (M=4.26). We share information with our clients and vendors pertaining commodities usage and other relevant details concerning the products (M=3.89). Our information systems are interconnected with those of our vendors and clients

(M=3.46). On average, most statements had means above 3.0 inferring that participants agreed with statements on strategic supply chain integration and partnership.

4.5.4 Responsible Eco-design

The fourth dimension of SSCM practices, responsible eco-design. In this regard, the researcher formulated various statements on eco-design and participants had to state the level of their satisfaction of the metrics on the scale of 1-5. The study generated mean and standard deviations. Table 4.8 portrays a breakdown of the outcome.

Table 4. 8 Responsible Eco-Design

Statement	Mean	Standard Dev
The firm’s products are environmentally friendly	3.54	1.024
The firm has designed mechanism in which the products are recycled to avoid pollution	4.02	.521
The firm have trained the personnel on the importance of environment throughout the supply chain partners	3.62	.542
The entity embraces specialised packaging materials for commodities that need customization during shipping and stowage that are eco-friendly	4.24	.405

Research Data (2022)

From Table 4.8, the entity embracing specialised packaging materials for commodities that need customization during shipping and stowage that are eco-friendly (M=4.24). The firm has designed mechanism in which the products are recycled to avoid pollution (M=4.02). The firm has designed mechanism in which the products are recycled to avoid pollution (M=3.62). The firm’s products are environmentally friendly (M=3.54). On average, utmost statements had means exceeding 3.5 implying that participants agreed with statements on responsible eco-design.

4.5.5 Information sharing and Management

The fifth dimension of sustainable SCMP, information sharing and management. In this regard, the researcher formulated various statements on information sharing and management and participants had to rate the level of their satisfaction on the scale of 1-5. The study generated mean and standard deviations. Table 4.9 provides a breakdown of the findings.

Table 4. 9 Information Sharing and Management

Statement	Mean	Standard Dev
There are systems that monitor the progress of transportation of diverse commodities to clients	4.46	.284
Our information systems are interconnected with those of our Vendors	3.12	1.512
We utilize IT tools in expediting access to information	4.09	.682
All workers are allowed to access pertinent information they may need in executing their duties	4.53	.613

Research Data (2022)

From Table 4.9, All workers are allowed to access pertinent information they may need in executing their duties (M=4.53). There are systems that monitor the progress of transportation of diverse commodities to clients (M=4.46). We utilize IT tools in expediting access to information (M=4.09). Respondents however were not certain whether information systems are interconnected with those of vendors (M=3.12). On average, most statements had values of means above 3.6 an implication that study's participants agreed with statements on information sharing and management.

4.6 Firms' Performance

The study looked at how sustainable SCM practices impacted firm performance. As a result, the investigation conveyed numerous statements on the theme, and study participants had to write down their acceptance extents with the assertion using a 5-point Likert scale; with 1 being strongly disagree and 5 being strongly agree. The study generated mean and deviations.

Table 4. 10 Firms' Performance

Statement	Mean	Standard Dev
Real time information exchange with suppliers and customers has led to improved efficiency in the organization	3.70	.873
Concentration on the eco-friendly products has led to improved efficiency and increase in the customers' demands	3.60	.996
Information sharing with suppliers has improved the capability with which poor supplier performance can be accommodated	3.80	1.308
Partnership and strategic alliance between different partners in the supply chain has led to improved operations costs	3.48	1.075
Information access has increased the speed and flexibility with which decision-making may be executed within the entity	3.63	1.156
Resource sharing has reduced resource requirements in tasks utilization in the firm	3.53	1.120
Employee interaction has increased creative initiatives among employees	3.19	1.363
Interaction with customers has positioned the entity to respond faster to dynamic client needs	3.60	1.159
Community engagement and interaction with the firm has created a good working relationship	3.12	.860
Enhanced client's satisfaction levels has boosted sales volumes	4.09	.899

Research Data (2022)

From Table 4.10, enhanced client’s satisfaction levels has boosted sales volumes (M=4.09), Information sharing with suppliers has improved the capability with which poor supplier performance can be accommodated (M=3.80), Real time information exchange with suppliers and customers has led to improved efficiency in the organization (M=3.70), Information access has increased the speed and flexibility with which decision making may be executed within the entity (M=3.63), Concentration on the eco-friendly products has led to improved efficiency and increase in the customers’ demands (M=3.60), Resource sharing has reduced resource requirements in tasks utilization in the firm(M=3.53), Partnership and strategic alliance between different partners in the supply chain has led to improved operations costs(M=3.48), Employee interaction has increased creative initiatives among employees(M=3.19) and community engagement and interaction with the firm has created a good working relationship (M=3.12).

4.7 Relationship between Sustainable Supply Chain Management Practices with firms’ Performance

Data was regressed to ascertain the relationship between performance of Oil and Gas entities in Kenya and sustainable supply chain management practices and the findings are tabulated in the subsequent tables.

Table 4. 11 Model Summary

Model	R	R Square	Adjusted Square	R Std. Error of the Estimate
1	.763 ^a	.582	.52	.617

Research Data (2022)

- a. Dependent Variable: Firms’ Performance
- b. Predictors: Social supply chain practices, internal environmental management, strategic supply chain integration and partnership, responsible Eco-design, Information sharing and management

Table 4.11 portrays the value of R^2 as 0.582% inferring that 58.2% of variation in firms' performance is accredited to the adoption of SSCMP (social SC practices, internal environment management, strategic SC integration and partnership, responsible eco-design and information sharing and management) by the Oil and Gas firms in Kenya. This is an adequate prediction model as only 42.7% of the variation is unaccounted for as an outcome of pure chance factors and variables not studied.

Table 4. 12 ANOVA Analysis

Model	Sum of Squares	Df	Mean Square	F	p-value
Regression	9.0254	5	1.805080	4.7339419	.000 ^b
Residual	6.4822	35	0.3813059		
Total	15.5076	40			

Research Data (2022)

- a. Dependent variable: Firms' Performance
- b. Predictors: Social supply chain practices, internal environmental management, strategic supply chain integration and partnership, responsible eco-design, Information sharing and management.

Table 4.12 demonstrates that the general model has a statistical relevance as the p-value=0 and does not surpass 5%. Furthermore, for =5% numerator, df =5 and denominator, df=35. The calculated F value of 4.73 backs the concept's numerical relevance. This finding signifies that the model can suitably predict firm performance.

Table 4. 13 Regression Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t (Value)	Sig. (P Value)
	B	Std. Error	Beta		
(Constant)	1.203	0.932		1.291	0.243
Social Supply Chain Practices (X ₁)	0.125	0.124	0.106	1.008	0.363
Internal Environmental Management (X ₂)	0.178	0.089	0.227	2.000	0.037
Strategic Supply Chain Integration and Partnership (X ₃)	0.461	0.124	0.473	3.718	0.001
Responsible Eco-Design (X ₄)	0.381	0.093	0.465	4.097	0.000
Information Sharing and Management (X ₅)	0.137	0.112	0.132	1.223	0.253

Research Data (2022)

- Dependent variable: Firms' Performance
- Predictor: Social supply chain practices, internal environmental management, strategic supply chain integration and partnership, responsible Eco-design, Information sharing and management

$$Y=1.203+0.125 X_1+0.178X_2+0.461 X_3+0.381 X_4+0.137 X_5$$

From the table 4.13, the finding shows that social supply chain practices with p equalling 0.363 value indicating that it is statistically insignificant at 5% critical value as it exceeds 0.05. This infers that social supply chain practices has no relationship and do not influence the firm's performance of Oil and Gas entities in Kenya.

Internal environmental management and firms' performance have a statistical relevance and are positively correlated (t=2.000, p=0.037). upon all factors being held at zero, a unit change in internal environmental management will results in an associated gain in firms' performance by 0.178; the P value of 0.037 that doesn't exceed 0.05 inferring that Internal environmental

management has a relationship and positively impacts performance of Oil and Gas entities in Kenya.

Strategic supply chain integration and partnership and firms' performance are have a statistical and noteworthy relevance ($t=3.718$, $p=0.001$) implying that strategic supply chain integration and partnership contributes to by 0.461 of the firms' performance. The p-value of strategic SCI and partnership is 0.001 showing strategic SCI and partnership has a relationship and influences the firm's performance of Oil and Gas entities as evidenced by the P value that doesn't exceed 5%.

There exists a substantial correlation between Responsible Eco-design and firms' performance ($t=4.097$, $p=0.000$) and a unit alteration in Responsible Eco-design contributes to 0.381 of the firms' performance. The p-value of Responsible Eco-design is 0.000 an indication that Responsible Eco-design has a relationship and impacts the firm's performance of Oil and Gas entities in as evidenced by the P value not surpassing 0.05.

Information sharing and management ($t=1.223$, $p=0.253$) does not impact the firms performance of Oil and Gas entities in Kenya. A unit increase in Information sharing and management, when all factors are held at constant, adds onto 0.138 of the performance. Information sharing and management has a p value of 0.253 an inference that it exceeds 5% and thus this implies that it does not impact the performance of Oil and Gas entities in Kenya.

4.8 Challenges of Implementing Sustainable Supply Chain Management Practices

The outcome on the barriers of implementing sustainable SCM practices are tabulated in 4.14.

Table 4. 14 Challenges of Implementing Sustainable Supply Chain Management Practices

Statement	Mean	Std. Dev
There exists financial constraint regarding implementation of sustainable SCM in the organization	3.72	0.879
Existence of inferior training of personnel concerning sustainable SCM	3.69	0.933
Existence of heightened insecurity level in the entity’s operation expressly via electronic-based sharing of information	3.62	1.034
The entity has inferior communication channels as a result of supply chain structures	3.59	0.776

Research Data (2022)

Table 4.14 specifies that diverse barriers are experienced while trying to implement sustainable supply chain management in entities. They entail financial restraint associated with implementing SSCMP by entities (M=3.72), existence of inferior training of personnel concerning sustainable supply chain management (M=3.69), existence of heightened insecurity level in the entity’s operation expressly via electronic-based sharing of information (M=3.62), and the entity having inferior communication channels as a result of supply chain structures (M=3.59).

4.9 Discussion of Findings

The outcome indicate that social supply chain practices does not impacts firms’ performance of Oil and Gas entities in Kenya. This finding disagrees with Mukhsin and Suryanto, 2022 who stated that social supply chain practices involve strategies are based on social needs within the firm. By inviting the communities in the planning and strategies of the organization can help the organization be competitive in the market and ultimately affects the firms’ performance.

The findings indicate that internal environment management positively influences the firms’ performance of Oil and Gas entities in Kenya. These outcome coincides with Bilala and Odari,

2021 (2016) who stated that environment consideration is critical in the operations of the firm. Companies that ensures that the customers interacts; hence making the products competitive in the market.

The findings indicate that strategic supply chain integration and partnership positively influences firms' performance of Oil and Gas entities in Kenya. The outcome is consistent with the argument of Chang, Talpur, Chang and Hashmi (2020) that established that supply chain integration and partnership enables the firm to have information of customers and suppliers regarding product usage and other details regarding the products. An efficient strategic supply chain integration and partnership aids the entity in significantly minimizing the overall cost by creating the platform of interaction of suppliers and customers.

The findings indicate that responsible eco-design influences firms' performance of Oil and Gas entities in Kenya. This outcome aligns with Alzubi and Akkerman (2022) who established that eco-design enables the use of environmental friendly products and provides a mechanism of the reduction of pollution of these products in the environment by providing mechanisms such as recycling in order to save the environment. By providing the mechanism such as recycling the firm reduces the overall cost and at the same time protects the environment which ultimately improves the firms' reputation hence positively affects firms' performance.

The findings indicate that information sharing and management does not influence firms' performance of Oil and Gas entities in Kenya. The outcome contradicts those of Adegoke, Mingbao, Abredu, Ndafira, Amoateng and Owusu-Gyan (2021) who established that information sharing is essential in the organization as it enables the organization to track the progress of their operations. An efficient information sharing and management system helps the firm to significantly execute their tasks in a timely manner.

On the challenges, among the barriers faced by the Oil and Gas firms in implementation of SSCMP entail financial restraint associated with implementing SSCMP by entities, existence of inferior training of personnel concerning sustainable supply chain management, existence of heightened insecurity level in the entity's operation expressly via electronic-based sharing of information and the entity having inferior communication channels as a result of supply chain structures. The outcome coincides with those of Arvis et al (2007) who note that with insufficient funds, the entities are incapable of gaining from the universal value chains due to low connectivity with regards to communication channels and capacity productivity. Abony (2005) adds that micro and upcoming find it difficult to obtain economies of scale resulting from insufficient stowage facilities.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The segment highlights the summarized results, draws conclusion, and recommends lessons from the outcome as well as suggestions are herein discussed

5.2 Summary of Findings

The key objective was establishing the effect of sustainable SCMP and firms' performance of oil and gas companies in Kenya. The objectives that steered the study are (i) to ascertain the SSCM Practices of Kenyan oil and gas companies (ii) to analyze the correlation between SSCM practices and firm performance of Kenyan oil and gas entities (iii) to assess challenges facing the implementation of the sustainable SCM practices.

The research finds out that social supply chain practices has an insignificant but positive effect on firms' performance. It was established that competitive strategies are based on customer and social needs. The firms frequently measured customer satisfaction levels to track any changes that might have a social impact. It was also established that communities are invited to participate in the design and operations of our firm. The firms also participate in the social development activities of the community.

The outcome showed that internal environment management positively impacted firms' performance. The findings established that all works are permitted to access pertinent information they may need to execute their duties. Workers regularly interrelate with each other via meetings, email. It was also established that firms use a database to track its employees' performance in the

SC. It was also established that firms share resources required to perform tasks among different department.

Strategic supply chain integration and partnership positively and significantly impacts firms' performance. It was established that firms have strategic suppliers of various product and service requirements. Firms repeatedly interrelate with vendors and customers in mutual information swapping platforms pertaining operating activities. It was also found out that firms share information with clients and suppliers pertaining commodity usage and other details concerning the items. The information systems are interlinked with those of our suppliers and customers.

The outcome ascertained that responsible eco-design positively impacted firms' performance. The entity adopts specialised packaging commodities for customized and special items during distribution and stowage that are eco-friendly. The firms have designed mechanism in which the products are recycled to avoid pollution. The firms have designed mechanism in which the products are recycled to avoid pollution. It was also established that the firm's products are environmentally friendly.

The study affirmed that information sharing and management had no impact on firms' performance. It was established that all works are permitted to access pertinent information they may need to execute their duties. Firms have systems in place that monitors the progress of transportation of diverse commodities to clients. Firms utilize IT tools in facilitating information access.

The core objective was to ascertain the influence of sustainable SCM practices on firms' performance. From regression outcome, the coefficient of determination (R^2) was 0.582, which infers that 58.2% change firms' performance is attributed to sustainable SCM practices. ANOVA

outcome at 5% level of significance affirmed that the overall model was fit. The p values of respective 1 variables of SSCM were all less than 0.05 apart from the social supply chain practices and Information Sharing and Management, showing that sustainable SCM practices has significant influence on firms' performance.

In respect to the challenges in the implementation of sustainable SCM practices, it was determined that the Oil and Gas firms in Kenya are experiencing financial limitation pertaining implementing sustainable SCM practices, lack of proper, heightened insecurity level occasioned by electronic based information flow and existence of inferior communication channels as a result of supply chain structures.

5.3 Conclusion

The researcher concluded that, social supply chain practices has an insignificant and positive impact on firms' performance of Oil and Gas Companies in Kenya. Most of the firms have embraced the social supply chain practices through measuring of customer satisfaction levels to track any changes that might have a social impact. Inviting communities in the design and operations of the firm and through participation of communities' development activities.

The research concludes that internal environmental management positively impacted firms' performance of Oil and Gas entities in Kenya. Through the internal environment management all employees are allowed to access all information they may require in execution of their tasks. Employees regularly interact with each other via meetings and email. Firms use database to track its employees' performance in the supply chain. Firms share resources required to perform tasks among different department, hence the organization has increased customer satisfaction,

streamlined the communication in the firm leading to high efficient and effectiveness of the operations in the firm and timely delivering commodities to clients.

The study concludes that strategic supply chain integration and partnership has a positive and significant impact on firms' performance. It was established that firms have strategic suppliers of various product and service requirements. Firms recurrently interact with vendors and customers in mutual information exchanges platforms. Firms share information with clients and suppliers pertaining commodity usage and other details concerning the items and the information systems are interconnected with those of our vendors and customers thus leading to timely commodity delivery and enhanced client's satisfaction.

The paper concludes that responsible eco-design has positively influenced firms' performance of Oil and Gas entities in Kenya. The entities adopted specialized packaging materials for special as well as customized commodities while distributing and stowing are eco-friendly. The firms have designed mechanism in which the products are recycled to avoid pollution. Firm's products are environmentally friendly. Adopting eco-design has enhanced client's satisfaction, minimized cost and increased of positive reputation about the commodities to the clients.

It is concluded that information sharing, and management had no impact on firms' performance of Oil and Gas Companies in Kenya. Firms' employees are allowed to access all information they may require in execution of their duties. Firms have systems in place that monitors the progress of delivery of various commodities to customers and firms utilize IT tools in facilitating information access, which has enhanced client's satisfaction as they may easily obtain their commodity in the required quantity and quality, reduction the cost of operations and it has increased the efficiency of the firms' operations.

5.4 Recommendation of the Study

It is recommended that the decision makers of oil and gas companies should adopt information sharing and management to enhance timeliness, minimize cost and boost flexibility. It was ascertained that sharing and managing of pertinent information are embraced by the companies to control clients, vendors and internal procedures.

The research also recommends that the oil and gas companies should regard fully implementing the strategic supply chain integration and partnership since interactions with various suppliers, sharing of information for mutual benefit will enhance operational flexibility and minimization of costs.

The research noted that social supply chain practices was insignificant but had a noteworthy impact on firms' performance. Most of the firms had not incorporated the social supply chain practices in their firm thus not realizing the benefit of social SC practices. The social SC practices led to good working relationship with the community hence providing a good working environment. Therefore, it's recommended that the Oil and Gas Companies in Kenya ought to fully embrace and social supply chain practices in order to enhance efficiency and have a higher market share.

5.5 Limitations of the Study

The study was limited to primary data, which was accomplished through the use of virtual questionnaires distributed via e-mail. The study's limitation in collecting primary data was that survey participants may have been afraid that the information provided would be used to scare them. To overcome this limitation, participants were guaranteed that the data collected would be kept confidential and adopted only for academic reasons. To bolster this reassurance, a letter from

the learning institution was obtained, which included information pertaining the purpose of the study.

Throughout the process of obtaining data, most study participants were preoccupied with their daily tasks. As a result, data collection from the preoccupied respondents could not be completed using one day or in person. To guarantee sufficient data collection and to enhance response rates, a drop-and-pick later technique was embraced when administering questionnaires as well as via e-mail. The contact information of the participants was recorded, and reminders were sent to prompt them to complete the collection instrument.

5.6 Suggestions for Further Research

The dissertation majored on sustainable SCM practices and their effect on the performance of Kenyan oil and gas companies. The research focused specifically on social supply chain practices, internal environmental management, strategic supply chain integration, responsible eco-design, and information sharing and management and how they impact firms' performance. The value of R^2 in the regression results was 0.582, indicating a 58.2% change in firm performance explained by sustainable SCM practices. As a result, it can be summed that, aside from sustainable SCM practices, there are other factors influencing firm performance that future research may investigate. The present study focused on oil and gas entities in Kenya. Future studies may be conducted with companies other than oil and gas companies.

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APPENDICES

Appendix I: List of Oil and Gas Firms

1. ONE PETROLEUM LIMITED
2. AFRO PETROLEUM LTD
3. AFTAH PETROLEUM(K)LTD
4. ALBA PETROLEUM LIMITED
5. ASHARAMI SYNERGY LIMITED
6. ASTROL PETROLEUM COMPANY LIMITED
7. AWALI GROUP LIMITED
8. AXON ENERGY LIMITED
9. BACHULAL POPATLAL (KENYA) LIMITED
10. BANODA OIL LIMITED
11. BRAIN FIELD OIL AND GAS LIMITED
12. BULK PETROLEUM LIMITED
13. BUSHRA ENERGY LIMITED
14. BUZEKI ENTERPRISES LIMITED
15. CITY OIL (K) LIMITED
16. DALBIT PETROLEUM LIMITED
17. DESERT STAR OIL CO. LIMITED
18. EAST AFRICAN GASOIL LIMITED
19. ELIORA ENERGY LIMITED
20. EMKAY INTERNATIONAL LIMITED
21. ENGEN KENYA LIMITED
22. EPPIC OIL (K) LIMITED
23. EVON INTERNATIONAL ENERGY LIMITED
24. FOSSIL FUELS LIMITED
25. GAPCO KENYA LIMITED
26. GASLINE PETROLEUM LIMITED-Conditional License
27. GLOBAL PETROLEUM PRODUCTS KENYA LIMITED
28. HARED ENERGY LIMITED
29. HASMACK COMPANY LIMITED
30. HASS PETROLEUM KENYA LIMITED
31. ILADE OIL CO. LIMITED
32. JAK LINE COMPANY LTD
33. JOJES OIL DEALERS LIMITED
34. KAYMAN ENERGY LIMITED
35. KENCOR PETROLEUM LIMITED
36. KOSMOIL PETROLEUM (EA) LIMITED
37. LINK OIL LTD
38. LUQMAN PETROLEUM LIMITED
39. MENA ENERGY LIMITED
40. MERIDIAN ENERGY LIMITED
41. MOGAS KENYA LIMITED
42. MOIL KENYA LIMITED
43. MS OIL LIMITED

44. NATIONAL OIL CORPORATION OF KENYA
45. NETGAS AND ENERGY LIMITED
46. OCEAN ENERGY LIMITED
47. OIL ENERGY KENYA LIMITED
48. OILCOM (K) LIMITED
49. OILPRO LIMITED
50. OLYMPIC PETROLEUM LIMITED
51. ORYX ENERGIES KENYA LIMITED
52. PERFORMANCE PARTS LIMITED
53. PETRO OIL KENYA LIMITED
54. PETROCAM KENYA LTD
55. RAMJI HARIBHAI DEVANI LIMITED
56. RANWAY TRADERS LIMITED
57. RED STAR PETROLEUM LIMITED
58. REGNOL OIL (K) LIMITED
59. RIVA PETROLEUM DEALERS LIMITED
60. ROYAL ENERGY (K) LIMITED
61. SAVANNA ENERGY KENYA LIMITED
62. SOCIETE PETROLIERE KENYA LIMITED
63. TAAM PETROLEUM LIMITED
64. TECAFLEX LIMITED
65. TESLOR CORPORATION LIMITED
66. TEXAS ENERGY LTD
67. TORCH ENERGY LTD
68. TOSHA PETROLEUM (KENYA) LIMITED
69. TOTAL KENYA LIMITED
70. TOWBA PETROLEUM COMPANY LIMITED
71. VIVO ENERGY KENYA LIMITED
72. ZACOSIA TRADING LIMITED

Source: EPRA (2022)

Appendix II: Questionnaire

QUESTIONNAIRE

Introduction

- i. This Questionnaire aims at obtaining information on Sustainable Supply Chain Management Practices and Firm Performance of Oil and Gas Companies in Kenya. The information is for academic reasons only

Section A: General Information

1. Company Name _____

2. What position do you hold in the Oil and Gas entity?

Supply Chain Manager

Procurement Officer

Operations Manager

Logistics Manager

Marketing Manager

Other _____

3. For what period have you held your position?

1-5 years

6-10 years

11-15 years

Over 15 years

Other (Specify) _____

SECTION B: EXTENT OF ADOPTING SUSTAINABLE SUPPLY CHAIN MANAGEMENT PRACTICES

SOCIAL SUPPLY CHAIN PRACTICES

On the scale subsequently given, rate each statement that pronounces social supply chain practices in your entity that may have an effect on firm performance. Using the Likert scale of 1-5 whereby 1= strongly disagree, 2= disagree, 3= moderately agree, 4= agree, and 5= strongly agree.

SOCIAL SUPPLY CHAIN PRACTICES	1	2	3	4	5
We participate in the social development activities of the community in our firm					
Our competitive techniques are based on Clients and social needs					
We regularly quantity client satisfaction levels to monitor any alterations that might have a social impact					
We invite the communities to participate in the design and operations of our firm					
INTERNAL ENVIRONMENT MANAGEMENT	1	2	3	4	5
All workers are permitted to obtain pertinent information they may require in execution of their duties					

Workers frequently interrelate with each other via meetings, email and calls					
The requisite resources needed in executing duties are shared among the diverse departments					
The entity uses a database to monitor its staff's performance along the chain					
STRATEGIC SUPPLY CHAIN INTEGRATION AND PARTNERSHIP	1	2	3	4	5
We have strategic vendors for diverse commodities and service requirements					
We share information with our clients and vendors pertaining commodities usage and other relevant details					
We frequently network with our vendors and clients in mutual information conversations platforms pertaining operating activities					
Our information systems are interconnected with those of our vendors and customers					
RESPONSIBLE ECO-DESIGN	1	2	3	4	5
The entity's commodities are environmentally friendly					
The firm has designed mechanism in which the products are recycled to avoid pollution					
The firm have trained the personnel on the importance of environment throughout the supply chain partners					
The entity adopts specialised materials for customized and special commodities during delivery and stowage that are eco-friendly					
INFORMATION SHARING AND MANAGEMENT	1	2	3	4	5
There are systems that monitor the progress of delivery of diverse commodities to clients					
Our information systems are interconnected with those of our vendors					
We utilize IT tools in enhancing information access					

All workers are permitted to obtain pertinent information they may require in execution of their duties					
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Any other? Kindly state _____

SECTION C: SUSTAINABLE SUPPLY CHAIN MANAGEMENT PRACTICES AND FIRM'S PERFORMANCE

Below are metrics describing the correlation of Sustainable Supply Chain Management Practices and Firm Performance. Kindly indicated the level of your concurrence on a scale of 1 to 5

No.	Performance Outcome	1	2	3	4	5
1	Real time information exchange with suppliers and customers has led to improved efficiency in the organization					
2	Concentration on the eco-friendly products has led to improved efficiency and increase in the customers' demands					
3	Information sharing with suppliers has improved the capability with which poor supplier performance can be accommodated					
4	Partnership and strategic alliance between different partners in the supply chain has led to improved operations costs					
5	Information access has increased the speed and flexibility with which decision-making may be executed within the entity					
6	Resource sharing has reduced resource requirements in tasks utilization in the firm					
7	Employee interaction has increased creative initiatives among employees					
8	Interaction with customers has positioned the firm to respond faster to dynamic customer needs					
9	Community engagement and interaction with the firm has created a good working relationship					
10	Enhanced client satisfaction levels have boosted sales volumes					

Any other? Please state _____

SECTION D: CHALLENGES OF SUSTAINABLE SUPPLY CHAIN MANAGEMENT PRACTICES IMPLEMENTATION

Please rate the level that you concur with the subsequent challenges in SSCMP using a scale of 1 to 5 with 1 being strongly disagree and 5 being strongly agree.

Statement	1	2	3	4	5
Lack of adequate finance to implement sustainable SCM practices					
Existence of inferior training of personnel concerning sustainability management					
Existence of heightened insecurity level in the entity’s operation expressly via electronic-based sharing of information					
The entity has inferior communication channels as a result of supply chain structures					

Any other challenge? Kindly indicate

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.....

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APPRECIATED FOR PARTICIPATING