

**FACTORS AFFECTING SUPPLY CHAIN MANAGEMENT BY OIL  
COMPANIES IN KENYA**

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## DECLARATION

I declare that this project is my original work and has not been submitted to any other university or institution of higher learning for examination purposes

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## **DEDICATION**

To my Granddad who always tells me to aim highest as education has no limit, as to knowledge is a garden if not cultivated then you will not harvest. My special dedication goes to my mum Shamira Yusuf and my father Farid Abdulla, my brothers Wasim and Abdulrehman who cheered me all through the long period it has taken me to complete this project.

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## **ABSTRACT**

Supply chain management (SCM) has received in recent years a great deal of attention by researchers and practitioners. The oil industry works as a global supply chain involving exploration, material handling, domestic and international transportation, use of technology, and so on. The industry offers a strong model for implementing supply chain management (SCM) techniques. The purpose of this study is to establish factors affecting supply chain management by oil companies in Kenya. The study was guided by the following specific objectives: To assess effect of constrained infrastructure on supply chain management by oil marketing companies, to establish the effect of price control on supply chain management by oil marketing companies, to determine the effect of open tender system on supply chain management by oil marketing companies and to determine the effect of advance payment of taxes on supply chain management by oil marketing companies. The research design used for this study was a descriptive design. The target population of this study was all the employees in the oil companies in Kenya. There are 50 oil marketing companies with an estimated total of 1500 employees. A sample size of 150 employees was taken. Data was collected by use of a questionnaire. Data was analyzed mainly by use of descriptive and inferential statistics.

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## **LIST OF ABBREVIATIONS AND ACRONYMS**

KPRL – Kenya Petroleum Refineries Limited

KRA – Kenya Revenue Authority

OTS – Open Tender System

SC – Supply Chain

SCM – Supply Chain Management

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## DEFINITION OF KEY TERMS

**Advance Payment of Taxes:** Advance payment of tax means to pay tax along with the earning of income. This tax is paid on the current year income in the same year

**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. It is also called competitive tender or public tender.

**Price Control:** is 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, viz. households and firms.

**Supply Chain Management:** refers to corporate business processes integration from end users through suppliers that provide information, goods, and services that add value for customers.

# CHAPTER ONE: INTRODUCTION

## 1.1 Background

Supply chain management (SCM) has received in recent years a great deal of attention by researchers and practitioners. Effective SCM will lead to a lowering of the total amount of resources required to provide the necessary level of customer service to a specific segment and improving customer service through increased product availability and reduced order cycle time (Banomyong & Supatn, 2011); engage in information exchange (forecasting techniques, inventory management, delivery) and structural collaboration (just-in-time system, outsourcing, vendor-managed inventory and co-locating plants) (Henry & Barro, 2009; Raja, Mazlan & Ali, 2006); relationships with downstream supply chain partners to create end-customer value (Iyer, 2011) and maximize benefits and minimize costs along the supply chain (Chima, 2007). Thus, the nature of SCM becomes visible to participating companies with successful implementation in the ever changing global environment of the business world, risks abound and it greatly affects the decision making processes of the business management.

According to Jain, Wadhwa and Deshmukh (2009), a supply chain is a dynamic process and involves the constant flow of information, materials, and funds across multiple functional areas both within and between chain members. Members in the chain need to cooperate with their business partners in order to meet customer's needs and to maximize their profit. However, it is a very difficult task in managing the multiple collaborations in a supply chain because there are so many firms involved in the supply chain operations with its own resources and objectives. The interdependence of multistage processes also requires real-time operation and decision making across different tasks, functional areas, and organizational boundaries in order to deal with problems and uncertainties. The strategic move of focus for mass customization, quick response, and high quality service cannot be achieved without more complex cooperation and dynamic structure of supply chains.

The oil industry works as a global supply chain involving exploration, material handling, domestic and international transportation, use of technology, and so on. The industry offers a strong model for implementing supply chain management (SCM) techniques. Supply chain management involves providing maximum satisfaction to end users (consumers), in other words, delivering the right product to the right person at the right time while still maximizing profits. Today, there are many opportunities for the coordination of activities across the supply chain even in the ever complex oil and gas sector. This is largely due to the development of information systems and communication technologies within the sector. Integrating supply management with other factors of operations allows all functions to be involved in the management decisions (Chima, 2007).

Over the years, the oil industry has continued to face growing challenges, from stricter government regulation, political risks, competition, emergent new comers and political hostilities, which has affected growth and output. Due to the scramble for resources, many oil companies have been driven to explore and produce in some of the most hostile and harsh environments, which in turn tend to be extremely costly. Also, there have been concerns in the industry about the growing scarcity of natural resources, which underlies fears of not being able to meet production levels and goals. However, in reality, the resources are not the cause of supply restrictions with vast potential still available due to continuous discoveries of oil reservoirs around the world. The main challenge facing the oil industry is not the availability of oil resources, but putting these reserves into production and delivering the final products to consumers at the minimum cost possible. Thus, a solid supply chain management program will enhance this goal (Chima, 2007).

Environmental uncertainties in oil industry lead to a need for higher reliability and flexibility within the production systems and the planning and control systems in the supply chain. Reducing these uncertainties will be achieved by understanding the root causes and how they interact with each other. Change in markets, products, technology, and competitors are occurring at an increasingly rapid pace (Defee & Fugate, 2010; Iyer, 2011). As a result, managers must make decisions on shorter notice, with less information, and with higher penalty costs.

Therefore, a reliable yet flexible system is fundamentally needed to assist the management in making decisions that might prove to be the make-or-break decision for their companies.

In the oil industry, the supply-chain network is composed of shipping via vessel, oil tankers, and pipelines that may run across multiple countries. This network is used to transport crude from wellhead to refinery for processing, to transport intermediates between multi-site refining facilities, and to transport finished products from product storage tanks to distribution centers and finally to the customers. Any disruptions arising in the global supply chain can have tremendous adverse effects in achieving operational efficiency, maintaining quality, profitability, and customer satisfaction. The adverse events may happen due to uncertainty in supply of crude, demand, transportation, market volatility, and political climate. Hence, Shah, Li, and Ierapetritou (2011) identify that to effectively model a supply-chain design problem, the dynamics of the supply chain ought to be considered and data aggregation techniques for the extensive data set should be employed.

The complexities in oil marketing companies supply chains impose enormous challenges to the SCM. SCM in the oil marketing companies in Kenya was studied in a qualitative and quantitative survey that covered 23 oil marketing companies in Kenya, with the purposes of identifying the challenges facing the SCM in oil marketing companies and determining the extent to which the oil marketing companies in Kenya are adopting best practices to manage challenges in their supply chain. The findings show that challenges facing supply chain management in the oil marketing companies in Kenya occur in one or more of the supply chain components; transportation, equipment, communication, suppliers, customers, labor and finance. In an effort to manage their supply chain and reduce costs, oil marketing companies are outsourcing their logistics functions to third-party logistics companies to managing their supply chains. Oil companies also engage in strategic planning, E-procurement, close partnership with suppliers, use of external consultants, outsourcing non core activities, dealing with few suppliers, engaging in vertical integration and Supply Chain Benchmarking. The researcher recommends that there is need to expand the Kenya pipe line to increase its oil transportation capacity and as a result reduce the cost of oil transportation. The oil marketing companies need to train their

personnel so as to appreciate the concept of SCM and the best practices and systems that are significant in mitigating the challenges of SCM. They also need to develop customer relationship management, supplier relationship management and engage in closer cooperation with other companies, government and regional players. Further, oil marketing companies in Kenya need to invest in IT systems (Barua 2010).

### **1.1.1 Oil Marketing in Kenya**

Vision 2030 recognizes that Kenya's energy costs are higher than those of her competitors and that Kenya must, therefore, generate more energy at a lower cost and increase efficiency in energy consumption. The Kenya Government is, therefore, encouraging foreign interest in oil exploration thus there is a modest upstream oil industry, currently limited to exploration in various parts of Kenya. There has been a confirmation that Kenya has struck oil in Turkana area but the commercial viability of these discoveries is yet to be determined. Petroleum is Kenya's major source of commercial energy and has, over the years, accounted for about 80% of the country's commercial energy requirements (Wanjiku, 2011).

According to Vision 2030, petroleum and electricity are the prime movers of the modern sector of the Kenyan economy. The domestic demand for various petroleum fuels on average stands at 2.5 million tons per year, all of it imported from the Gulf region, either as crude oil for processing at the Kenya Petroleum Refineries Limited or as refined petroleum products. Prior to liberalization in October 1994, a significant feature of Kenya's oil industry was a relatively high level of government direct participation, and a correspondingly low level of private sector involvement. Seven marketing and distribution companies were responsible for procuring and importing their own oil. The National Oil Corporation of Kenya (NOCK) was mandated to supply 30% of the crude oil requirement into the country.

Kenya is a net importer of petroleum products and has a refinery owned and managed by the Kenya Petroleum Refineries Ltd (KPRL), an oil pipeline from Mombasa to Nairobi and Western Kenya with terminals in Nairobi, Nakuru, Eldoret and Kisumu, run by the Kenya Pipeline

Company (KPC). Both KPRL and KPC are substantially government controlled (KPRL 50% and KPC 100%). The sector has over 30 oil marketing companies (OMCs) comprising of four major companies namely Kenya Shell, Total, KenolKobil, Libya Oil and other emerging oil companies which include the Government owned National Oil Corporation of Kenya (NOCK).

Prior to 1994, the government, in consultation with the oil marketers, set consumer prices for petroleum products in the country (Mecheo and Omiti, 2003). However, since October 1994, the procurement, distribution, and pricing of petroleum products were liberalized with a view to enhancing operational efficiency of the industry and also attracting private capital (Mecheo and Omiti, 2003). In 2006, the Energy Act No. 12 of 2006 was enacted. This led to the transformation of the then Electricity Regulatory Board (ERB) to the Energy Regulatory Commission (ERC) to also regulate petroleum and renewable energy sectors in addition to electricity.

According to Mwirichia (2011), ERC is a single sector regulatory agency with responsibility for economic and technical regulation of electric power, renewable energy and downstream petroleum sub-sectors including tariff setting and review; licensing; enforcement of compliance; dispute settlement and approval of power purchase and network service contracts. This is supported by the Energy Act No. 12 of 2006 that states in Section 5(a) (ii) that the objects and functions of ERC include regulating the importation, exportation, transportation, refining, storage and sale of petroleum and petroleum products. Section 102 of the Act empowers the Minister to make regulations upon recommendation by the Commission on petroleum related activities including determination of retail prices for petroleum products (Katisya-Njoroge, 2010).

On December 15, 2010 the Government of Kenya enacted a new legislation, the Energy (Petroleum Pricing) Regulations, 2010 which was aimed at preserving availability of specified petroleum products in all parts of Kenya; stabilizing prices of specified petroleum products in Kenya and minimizing the variances in prices of specified petroleum products across the country (Katisya-Njoroge, 2010). The new regulations effectively introduced government control on the

maximum prices of petroleum products based on a formula decided upon by the Energy Regulation Commission (ERC). This formula is, however, still being contested by the Oil Marketing Companies. Petroleum price regulation in Kenya last existed in the period prior to mid 1993 when deregulation was implemented as a result of economic challenges faced by the Government at that time as the Kenya Shilling lost ground against the hard currencies leading to inflationary pressure that rendered regulation untenable.

## **1.2 Problem Statement**

In the oil industry, the supply-chain network is composed of shipping via vessel, oil tankers, and pipelines that may run across multiple countries. This network is used to transport crude from wellhead to refinery for processing, to transport intermediates between multi-site refining facilities, and to transport finished products from product storage tanks to distribution centers and finally to the customers. Any disruptions arising in the global supply chain can have tremendous adverse effects in achieving operational efficiency, maintaining quality, profitability, and customer satisfaction. The adverse events may happen due to uncertainty in supply of crude, demand, transportation, market volatility, and political climate. Hence, Shah, Li, and Ierapetritou (2011) identify that to effectively model a supply-chain design problem, the dynamics of the supply chain ought to be considered and data aggregation techniques for the extensive data set should be employed.

Environmental uncertainties in oil industry lead to a need for higher reliability and flexibility within the production systems and the planning and control systems in the supply chain. Reducing these uncertainties will be achieved by understanding the root causes and how they interact with each other. Change in markets, products, technology, and competitors are occurring at an increasingly rapid pace (Defee & Fugate, 2010; Iyer, 2011). As a result, managers must make decisions on shorter notice, with less information, and with higher penalty costs. Therefore, a reliable yet flexible system is fundamentally needed to assist the management in making decisions that might prove to be the make-or-break decision for their companies. There is a general acceptance of the existence of market failure which requires government intervention

to rectify. Such failure has three sources. The existence of imperfect competition arising from the presence of monopoly power and asymmetric information, the presence of ownership externalities and finally the existence of public goods defined as goods where consumption is non-rival and exclusion from access technically infeasible. Solutions to these problems of market failure lay in corrective taxes and subsidies, regulation, price controls, planning and ultimately government ownership (Barua 2010).

Local studies on factors affecting effective supply chain management by oil companies include Kimani (2013) who conducted a study on supply chain management challenges in Kenya petroleum industry a case study of National Oil Corporation ,his focus was on efficiency and not effective supply chain management by oil companies. Awino (2009) conducted a study on empirical investigation of supply chain management best practices in large private manufacturing firms in Kenya. She noted that today, large companies are mainly focusing on becoming efficient and flexible in their manufacturing methods in order to handle uncertainty in the business environment. Chima (2007) conducted a study on Supply-Chain Management Issues in the Oil and Gas Industry and asserted that oil and gas industry is involved in a global supply-chain that includes domestic and international transportation, ordering and inventory visibility and control, materials handling, import/export facilitation and information technology. However the above studies did not concentrate on the factors affecting effective supply chain management by oil companies. It is for this research gap that the study wishes to investigate the factors affecting Supply Chain Management by oil companies.

### **1.3 Objectives**

The general objective of the study is to investigate the factors affecting OMC's in practicing Supply Chain Management.

The specific objectives are as follows:

- i. To assess effect of constrained infrastructure on supply chain management by oil marketing companies.
- ii. To establish the effect of price control on supply chain management by oil marketing companies.
- iii. To determine the effect of open tender system on supply chain management by oil marketing companies.
- iv. To determine the effect of advance payment of taxes on supply chain management by oil marketing companies.

## **1.4 Research Questions**

The study will attempt to answer the following questions:

- i. To what extent does constrained infrastructure influence supply chain management by oil marketing companies in Kenya?
- ii. To what extent does price control affect supply chain management by oil marketing companies in Kenya?
- iii. To what extent does open tender system affect supply chain management by oil marketing companies in Kenya?
- iv. To what extent does advance payment of taxes affect supply chain management by oil marketing companies in Kenya?

## **1.5 Significance of the Study**

The study is of importance to oil company managers when they will be formulating their supply chain management policies. The Government of Kenya and Regulators may find this study

useful to enable them understand the effect of their controls in the supply chain of oil companies thus formulate policies which are not negatively affecting the sector.

Findings of this research will be of useful reference to other researchers or for further research in the same field. This study will also increase the existing body of knowledge on supply chain management particularly in the oil industry where little or no research has been done

## **1.6 Scope Of The Study**

The study covered the factors affecting supply chain management by oil companies. From a contextual stand point, the study will focus on all 50 oil marketing companies in Kenya.

## **1.7 Assumptions**

It was assumed that the respondents will answer questions correctly, honestly and provide all the required information. It was further assumed that the selected sample will be adequate and representative of the population and will be reliable in arriving at reliable generalizations and conclusions.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction**

This chapter discusses theories relevant to the study. Literature related to the study is also reviewed with the aim of identifying literature gaps. The literature review will also guide the relevance of the study findings.

### **2.2 Theoretical Review**

Several theories were discussed in this section. For instance, the theory of supply chain management informed the dependent variable while the theory of regulation informed the variable of price controls.

#### **2.2.1 Theory of Supply Chain Management**

The connections and nodes in a Supply Chain achieve functions that contribute to the value of the goods transporting through the chain and thus its achievement. Any connection that does not carry out well reduces the overall effectiveness of the whole Supply Chain. The notion of Supply Chain management as used in many research is usually linked with the globalization of producing and the penchant for manufacturers to source their inputs planetary, which necessitates management of profitable ways of regulating worldwide flows of inputs or outputs. The principal focus of market competition in such situations is not only between goods, but between the Supply Chains delivering the goods. As competition in international markets is progressively dependent upon the of arrival time of goods as well as their quality, coordination between suppliers and distributors has become an important characteristic of the Supply Chain. As the customer satisfaction is a crucial benchmark of the success of the Supply Chain, effective management of the linking processes is crucial (Trkman, Stemberger and Jaklic, 2005).

Additionally, market uncertainty necessitates Supply Chains to be easily flexible to changes in the situation of trade. Such flexibility in supply requires effective Supply Chain Management.

According to Grant, Lambert, Stock and Ellram (2006), Supply Chain management refers to corporate business processes integration from end users through suppliers that provide information, goods, and services that add value for customers.

Supply chain can be summed up as a series of interconnected activities which are concerned with planning, coordinating and controlling materials, parts and finished products from supplier to customer (Lourenco, 2001). The key success of SCM will rely on the incorporation of the activities of the supply chain, meaning cooperation, information sharing and organization throughout the entire supply chain. The supply chain in the oil industry is considered a complex one where there exists a linkage between upstream suppliers, downstream distributors, information capital and flow through the chain.

### **2.2.2 Public Interest Theories of Regulation**

The first group of regulation theories account for regulation from the point of view of aiming for public interest. This public interest can be further described as the best possible allocation of scarce resources for individual and collective goods. In western economies, the allocation of scarce resources is to a significant extent coordinated by the market mechanism. In theory, it can even be demonstrated that, under certain circumstances, the allocation of resources by means of the market mechanism is optimal (Arrow, 1985). Because these conditions are frequently not adhered to in practice, the allocation of resources is not optimal and a demand for methods for improving the allocation arises (Bator, 1958). One of the methods of achieving efficiency in the allocation of resources is government regulation (Arrow, 1970; Shubik, 1970). According to public interest theory, government regulation is the instrument for overcoming the disadvantages of imperfect competition, unbalanced market operation, missing markets and undesirable market results.

In the first place, regulation can improve the allocation by facilitating, maintaining, or imitating market operation. The exchange of goods and production factors in markets assumes the definition, allocation and assertion of individual property rights and freedom to contract (Pejovich, 1979). The guarantee of property rights and any necessary enforcement of contract

compliance can be more efficiently organized collectively than individually. Furthermore, the costs of market transactions are reduced by property and contract law.

The freedom to contract can, however, also be used to achieve cooperation between parties opposed to market operation. Agreements between producers give rise to prices deviating from the marginal costs and an inefficient quantity of goods is put on the market. Antimonopoly legislation is aimed at maintaining the market operation through monitoring the creation of positions of economic power and by prohibiting competition limiting agreements or punishing the misuse thereof (Arrow, 1970).

### **2.2.3 Theory of Efficiency**

In economics, the term economic efficiency refers to the use of resources so as to maximize the production of goods and services (Sullivan and Shefrin, 2003). An economic system is said to be more efficient than another (in relative terms) if it can provide more goods and services for society without using more resources. In absolute terms, a situation can be called economically efficient if: No one can be made better off without making someone else worse off (commonly referred to as Pareto efficiency), No additional output can be obtained without increasing the amount of inputs, Production proceeds at the lowest possible per-unit cost. These definitions of efficiency are not exactly equivalent, but they are all encompassed by the idea that a system is efficient if nothing more can be achieved given the resources available

There are two main strains in economic thought on economic efficiency, which respectively emphasize the distortions created by governments (and reduced by decreasing government involvement) and the distortions created by markets (and reduced by increasing government involvement). These are at times competing, at times complementary – either debating the *overall* level of government involvement, or the effects of specific government involvement. Broadly speaking, this dialog is referred to as economic liberalism or neoliberalism, though these terms are also used more narrowly to refer to particular views, especially advocating *laissez faire*. Further, there are differences in views on microeconomic versus macroeconomic

efficiency, some advocating a greater role for government in one sphere or the other (Barr, 2004).

A market can be said to have allocative efficiency if the price of a product that the market is supplying is equal to the value consumers place on it, represented by marginal cost. Because productive resources are scarce, the resources must be allocated to various Industries in just the right amounts, otherwise too much or too little output gets produced. When drawing diagrams for firms, allocative efficiency is satisfied if the equilibrium is at the point where marginal cost is equal to average revenue. This is the case for the long run equilibrium of perfect competition. Productive efficiency is when units of goods are being supplied at the lowest possible average total cost. When drawing diagrams for firms, this condition is satisfied if the equilibrium is at the minimum point of the ATC curve. This is again the case for the long run equilibrium of perfect competition (Barr, 2004).

## **2.3 Empirical Review**

This section reviews literature from studies carried out related to improvement of efficiency of supply chains.

### **2.3.1 Constrained Infrastructure**

Any disruptions arising in the global supply chain can have tremendous adverse effects in achieving operational efficiency, maintaining quality, profitability, and customer satisfaction. The adverse events may happen due to constrained infrastructure, price control, open tender system and payment of taxes. Shah, Li and Ierapetritou (2011) identify that to effectively model a supply-chain design problem, the dynamics of the supply chain ought to be considered and data aggregation techniques for the extensive data set should be employed.

The key element in a logistics chain is transportation system, which joints the separated activities. Transportation occupies one-third of the amount in the logistics costs and transportation systems influence the performance of logistics system hugely. Transporting is

required in the whole production procedures, from manufacturing to delivery to the final consumers and returns. Only a good coordination between each component would bring the benefits to a maximum (Chima, 2007).

In the oil industry, the supply-chain network is composed of shipping via vessel, oil tankers, and pipelines that may run across multiple countries. This network is used to transport crude from wellhead to refinery for processing, to transport intermediates between multi-site refining facilities, and to transport finished products from product storage tanks to distribution centers and finally to the customers. Any disruptions arising in the global supply chain can have tremendous adverse effects in achieving operational efficiency, maintaining quality, profitability, and customer satisfaction. The adverse events may happen due to uncertainty in supply of crude, demand, transportation, market volatility, and political climate. Hence, Shah et al. (2011) identify that to effectively model a supply-chain design problem, the dynamics of the supply chain ought to be considered and data aggregation techniques for the extensive data set should be employed.

Budiman (2004) found that supply fluctuation was due to capacity adjustment lead time, production lead time, order processing delay and order wait time. Svenson (2005) observes that the reversed bullwhip effect is caused by factors such as deficient information sharing, insufficient market data, deficient forecasts and capacity issues. Facilities with mass production are responsive to supply variability while customization platforms are prone to longer production lead times. Business processes sub optimization by design or default can lead to a butterfly effect where a small variation can lead to system wide variation. Most companies are no longer simply contented with price as a determinant in procurement services but also sustainability of the supply and ability to meet unpredictable and short notice supply instructions. Ability and expertise override costs where the cost curve minimization is already achieved.

Sweeny (2005) argues that managing the information flows is the most critical of these activities. This is because the flow or movement of materials or money is usually triggered by associated information movement. Lalwani et al (2006) proposed that current developments in systems

thinking and continuous system simulation, when applied within the context of an operations management framework, may offer the good design of supply chain and improve in supply chain performance.

Shah et al. (2011) stated that, a typical petroleum industry supply chain is composed of an exploration phase at the wellhead, crude procurement and storage logistics, transportation to the oil refineries, refinery operations, and distribution and transportation of the final products. The upstream activities (exploration, development and production of crude oil or natural gas) and downstream activities (tankers, pipelines, retailers and consumers) are two important activities in the petroleum industry (Mohd and Ali, 2009). SCM in O&G industry requires the company to integrate its decisions with those made within its chain of customers and suppliers. This process involves relationship management of the company to their customers and suppliers. A firm can create long-term strategic relationships with their suppliers and in most cases there is a collaborative process between the oil and gas company with its suppliers (Chima, 2007).

Kimani (2013) conducted a study on supply chain management challenges in Kenya petroleum industry and noted that Kenya's petroleum industry faces supply chain challenges such as lack of strategic stocks, relatively high petroleum prices compared to other East African countries, frequent fuel shortages, sub-standard products and diversion of products destined for export back into the country. He explored challenges facing implementation of effective supply chain management practices in petroleum industry in Kenya, a case of National Oil Corporation. Specifically the study sought to explore the influence information technology, supply chain design, people issues and partnership/collaboration issues to the implementation of effective supply chain management. He concluded that all four independent variables have high effect on implementation of effective SCM in the petroleum sector.

Chima (2007) conducted a study on Supply-Chain Management Issues in the Oil and Gas Industry. He asserted that oil and gas industry is involved in a global supply-chain that includes domestic and international transportation, ordering and inventory visibility and control, materials handling, import/export facilitation and information technology. Thus, the industry offers a

classic model for implementing supply-chain management techniques. In a supply-chain, a company is linked to its upstream suppliers and downstream distributors as materials, information, and capital flow through the supply-chain.

Awino (2009) conducted a study on empirical investigation of supply chain management best practices in large private manufacturing firms in Kenya. He noted that Today, large companies are mainly focusing on becoming efficient and flexible in their manufacturing methods in order to handle uncertainty in the business environment. To do this, they need different strategies to manage the flow of goods from the point of production to the consumer. However, most firms have not been able to formulate the right strategies required to achieve this objective in Supply Chain Management (SCM), this calls for a strategic fit of an organization's core competencies, strategy and core capability. 11 critical factors were established as the best practices: operating policies, linkages within supply chain firms, improved performance, information technology systems, strategic alliance, performance measures, goal orientation, customer relationships, guidelines and procedures, supplier selection and supplier evaluation. When benchmarked, these practices were found to be universal and compares with the best practices globally.

The petroleum industry can be characterized as a typical supply chain where all levels of decisions (strategic, tactical, and operational) may arise in it. Management of the petroleum supply chain is a complex task due to the large size of the physical supply network which dispersed over vast geography, complex refinery production operations, and inherent uncertainty. Shah et al. (2011) stated that uncertainty arises in realistic decision making processes and has a huge impact on the refinery planning activities. Three major uncertainties that should be considered in refinery production planning include: market demand for products; prices of crude oil and the saleable products; and product or production yields of crude oil from chemical reactions in the primary crude distillation unit (Shah et al., 2011).

### 2.3.2 Price control

Eight countries have price controls, including all five West African countries. The eight countries use different variations of an import-parity structure with international spot reference prices, market marine freight rates, and the dollar-local currency exchange rates as the three key short term adjustment parameters. With the exception of Malawi, the countries with price controls adjust prices monthly. Malawi has a price stabilization fund and has no pre-set automatic adjustment frequency. The stabilization fund ran up a large deficit in 2008 (Kojima & Masami, 2009).

Kenya Association of Manufacturers (2002) posits that removal of price controls, foreign exchange controls and introduction of investment incentives have, however, not resulted in major changes in the overall economy. In particular, they have not improved the manufacturing performance. Therefore, to build a self-sustaining industrial sector, it is necessary to establish strategic linkages within the domestic economy. Some efforts have to be made to promote strategic options among supply chains so as to enhance spread effects of industrial growth and to facilitate transfer of technology, skills and growth of small and medium scale sub-contractors. The linkages of the study variables in SCM in Kenya are weak and because of this, there exists little inter-industry integration in the country. This has resulted in consistently low manufacturing value added in the sector (KAM ,1989).

According to Rong et al. (2009), when customers react not only to price itself but changes in the price, some pricing strategies implemented by the supplier may lead to reversed bullwhip effect. Where there is a central pricing authority like in price controls, price change anticipations can result in supply shocks as every supply chain element seeks to maximize on the price differentials. Under imperfect market conditions like in the oligopolistic markets, collusions by the market players can set supply quotas that are preservative of desired price levels. However price variations under perfect market conditions are a reflection of market forces of demand and supply and reverse bull whip effect plays the causal role on pressure on price.

Wabwoba (2011) did a research on the impact of oil price regulation on the financial performance of NOCK. It was observed that when the international crude oil prices were rising, oil marketing companies quickly passed on these increased costs to consumers but took long to pass on cost reduction benefits to consumers when international oil prices were on a downward spiral. Hence the government through its agency the ERC (Energy Regulatory Commission) came up with a way of regulating the fuel prices by setting the maximum prices which the oil marketers are to charge. The ERC in addition developed a concept paper enumerating the petroleum supply chain logistics and their cost implications on downstream retail prices (ERC 2011).

Storage capacity, which exists at every point in the supply chain, is important because stocks can be used to help reduce the magnitude of sharp price spikes due to physical disruptions to supply (Bacon & Kojima 2008). Such protection against supply shortages may be particularly important for landlocked countries. Storage capacity is expensive to build and holding stocks within this capacity also incurs substantial additional financial costs. As a result, companies hold contingency stocks to avoid stock-outs but use just-in-time inventory management just as in any other business; they strive to optimize their capacity with other links in their supply-and-delivery chain. Maximum cost efficiency is achieved when this optimization is achieved and contingency stock levels are the result of a careful risk assessment. The optimal level is situation-specific with no typical standard.

Business Daily (2009) noted that the ERC in line with its mandate has drafted regulations to control pump prices. The Energy Act requires all proposed regulations to be recommended by the ERC to the Minister for Energy after consultations with the public. Although the National Energy Policy of 2004 states clearly that government will let market forces determine prices, during the Parliamentary readings of the Energy Bill a last minute clause was inserted in section 102 giving the Minister for Energy power to make regulations determining the retail prices of petroleum and petroleum products. Accordingly the ERC in line with its function of protecting consumer and stakeholder interests has recommended regulations that will control pump prices. The regulations propose a formula for pump prices which incorporates the crude or refined

product prices, freight, local transportation costs, financing, insurance, the refinery processing fees, taxes and a profit margin. The proposed pump price regulations have attracted resistance from oil marketers who would prefer to have the market forces and competition control pricing. The regulations have been viewed by economists as taking the country back to the pre-1994 days before the industry was liberalized.

### **2.3.3 Open tender system**

In Kenya, the government set up an Open Tender System (OTS) to import crude oil for KPRL (Kenya Petroleum Refineries Limited) and petroleum products. Under the system, crude oil is purchased every month by a single company for the entire market on the basis of a public tender, transported through one terminal, and shared among all marketing companies in proportion to their share of the market. Petroleum products are similarly purchased through the Open Tender System. Depending on supply and demand, the oil marketing companies may source the balance of their needs independently (Wabwoba, 2011).

The Open Tender System is intended to have the dual benefit of ensuring competitive prices (which are made public) and transporting the oil in a way that would minimize evasion of the import duty. Each company is required to take the crude oil allocation and pay for the consignment within a specified time frame or risk penalties for late payment. In times of high oil prices, some marketers could not pay on time for imports, and their late payments delayed subsequent crude shipments, lowered refinery throughput, and caused fuel shortages. Kenya imports enough petroleum products to accommodate three separate tenders a month, opening up the possibility of options other than the current Open Tender System where the right to import is granted to only one company (Kojima & Masami, 2009).

Business Daily (2009) noted that the importation of crude and refined product is undertaken through the open tender system which is a procurement system that requires an oil marketer to bid for the supply requirements for the entire market. For an oil company to participate in the open tender system it must be licensed and meet the conditions set by the ERC. The successful

bidder then imports and sells the product to the other oil companies as per their share of the market. The quality and quantity of products and their pricing is closely monitored by the Ministry of Energy. The importation of petroleum products through the open tender system is regulated by section 31A of the Petroleum Rules, Legal notice No. 197 of 2003 and the tender terms and conditions for the delivery of crude oil into Kenya. The open tender system ensures supply of product. It also ensures that products are imported at the lowest bid price and that the price is not subjected to fluctuating international market prices.

Owuor (2007) noted that from January 1, 2004, the government introduced a process in which all the crude oil is imported through an Open Tender System (OTS) coordinated by the Ministry of Energy on behalf of all the companies licensed to import petroleum products. This implies oil companies obtain bulk of their imports at more or less the same cost and therefore opportunity to gain competitive advantage through low costs is generally limited to product storage and distribution activities.

Njoroge (2007) noted that Petroleum products consumed in Kenya are imported either as crude oil or as refined products. From January 1, 2004, the government introduced a process in which all the crude oil is imported through an Open Tender System (OTS) coordinated by the Ministry of Energy on behalf of all the companies licensed to import petroleum products. The crude is refined at Kenya Petroleum Refineries Limited (KPRL) to meet 70% of the country's requirements. The balance 30% of the demand is met by importation of refined products. Of this quantity of refined products, 70% is imported through a product tender system, also coordinated by the Ministry of Energy, while the oil companies can import the remaining requirement on their own.

Africog (2009) argued that Kenya's oil import and trading arrangement is based on a complex Open Tendering System (OTS). Under the OTS, which is operated by the Ministry of Energy, oil marketers compete to import crude and refined products for the whole industry. The winner imports the monthly oil requirements and sells to other marketers at an agreed price. The import is in some instances guaranteed by financiers under a Collateral Financing Agreement (CFA).

The CFA arrangement was introduced in 2004 by KPC in order to enable oil marketing companies to use their stock within KPC transport and storage system as security in order to secure financing. Under the scheme, banks issue Letters of Credit committing themselves to pay 80 percent of the total cost of the oil imported. In turn, an oil importer signs an agreement with KPC stating that oil within the KPC system can only be released with the authority and instructions of the financiers of the consignment.. Oil marketers would only have access to their share of the imported oil from KPC on the written authorization of the financiers after they have paid for their entitlement. However, collusion between Triton and KPC junior officers overrode this arrangement leading to the highly publicized Triton Scandal

#### **2.3.4 Advance Payment of Taxes**

Taxes on petroleum products are a critical source of government revenue for low-income countries. The reason is that taxing fuel is one of the easiest ways to get revenue: collecting fuel taxes is relatively straightforward, and the consumption of fuels as a group is relatively price inelastic and income elastic, ensuring buoyant revenue as income rises and tax rates are increased (Bacon, 2001). In setting tax rates on gasoline and diesel, many factors need to be considered. They include the government's revenue requirements, efficiency of resource use, the need to finance road maintenance, road congestion impacts, equity, the use of fuels in sectors other than transport, and the impact of the fuel tax structure on other economic activities and on the poor. It is not possible to achieve all these objectives simultaneously through fuel tax policies alone. Most governments complement fuel taxation with other policy instruments, in particular to correct for externalities. The challenge of meeting the various objectives is especially difficult in low income countries, where fewer policy instruments are available. In determining the levels and structure of fuel taxation, important compromises have to be made between the effects on government revenue generation, income distribution, the efficient use of roads, and environmental pollution. In so doing, attention must be accorded to the relative importance of each objective, the efficiency of fuel taxation as an instrument for achieving the objectives, and the magnitude of any perverse effects—such as adulteration of high-tax fuels with low-tax fuels—in relation to other aims (William, 2001).

Kathuri (2006) noted that Kenya is standing on the threshold of a severe fuel crisis following an order stopping the Kenya Pipeline Company (KPC) from supplying oil to 10 top petroleum companies in the country. Kenya Revenue Authority issued the order citing failure by the companies to pay taxes as required by law. The companies, including market leaders Kenya Shell and Kenol/Kobil, have been engaged in a bitter war with the taxman over the new rule that requires them to pay taxes within 30 days of collecting the oil from KPC. Some of the oil companies have deliberately refused to pay up arguing that it was unfair for the taxman to demand that they pay taxes while it was sitting on billions of shillings in Value Added Tax and suspended duty refunds.

Standard Online (2006) noted that Industry experts said the KRA order may throw the entire Eastern African region into a severe fuel crisis since some of the barred companies like Kenol/Kobil are market leaders in regional markets such as Uganda and Rwanda. In a letter to KPC, KRA Commissioner General Michael Waweru said the companies, including Mobil, the National Oil Corporation of Kenya (NOCK), Mobil, Total and Triton, be immediately barred from accessing oil from KPC depots until they clear outstanding taxes. Also affected by the order are Dalbit, Godan, MGS and Oilcom. The inclusion of market leaders such as Kenya Shell, Kenol/Kobil, Total and Mobil in the list of barred companies is expected to throw the country into a severe fuel crisis within the next three to four days when the companies are expected to have sold out their current stocks.

Standard Online (2006) also noted that differences between the oil companies and the taxman arise from the fact the law is specific as when the companies should pay taxes for oil supplies but does not give a timeframe within which KRA should pay VAT refunds. KRA is said to be lagging behind in VAT refunds by up to two years. The marketers argue that it is unfair for the taxman to sit on billions of shillings they need to conduct their business while at the same time demand that they pay in billions of shillings in taxes they owe the same entity. The oil marketers have been at loggerheads with KRA since last September when the new taxation rule instituted by former Finance minister David Mwiraria came into effect. On Thursday, KPC said the oil dealers had always forced consumers and suppliers to pay them in advance and should embrace

the same principle in their dealings with the taxman. Kosgei ruled out any negotiations on the matter and ordered all KPC outlets to enforce the decision.

Nairobi Chronicle (2008) noted that the imposition of advance tax by the Kenya Revenue Authority has worsened a bad situation. KRA introduced advance tax as a means of curbing the dumping of duty free fuel meant for export into the local market. With this measure, KRA collects taxes at the port of Mombasa before fuel is distributed to consumers. In effect oil companies must pay billions of shillings to the KRA before they are allowed to sell. Consequently, they must borrow to pay the tax. When advance tax was introduced, the price of fuel immediately shot up by Shs3 a litre due to interest payments for tax loans. In a global financial environment where credit is hard to come by, oil companies will find it challenging to borrow to pay advance tax. Already, one oil company – Triton Petroleum – fell into receivership this December due to this.

## 2.4 Conceptual Framework

The current study develops the following conceptual framework. The independent variables are the factors affecting supply chain management by oil companies while the dependent variable is supply chain management.

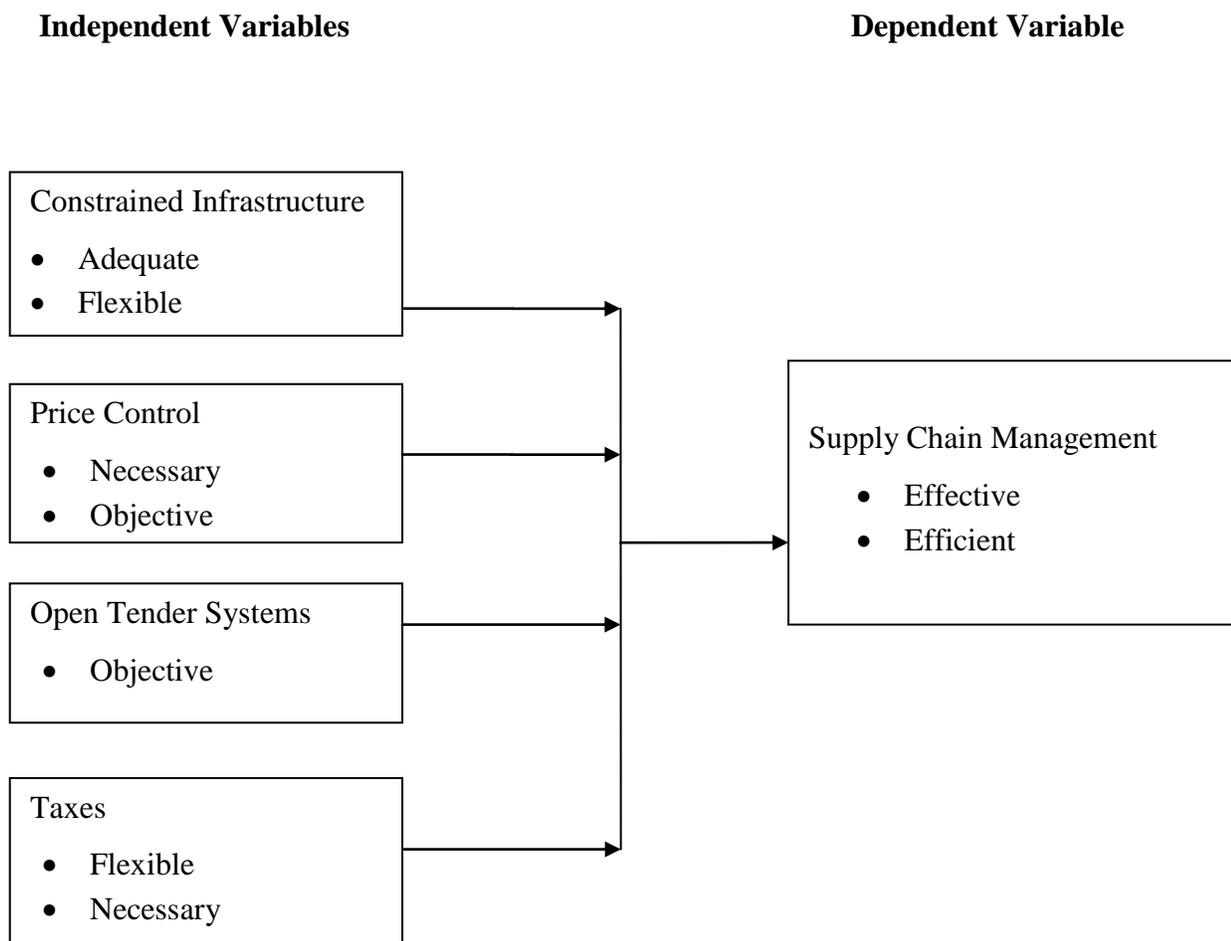


Figure 2.1: Conceptual Framework

Source: Researcher (2013)

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter sets out various stages and phases that were followed in completing the study. It involves a blueprint for the collection, measurement and analysis of data. In this stage, most decisions about how research was executed and how respondents were approached, as well as when, where and how the research was completed. Therefore in this section the research identifies the procedures and techniques that was used in the collection, processing and analysis of data.

#### **3.2 Research Design**

Research design is an outline of research study which indicates that what the researcher will do from writing the hypothesis and its operational implications to the final analysis of data. A research design is the arrangement of conditions for data collection and analysis of data in a manner that aim to combine relevance to research purpose with economy in research procedure (Kothari, 2004). Research design constitutes decision regarding what, why, where, when and how concerning an inquiry or a research study (Sekaran, 2011).

This study employed descriptive survey design. Descriptive survey is conducted to describe the present situation, what people currently believe, what people are doing at the moment and so forth (Baumgartner, Strong and Hensley 2002). This design was selected for this study because it provided numeric descriptions of the population and describes events as they are, as they were or as they will be (Kombo & Trump, 2006).

### **3.3 Target Population**

Burns and Grove (2003) and Mugenda and Mugenda (2003) describe population as all the elements that meet the criteria for inclusion in a study. Population is therefore the entire group of individuals, events or objects having a common observable characteristic. The units of analysis will be the oil marketers which are 50. There are 50 oil marketing companies in Kenya (Appendix III). The target population of the study was composed of all the managerial employees in the 50 oil companies in Kenya. There are approximately 1500 of them in the 50 oil marketing firms. This was taken as the population of the study.

### **3.4 Sampling Technique and Sample Size**

A sample is a subset of population (Hyndman, 2008). Marczyk, DeMatteo & Festinger (2005) defined a sample as a subset of the population to be studied. It is a true representative of the entire population to be studied (Leary, 2001). Similarly sampling is the selection of a subset of individuals from within a population to yield some knowledge about the whole population, especially for the purposes of making predictions based on statistical inference (Scott & Wild, 1986; Black and William, 2004). Its main advantages are cost, speed, accuracy and quality of the data (Ader, Mellenbergh, & Hand, 2008). A good sample should be truly representative of the population, result in a small sampling error, viable, economical, and systematic, whose results can be applied to a universe with a reasonable level of confidence (Kothari, 2004).

Stratified random sampling technique was used to determine the sample size. This method was preferred because; the population that was sampled was divided into homogenous groups based on characteristics considered important to the indicators being measured. This method also helped to achieve precision, flexible in the choice of the sample design for different strata and finally one is able to get estimates of each stratum in addition to the population estimate (Kothari, 2004). The strata for the study were divided into top managers, a middle level managers and supervisors. The sample was distributed equally among the strata.

The target sample was 10% of the population. According to Mugenda and Mugenda (2003) and Kothari (2004) a sample size of 10% is adequate for a descriptive study which has a small population. The target sample was 150 employees. Three employees from each of the 50 firms were selected purposively. The preferred employees included a top manager, a middle manager and a supervisor as they will be knowledgeable about issues discussed in the study.

**Table 3.1: Sample Matrix**

<b>Strata</b>	<b>Target Sample</b>	<b>% Sample</b>
Top Managers	50	33%
Middle level managers	50	33%
Supervisors	50	34%
Total	150	100%
Estimated population	1500	10%

### **3.5 Data Collection Instrument**

This study used primary data which was collected through use of questionnaires. A questionnaire is a pre-formulated written set of questions to which the respondents record the answers usually within rather closely delineated alternatives. A five point likert scale questionnaire was used. Likert scale is an interval scale that specifically uses five anchors of strongly disagrees, disagree, neutral, agree and strongly agree. The likert measures the level of agreement or disagreement. Likert scales are good in measuring perception, attitude, values and behaviour. The likert scale has scales that assist in converting the qualitative responses into quantitative values (Mugenda & Mugenda, 2003, Upagade & Shende, 2012, Zikmund, Babin, Carr & Griffin, 2010).

### **3.6 Data Collection Procedure**

Burns and Grove (2003) define data collection as the precise, systematic gathering of information relevant to the research sub-problems, using methods such as interviews, participant observations, focus group discussion, narratives and case histories. In my case data was collected by use of questionnaires, the questionnaires were sent to the respondents through e-mail under a

questionnaire forwarding letter accompanied by an introduction letter from the University if any. I made follow ups that they were fully completed and mailed back to me promptly.

### **3.7 Data Processing and Analysis**

Data Analysis is the processing of data to make meaningful information (Sounders, Lewis and Thornbill, 2009). Burns and Grove (2003) define data analysis as a mechanism for reducing and organizing data to produce findings that require interpretation by the researcher. According to Hyndman (2008) data processing involves translating the answers on a questionnaire into a form that can be manipulated to produce statistics. This involves coding, editing, data entry, and monitoring the whole data processing procedure.

After data had been collected through questionnaires, it was prepared in readiness for analysis by editing, handling blank responses, coding, categorizing and keying into Statistical Package for Social Sciences (SPSS) computer software for analysis. SPSS was used to produce frequencies, descriptive and inferential statistics which will be used to derive conclusions and generalizations regarding the population.

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

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

Where ;

Y = Efficiency in supply chain management

X<sub>1</sub> = Constrained Infrastructure

X<sub>2</sub> = Price Control

X<sub>3</sub> = Open Tender System

X<sub>4</sub> = Advance Payment of Taxes

In the model,  $\beta_0$  = the constant term while the coefficient  $\beta_i = 1 \dots 4$  will be used to measure the sensitivity of the dependent variable (Y) to unit change in the predictor variables  $X_1, X_2, X_3$  and  $X_4$ .  $\mu$  is the error term which captures the unexplained variations in the model.

## CHAPTER FOUR: DATA ANALYSIS AND PRESENTATION

### 4.1 Introduction

The general objective of the study was to investigate the factors affecting OMC's in practicing supply chain management. The specific objectives were: to assess the effect of constrained infrastructure, price control, open tender system and advance payment of taxes on supply chain management by oil marketing companies. Out of the targeted sample of 150,120 employees (80%) responded to the questionnaire. This was considered adequate for the objectives of this study. In this chapter, the analyzed data is presented together with the relevant interpretations. Findings have been presented in three parts: General information on respondents, assessment of factors influencing supply chain management and regression analysis.

### 4.2 General Information on respondents

#### 4.2.1 Gender of respondents

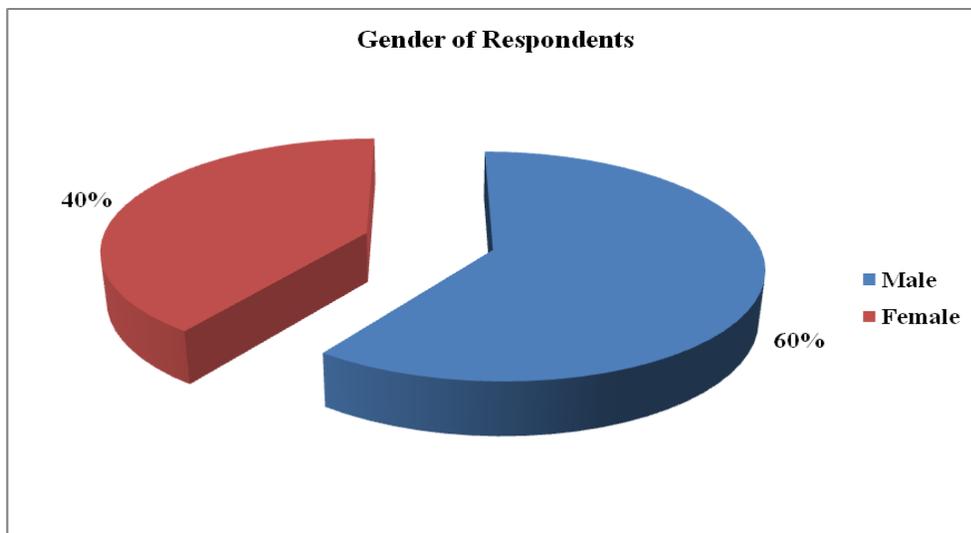
**Table 1: Gender of respondents**

	<b>Frequency</b>	<b>Percentage (%)</b>
<b>Male</b>	72	60
<b>Female</b>	48	40
<b>Total</b>	<b>120</b>	<b>100</b>

Source: Research data

From the table it is evident that 72 out of 120 (60%) respondents were male while 48 (40%) are female. This implies that the study was balanced on gender. This implies that majority of the respondents were male. This information is also presented on Chart 1 below.

**Chart 1: Gender of respondents**



Source: Research data

#### 4.2.2 Age of respondents

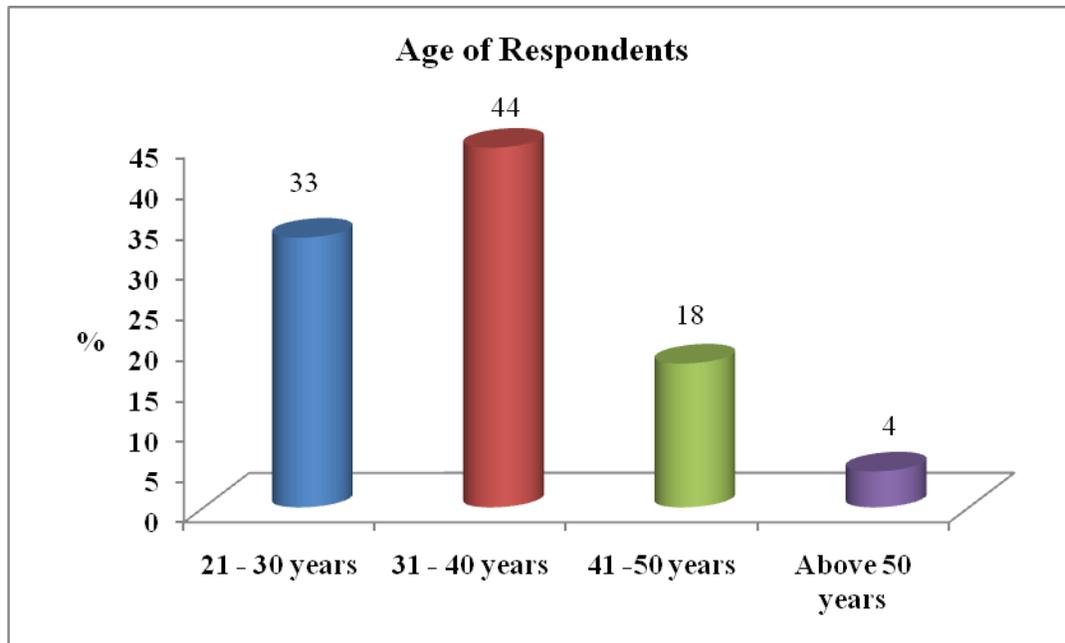
**Table 2: Age of respondents**

<b>Range</b>	<b>Frequency</b>	<b>Percentage (%)</b>
21 - 30 years	40	33
31 - 40 years	53	44
41 -50 years	22	18
Above 50 years	5	4
<b>TOTAL</b>	<b>120</b>	<b>100</b>

Source: Research data

Table 2 shows that 40 (33%) of the respondents were aged between 21 – 30 years, 53 (44%) aged 31 - 40 years, 22 (18%) aged 41 – 50 years while only 5 (4%) aged above 50 years. This indicates that majority of the respondents were aged between 21 – 40 years. Chart 2 below also displays this information.

**Graph 2: Age of Respondents**



Source: Research data

#### 4.2.3 Education level

**Table 3: Education level**

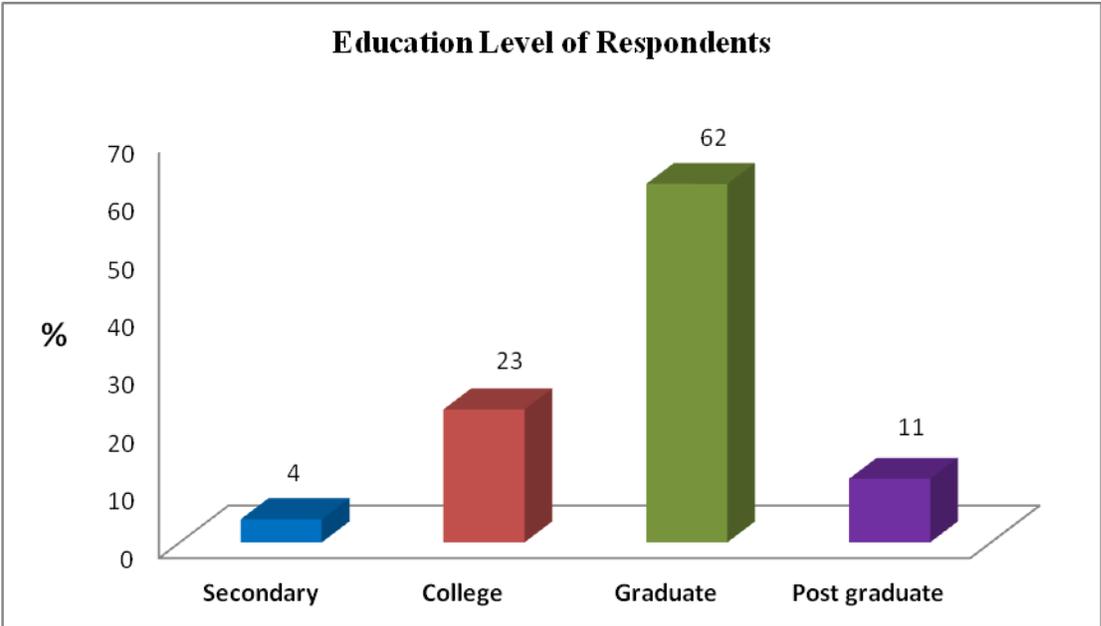
	Frequency	Percentage (%)
Secondary	5	4

College	28	23
Graduate	74	62
Post graduate	13	11
<b>TOTAL</b>	<b>120</b>	<b>100</b>

Source: Research data

The study also sought to establish the education level of the respondents. The findings as shown in table 3 above indicate that 5 out of 120 (4%) had attained secondary school level, 28 (23%) College level, 74 (62%) graduate level, while 13 (11%) post graduate level. This implies that most of the respondents were graduates. Chart 3 below depicts this information.

**Graph 3: Education level**



Source: Research data

#### 4.2.4 Years in Current Employment

**Table 4: Years in Current Employment**

<b>Range</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Less than 1 year	11	9
1 - 2 years	13	11
3 -5 years	22	18
More than 5 years	74	62
<b>TOTAL</b>	<b>120</b>	<b>100</b>

Source: Research data

Results on the years of service in current employment revealed that majority of the respondents (62%) had worked for more than 5 years, 9% had worked for less than 1 year, 11% between 1 – 2 years and 18% 3-5 years.

#### 4.2.5 Respondents Department

**Table 5: Respondents Department**

	<b>Frequency</b>	<b>Percentage (%)</b>
Accounting and Finance	32	27
Operations	40	33
Supplies	48	40
<b>TOTAL</b>	<b>120</b>	<b>100</b>

Source: Research data

With regard to respondents department the study showed that 32 out of 120 (27%) respondents were from the Accounting and Finance department, 40 (33%) from the Operations department while 48 (40%) were from the Supplies department.

### 4.3 Factors affecting Supply Chain Management

The specific objectives of this study were to assess the effect of constrained infrastructure, price control, open tender system and advance payment of taxes on supply chain management by oil marketing companies. Data was analyzed using mean scores and standard deviations. A mean score of <1.5 implies strongly disagree, 1.5 – 2.5 disagree, 2.5 – 3.5 neither agree nor disagree, 3.5 – 4.5 agree while a mean score of > 4.5 implies strongly agree. Standard deviation of <1 means that there were no significant variations in response while that >1 implies that there were significant variations in responses.

#### 4.3.1 Constrained Infrastructure

**Table 6: Constrained Infrastructure**

Statement	Mean	STDEV
Management information system of the organization is reliable	3.98	0.87
The storage facilities of the organization are adequate	3.73	0.86
The transportation infrastructure of the organization is adequate and reliable	3.76	0.93
The marketing infrastructure of the oil product is adequate and reliable	3.84	0.77

Long-term strategic relationships with other suppliers has positively affected storage	4.04	1.00
Long-term strategic relationships with other suppliers has positively affected transportation of oil products	4.07	0.99
<b>Overall</b>	<b>3.90</b>	<b>0.91</b>

Source: Research data

As shown in Table 6, the respondents agreed with all the aspects of constrained infrastructure as the mean scores were in range 3.5 – 4.5. They agreed that management information system of the organization is reliable (3.98), the storage facilities of the organization are adequate (3.73), the transportation infrastructure of the organization is adequate and reliable (3.76), and the marketing infrastructure of the oil product is adequate and reliable (3.84). The respondents also agreed that long-term strategic relationships with other suppliers have positively affected storage (4.04) and transportation of oil products (4.07). The overall mean of 3.9 also indicates agreement with all the aspects of constrained infrastructure. There were no significant variations in the responses as the standard deviation is less than 1.

### 4.3.2 Price Control

**Table 7: Price Control**

<b>Statement</b>	<b>Mean</b>	<b>STDEV</b>
Countries with price controls adjust prices monthly	4.04	0.85
Removal of price controls have not improved oil marketing performance	3.84	1.00
Price control have positively affected supply chain management	3.71	1.08
Price control has affected the storage of the products	3.93	0.84
Price control has affected the transportation	4.11	0.88
Price controls have affected the cost structure of supply chain management	4.22	0.97
<b>Overall</b>	<b>3.98</b>	<b>0.95</b>

Source: Research data

Table 7 above shows that the respondents agreed with all the aspects of price control as the mean scores were in range of 3.5 – 4.5. They agreed that countries with price controls adjust prices monthly (4.04), removal of price controls have not improved oil marketing performance (3.84), price control have positively affected supply chain management (3.71) and price control has affected the storage of the products (3.93). They also agreed that price control has affected the transportation (4.11) and price controls have affected the cost structure of supply chain management (4.22). The overall mean of 3.98 also indicates agreement with all the aspects of price control. There were no significant variations in the responses as the standard deviation is less than 1.

### 4.3.3: Open Tender System

Table 8: Open Tender System

<b>Statement</b>	<b>Mean</b>	<b>STDEV</b>
My organization participates in open tendering system	4.04	0.90
Open tender system has a benefit of ensuring competitive prices of oil	3.84	0.88
Open tender system has a benefit of ensuring transporting the oil in a way that would minimize evasion of the import duty	3.84	1.00
Open tender system is a flexible way of managing supply of oil products	3.71	0.91
Open tender system reduces the cost of doing business	3.96	0.85
Open tender system reduces overstocking of oil products	3.96	0.99
<b>Overall</b>	<b>3.89</b>	<b>0.95</b>

Source: Research data

Results on the open tender system (Table 8) revealed that the respondents agreed with all the statements as mean scores range from 3.5 – 4.5. The findings indicate that all respondents agreed that their organization participates in open tendering system (4.04) and that the Open tender system has a benefit of ensuring competitive prices of oil (3.84) and transporting the oil in a way that would minimize evasion of the import duty (3.84). They also agreed that the open tender system is a flexible way of managing supply of oil products (3.71), reduces the cost of doing business (3.96) and reduces overstocking of oil products (3.96). The overall mean of 3.89 also confirms these findings. The overall standard deviation was < 1 hence no significant variations in the responses.

#### 4.3.4: Advance payment of Taxes

Table 9: Advance payment of Taxes

Statement	Mean	STDEV
Advance payment of Taxes on oil products have increased the cost of products	3.64	0.76
Advance payment of Taxes have had a negative effect on cost of storage of oil products	3.82	0.84
Advance payment of Taxes have had a negative effect on cost of transportation of oil products	3.71	1.10
Advance payment of Taxes have reduced the demand of oil products	3.0	0.9

Advance payment of Taxes have reduced the competitive advantage of oil marketing companies	4.62	0.99
Advance tax has adverse effect on company cash flow	3.95	0.68
<b>Overall</b>	<b>3.79</b>	<b>0.88</b>

Source: Research data

Table 9 above shows that all respondents agreed that advance payment of taxes on oil products have increased the cost of products (3.64), have had a negative effect on cost of storage of oil products (3.82), have had a negative effect on cost of transportation of oil products (3.71) and have had adverse effect on company cash flow (3.95). The respondents strongly agree that advance payment of taxes have reduced the competitive advantage of oil marketing companies (4.62). However the respondents neither agreed nor disagreed on whether advance payment of taxes had reduced the demand of oil products (3.0). The overall mean of 3.79 indicates agreement with most of the statements while the overall standard deviation of 0.88 means there were no significant variations in the responses.

#### **4.4 Supply Chain Management**

Data on the Supply Chain Management was also analysed using mean scores and standard deviation. A mean score of <1.5 implies strongly disagree, 1.5 – 2.5 disagree, 2.5 – 3.5 neither agree nor disagree, 3.5 – 4.5 agree while a mean score of > 4.5 implies strongly agree. Standard

deviation of <1 means that there were no significant variations in response while that >1 implies that there were significant variations in responses.

**Table 10: Supply Chain Management**

<b>Statement</b>	<b>Mean</b>	<b>STDEV</b>
Our organization has attained effective procedures in the importation of oil products.	4.20	0.89
Our organization has attained effectiveness in the overall procurement of oil products.	4.11	0.93
Supply chain management is key to operational effectiveness in our company	3.98	0.85
Our organization goals are geared towards achievement of operational effectiveness	4.07	0.76
Highly qualified employees are key to having effective supply chain management	4.00	0.95
<b>Overall</b>	<b>4.07</b>	<b>0.73</b>

Source: Research data

The results as shown in Table 10 revealed that the respondents agreed with all the statements on Supply Chain Management as the mean scores were in the range of 3.5 – 4.5. They agreed that their organizations had attained effective procedures in the importation of oil products (4.20) and effectiveness in the overall procurement of oil products (4.11). They also agreed that Supply Chain Management was key to operational effectiveness in their companies (3.98), organization goals are geared towards achievement of operational effectiveness (4.07) and highly qualified employees are key to having effective supply chain management (4.00). The overall mean of 4.07 indicates agreement with most of the statements while the overall standard deviation of 0.73 means there were no significant variations in the responses.

#### **4.5 Regression Analysis**

In order to assess the effect of constrained infrastructure, price control, open tender system and advance payment of taxes on supply chain management by oil marketing companies the study conducted a multivariate regression analysis. The dependent variable was supply chain management while the independent variables were constrained infrastructure, price control, open tender system and advance payment of taxes. Data was input into the SPSS software and the results obtained are shown in table 11 below.

#### **Table 11: Regression Analysis Outputs**

##### **Variables Entered/Removed**

Model	Variables Entered	Variables Removed	Method
1	Advance payment of Taxes , Open Tender System , Price Control , Constrained Infrastructure <sup>a</sup>	.	Enter

a. All requested variables entered.

b. Dependent Variable: Supply Chain Management

### Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.981 <sup>a</sup>	.963	.816	.0343

a. Predictors: (Constant), Advance payment of Taxes , Open Tender System , Price Control , Constrained Infrastructure

**ANOVA<sup>b</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.031	4	.008	6.544	.024 <sup>a</sup>
	Residual	.001	1	.001		
	Total	.032	5			

a. Predictors: (Constant), Advance payment of Taxes , Open Tender System , Price Control , Constrained Infrastructure

b. Dependent Variable: Supply Chain Management

**Coefficients**

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.

	B	Std. Error	Beta		
(Constant)	3.003	.564		5.328	.118
Constrained Infrastructure	.114	.598	.175	.191	.880
Price Control	.457	.345	.820	1.324	.412
Open Tender System	.051	.236	.072	.217	.864
Advance payment of Taxes	-.363	.118	-1.171	-3.089	.199

a. Dependent Variable: Supply Chain Management

Source: Research data

From the Coefficients table the regression model can be derived as follows:

$$Y = 3.003 + 0.114(\text{constrained infrastructure}) + 0.457(\text{price control}) + 0.051(\text{open tender system}) - 0.363(\text{advance payment of taxes}) + 0.0343$$

The p-value is 0.024 (ANOVA table) which is  $< 0.05$ . This implies that the independent variables are predictors of the dependent variables. The results therefore indicate that constrained infrastructure, price control, open tender system and advance payment of taxes are predictors of an efficient supply chain management system. However, advance payments of taxes have a negative effect on the efficient supply chain management. The  $R^2$  value of 0.963 (Model Summary table) shows that 96.3% of the variations in efficient supply chain management are influenced by constrained infrastructure, price control, open tender system and advance payment of taxes leaving only 3.7% to be predicted by other factors.

## **CHAPTER FIVE: DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS**

### **5.1 Introduction**

This chapter summarizes and draws conclusions and recommendations on the findings of the main objectives of the study which was to investigate the factors affecting OMC's in practicing Supply Chain Management. This chapter also relates the research findings to the problem under investigation. This chapter also provides a conclusion in line with the objectives of the research. It then recommends for areas of further study.

The oil industry works as a global supply chain involving exploration, material handling, domestic and international transportation, use of technology, and so on. The industry offers a strong model for implementing supply chain management (SCM) techniques. Environmental uncertainties in oil industry lead to a need for higher reliability and flexibility within the production systems and the planning and control systems in the supply chain. Reducing these uncertainties will be achieved by understanding the root causes and how they interact with each other. Change in markets, products, technology, and competitors are occurring at an increasingly rapid pace (Defee & Fugate, 2010; Iyer, 2011).

In the oil industry, the supply-chain network is composed of shipping via vessel, oil tankers, and pipelines that may run across multiple countries. This network is used to transport crude from wellhead to refinery for processing, to transport intermediates between multi-site refining facilities, and to transport finished products from product storage tanks to distribution centers and finally to the customers. Any disruptions arising in the global supply chain can have tremendous adverse effects in achieving operational efficiency, maintaining quality, profitability, and customer satisfaction.

The general objective of the study was to investigate the factors affecting OMC's in practicing supply chain management. This involved assessing the effect of constrained infrastructure, price control, open tender system and advance payment of taxes on supply chain management by oil marketing companies.

## **5.2 Discussions**

The first specific objective of the study was to assess effect of constrained infrastructure on supply chain management by oil marketing companies. The study revealed that management information system of the organization was reliable (3.98), the storage facilities of the organization were adequate (3.73), the transportation infrastructure of the organization was adequate and reliable (3.76), and the marketing infrastructure of the oil products was also adequate and reliable (3.84). The findings also revealed that long-term strategic relationships with other suppliers had positively affected storage (4.04) and transportation of oil products (4.07). The overall mean of 3.9 also indicated agreement with all the aspects of constrained infrastructure. There were no significant variations in the responses as the standard deviation was less than 1.

The second specific objective of the study was to assess effect of price controls on supply chain management by oil marketing companies. The study revealed that countries with price controls adjusted prices monthly (4.04), removal of price controls had not improved oil marketing performance (3.84), price controls had positively affected supply chain management (3.71) and price controls had affected the storage of the oil products (3.93). The study also showed that price control had affected the transportation (4.11) and the cost structure of supply chain management (4.22). The overall mean of 3.98 also indicated agreement with all the aspects of price control. There were no significant variations in the responses as the standard deviation was less than 1.

The third specific objective of the study was to assess effect of the open tender system on supply chain management by oil marketing companies. Results on the open tender system indicated that the organizations participate in open tendering system (4.04) and that the open tender system had a benefit of ensuring competitive prices of oil (3.84) and transporting the oil in a way that would minimize evasion of the import duty (3.84). They study also revealed that the open tender system was a flexible way of managing supply of oil products (3.71), reduced the cost of doing business (3.96) and overstocking of oil products (3.96).

The overall mean of 3.89 also confirmed these findings. The overall standard deviation was  $< 1$  hence no significant variations in the responses.

The fourth specific objective of the study was to assess effect of advance tax payments on supply chain management by oil marketing companies. Results obtained showed that advance payment of taxes on oil products had increased the cost of products (3.64), had a negative effect on cost of storage of oil products (3.82) and cost of transportation of oil products (3.71) and had adverse effect on company cash flow (3.95). The findings also indicated that advance payment of taxes had reduced the competitive advantage of oil marketing companies (4.62). However there was no consensus on whether advance payment of taxes had reduced the demand of oil products (3.0). The overall mean of 3.79 indicated that there was agreement with most of the statements while the overall standard deviation of 0.88 showed that there were no significant variations in the responses.

The results on Supply Chain Management revealed that the organizations had attained effective procedures in the importation of oil products (4.20) and effectiveness in the overall procurement of oil products (4.11). The study also found out that Supply Chain Management was crucial in the operational effectiveness of the oil marketing companies (3.98). Most organizational goals were geared towards achievement of operational effectiveness (4.07) and highly qualified employees were essential in having effective supply chain management (4.0). The overall mean of 4.07 indicated effective Supply Chain Management plays a crucial in the oil marketing

companies. The overall standard deviation of 0.73 means there were no significant variations in the responses.

A further analysis was conducted using regression analysis to establish the relationship between constrained infrastructure, price control, open tender system and advance tax payment as independent variables with efficient supply chain management system as the dependent variable. The study revealed that there was a strong relationship between the independent variables and efficient supply chain management. However, the beta coefficient for advance tax payments was negative indicating a negative effect on the efficient supply chain management.

The study established that 96.3% of the variations in efficient supply chain management are influenced by variations in the independent variations.

### **5.3 Conclusions**

Based on the findings, it can be concluded that the oil marketing companies consider constrained infrastructure to be an important factor in ensuring an efficient and effective supply chain management system.

The study showed that the management information systems of the oil marketing companies were reliable and that the storage facilities of the organization were adequate to support their supply chain. The results also indicated that the transportation infrastructure of the firms was adequate and reliable and that the marketing infrastructure of the oil products was adequate and reliable. This enhanced the efficiency of their supply chain management system. It was established that the long-term strategic relationships with other suppliers had positively affected storage and transportation of the oil products.

The results indicated that price controls have a significant impact on the efficiency of the SCM system among the oil marketing firms. The study established that countries with price controls adjust prices monthly and that the removal of price controls had not improved oil marketing performance. Price controls had positively affected supply chain management and the storage of

the oil products. Price control had also affected the transportation and the cost structure of supply chain management. This clearly shows that price controls are an important factor in determining the efficiency of SCM.

The open tender system also influences the SCM to a great extent. Results indicated that the oil marketing firms participate in the open tendering system and that the system has a benefit of ensuring competitive prices of oil. The open tender system also supports the transportation of the oil in a way that minimizes evasion of the import duty. The system is seen as a flexible way of managing supply of oil products hence reduces the cost of doing business and overstocking of oil products.

Advance payment of taxes on oil products have increased the cost of products and have had a negative effect on cost of storage and transportation of oil products. These payments have also had adverse effect on the company cash flow and have reduced the competitive advantage of oil marketing companies. It is however not clear whether advance payment of taxes had reduced the demand for oil products. From the regression model the beta coefficient was negative indicating a negative effect on efficient supply chain management.

In terms of the supply chain management, it can be concluded that most of the firms surveyed had attained effective procedures in the importation of oil products and effectiveness in the overall procurement of oil products. Supply Chain Management is crucial to operational effectiveness of the oil firms and the organization's goals must be geared towards achievement of operational effectiveness. Highly qualified employees are key to having an effective supply chain management among the oil marketing firms.

This study concluded that constrained infrastructure, price control, open tender system and advance payment of taxes influence the supply chain management to a great extent among the oil marketing firms. However, the advance payment of taxes has a negative effect.

## **5.4 Recommendations**

The study clearly revealed that all the variables influence the SCM to great extent are therefore important factors in ensuring an efficient system. From the analysis also, it was realized that all these factors affects one or more of the supply chain metrics.

This study therefore confirms that oil marketing firms like all the other modern firms are faced with the challenges beyond their control, thus these firms should therefore realize that all efforts including investment in the implementation and use of the SCM strategies need to be geared towards gaining and maintaining competitiveness in the global market place.

It is therefore recommended that:

- I. The government in their control of the industry formulates policies that help in efficient and effective supply chain management as this will be beneficial to the economy in terms of reduced cost of business thus the effect would be to lower prices and thus improve the standard of living while also attracting more investors into the country.
- II. The OMC's should adopt their strategies in line with the government regulations so that they can manage their supply chain in the best way possible to achieve maximum performance.

## **5.5 Suggestions for further research**

The study was conducted on oil marketing firms only. The findings can be verified by widening the scope to other key stakeholders in the oil industry in Kenya such as the Kenya Pipeline, Kenya petroleum refineries, Kenya Ports Authority, Energy regulatory commission among others. A study can also be conducted to assess the supply chain management in other sectors other than oil industry to validate or invalidate the results.

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## **APPENDICES**

### **APPENDIX 1: INTRODUCTION LETTER**

Date: .....

Dear Sir,

#### **RE: Data Collection**

I am Bahaidar Fahad, a post graduate student of Master of Business Administration at Kenyatta University, Mombasa. I am carrying out an evaluation study of the factors affecting supply chain management by oil companies.

It will be of great value if you can share your wealth of knowledge by completing the attached questionnaire. Your answers will be handled with highest anonymity and confidentiality; this will be achieved by no indication of names. Kindly return the completed questionnaire to me.

Your participation will be highly appreciated.

Yours Sincerely

**BAHAIDAR FAHAD**

## APPENDIX II: QUESTIONNAIRE

Fill in the questionnaire by ticking and filling where appropriate.

### PART 1: GENERAL DATA

1. Gender

a) Male

b) Female

2. Highest level of education

a) Secondary level

b) College level

c) University level

d) Post graduate level

3. Number of years in current employment

a) less than one year

b) 1 to 2 year

c) 3 to 5 years

d) More than 5 years

4. Department

5. Kindly indicate your age bracket

a) 21-30 years

b) 31-40 years

c) 41-50 years

d) 51 years & above

**PART 2: THIS PART IS DIVIDED INTO FIVE SECTIONS**

**6. Section A: Constrained Infrastructure**

This section aims at determining whether constrained infrastructure has an effect on effective supply chain management by oil marketing companies. Please indicate your agreement or otherwise with the following statements using the following likert scale.

*Strongly Agree=5, Agree=4, Neither Agree nor Disagree=3, Disagree=2, Strongly disagree=1*

<b>Statement</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Management information system of the organization is reliable					
The storage facilities of the organization are adequate					
The transportation infrastructure of the organization is adequate and reliable					
The marketing infrastructure of the oil product is adequate and reliable					
Long-term strategic relationships with other suppliers has positively affected storage					
Long-term strategic relationships with other suppliers has positively affected transportation of oil products					

**7. Section B: Price Control**

This section aims at determining whether price control has an effect on effective supply chain management by oil marketing companies. Please indicate your agreement or otherwise with the following statements using the following likert scale.

*Strongly Agree=5, Agree=4, Neither Agree nor Disagree=3, Disagree=2, Strongly disagree=1*

<b>Statement</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
countries with price controls adjust prices					

<b>Statement</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
monthly					
Removal of price controls have not improved oil marketing performance					
Price control have positively affected supply chain management					
Price control has affected the storage of the products					
Price control has affected the transportation					
Price controls have affected the cost structure of supply chain management					

**8. Section C: Open Tender System**

This section aims at determining whether open tender system has an effect on effective supply chain management by oil marketing companies. Please indicate your agreement or otherwise with the following statements using the following likert scale.

*Strongly Agree=5, Agree=4, Neither Agree nor Disagree=3, Disagree=2, Strongly disagree=1*

<b>Statement</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
My organization participates in open tendering system					
Open tender system has a benefit of ensuring competitive prices of oil					
Open tender system has a benefit of ensuring transporting the oil in a way that would minimize evasion of the import duty					
Open tender system is a flexible way of managing supply of oil products					
Open tender system reduces the cost of doing business					
Open tender system reduces overstocking of oil products					

**9. Section D: Advance payment of Taxes**

This section aims at determining whether Advance payment of Taxes have an effect on effective supply chain management by oil marketing companies. Please indicate your agreement or otherwise with the following statements using the following likert scale.

*Strongly Agree=5, Agree=4, Neither Agree nor Disagree=3, Disagree=2, Strongly disagree=1*

<b>Statement</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Advance payment of Taxes on oil products have increased the cost of products					
Advance payment of Taxes have had a negative effect on cost of storage of oil products					
Advance payment of Taxes have had a negative effect on cost of transportation of oil products					
Advance payment of Taxes have reduced the demand of oil products					
Advance payment of Taxes have reduced the competitive advantage of oil marketing companies					
Advance tax has adverse effect on company cashflow					

**10. Section E: Supply Chain Management**

This section is on supply chain management. Please indicate your agreement or otherwise with the following statements using the following likert scale.

*Strongly Agree=5, Agree=4, Neither Agree nor Disagree=3, Disagree=2, Strongly disagree=1*

<b>Statement</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Our organization has attained effective procedures in the importation of oil products.					
Our organization has attained effectiveness in					

<b>Statement</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
the overall procurement of oil products.					
Supply chain management is key to operational effectiveness in our company					
Our organization goals are geared towards achievement of operational effectiveness					
Highly qualified employees are key to having effective supply chain management					

11. From your experience are there any other factors affecting supply chain management by OMC's in Kenya?

Thanks for your participation.

#### **APPENDIX III- LIST OF OIL COMPANIES**

<b>No</b>	<b>Name of Company</b>	<b>Address</b>	<b>Location</b>
1	LIBYA OIL (K) LTD	P.O BOX 64900 00620	NAIROBI
2	KOBIL PETROLEUM (K) LTD	P.O BOX 30061	NAIROBI
3	SHELL		
4	TOTAL KENYA LIMITED	P.O BOX 30322 00100	NAIROBI
5	KENYA OIL LIMITED	P.O BOX 44202	NAIROBI
6	NATIONAL OIL KENYA LIMITED	P.O BOX 58567	NAIROBI
7	ENGEN KENYA LIMITED	P.O BOX 10797	NAIROBI
8	GAPCO (K) LIMITED	P.O BOX 40908	NAIROBI
9	MAFUTA LIMITED		
10	PETRO OIL (K) LTD	P.O BOX 90462-80100	MOMBASA
11	KAMKIS TRADING LTD	P.O. Box 9545 - 00300	NAIROBI
12	DALBIT PETROLEUM (K) LTD	P.O BOX 1931 -00200	NAIROBI
13	MOIL	P.O Box 3508	KISUMU
14	METRO	P.O Box 35198-00200	NAIROBI
15	HASHI ENERGY (K) LTD	P.O BOX 10795	NAIROBI
16	HASS PETROLEUM	P.O BOX 76337-00508	NAIROBI
17	GALANA OIL (K) LTD	P.O BOX 11672-00100	NAIROBI
18	ADDAX	P.O Box 12403-00100	NAIROBI

<b>No</b>	<b>Name of Company</b>	<b>Address</b>	<b>Location</b>
19	FOSSIL FUELS LTD	P.O BOX 41961-00100	NAIROBI
20	OILCOM (K) LIMITED	P.O BOX 10370	NAIROBI
21	GLOBAL PETROLEUM	P.O BOX 30621-00100	NAIROBI
22	Mogas Kenya Limited	P.O Box 27696-00506	NAIROBI
23	BAKRI	P.O Box 19095-00501	NAIROBI
24	GULF ENERGY	P.O Box 61872-00200	NAIROBI
25	OILCITY	P.O Box 9222-00100	NAIROBI
26	ROYAL ENERGY (K) LTD	P.O Box 90148-80100	MOMBASA
27	RIVA	P.O BOX 16299-20100	NAIROBI
28	Jade Petroleum Limited	P.O. Box 34725, 00100	NAIROBI
29	MULOIL (K) LTD	P.O BOX 41391-00100	NAIROBI
30	Riva Petroleum Dealers limited	P.O. BOX 16299-20100	NAIROBI
31	HARED		
32	Trojan International LTD	P.O. BOX 100339-00100	NAIROBI
33	PREMIUM	P.O Box 56672-00100	NAIROBI
34	AL-LEYL PETROLEUM LIMITED	P.O.BOX 1173-80100	MOMBASA
35	Banoda Oil LTD	P.O Box 101537-00101	NAIROBI
36	RANWAY TRADERS LTD	P.O Box 56022- 00200	NAIROBI
37	Tosha Petroleum LTD	P.O Box 28433- 00100	NAIROBI
38	NAFTON PETROLEUM LIMITED	P.O. BOX 101664 – 00101	NAIROBI
39	KEROKA PETROLEUM LIMITED	P. O. BOX 8034 – 00300	NAIROBI
40	PJ PETROLEUM EQUIPMENT LIMITED	P.O. BOX 74502 – 00200	NAIROBI
41	OLYMPIC PETROLEUM LIMITED	P.O BOX 24457-00100	NAIROBI
42	SAMHAR PETROLEUM PRODUCTS CO. LTD	P.O BOX 10046-00101	NAIROBI
43	AINUSHAMSI ENERGY LIMITED	P.O BOX 5134 - 00506	NAIROBI
44	FAST ENERGY LIMITED	P. O. BOX 22712 – 00400	NAIROBI
45	TOPAZ PETROLEUM LIMITED	P. O. BOX 16236 – 00100	NAIROBI
46	ESSAR PETROLEUM (East Africa) Ltd	PO Box 45742-00100	NAIROBI
47	REGNOL OIL KENYA LTD	P.O. BOX 77883 – 00622 JUJAR D	NAIROBI
48	EAST AFRICA GASOIL LTD	P.O BOX 3378-80100	MOMBASA
49	ONE PETROLEUM LIMITED	P. O. BOX 90147 – 80100,	MOMBASA
50	Millenium Dealers Limited	P.O. Box 27549-00506	Nairobi

**Source: KRA list of Oil Companies 2012.**

**Appendix IV: Research Work Plan**

Activity	TIMEFRAME															
	Month 1				Month 2				Month 3				Month 4			
	Week				Week				Week				Week			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Topic selection & approval	■															
Supervisor appointment		■														
Produce draft proposal			■	■												
Incorporate reviews by supervisor				■	■	■	■	■								
Draft proposal ready for presentation							■	■								
Incorporation of panel comments into proposal									■	■						
Pilot testing of questionnaire											■					
Data collection from selected sample												■	■	■		
Data processing and analysis													■	■		
Review of draft project by supervisor														■	■	■
Incorporate supervisor comments															■	■
Supervisor Clears Project																■
Finalization and delivery of copies to board of postgraduate studies																■

### Appendix V: Estimated Research Budget

<b>Item Description</b>	<b>Qty Description</b>	<b>Quantity</b>	<b>Unit Price - KShs</b>	<b>Cost- KShs</b>
Stationery	pieces	1	2,000	2,000
Photocopying Services	pages	2000	3	6,000
Spiral binding	pieces	20	100	2,000
Book binding	pieces	10	400	4,000
Contingency				6,000
<b>Total</b>				<b>20,000</b>