EFFECT OF SUPPLY CHAIN RISK MANAGEMENT ON OPERATIONAL PERFORMANCE OF OIL MARKETING COMPANIES IN KENYA

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DECLARATION

I declare that this research project is my original work and has never been submitted for award of a degree or diploma at the University of Nairobi or any other educational institution.

…… ……

Signature **Date**

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D61/77593/2015

This research project has been submitted for examination with my approval as the University Supervisor.

…… ……

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DEDICATION

I would like to dedicate this Research Project to my lovely daughters, Kyla and Kaycee, who have endured my absence as I pursued my studies. God Bless You.

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I would like to thank my supervisor, Dr. Kingsford Rucha, for taking time to guide me through the project writing and the valuable advice and encouragement he has given me during this period which has enabled me to achieve this. I would also like to thank my family for the support and understanding they have given me during this period.

ABSTRACT

Supply chain risk management is the implementation of strategies for managing risks along the supply chain together with continuous risk assessment with the aim of reducing exposure and vulnerability thereby ensuring continuity of the enterprises. Managing risks in the supply chain is becoming an important avenue for harnessing competitiveness due to the increasing vulnerability of the supply chains. The main objective of the study was to determine the effect of supply chain risk management on operational performance of oil marketing companies in Kenya. The study was anchored using the resource based theory and the agency theory which support the fact that information on and the planning of supply risk management can improve the company's competitive position. The research adopted a correlational survey research design. Data was collected using a questionnaire which was administered to the supervisors or the heads of department. The population of this study comprised of all Eighty Five (85) Oil Marketing Companies in Kenya and a total of fifty four (54) questionnaires were completed satisfactorily and returned. From the findings it was deduced that oil marketing firms have some mechanism for risk management in their supply chain. The regression analysis indicates that operational performance is present to some extent without the risk management element. The regression model developed was $Y_1=0.661 + 0.198X_1 + 0.0738X_2 - 0.153X_3 + 0.09X_4 + 0.199$.The resulting equation shows there is a linear relationship between variables X1 (Supply Risk Management), X2 (Demand Risk management) and X4 (Political Risk Management) and the operational performance of oil marketing companies however there's a negative relationship between Operational Risk management(X3) with operational performance of oil marketing firms. The researcher concluded that management of risk in the supply chain is an important tool for the improvement of operational performance of a company as the consumers will be served better if risks were mitigated to avoid supply chain disruptions. The study recommends that managers should have an understanding of the risks in the supply chain as this is important for survival in the marketplace. Another recommendation from the researcher is that companies should have a risk mitigation plan, this will help organization to manage and close the gaps within their supply chain.

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ABBREVIATIONS AND ACRONYMS

SC	-	Supply Chain
SCRM	-	Supply Chain Risk Management
OP	-	Operational Performance
OMC	-	Oil Marketing Companies
KPRL	-	Kenya Petroleum Refineries Ltd
KPC	-	Kenya Pipeline Company
ERC	-	Energy Regulatory Commission
NOCK	-	National Oil Corporation of Kenya
MRA	-	Multiple Regression Analysis
VMI	-	Vendor Managed Inventory

DEFINITION OF TERMS

Supply Chain	These are series of value creating processes spanning over company boundaries in order to provide value to the end consumer (Chopra, 2008)
Supply Chain Management	These are corporate business processes integration from end users through suppliers that provide information, goods, and services that add value for customers. (Lysons and Farrington, 2008)
Supply Chain Risk Management	This is "the implementation of strategies to manage both every day and exceptional risks along the supply chain based on continuous risk assessment with the objective of reducing vulnerability and ensuring continuity" (Weele A.J., 1995).
Risk	This Risk is the potential for unexpected negative event to occur (Crompton, H.K. and Jessop, D. 2009).
Risk management	Risk management is the use of various management practices to reduce the production and financial risk of the business (Crompton, H.K. and Jessop, D. 2009)
Resilience	Resilience refers to a dynamic process of maintaining positive adaptation and application coping strategies in the face of adversity (Hannan, 2006).

Oil Marketing Companies	Oil marketing companies are those companies that control the oil market in terms of supply and distribution in Kenya
Open Tendering System	A bidding process that is open to all qualified bidders and where the sealed bids are opened in public for scrutiny and are chosen on the basis of price and quality.
Price Control	This the economic term used to refer to a situation where the general price level covering consumer goods remains unchanged or if it does change, it happens at a low rate so that it is not strong enough to make any significant influence on economic decisions of participants in an economy. (Lysons and Farrington, 2008)

CHAPTER ONE: INTRODUCTION

1.1 Background of Study

Supply chain is a series of value adding processes that span across boundaries in an effort to create value to the end consumer (Chopra, 2008). Different organizations apply different tools to avoid risks in the quest to manage risks in supply chain. Many scholars have tried to define risk and uncertainty and they have come up with varied definitions. Zsidisin (2009) defined risk as anything present where there is a very high chance that an unfortunate event may occur which has a high negative impact. In this regard, risk can be defined as a potential occurrence of a positive or negative incident, and failure to explore an opportunity of satisfying customer's need whose outcomes can result in financial loss or inability to satisfy the company's customers. Risks in a supply chain appear as any type of disruptions of normal activities, fluctuating prices, substandard product or service, or activities performed in the supply chain that damages the reputation of the firm.

Three theories were used to achieve the study objectives. First was Resource Based View, resources within a supply chain can be used as the basis for strategy formulation and as a result yield maximum economic rent by exploiting unique capabilities, competencies and resource in line with market needs and wants. These recourses need to be valuable, inimitable, rare and non-substitutable, for the competitive advantage to be sustained. Second was the Agency theory, which portrays relationship in which one party who is refered to as the principal,chooses to delegates their work to another party who is now the agent. The agent performs the delegated work (Woods 2004). There are two main problems that may arise in such a relationships, one is the desires and goals of the respective principal and his agent have a likelihood to conflict. Secondly, it can be tricky for the principal to confirmthat the agent is indeed doing what he is being paid for . The

thirdtheory usedis the Stakeholder management theory, a theory based on organizational management, business ethics which addresses proper morals and values to apply in managing an organization. Gratton (2004) defined the stakeholder concept as groups of individuals without their support, the organization as an entity may cease to exist.

The history of oil and petroleum marketing, storage and distribution in Kenya first started in the colonial times of 1903. During that period, the import distributed in metal tins was kerosene, but much later they introduced gasoline also imported but in drums. Royal Dutch Shell was the first firm to establish a first depot located in Shimanzi, Mombasa. In 1963 the Kenya petroleum refineries was built, with shell owning 50% and the government of Kenya 50%. It has been refining and storing hydrocarbons until 2013 when the refining stopped, and hence they embarked on storage of finished products. Other storage companies have since come up, namely Kenya Pipeline company storage facility at Kipevu terminal, Vivo Energy and Louis Dryfeus that stores edibale oil among others.

1.1.1 Supply Chain Risk Management

Supply chain risk management (SCRM) is defined as implementation of strategies aimed at managing risks inherent in a supply chain in conjunction with continuous risk assessment program with an aimed at reducing exposure and vulnerability thereby promoting continuity (Lysons & Millingham, 2003). This principle tries to defuse supply chain exposure through an organized and holistic approach that involves all the stakeholders in a supply chain, It assesses the failure points risks in a supply chain. Supply chain risks include demurrages, natural cause delays in delivery and counterfeit products. These risks touch on quality, quantity, security, availability, and logistical costs.

Four processes are involved in implementation of Supply chain risk management (SCRM). These are, identification of the risk, assessment of the risk, control and monitoring of risks. Due to supply chains complexity, these processes might not suffice to counter all the eventualities in supply chain. Cavinato (2004)noted that supply chain risk management concept is very cause-oriented and often combined with supply chain resilience, which strives to impact on many supply chains to recover from risks despite the degree.

Risks in a supply chain actually span over organizational borders (Mintzberg, 2001). Organizations have to identify threats that are generated within and beyond their borders and also distinguish these risks. Risks are therefore handled in different contexts including, materials flows, products flow, information flows, cost and performance assessment processes in different companies. Therefore risk actually affects the overall supply chain performance of an organization. Since these factors arise from various functions within the company, therefore they may be interpreted differently. Companies can be proactive in the management of these risks but it is important to note that some risks can only be dealt with reactively. Crompton & Jessop, (2009) further description of supply chain risk management practices are differentiated management tools that most companies adapt to manage different kinds of events within a supply chain.

1.1.2 Operational Performance

A major objective of companies is return of investment achieved through different functions. In achieving operation excellence, managers should be able to identify and assess major risks involved in a supply chain while also increasing shareholders' return. The motivation for risk management in effort to increase profits and reduce losses comes from those risks which can lead to the firm's under –performance. A firm's operational

performance is key in their survival in the market. A pioneer study carried out in this area of research, risk management and performance was done by (Akindele, 2012), it examined the effects of supply chain risk management and corporate governance on five star hotels. It identified risks that lead to under performance of the hotels and hence loss in the overall operational performance.

Processes in the firm can increase or may absorb or put in measures to counter the effect of risks in a supply chain which affects operational performance. Losses like demurrages and loss of customer leads to poor service delivery and actually collapse of many companies. Supply chain bottlenecks and over dependence on processes and systems that are not value adding lead to increased losses and costs along the supply chain. Companies may need to offload unnecessary bottlenecks in the supply chain through elimination or excess capacities (Mangan, 2008). Supplier insolvency in a supply risk is affected by level of excess stock or carrying capacity within the supply chain.

Control mechanisms regarding order quantities, mode of transport, safety stocks, and batch sizes can amplify or hold risk effectiveness. The effects of sudden trough in demand increases and can lead to suddenly plunging the company in financial uncertainties', leading to borrowing or unfulfilled customer demands. Supply and demand are specific to an industry and are expected to affect several players in a given Supply chain. More so, internal supply chain risk management sources come from demand and supply of commodities, thereby any company in a supply chain should be able to counter these risks are they exposes the company's overall performance.

1.1.3 Supply Chain Risk Management and Operational Performance

It is the objective of many organizations and state corporations to greatly improve their customer value through having efficient and effective processes. This can be achieved

through having a connection between Supply Chain Risk Management and operational performance. Although globally popular paradigms such as lean management, just-in-time delivery or global sourcing can lead to reduced exposure to supply chain risks (Zsidisin, 2009), specific tools can be used to moderate the disadvantages involved in these approaches and hence promote operation performance in an organization. These supply chain risk management tools concern both the above mentioned practices which can (even partially) be used for managing risks, there are also risk-specific tools (supply chain risk mapping, risk-adjusted revenue analysis.) used by companies individually.

Other Sources of risks are that affect Operational Performance are from Suppliers inability to meet lead times, production delays and interruptions in the supply chain, competition among buyers, and financial capability. Risks from buyer-supplier relationships include contractual risks that bind one from exiting the agreement, difference in culture and beliefs. Operational Performance Management is an improvement methodology and a combination of set of processes that together can assist companies optimize their overall business performance. An organization is able to improve its operational performance through identifying of risks in a given supply chain, as these risks contribute to the loss of income and inability to meet customer needs. Some of these risks include technological risks, turbulence risks, financial risks, societal risks, political risks and market risks.

1.1.4 Oil Marketing Companies in Kenya

Oil Marketing Companies (OMC) are responsible for procuring and importing refined oil, they were selected through Open Tendering by the Ministry of Energy. This sector has over eighty five (85) oil marketing companies (OMCs) which comprise of Total Keya, Kenya Shell, KenolKobil, Oil Libya and National Oil Corporation of Kenya (NOCK).

Massive consultations were done around 1994, between the government of Kenya and other stakeholders in the oil industry in an effort to set standard fixed consumer retail prices for all petroleum products in the country (Awino, 2003) this was aimed at promoting uniformity and hence safeguarding the interests of the all stakeholders.

Vision 2030 identified the petroleum and energy industry as the prime movers of the Kenyan economy. The high demand for petroleum fuels in the domestic market stands at an average 2.5 million tons per year, all refined products having been imported from the Gulf region (Yusuf, 2003). In October 1994, the government liberalized the importation, distribution, storage and pricing of products with a view to promote fair trading terms, enhance operational efficiency, control costs and also attract private capital from investors. Currently the oil and gas industry is fully importing refined petroleum products because the only refinery based in Kenya stopped its operations in 2013. The discovery of crude oil in various parts of the country may be the opportunity to revive the stalled refinery in future.

In the year 2012, there was oil discovery in Turkana Kenya. This has so far been a welcomed development in the country with high prospects anticipated. This has been followed by continued activities for the exploration of oil in Turkana, in a bid to make further discoveries to realize the full perspective of the rift basins. It has been vouched that the discovery and subsequent extraction of oil and gas in Kenya will be a boost to the energy sector in the country. The two main players in the Oil sector in Kenya are, The Kenya Petroleum Refineries Limited (KPRL), who until 2013 provided crude oil refining, laboratory, loading facility, and emergency response training services.

The refinery is currently being utilized as a storage facility for products included liquefied petroleum gas (LPG), unleaded gasoline, regular and premium petroleum, automotive

gasoil, dual purpose kerosene, industrial diesel oil, and fuel oil, as well as special products, including bitumen and greases. Kenya Petroleum Refineries Limited stopped its refining plant in 2013 and is currently fully into storage and distributions of petroleum products. The other is The Kenya Pipeline Company (KPC) a Parastatal established in 1973 and started commercial operations in 1978. The government's objective of setting up the Company was to fill the gap of distribution of the petroleum products. The railway was no longer effective in distribution; hence most marketers had resorted to road transport. The company's existence has led to reliable, safe, efficient, cost effective and faster means of transporting the products from Mombasa Island to the mainland. KPC has huge storage tanks used as temporary holding points for petroleum products before being distributed to various markers. It also utilizes pipelines for further distribution of products to the hinterland and across the borders to neighboring countries.

1.2 Research Problem

Supply Chain Risk Management is an important concept because it helps organizations identify and reduce risks in a supply chain. These risks can lead to high cost of products to the end users, and increased operational costs of the Oil Marketing Companies. Risks to the supply chain negatively affect the operational performance of a firm, and they can range from unpredictable natural causes like floods and typhoons to substandard products and imitations flooding the market. Management of these risks can lead in reduced operational costs and affordable price to the end users. Supply chain risks span across product quality, lead times, security while in transit and modes of transport. (Lysons & Farrignton, 2008). In order for organizations to succeed in the long run they must keenly manage their entire supply chain risks. A risk mitigation plan will help organization to manage and close the gaps within their supply chain. Supply chain challenges, such as

corruption, theft, and reputational concerns, are encountered throughout all stages of the supply chain and hence mitigation should be in place to counter such challenges.

The study aimed at identifying, managing, and mitigating risks in the supply chain to help Oil Marketing Companies improve their operation performance, by innovative risk management technology, improve their supply chain visibility, and ensure their operations run smoothly and efficiently. Implementation of Supply Chain Risk Management will reduce supply risks and exposure through mitigating the risks and involving all stakeholders in the supply chain. It identifies, assesses and analyses the risks and exposes failure points in the chain. Changes in the market and the technology is evolving at a fast rate, therefore understanding the root causes and coming up with processes to mitigate them to reduce supply chain risks (Colicchia & Fernanda, 2012).

The logistics environment in the oil and energy industry is highly inflexible, this arises from low mode of transportation leading to long lead times, volume limitations of crude oil dealers and restrictions in modes of transportation (Jeffreys, 2004). The long distance that exists between supply chain players and also slow modes of transportation, mainly sea transport leads to in-transit inventory carrying cost, high inventory, high transportation and carrying costs experienced by marketers. Risks in the energy sector and particularly to the Oil Marketing Companies can appear as any kind of disruptions in a supply chain, price uncertainty and perceived poor quality of the product. This hostile business environment threatens the survival of enterprises like Oil Marketing Companies in Kenya and is often responsible for the closure of many businesses. Oil Marketing Companies in Kenya are uniquely disadvantaged in many ways due to their capital intensive investment nature. Given their unique challenges, only the adoption of appropriate practices in the Supply chain to ensures the resilience of their enterprises to

avoid laying off staff and even closure. A good example is the Kenya Petroleum Refineries Limited, which is the only Refinery in East Africa but still had to close its refining operations in 2013.

Local studies on application of supply chain risk management by Oil Marketing Companies include (Mwenda, 2012). The study focused on challenges of supply chain risk management in the energy sector a case study of National Oil Corporation of Kenya, the study focused on efficiency and not operational performance. (Yusuf, 2003) in his study focus was on empirical investigation of best practices in a supply chain of a large private manufacturing company in Kenya, it pointed out that multinationals focusing on becoming more efficient and also flexible in the application of manufacturing and operational methods with a goal to meet customer requirements.

Ogola, (1998) conducted a study on Supply-Chain Management practices in the energy sector where he noted that the energy sector is involved in a global supply-chain which involves both domestic and international transportation modes, material handling, ordering, inventory management and import and export. The above studies did not address the effects of supply chain risk management on operational performance of Oil Marketing Companies in the industry. The study sought to provide answers for this research gap. The study sought to answer the question: To what extent does supply risk management, demand risk management, operational risk management and political risk management affect the operational performance of oil marketing companies based in Kenya?

1.3 Research Objective

The objective of this study was to determine the effect of supply chain risk management on operational performance of oil marketing companies in Kenya.

1.4 Value of the Study

The study shall be of significance to management of various Oil Marketing Companies in Kenya in the energy sector since it will inform them on how supply chain risk management impact on their operational performance. The Oil Marketing Companies in Kenya stand to benefit because they can use recommendations given in this study to form a basis for enhancing supply chain risk management in their respective companies.

The study shall also be of significance to future researchers, as it will act as a source of information on supply chain risk management in the petroleum industry and a source of ready and reliable literature that can be used for future studies. Financial institutions such as banks have a relationship with Oil Marketing Companies in Kenya by way of providing loans and funds. Therefore, this study could be useful to the banking sector by helping them develop financial packages which are beneficial to oil marketing companies and that are suitable for their field.

The study shall also help in policy formulation in the Energy Sector by identifying common risks faced by Oil marketing companies. The contribution in this study can be of help to various stakeholders in the industry and can be used in standard policy formulation.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter reviewed relevant literature pertaining to how supply chain risk management affects operational performance. The literature review was structured according to the specific objectives. The first section of the literature dwelled on the specific effects of supply chain risk management on operational performance.

2.2 Theoretical Review

This is the structure that supported the theory of this study. Reference was made to literature relevant to the study only.

2.2.1 Resource Based View

The research was anchored on the resource-based view, according to its proponent, the resource-based view is based on the concept of economic rent. It considers a firm as a collection of resources competencies and capabilities that need to be mixed appropriately in order to deliver competitive advanced (Willmott, 1994). The resources within a firm can be used as the basis for strategy formulation and as a result yield maximum economic rent by exploiting these unique capabilities, competencies and resource in line with market needs and wants. These recourses need to be valuable, inimitable, rare and non-substitutable, for the competitive advantage to be sustained thus making the firm profitable (Wernerfelt 1984).

The study viewed the different stakeholders in a supply chain as, competencies and capabilities within a firm that can identify and mitigate supply chain risks in the creation of competitive advantage. By ensuring that these resources remain valuable inimitable, rare and non-substitutable guarantees the achievement of supply chain risk management.

2.2.2 Agency Theory

The research also focused on the agency theory, which describes precisely, the agency relationship whereby one party, which is the the principal, will delegate work to another party,the agent, who in turn will performs that work (Woods, 2004). There are two main problems that could arise in an agent-principal relationship, one being the desires and goals of the respective principal and the respective agent conflicting, thereby being very difficult for the principal to actually verify and control what the agent actually does on a daily basis.

This theory can be applied to a relationship of employer-employee, owner-manager, buyer-supplier among other agency relationships. The theory is mostly applied in situations that have difficult contracting problems. According to (Gordon, 2004), there are unique distinctions of the principal-agentrelationship. In an owner-manager or manager-worker relationship, the one with the power to plan and implement contracts is the principal. He also holds the power to put or remove incentives for the workers and their managers.

Agency theory in supply chain involves at least two parts with different goals, stakeholders competing for the contract. In the case of a firm, there exists several internal stakeholders more likely with very conflicting goals, hence making the process more complex. They include line managers, procurement officers, financial officers and users. They may possess conflicting interests although no agency relationship in existence. This actually introduces the applicability of stakeholder management theory.

2.2.3 Stakeholder Management Theory

This is a theory focusing on organizational management and standard business ethics which considers morals and values while managing the organization. (Gupta, 2001).

Defined the stakeholder concept as that which includes groups whom without their support the organization may cease to exist. Other management studies and theories often discuss how organizations should interact and be concerned with their stakeholders. However, traditionally, the firm may view shareholders as the owners of the company, whereas management possess a binding duty to put their interests first as well as to increase stakeholder value.

Stakeholder theory argues that there are other players who directly or indirectly affect or influence a company's existence, they include governmental bodies, communities, political groups, financiers, trade associations, suppliers, employees, trade unions and customers. In other circumstances, competitors are also considered stakeholders; this is deduced from the capability to affect the organization and stakeholders in one way or the other. Mangan, et al. 2008derived a typology of stakeholders based on the attributes of power, legitimacy, and urgency.

The theory states, under any given situations, especially where contingent- claims markets are complete, risks are allocated in an optimal manner (Hannan, 2006). This will however involve a period of uncertainty as to whether the situation facing an individual in future will be a positive one or not and therefore this calls for the allocation and distribution of risks in the supply chain in an efficient manner. Competitors of a firm are often considered as stakeholders too, through their ability to affect the firm and other stakeholders. (Cavinato, 2004), observed that stakeholders hold some power to impose their own will in a legitimate relationship compliance to structures through time sensitivity or criticality of the stakeholder's claims.

2.3 Supply Chain Risk Management

SCRM attempts to reduce and identify risks in the supply chain through a holistic approach that involves numerous stakeholders in a supply chain. It is able to identify and analyze risks of failure points within and outside a supply chain. These risks include unpredictable natural occurrences, counterfeit/imitation products, quality, security, and resiliency. Supply chain risk management basically involves four main processes namely: identification of risks, initial assessment and controlling, then monitoring of supply chain risks periodically. However they may not sufficiently ensure preparedness of the firm to all eventualities. Some of the eventualities are due to natural causes and nature of business.

Rise in supply chain risks can be attributed to globalization and increased demands on petroleum products. Major industries and households mainly use petroleum products to perform various functions. The following, according to (Cavinato, 2004), are some of the potential sources of risks from buyers in the in the supply chain: Clarity of definition of requirements, internal relationships, Presentation and approach to market, movement of commodities, cultural beliefs and trade barriers between nations.

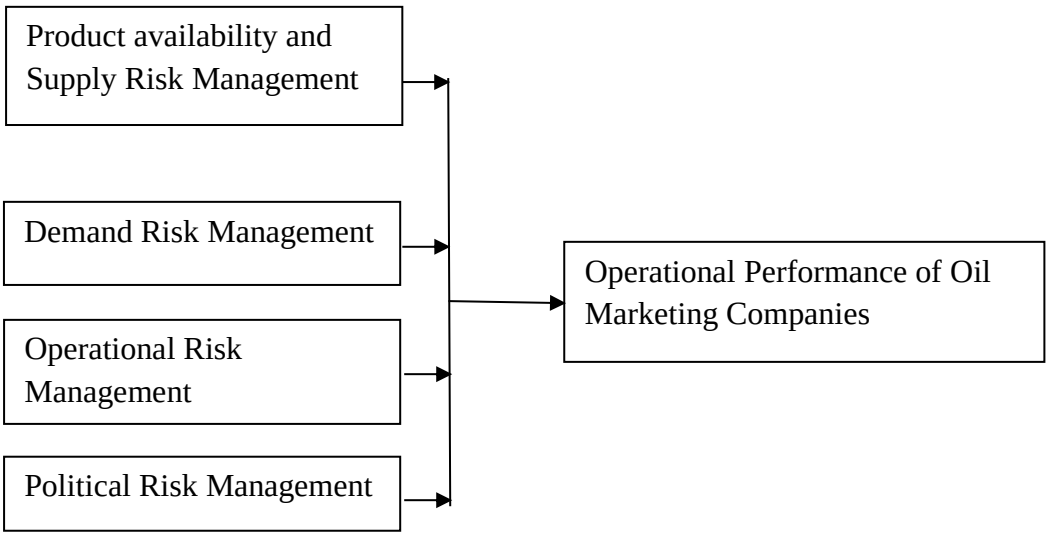
Risk management in organizations is assumed to overlap all processes and projects in order to be able to mitigate the negative applications of risks and boost high profits, growth and success at the same time. Therefore risk management, ought to be linked with a company's overall performance (Mintzberg, 2009). Risks in a supply chain context span over organizational borders according to (Chopra, 2008), with this approach, companies have to identify and assess threats emanating from within and outside their borders and also differentiate among them.

Risk in the supply chain can be through products flows, upward and downward information flows and the cost and performance processes. Williams (2013) conducted a

literature review which highlighted comprehensive and clear grouping of supply chain risk management tools. First, is the channel through which the risk appears. Hereby, we distinguish between within the firm, in the supply chain and beyond risks. Secondly, we have the supply chain risk management process. This involves differentiation, identification, evaluation and management of risks. However, there exists other supply chain risk management tools that companies can apply. Companies can prepare proactively for the management of risks despite the fact that there are predominant risks that can only be handled in a reactive manner (Gratton, 2004). The cause-oriented and application-oriented (Williams, 2013) supply chain risk management tools are some of the differentiated processes applied by companies. These methods examined can be applied to avoid, reduce, transfer or accept the risks in the supply chain.

2.4 Conceptual Framework

In order to find out the research project questions, the following conceptual framework was adopted. The dependent variable is the Operational Performance of Oil Marketing Companies measured by the supply risk management**,** demand risk management, operational risk management and political risk management per figure 1 below. Figure 1 also exhibits the operationalization of the research variables used in the study.



Independent Variables **Dependent Variable**

Figure 2.1: Conceptual Framework

2.4.1 Product Availability and Supply Risk Management

Supply chain risk management is a principle of managing risks in a dynamic environment within the supply chain (Crompton & Jessop, 1989). In Supply risk management is not only about the acquisition of goods and services always at the right price and time or place but also about identifying and mitigating possible disruptions to the supply chain that could hinder delivery (Onawumi et al, 2011). Managing Risk along the supply chain is vital, and a company taking service delivery seriously must take it upon itself to build a plan for dealing with potential supply chain disruptions. Companies able to meet their customer's needs through having enough stock to satisfy these needs are most likely to meet their overall objective of their existence.

The selection of companies to import oil in Kenya is carried out by the government through Open Tendering. It may be done through Joint Import or Private import. The companies may suffer demurrage due to delay in logistics which in turn my lead to high costs which will lead to high prices of the commodity when it reaches the consumers. There is also the risk of increased costs to the marketing companies due to sudden price changes in the international market and price fluctuations. Quality issues arise due to contamination at the point of loading, offloading or storage. There is also the risk of spillage during transfers or loading. Supply risks also include port regulations in regard to discharge of LPG and other hazardous products. All above risks eventually may lead to other low supply or increased prices of the products.

2.4.2 Demand Risk Management

Events either in the upstream or downstream of a supply chain can lead to unpredictable demand. Demand risk management can be related to misunderstood customer demand or increase in customer demands. Scholars have come up with various solutions which have been applied to handle inventories issues within a supply chain. Such as vendor-managed inventory (VMI), Enterprise resource planning to where suppliers stock their customers' warehouse and only bill upon consumption. In order to have a robust supply, it requires proper planning of transportation needs, logistical preparedness and application of specialized facilities in which the bulk of products can be broken down during transportation, as well as a quick order-picking to match customer orders, and break bulk initiatives (Woods, 2004).

Demand risk management is affected by supply related interruptions to product flow within the supply chain. This occurs when there is no adequate order fulfillment, or environment related issues that originate from disturbances outside the supply chain. It can also be affected by risks related to the condition supplier's physical capacity to hold products for a given period. Disruptions in the internal operations or processes can also lead to high demand or low demand of products, example is changes in management structure, reporting structure, key personnel or business processes. Planning and control should be carried out, adequate assessment, planning, mitigation risks caused by not having a proper plan. Planning and hedging should then be put in place to counter demand risks.

2.4.3 Operational Risk Management

These are risks faced by companies hence in part affects their profit margins and delivery. They include: Fluctuation in demand which affects depot running costs as the fixed costs

have to be sustained. Onawumi & Adebiyi, (2011) stated the chain is able to adapt to demand changes in situations where there is accurate and up-to-date the information flow. Distributing the exact demand requirement to customers helps to decrease the inventory holding levels in the supply chain hence positively impacting on the bullwhip-application. For an effective operational success the information exchange between supply chain players must be valid, precise, mutual and selective but not necessarily symmetric (Chopra, 2008).

Price control by the government is another operational risks, the government sets an average cost for all oil products brought in by marketing companies. This control is to protect the consumers from extortion by these marketer**s**. Delays in clearance of products from the Kenya Ports Authority due to Kenya Revenue Authority related issues, that is, tax and clearance issues. There is also the minimum stock rule set by the government, this affects the company's cash flows. Kenya Ports Authority infrastructure is another Operational Risk, whereby there are limited berths to dock, therefore the Ship bringing in the products incur demurrage due to delays in offloading.

Transportation of petroleum products is a delicate and crucial affair. Most of the petroleum products are transported either through vessels or pipelines. During this stage of the supply chain products are being transported to the refinery, bulk storage facilities, or being distributed to the retail customer. Different threats and challenges are experienced during the transportation stage. Vandalism of pipelines has been known to happen in order to steal gasoline directly from the pipelines, and barges, which could impact the environment through oil spills and hazardous fume releases besides financial losses being incurred. To ensure shipments arrive safely and on-time, it's important for oil marketing companies to know what geographic risks are present throughout the

transportation routes. Potential Supply Chain Threats during transportation include: Theft / Sea Piracy, Terrorism, Natural Disasters and Man-Made Disruptions.

2.4.4 Political Risk Management

The petroleum industry involves interaction among various players located in different locations in the world. The players are likely to encounters major challenges in unstable countries that are not majorly present in other industries. These logistic challenges coupled with unstable political risks do worsen the already volatile conditions. These risks come about due to change of governments. When a new government comes in to power, they bring in new regulations on products imports and exports, and also trade barriers and embargos. These changes affect the normal operations of companies when trading. Bilateral relations among Nations may also impact positively or negatively on the importation of products from different locations worldwide. Players can manage these risks by formulation of policies governing the industry; through Acts of Parliament.

In a supply chain context risks span over organizational borders (Hannan, 2008). In order for globalization to thrive, nations must trade amongst each other, enter into business agreements and treaties, and also import what they are not good in production, and in the same time export what they are good in production especially where they enjoy economies of scale. In this regards, political stability of a country can greatly influence the availability of some commodities need. Crompton & Jessop, (1989) stated that mutual bilateral relations between nations contribute greatly to the efficient and effective supply chain.

2.4.5 Operational Performance

In achieving operation excellence, managers should be able to identify and assess major risks involved in a supply chain while also increasing shareholders' return. The

motivation for risk management in effort to increase profits and reduce losses comes from those risks which can lead to the firm's under –performance. The exposure to risks in the oil industry is very high and risk measures are key to the company's survival, therefore operational performance is key in their survival in the market. A pioneer study carried out in this area of research, risk management and performance was done by (Akindele, 2012), it examined the effects of supply chain risk management and corporate governance on five star hotels. It identified risks that lead to under performance of the hotels and hence loss in the overall operational performance.

Losses like demurrages and loss of customer leads to poor service delivery and actually collapse of many companies. Supply chain bottlenecks and over dependence on processes and systems that are not value adding lead to increased losses and costs along the supply chain. Companies may need to offload unnecessary bottlenecks in the supply chain through elimination or excess capacities (Mangan, 2008). The impact of insolvency of a supplier will lead to supply risk is affected by the number of excess stock or carrying capacity being held.

Supply and demand are specific to an industry and are expected to affect a number of players in the Supply chain. Control mechanisms regarding order quantities, mode of transport, safety stocks, batch sizes can magnify or hold risk effectiveness. More so, internal supply chain risk management sources come from demand and supply of commodities, thereby company's in the supply chain ought to counter these risks are they exposes the company's overall performance.

2.5 Empirical Review

Local studies on application of supply chain risk management by oil companies include (Musyoki, 2003). He conducted a detailed study on supply chain risk management

challenges in the energy sector a case study of National Oil Corporation. The focus was majorly on efficiency and not operational performance of supply chain risk management by Oil Marketing Companies. He failed to acknowledge that operational performance lead to greater efficiency in the movement and storage of oil products. Yusuf (2003) conducted a study on large private manufacturing companies in Kenya, an empirical investigation of best practices in supply chain management. The study noted that, large companies mainly focus on becoming effective and efficient in their manufacturing methods as a way to handle uncertainty in the business environment. It however did not discuss further the operational performance of these manufacturing companies and the risks encountered in the supply chain.

Mwenda (2012) conducted a study on Supply-Chain Management Issues in the Oil and Gas Industry. The study noted that oil and gas industry is involved in a global environment that includes use of varied transportation modes, order processing and inventory management, transshipment orders, materials handling, international trading and logistics. However, the studies did not address the effects of supply chain risk management on operational performance. (Evans,2003) did a study entitled 'An Evaluation of KPRL's Purchasing and Supplies Procedures' at the Kenya Petroleum Refineries Ltd (Mombasa). The study objectives were to establish the effect of the Purchasing and Supplies Procedures on the attainment of organizational goals and to establish the indicators of good performance. The findings were that the procedures were not being reviewed regularly and that they were not flexible to suit certain needs. The researcher however did not discuss supply chain risks affect purchasing and supplies.

2.6 Summary of Literature Review and Research gaps

There is no one best set of solutions to the quagmires that plague the performance measurement in SCRM. However, at the same time, there is no better endeavor in which to place operational performance while eliminating risks in the supply chain. Eliminating risks in a supply chain is critical to long-term success and enhanced operational performance of a firm. Researchers should be careful not to confuse the two concepts. Not only are these approaches useful in assessing operational performance, but the entire effectiveness of a supply chain. In comparing efficiency and effectiveness of a supply chain, (Daft, 2007) stated that it is important to do the right things thereby improving effectiveness rather than to do things right by improving efficiency. Thereby, an organization focusing on doing the right things wrong, can outperform organizations that doing the wrong things right.

The research considered how the supply chain risk management affected the operational performance of Oil Marketing Companies in Kenya. The research also established how specific risks in the supply chain, leads to increased operational costs, affect final cost of the product, and product loss to Oil Marketing Companies. It is important to note that, internal factors which originate from within the organization can also be sources of supply chain risks, whereas external factors from outside the organizations like suppliers response time, infrastructure and political influences are some of the risks identified. This research project will provided information for these.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter discussed the design of the research. It outlined the methodology of the study, explained the procedure that was carried out in order to conduct the study, and justified the reason why this methodology and research design was preferred by the researcher. Data collection procedure was also discussed followed by the techniques for analyzing data.

3.2 Research Design

This research employed correlational survey research design. Survey is often used to assess thoughts, opinions, and feeling of the correspondents. This design was selected for this study for its uniqueness, standardization of measure and the need to use survey data to complement existing secondary data. According to Gratton & Jones, (2004) Correlational study on the other hand is a quantitative method whereby we have two quantitative variables and we will be trying to determine the relationship between these two variables. Correlation evidence will be significant because it will assist in identifying potential causes of behavior of the two variables, which are related, thereby one will be able to make predictions for these two variables. The method was preferred as it will

enabled the researcher collect much more data relevant to the study. The collected data acts as a good starting point for future scholars.

3.3 Population of the Study

Population hereby does refer to the entire group of individuals and events or objects having a common observable characteristic. Simply put, population is the aggregate of all that conforms to a given specification (Crompton and Jessop 2009). The population of this study comprised of all Eighty Five (85) Oil Marketing Companies in Kenya as per the list provided by the Energy Regulatory Commission of Kenya, (ERC, 2016).

3.4 Sample and Sampling Techniques

Stratified random sampling with a disproportionate approach was used with an aim of determining the sample size. This was the preferred approach, with a plan to divide the population that will be sampled into homogenous groups, basing this on characteristics which were considered as important to the variables measured.

3.5 Data Collection

Collected data was obtained from primary sources. Questionnaires were used to obtain primary data. The questionnaires were sent through email to the respective respondents. The questionnaire comprised of twenty questions accompanied by an introduction letter and confidentiality statement.

The questionnaire was divided into three main sections. Section one, sought the general information. Section two, sought to obtain supply chain risk management processes applied by the oil marketers. Lastly, the questions in the third section contained questions on operational performance. The target respondents shall be Supervisors and Head of Department of the Oil Marketing Companies.

3.6 Data Analysis

The data collected from questionnaires was checked for accuracy, its completeness and consistency before being edited, tabulated and processed for ease of understanding. The collected data was analyzed by Multiple Regression Analysis (MRA), a statistical process used to estimate relationships among variables. This process included techniques for modeling and analyzing several variables, with the main focus being on the relationship between the dependent variable and independent variables. It provides an understanding on how values of the specific dependent variable changes when any independent variables gets varied, whereas the other independent variables are held fixed.

A multivariate regression model was used to link the independent variables to the dependent variable as shown below;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \mu$$

Where; Y = Operational Performance

X_1 = Supply Risk Management

X_2 = Demand Risk management

X_3 = Operational Risk management

X_4 = Political Risk Management

In the model, β_0 = the constant term while the coefficient βii = 1,2,3,4 was used to measure the sensitivity of the dependent variable (Y) to unit change in the predictor variables X_1, X_2, X_3andX_4. μ is the error term which captures the unexplained variations in the model.

Model validation using coefficient of determination

The coefficient of determination R^2 (or sometimes R^2) is a measure of how well the regression has performed. The higher the R^2, the more useful the model. R^2 takes on values between 0 and 1.

$$r = \frac{n(\Sigma xy) - (\Sigma x)(\Sigma y)}{\sqrt{[\, n\Sigma x^2 - (\Sigma x)^2 \,][\, n\Sigma y^2 - (\Sigma y)^2 \,]}}$$

Then square r

CHAPTER FOUR: DATA ANALYSIS AND FINDINGS

4.1 Introduction

This chapter contains data analysis and presentation of findings. The research questions are answered in this chapter in line with the main objective of this study and information sought to determine the outcome.

4.2 Response Rate

The number of questionnaires presented to the respondents were eighty five (85) according to the registered oil marketing companies by ERC and a total of fifty four (54) questionnaires were completed satisfactorily and returned; this gave the study a 63.53percent response rate. The table 4.1 shows the study's response pattern. It shows that the response rate was 63.53% meaning the oil marketing companies were sufficiently represented by the research data.

Table 4.1: Response Rate

	Questionnaires Distributed	**Questionnaires Returned**	**Percentage**
Total	85	54	63.53%

4.3 General Information

The respondents were requested to indicate their education level, number of years they had been in working in the company as well as the positions they held in the firm. Majority of the respondents representing 51.85% responded that they hold degrees and 16.67% had a Master's degree thus most of them could comprehend the variables under study. Most respondents had served in the company for more than four years with a

cumulative percentage of 91% this meant that the respondents had served their firms long enough, therefore were in a position to give credible information.

Table 4.2: Profile of the Respondents

	ACADEMIC QUALIFICATIONS					
Period in company /Position	**Certificate**	**Degree**	**Diploma**	**Masters**	**Grand total**	**Percentage**
10 AND ABOVE		**9**	**2**	**3**	**14**	**25.93%**
HOD		1	2	2	5	
Manager		2		1	3	
Supervisor		6			6	
4-6 Years	**2**	**7**	**9**		**18**	**33.33%**
Junior officer	2	1	7		10	
Manager		2			2	
Supervisor		4	2		6	
7-9 Years		**8**	**3**	**6**	**17**	**31.48%**
HOD				4	4	
Junior officer		1			1	
Supervisor		7	3	2	12	
Less than 2 years	**1**	**4**			**5**	**9.26%**
Junior officer	1	4			5	
Grand Total	**3**	**28**	**14**	**9**	**54**	**100%**
Percentage	**3.5%**	**51.85%**	**25.93%**	**16.67%**	**100%**	

4.4 Oil Marketing Companies Profile

The study sought to determine the profile of companies under study in order to determine the period the firm had been in operation, this would help the researcher determine if the companies were experienced in oil marketing, the companies location and the department of the respondents to establish if they were in a position to give information on operational performance and supply chain risk management practices. The respondents were asked to indicate the number of years the company has been in business and the departments they worked in.

Most of the respondents worked in the operations department represented by a 50% response this was followed by finance depart with 24.07%, so they could possess an understanding of supply chain risk management and the operational structure of the organization and how SCRM effects the companies' operational performance. Majority of the respondents representing 62.96% responded that they have been in the specific business for more than ten years and others have been in business for more than seven years thus from the results it can be inferred that majority of the companies were in business long enough to understand risks associated with the oil industry. The findings of the study are as shown in Table 4.3

Table 4.3: Profile of Companies

	Department					
Duration Years /Town	**ADM**	**Finance**	**HR**	**Marketing**	**OD**	**Grand Total**
10 AND ABOVE	**2**	**11**	**1**	**3**	**17**	**34**
Eldoret					3	**3**
MSA		9	1	3	14	**27**
Nairobi	2	2				**4**
1-3				**2**		**2**
Nairobi				2		**1**
4-6	**1**				**7**	**8**
Eldoret					2	**2**
MSA					3	**3**
Nairobi	1				2	**3**
7-9	**2**	**2**	**2**		**3**	**9**
Eldoret	1		2			**3**
MSA					3	**3**
Nairobi		2				**2**
Nakuru	1					**1**
Grand Total	**5**	**13**	**3**	**5**	**27**	**54**

4.5 Descriptive Analysis of the Study Variables

This study involved determining the effect of supply chain risk management on operational performance of oil marketing companies. It was firstly critical to paint a picture of the extent of adoption and implementation of supply chain risk management. The respondents answered various supply chain risk management issues which include; Supply Risk Management, Demand Risk management, Operational Risk management and Political Risk Management. These issues were rated in a likert scale and the results were as illustrated below.

4.5.1 Descriptive Analysis of Supply Risk Management Practices

The respondents were asked to rate supply chain risk management indicators so as to evaluate and rate the extent of application of supply risk management in the oil marketing firms. When asked to rate the effect of supply risk management metrics on product availability in the market on the final pricing, the findings indicate a strong dependence of supply chain performance on product availability because affected the final pricing represent by a mean of 1.1671 and a standard deviation of 0.4158. From the findings the study can conclude that it was essential for the oil marketing firms to partner with critical suppliers to mitigate risk as this was presented by the least mean of 1.122 indicating that the respondents strongly agree with the need to partner and that they had already partnered. From the findings the study concludes that a high number of the oil marketing firms had implemented supply risk management which had a mean 1.2185 which is less than 2. The summary of the findings is presented in Table 4.4

Table 4.4. Average Responses of Supply Risk management

Operational Performance Measures (in %)		
Supply Risk Management (X1)	**Mean**	**Std deviation**
Supply and product availability affect the final price of the product	1.1671	0.41585
Modes of transport and routes for shipments affect product availability	1.3461	0.5115
Production uncertainties affect supply	1.3135	0.4667
Storage inadequacies affect supply	1.1436	0.4002
Multi-party supply pipelines affect supply of products	1.1436	0.3751
Have you partnered with critical suppliers to mitigate the exposure risks in the supply chain.	1.1223	0.3673
Average	**1.2185**	**.42251**

4.5.2. Demand Risk Management Practice

The study sought to determine to which extend the oil marketing firms had implemented the demand risk management metrics. The respondents represented by a mean and a standard deviation 1.212 and .3989 respectively indicated that demand risk is experienced when there is increased quantities and values of shipments pose additional risks in delivery. The highest effect of demand risk management is the commitment of the ordering level which showed a mean of 1.124 in the supply chain of oil marketing firms.

The research data strongly indicate implementation of the independent variable metric the demand risk management because most of the responses mean are below 1.5. Findings are as presented in Table 4.5.

Table 4.5. Average Responses of Demand Risk management

Demand Risk Management Indicators	Mean	Std deviation
Demand variability affects product availability	1.145	0.2787
Increased quantities and values of shipments pose additional risks in delivery	1.212	0.3989
Order level commitment affects operational performance	1.124	0.2999
Average	**1.2102**	**.32583**

4.5.3 Operational Risk Management Practice

The respondents were asked to measure the extent of application of risk management in the oil marketing firms by responding to indicators of the operational risk management metric**.** When asked to rate the effect of operational risk management metrics of the oil marketing firms, 51.9% of the respondents strongly agree that demurrages were beyond their control while 9.2 were neutral on the effect of the metric. 33.3% strongly felt that planning failures can lead to increase operational costs. From the finding it was established that 65% of the respondents strongly agree and agree that the implementation of operational risk management was present in the oil marketing firms. The summary of the findings is presented in Table 4.6.

Table 4.6. Average Responses of Supply Risk management

Operational Risk Management Indicators	Mean	Std deviation
Demurrages are beyond our control	1.1627	.2472
Planning failures lead to increased operational costs	1.1315	.1521
Infrastructure limitations affects cost of final product	1.1068	.1411
Contractual terms with suppliers increase exposure of importing petroleum products	1.1618	.2308
Average	1.1407	.19281

4.5.4 Political Risk Management

The respondents were asked to rate political risk management in supply chain of oil marketing firms so as to evaluate the extent of adoption. The finding show that government regulation affect competition by 42.6% and interestingly 24.1% were not sure that government regulation affects competition. The 67.7% of the respondents establish that political unrest affect product availability and 42.6% strongly agree that in countries where there is corruption product availability is affected. From the findings the study concludes that a high percentage of firms of above 80% had implemented some element of political risk management which affects the operational performance of oil marketing firms. The summary of the findings is presented in Table 4.7

Table 4.7. Average Responses of Political Risk management

Political Risk Management Indicators	Mean	Std deviation
Government Regulations affect competition	1.2402	.3164
Marketers interest versus government interest are an obstacle	1.1202	.2654
Suppliers in countries with social unrest , terrorist or high levels of corruption affect cost	1.3452	.3343
Strained government relations affects product availability	1.1021	.2864
Total Average	1.2019	.30062

It can be observed from the study results in Table 4.7 that respondent feel that strained government relations may affect product availability which had a mean of 1.1021 and a standard deviation of 2.864 meaning most of the respondent strongly indicated that government relations affect the availability of the oil marketing firm's products. Market interest and government interest was an obstacle in the supply chain of oil marketing firms represented by a mean of 1.1202 thus there is a need to align the market interest and government interest in order to avoid risk in the supply chain. Other factors such as the state of the country of operation in terms of terrorism and corruption affect the cost of doing business had a mean of 1.3454 which is a risk that need to be managed.

4.5.5 Summary of Supply Chain Risk Management adoption

The findings presented in Table 4.8 show that the most adopted supply chain risk management practice was operational risk management with a mean of 1.1407. Then

followed by political risk management with a mean of 1.2017. It was apparent from the finding that the least adopted practices were demand risk management and supply risk management with means of 1.2102 and 1.2185 respectively. The means all indicate a strong presence of supply chain risk management since they are all less than 2.

Table 4. 8 Summary of Supply Risk Management Descriptive Statistics

	N	Mean	Std. Deviation	Rank
Supply risk management(X1)	54	1.2185	.42251	4
Demand Risk management(X2)	54	1.2102	.32583	3
Operational Risk management(X3)	54	1.1407	.19281	1
Political Risk Management(X4)	54	1.2019	.30062	2
Valid N (list wise)	54			

4.5.6 Operational Performance

The respondents were asked to indicate their operational performance level based on its metrics against supply chain risk management elements. The findings show that the implementation of supply chain risk management practices improved operational performance of oil marketing firms in Kenya as the study determined a mean of 1.164. From the table 4.8 the respondents showed that cost reduced with a mean 1.1223, service delivery with a mean of 1.1221 followed. Coming in third in the list was customer satisfaction with a mean of 1.1453, last in the list was response time with a mean of 1.2133 and the fourth operational performance metric was product availability with a mean of 1.2126. Thus the researcher concluded that implementation of supply chain risk management had a positive effect on operational performance as presented in the summary of findings in Table 4.8

Table 4.9. Average Responses of Operational performance on Supply Chain Risk management

Operational Performance Measures		
	Mean	**Std Deviation**
Service Delivery	1.1271	0.1987
Response Time	1.2133	0.2388
Product availability	1.2126	0.2312
Customer Satisfaction	1.1453	0.2145
Cost	1.1223	0.1973
Average	**1.1641**	**.21609**

4.6 Supply Chain Risk Management Practices on Operational Performance

The study sought to establish the effect of supply chain risk management on operational performance of oil marketing companies in Kenya. The supply chain risk management indicators were rated on a 1 - 5 scale against various operation performance indicators. The average responses obtained for each of the aspect of the supply chain risk management and composite operational performance.

Where:

$\mathbf{X_1}$ = Supply Risk Management, $\mathbf{X_2}$ = Demand Risk management, $\mathbf{X_3}$ = Operational Risk management, $\mathbf{X_4}$ = Political Risk Management and $\mathbf{Y_0}$ **=** Operational performance index

The researcher then applied the regression models to determine the relationship between supply chain risk management and operational performance. The models were obtained using the data which was developed after coding the data and organizing it for regression

as per the responses of each supply chain risk management variable and operational performance metric respectively.

4.6.1 Regression Analysis

The researcher sought to establish the effects of supply chain risk management on operational performance (Y_1).The independent variables X_1, X_2, X_3, X4, and X_5 were measured against the Y_1 dependent variable using regression analysis. The results were as presented on table 4.5below. From the Table, the Adjusted R^2 0.2051 which means that 20.51% variation in operational performance was well accounted for by the variation of supply chain risk management metrics. The correlation coefficient gives the study strength of the correlation between the variables under study. The correlation coefficient should have a value between +1 and −1. The results of the multiple R was0.525 indicating there is a strong correlation between supply chain risk management and operational performance.

Table 4.10: Summary of the Regression Model of Supply chain risk management on Operational Performance

Summary Output of the Regression Model	
Regression Statistics	
Multiple R	0.514916753
R Square	0.265139263
Adjusted R Square	0.205150631
Standard Error	0.192656486
Observations	54

a. Predictors: X_1 = Supply Risk Management, X_2 = Demand Risk management, X_3 = Operational Risk management, X_4 = Political Risk Management

b. Dependent Variable: Y = Operational Performance

4.6.2 Analysis of variance (ANOVA)

Analysis of variance (ANOVA) was carried out as indicated on Table 4.11. From the ANOVA the significant value for the model was 0.00395which means that the model was statistically significant since the value was lower than 0.05.The results were as presented on Table 4.11.

Table 4.11 Analysis of Variance (ANOVA)

	Df	***SS***	***MS***	***F***	***Significance F***
Regression	4	0.656194	0.164049	4.419825	0.003952
Residual	49	1.81871	0.037117		

a. Predictors: X_1 = Supply Risk Management, X_2 = Demand Risk management, X_3 = Operational Risk management, X_4 = Political Risk Management

b. Dependent Variable: Y = Operational Performance

4.6.3 The Regression Analysis Coefficients

From the analysis of data the following regression model was produced; $\mathbf{Y_1 = 0.661 + 0.198X_1 + 0.074X_2 - 0.153X_3 + 0.289X_4 + 0.199}$. Thus the study deduced that holdingX1 (Supply Risk Management), X2 (Demand Risk management), X3 (Operational Risk management) and X4 (Political Risk Management) the Operational performance

index(dependent variable Y_0) of oil marketing companies in Kenya would be 0.661. This means that, the operational performance of the oil marketing companies would improve positively with supply chain risk management.

The findings also indicate that a factor increase in supply risk management (X1) would lead to an increase in the operational performance factor of 0.198, a unit increase in Demand Risk management (X2) would lead to a positive increase in the operational performance factor by 0.074, conversely, an increase in a unit of Operational Risk management(X3) factor would lead to a drop of the operational performance factor by 0.153 of the firm, lastly a unit increase in Political Risk Management(X4) metric would lead to a 0.289 increase in operational performance of the firm. The equation shows there is a linear relationship between variables X1 (Supply Risk Management), X2 (Demand Risk management) and X4 (Political Risk Management) and the operational performance of oil marketing companies. On the other hand information shows that there's a negative relationship between Operational Risk management metric and operational performance of oil marketing companies. It is also clear from the table that the tested aspects of supply chain risk management have a significance values that are below 0.05 thus implying that they are significant in the determination of operational performance of the oil marketing firms in Kenya. The findings are presented in Table 4.12.

Table 4.12: Regression Analysis Coefficients

Coefficients[a]					
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	.661	.199		3.320	.002
supply risk management(X1)	.198	.066	.387	3.012	.004
Demand Risk management(X2)	.074	.084	.111	.881	.038
Operational Risk management(X3)	-.153	.146	-.137	-1.050	.029
Political Risk ;ement(X4)	.289	.091	.403	3.180	.003

a. Dependent Variable: Operational Performance

$$\mathbf{Y_1 = 0.661 + 0.198X_1 + 0.074X_2 - 0.153X_3 + 0.289X_4 + 0.199}$$

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter summarizes the research findings and also discusses conclusions and recommendations of the study. The conclusions are drawn from the findings of the study which sought to determine the effect of supply chain risk management on operational performance of oil marketing companies in Kenya.

5.2 Summary of Findings

The objective of the study was to establish the effect of supply chain risk management on the operational performance of oil marketing companies in Kenya. The research outcome provides evidence that oil marketing companies had implemented some form of supply chain risk management for improving their operations and thus the research could perform the regression analysis to determine the relationship of the variables. Cost, customer satisfaction, delivery speed and product availability were the performance indicators used to evaluate operational performance of oil marketing companies. From the regression analysis, the researcher concluded that there is a clear positive relationship between supply chain risk management and operational performance of oil marketing companies.

Further, the independent variable metrics Supply Risk Management, X1from the findings most of the respondents indicated that oil marketing firms was implemented to a large extent. The model indicates a strong positive relationship between supply risk management and operational performance. The sub variable X2 that is the Demand Risk management had about 70% of the respondents attesting that there is a high level of

implementation of the metric in oil marketing firms and that there is a positive relationship between it and operational performance.

Whereas metric X3 which was Political Risk Management had about 50% of the respondents supporting it as a concept practiced in oil marketing firms. It however showed a negative relationship with the operational performance variable oil marketing firms. The metric X4 which was Political Risk Management had respondents supporting it was widely adopted by oil marketing firms and results showed a positive relationship on operational performance.

According to these findings, oil marketing companies should increasingly adopt X1 (Supply Risk Management), X2 (Demand Risk management) and X4 (Political Risk Management) so as to improve operational performance of oil marketing companies and reduce operational risk when setting policies on supply chain risk management.

5.3 Study Conclusions

The study concludes that the major objective of supply chain risk management is to improve operational performance of companies. The study concurs with researchers Hannan et.al, (2006), who proposed that management of inherent risk in a supply chain was crucial for the improvement of operational performance of a company. The customers will be served better if the company planned for ways of overcoming the risks and thus avoid potential supply disruptions. This can be done by having enough stocks to satisfy the customers' needs this will help the company justify their existence and classify them as a going concern.

The research found that not all supply chain risk management metrics lead to improved operational performance, there is need to approach supply chain risk management with caution as managing operational risks would lead to decreased financial performance

which may be attributed to the fact that most of the price controls were done by the government and as such will affect all the oil marketing companies and the controls are aimed at protecting the client and may harm the firm (Chopra, 2008).

From the findings, it is without a doubt that supply chain risk management is not the only factor that improves operational performance of a firm and that not all the strategies would lead to a positive increase in operational performance. The oil marketing companies can embrace the supply chain risk management though it is definitely not a sufficient condition for improvement as demonstrated by the model that operational risk management has a negative relationship with operational performance. This illustrates that if we initially increase supply chain risk management metrics we will improve the operational performance however if we continue to add more we will reach a point where there will be no further improvement and thus we would not be adding value to the company.

5.4 Study Recommendations

From the findings the researcher recommends that oil marketing companies should adopt mechanisms for supply chain risk management to improve operational performance of their companies. The main focus of the efforts should be based on improving the operational performance of oil marketing firms.

The study recommends supply chain risk management to be approached with caution as at some point it may cause harm. The researcher specifically recommends the linear use of sub variables X1 (Supply Risk Management), X2(Demand Risk management) and X4 (Political Risk Management**)** to improve the operational performance of the company while sub variable X3(Operational Risk management) used inversely as it may not lead to

improvement of operational performance of a company this is because it may not affect the metrics of operational performance.

The researcher recommends that the firm should ensure that they understand the risks in the environment and therefore extensive research and information on risks in supply chain is important. However findings indicate that management of supply chain risk is not the only element in improving operational performance. The research also recommends an expert opinion of the risk management element in the firm as well as a periodic assessment of the impact of policies developed for supply chain risk management. This measurement and evaluation is critical to ensure that the policies are truly improving the operational performance of the firm or are negatively affecting it.

5.5 Limitations of the Research

The researcher found it difficult to get access to the respondents of the questionnaires therefore some had to be done online and other had to reschedule meetings to align with the availability of the respondents. The geographic disparity of the oil marketing companies this was countered by use of electronic media to reach the respondents. Another issue was on the reluctance of the companies to give information on supply chain risk management, the challenge was addressed by informing the respondents that the information was sought only for academic purpose only and not for any other investigation.

5.6 Suggestions for Further Research

This study was conducted on Oil Marketing Companies registered in Kenya as per the Energy Regulatory Commission (ERC) publication. The researcher suggests that a similar study be conducted on another industry to see if there will be a variation in the regression

equation. The same study should also be done in another context as this will assist in providing quantifiable information upon which reliable conclusions can be made.

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APPENDICES

Appendix I: Questionnaire

Declaration

This research intends to study the effects of Supply Chain Risk Management on Operational Performance of Oil Marketing Companies in Kenya. The information obtained from this study shall be treated as confidential and shall be used for academic purposes only.

SECTION A: GENERAL INFORMATION

1. What is your academic qualification?
   Certificate [ ] Diploma [ ] Degree [ ] Masters [ ] Phd [ ]

2. For how long have you worked for this company?
   Less than 2 years [ ] 4 – 6years [ ] 7 - 9years[ ] 10 years and above [ ]

3. What position do you occupy in the department?

Junior Officer [ ] Supervisor [ ] Head of Department [ ] Manager [ ]

4. Which of these departments do you belong to?

   Human Resources [ ] Operations Department [ ]

   Marketing Department [ ] Finance [ ] Administration [ ]

5. How long has your company been in this business?

1-3 years [ ] 4-6 years [ ] 7-9 years [ ] 10years and above[ ]

6. Which town is your office based?
   Nairobi [ ] Mombasa [ ] Nakuru [ ] Eldoret [ ]

SECTION B: SUPPLY CHAIN RISK MANAGEMENT

7. Indicate the extent to which your organization has applied below supply chain risks to improve operational performance in your organization

[1] Strongly agree [2] Agree [3] Neutral [4] Disagree [5] Strongly disagree

Operational Performance Measures	**1**	**2**	**3**	**4**	**5**
Supply Risk Management					
Supply and product availability affect the final price of the product Modes of transport and routes for shipments affect product availability					
Production un certainties affect supply					
Storage inadequacies affect supply					
Multi-party supply pipelines affect supply of products					
Have you partnered with critical suppliers to mitigate the exposure risks in the supply chain?					
Demand Risk Management					
Demand variability affects product availability					
Increased quantities and values of shipments pose additional risks in delivery					
Order level commitment affects operational performance					
Operational Risk Management					
Demurrages are beyond our control					
Planning failures lead to increased operational costs					
Infrastructure limitations affects cost of final product					
Contractual terms with suppliers increase exposure of importing petroleum products					
Political Risk Management					

Government Regulations affect competition					
Marketers interest versus government interest are an obstacle					
Suppliers in countries with social unrest , terrorist or high levels of corruption affect cost					
Strained government relations affects product availability					

SECTION C: OPERATIONAL PERFORMANCE

8. Indicate to what extent has Operational Performance improved/not improved since the implementation of supply chain risk management strategies in your organization by ticking where appropriate.

[1] Very satisfied [2] satisfied [3] Neither satisfied nor dissatisfied

[4] Dissatisfied [5] Very dissatisfied

Operational Performance Measures	**1**	**2**	**3**	**4**	**5**
Customer Satisfaction					
Overall, how satisfied are your customers					
How satisfied are you with your commitment to serve them					
I am satisfied with the effort my company has put to meet customer needs					
How satisfied or dissatisfied are you with your company					
Service Delivery					
Timely order fulfillment					
Response to customer queries/complaints					
Reduced customer complaints					
Level of efficiency					
Response Time					
Prompt response to emergency Orders					

Timely order fulfillment					

[1] Strongly agree [2] Agree [3] Neutral [4] Disagree [5] Strongly disagree

Operational Performance Measures	**1**	**2**	**3**	**4**	**5**
Cost					
Reduced transportation costs					
Reduced number of returns/rejected orders					
Reduced operational costs					
Reduced demurrage costs					
Products Availability					
Orders fulfilled on time					
Always deliver Complete orders					
Reduced backlog					
Able to meet customer demand					
Management Commitment					
My organization/business unit is concerned about supply chain risks					
Developed supply chain risk mitigation strategy					
Periodically collect risk information from your critical suppliers					
Have integrated risk management in our business unit's supply chain agenda					

Appendix II: List of Oil Marketing Companies in Kenya

1. Total Kenya Limited
2. Vivo Energy Kenya Ltd
3. KenolKobil Limited
4. Libya Oil Kenya Ltd.
5. Galana Oil
6. Gulf Energy
7. Hashi Energy
8. National Oil Corporation of Kenya
9. Hass Petroleum
10. Nomad Petroleum
11. Fossil Fuels
12. East African Gas oil
13. Engen Kenya Limited
14. Bakri Energy
15. Oryx Energies
16. Petro Oil Kenya Limited
17. Stabex International Limited
18. Banoda
19. Aspam/Essar Petroleum
20. Ainushamsi Petroleum
21. Afrioil International Limited
22. Regnoil Petroleum
23. Riva Petrol
24. Royal Energy
25. Olympic Petroleum
26. Tosha Petroleum
27. Towba Petroleum
28. Mogas Kenya Ltd
29. Netgas Petroleum
30. Futures Petroleum
31. Acer Petroleum
32. Afro Petroleum
33. Alba Petroleum
34. Amana Kenya Ltd
35. Arech Petroleum
36. Astrol Petroleum
37. Axon Petroleum
38. BachulalPopatlal
39. Blue Sky Petroleum
40. Brainfield Petroleum
41. Bushra Petroleum
42. City Links Kenya Ltd
43. City Oil Kenya Ltd
44. Dalbit Petroleum
45. Eco Oil
46. Eliora Petroleum
47. Emkay Petroleum
48. Eppic Kenya Ltd
49. Fast Energy
50. Fine Jet Ltd
51. Gapco Petroleum
52. Global Petroleum
53. Hared Petroleum
54. Ilade Oil
55. Intoil Petroleum
56. Jade Petroleum
57. Kencor Kenya Ltd
58. Kosmoil Petroleum
59. Links Oil Limited
60. Luqmann Petroleum

61. Moil Petroleum
62. MS Oil Kenya Limited
63. Ocean Energy
64. Oilcom Limited
65. Oil Energy
66. Oilpoint Kenya Ltd
67. One Petroleum
68. Orix Oil
69. Pacific / Keroka Petroleum
70. Performance Parts Limited
71. Petrocam Limited
72. Petro Sun Limited
73. Piccallily Petroleum
74. Prime Regional Suppliers Ltd
75. Ramji H. Devani
76. Ranway Petroleum
77. Safari Petrol
78. Savanna Petroleum
79. Sicar Limited
80. Societe' Petroliere'
81. Texas Petroleum
82. Tiba Petroleum
83. Tradiverse Limited
84. Tristar Petroleum
85. Trojan Petroleum

Source: Energy Regulatory Commission (2017)

Appendix III: MBA Research Project Certificate of Correction

UNIVERSITY OF NAIROBI
SCHOOL OF BUSINESS
MBA PROGRAM

Telephone: 4184160/5Ext 201
Telegrams: "Varsity" Nairobi
Telex: 22093 Varsity

P.O. Box 30197 - 00100
NAIROBI, KENYA

MBA RESEARCH PROJECT CERTIFICATE OF CORRECTION

Name of Candidate JANETTE DOROTHY MUTIMBIA

Registration Number D61/77593/2015

Title of Research Project EFFECT OF SOPPLY CHAIN RISK MANAGEMENT ON OPERATIONAL PERFORMANCE OF OIL MARKETING COMPANIES IN KENYA

The above named candidate has completed the corrections required in his/her research and produced seven copies as required.

He/she has my permission as the supervisor, to submit to the MBA Office the seven copies to enable him/her join the list of graduands in this year's graduation ceremony.

Supervisor's Name Dr. K. Rucha

Signature

Date 11/12/2015

MBA CO-ORDINATOR

Signature

Appendix IV: Proposal Correction Form

UNIVERSITY OF NAIROBI
SCHOOL OF BUSINESS

PROPOSAL CORRECTION FORM

Student Name JANETTE DOROTHY MUTIMBIA

Registration Number D61/77593/2015

Department SCHOOL OF BUSINESS

Specialization OPERATIONS MANAGEMENT

Title of Project Proposal EFFECT OF SUPPLY CHAIN RISK MANAGEMENT ON OPERATIONAL PERFORMANCE OF OIL MARKETING COMPANIES IN KENYA

The student has done all the corrections as suggested during the Proposal Presentation and can now proceed to collect data.

Name of Supervisor [signature] Signature [signature] Date 30/11/2017

Appendix V: Summary of Anti Plagiarism Report

EFFECTS OF SUPPLY CHAIN RISK MANAGEMENT ON OPERATIONAL PERFORMANCE

ORIGINALITY REPORT

15%	11%	5%	8%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	citeseerx.ist.psu.edu Internet Source	1%
2	Submitted to Mesa State College Student Paper	1%
3	www.onlinejournal.in Internet Source	1%
4	Submitted to Kenyatta University Student Paper	1%
5	"Supply Chain Risk Management", Springer Nature, 2018 Publication	1%
6	en.wikipedia.org Internet Source	1%
7	Submitted to CVC Nigeria Consortium Student Paper	<1%
8	erepository.uonbi.ac.ke Internet Source	<1%

11/12/2018