

**CHALLENGES FACING SUPPLY CHAIN MANAGEMENT IN THE  
OIL MARKETING COMPANIES IN KENYA**

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**A Management Research Project submitted in partial fulfillment of the  
requirement for the award of the Degree of Master of Business  
Administration (MBA), School of Business, University of Nairobi.**

**2010**

## **DECLARARTION**

I the undersigned, declare that this Management Research Project is my original work and that it has not been submitted for any Degree qualification in this or any other University or Institution for academic credit.

Signatureí í í í í í í í í í í í í í í í í ..Dateí í í í í í í í í í í í í

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## **DEDICATION**

To Armelia, Malia, Abby, Ross and My Mother Roselyn

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## **ABSTRACT**

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.

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## **LIST OF ABBREVIATIONS**

|       |   |
|-------|---|
| SCM   | Supply Chain Management                   |
| SC    | Supply Chain                              |
| 3PL   | Third Party Logistics                     |
| NEMA  | National Environment Management Authority |
| KPRL  | Kenya petroleum refineries limited        |
| POM   | Production and Operations Management      |
| DRC   | Democratic Republic Of Congo              |
| ERP   | Enterprise Resource Planning              |
| CRM   | Customer Relationships Management         |
| SRM   | Supplier Relationships Management         |
| MRP   | Materials Requirement Planning            |
| MRPII | Manufacturing Resources Planning          |
| WMS   | Warehouse Management Systems              |
| APS   | Advanced Planning Systems                 |
| JIT   | Just In Time                              |



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# CHAPTER ONE: INTRODUCTION

## 1.1. Background of the study

Supply chains have grown more global and interconnected; as a result they have increased their exposure to shocks and increased the frequency of disruptions. Supply chain speed only exacerbates the problem. Even minor missteps and miscalculations can have major consequences as their impacts spread like viruses throughout complex supply chain networks, (Robert, 2009). As compliance mandates, suppliers and information flows multiply, supply chains are becoming more complex, costly and vulnerable. Organizations are finding it increasingly difficult to respond to these challenges, especially with conventional supply chain strategies and designs.

### 1.1.1. Supply chain

According to Mentzer et al. (2001) supply chain (SC) is defined as a set of three or more entities directly involved in the upstream and downstream flows of products, services, finances, and/or information from a source to a customer. The vision of the supply chain as a holistic construct with close cooperation between the different organizational units has replaced the traditional picture of it as a collection of vertically organized functional units (Stadtler and Kilger, 2005). This, however, leads to a complex planning situation with multiple items, produced at multiple work centers in multi-site production systems.

In a supply-chain, an organization will link to its suppliers upstream and to its distributors downstream in order to serve its customers. Usually, materials, information, capital, labour, technology, financial assets and other resources flow through the supply-chain. Since the goal of the firm is to maximize profits, the firm must maximize benefits and minimize costs along the supply-chain. The firm must weigh the benefits versus the costs of each decision it makes along its supply-chain Christopher et al. (1997).

### **1.1.2. Supply Chain Management**

According to the Global Supply Chain Forum, Supply Chain Management (SCM) is the integration of key business processes from end user through original suppliers that provide products, services, and information that adds value for customer and other stakeholders (Chan and Qi, 2003). SCM is a proactive relationship between a buyer and supplier and the integration is across the whole of the SC, not just first-tier suppliers (Cox, 2004). Most SCM-related challenges stem from either uncertainties or an inability to co-ordinate several activities and partners Turban et al. (2004). The motive behind the formation of supply chain management is to increase channel competitive advantage (Bowersox and Closs 1996; Monczka et al. 1998). (Porter, 1980) defines two basic competitiveness or competitive advantage: cost leadership and differentiation. Improving a firm's competitiveness and profitability through supply chain management can be accomplished by enhancing overall customer satisfaction (Giunipero and Brand, 1996).

Supply chain management has become an important means for sustaining competitive advantage for all successful industries and businesses (Magretta, 1998). The objective of every supply chain is to maximize the overall value generated. The value a supply chain generates to an organization is the difference between what the final product is worth to the customer and the effort the supply chain expends in filling the customer's request. For most commercial supply chains, value will be strongly correlated with supply chain profitability, the difference between the revenue generated from the customer and the overall cost across the supply chain (Chopra and Meindl, 2003; Lee, 2002; Cavinato, 2002).

Liberalized Markets, globalization and global supply chains have to be regarded as business opportunities of economic development for each supply chain actor, but at the same time, they introduce a number of challenges that affect the Capability of the Supply chain. SCM in the oil marketing companies contains various challenges, specifically in the logistics area, that are not present in most other companies. These logistical challenges are a major influence on the cost of oil and its derivatives.

## **1.2. The oil marketing companies in Kenya**

The oil industry is usually divided into three major components: upstream, midstream and downstream. Midstream operations are usually included in the downstream category. The first part covers the exploration, production and transportation of crude oil and gas to the point of transformation into final products (mainly refineries). The downstream activities deal with the processing of crude oil in refineries, the distribution and the marketing activities of all the oil derived products, Raed et al. (2006). As petroleum is a non-renewable natural resource. The industry is faced with an inevitable eventual depletion of the world's oil supply.

A typical oil supply chain begins with the crude oil producer, next, the oil moves to the refiner, the transporter, the retailer and finally to the gas pump where a customer receives the product. This oil industry is strategic as the base of transportation and other essential activities of the economy of any country. As a result of these strategic issues, it is in the center of the international geopolitical and macroeconomic panorama and most of the governments maintain careful control of the evolution of the industry or even directly manage the operations in their respective countries. The Organization of the Petroleum Exporting Countries (OPEC) controls major crude oil by setting production quotas. The values (revenue opportunities) are added by processing and chemically changing the crude oil, which is called "refining." (www.gravmag.com, 2006). It is important to note that greater economic rewards can be gained only with well-integrated global oil supply chain.

Kenya has no known oil or gas reserves. The Kenyan government is encouraging foreign interest in oil exploration and there is a modest upstream oil activity. It is endowed with other energy sources including wood fuel, coal, solar and wind power, much of which is untapped. According to encyclopaedia of nations (2010), the government of Kenya has spent over \$1.6 million on oil exploration by 2000. The oil refinery in Mombasa, built in 1959 and half-owned by the government, and major oil marketing companies, typically operates at around 65% of its total capacity (averaging 95,000 barrels per day) and is supposed to serve Kenya, Tanzania, Uganda, the DRC, Rwanda, Burundi, and offshore

islands. Kenya deregulated its oil industry in 1994. Refinery products include gasoline, jet/turbo fuel, light diesel oil and fuel oil. The refinery's future is an important domestic issue in Kenya, and management is considering upgrading the facility rather than allowing the refinery to close.

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. 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, Nairobi Business Daily (2010).

Table 1. Crude oil imports into Kenya between January and March 2010

| <b>Importer</b> | <b>Metric tones</b> | <b>%</b>     |
|-----------------|---------------------|--------------|
| KenolKobil      | 163630              | 40.4         |
| Gulf energy     | 159856              | 39.4         |
| Addax Kenya     | 81905               | 20.2         |
| <b>Total</b>    | <b>405391</b>       | <b>100.0</b> |

**Source: KPRL**

Prior to liberalization in October 1994, a significant feature of Kenya's oil industry was a relatively high level of government's direct participation, and a correspondingly low level of private sector involvement. Seven oil marketing and distribution companies were responsible for procuring and importing their own oil. The National Oil Corporation of Kenya was mandated to supply 30% of the crude oil requirement into the country.

Since liberalization, many new oil marketing companies have been licensed by the government to engage in petroleum trading, especially import and export, wholesale and retail of petroleum products. However, despite this initiative, only about ten new entrants are actively trading with a market presence of less than 10% of the market share due to tariff and non-tariff barriers to entry. National Oil Corporation of Kenya Limited was incorporated in 1981 under the Companies Act (Cap 486). The company's main objective

then was to coordinate oil exploration (upstream) activities. In 1988 the company was mandated on behalf of the government to supply 30% of the country's crude oil requirements that would in turn be sold to oil marketing companies for refining and onward sale to consumers.

Table 2. Market share of oil companies in Kenya

| <b>Company</b> | <b>%</b> | <b>Company</b> | <b>%</b> |
|----------------|----------|----------------|----------|
| Total          | 31.1     | Trojan         | 0.7      |
| Kenolkobil     | 18.7     | Kamkis         | 0.5      |
| Shell          | 17.8     | Bakri          | 0.4      |
| Libya oil      | 11.7     | Petro oil      | 0.3      |
| Gapco          | 6.1      | Mgs            | 0.2      |
| National oil   | 4.0      | Global         | 0.2      |
| Hashi energy   | 2.0      | Sovereign      | 0.2      |
| Oilcom         | 1.4      | Orix           | 0.2      |
| Gulf energy    | 1.2      | Jade           | 0.1      |
| Engen          | 1.2      | Millennium     | 0.1      |
| Fossil         | 0.9      | Premium        | 0.1      |
| Rivapet        | 0.8      | Total          | 100      |

**Source: Petroleum insight 2010**

### **1.3. Statement of the problem**

Modern supply chains are very complex, with many parallel physical and information flows occurring in order to ensure that products are delivered in the right quantities, to the right place in a cost-effective manner. Consequently, some authors have suggested that supply networks may be a more accurate term than supply chains Christopher et al. (1997). It has also been suggested that the drive towards more efficient supply chains during recent years has resulted in the supply chains becoming more vulnerable to disruption and prone to challenges (Christopher and Lee, 2004; McGillivray, 2000; Engardio, 2001).

In 2009, Ruteri and Xu in their supply chain management and challenges facing the food industry sector in Tanzania, found out that the challenges that affect supply chain management in the food industry comprised of greater differentiation of food products, competition for consumers, understanding of supply chain management concept, inventory management, pricing strategy, customer service and customer perceived value, marketing and distribution strategies. They further found out that there is a further challenge of understanding the application of information technology, road infrastructure and power supply and finally storage facilities.

According to IBM global chief supply chain management officer study 2009, the key supply chain management challenges for life sciences supply chains include supply chain visibility, increasing customer demands, risk management, globalization and cost containment. According to Wilfried et al. (2009), the competitiveness of a supply chain is determined by many different factors and a resource based view of the firm, with attention to networks, knowledge management and environment. Challenges affect a supply chain by affecting one or more of its components. These components are either internal or external to the supply chain, and can be classified as belonging to the following realms or contributors to the functioning of the supply chain: Transportation, Utilities/Equipment, Communication, Suppliers, Customers, Labour and Finance (Stecke and Kumar, 2007)

Despite the importance of the petroleum industry in daily life and the operational challenges it experiences, the topic of challenges affecting supply chain management in the oil marketing companies has received very little attention in operations and supply chain management literature. Although some discussion on challenges affecting supply chain management can be found in literature evidenced by aforementioned studies, the basis of most of the literature is in single organizations and in developed countries.

Applying the knowledge gained from a single company perspective from developed countries to a supply chain management context in less developed countries like Kenya, may be limited. This is because it may not reflect a supply chain management orientation in the oil marketing companies in less developed countries and in identifying important



remedial measures from a manager's perspective. In order to achieve efficient supply chain management for activities of the oil marketing companies in Kenya, the organizations need to recognize and understand the challenges affecting their supply chain management. This study therefore, sought to answer the following questions, what are the supply chain management challenges in the oil marketing companies in Kenya? And, to what extent is the oil marketing companies in Kenya adopting best practices to manage the challenges in their supply chains?

#### **1.4. Research objectives**

The study was guided by the following objectives:

- 1) To establish the challenges facing supply chain management in the oil marketing companies in Kenya
- 2) To determine the extent to which the oil marketing companies in Kenya are adopting best practices to manage challenges in their supply chain.

#### **1.5. Significance of the study**

While this study may be of value to any person interested in highlighting the challenges facing the oil marketing companies in Kenya, it's hoped that the study findings will specifically benefit the following groups:

##### **1. The oil marketing companies in Kenya**

The study will go along way into providing information on the challenges of supply chain management in the oil marketing companies in Kenya considering that Kenya is affected by real issues which include high political turbulence, challenging logistical problems, poor road network. The kind of challenges that may be experienced by third world countries may by far differ from those experienced by the western countries. It's in this light that this research is going to be of great significance to the oil marketing companies and oil industry players.

It's hoped that the study will be useful to the policy makers and the management of organizations in addressing the challenges in organizations and the industry so as to guard

against the danger of affecting the performance of the organizations. The findings and the recommendations of the study shall also be useful to managers. From now hence, they will not rely on expert judgement, haphazard personal experiences or traditions, but rather base their methods, decisions and actions on concrete knowledge of issues of challenges of supply chain management in the oil industry supported by study findings.

## **2. Academics**

The study is expected to contribute to the existing literature in the field of challenges affecting supply chain management in the oil industry. It is also hoped that the study will form the basis for further research in the area of challenges in the supply chain management.

## CHAPTER TWO: LITERATURE REVIEW

### 2.1 Introduction

The boom in global demand of oil along with the ease of international trade and the inflexibility involved in the petroleum industry's supply chain has made its management more complex and more challenging (Coia, 1999; Morton, 2003). Despite the importance of supply chain management and its growing complexity, the petroleum industry is still in the development stage of efficiently managing their supply chains. In fact, according to Steve Welsh, managing director of the College of Petroleum and Energy Studies at the University of Oxford, the oil and petrochemical industry's insight into the supply chain is still in its infancy (Schwartz, 2000). However, even with the inflexibility and complexity involved in the industry's supply chain, there is a lot of room for improvement and cost reduction.

Due to recent political unrest in the Middle East, which is the largest oil producing region, sustainable oil supply has become highly unpredictable. Oil and petrochemicals companies are forced to maintain higher safety stocks and search for alternative sources of supplies (Ikram, 2004). Inflexibility in the supply chain is the constraint involved along the chain, such as long lead-times, manufacturing capacity, and limited means of transportation, that are hard to change. Commodities such as oil, gas, and petrochemicals require specific modes of transportation such as pipelines, vessels or tankers, and railroads. These commodities are produced in specific and limited regions of the world, yet they are demanded all over the globe since they represent an essential source of energy and raw material for a large number of other industries. Several weeks lead-time from the shipping point to the final customer's location is very common in this type of industry. For example, it takes five weeks for the Persian Gulf's oil to make its way to the United States and up to another three weeks for it to be processed and delivered (Schwartz, 2000).

According to Christopher (2007), Supply-chain link in the oil industry would follow the following process; Exploration    Production    Refining    Marketing    Consumer. The links represent the major supply-chain links in the oil and gas industry. Further, the

links represent the interface between companies and materials that flow through the supply-chain. Within each stage, there are many operations. For example, exploration includes seismic, geophysical and geological operations, while production operations include drilling, reservoir, production, and facilities engineering. Refining is a complex operation and its output is the input to marketing. Marketing includes the retail sale of gasoline, engine oil and other refined products. Each stage of the link can be a separate company or a unit of an integrated firm.

A key characteristic of supply chain management is the coordination of activities between interdependent organizations and can hence be defined as the management of upstream and downstream relationships with suppliers and customers in order to create enhanced value in the final market place at less cost to the supply chain as a whole (Christopher, 1992). Therefore, any approach to managing challenges from a supply chain perspective must have a broader scope than that of a single organization and provide insights regarding how the key processes have to be performed across at least three organizations. However, supply chains should not be thought of as a single organizational entity. Instead, it should be recognized that coordination and joint effort rely on dependency, bargaining, negotiation and persuasion across organization borders and is inhibited by goal incongruence.

To assess challenges in a supply chain management context, companies must not only identify direct challenges to their operations but also the challenges to all other entities as well as those challenges caused by the linkages between the organizations. Similarly, Harland et al. (2003), who conducted four case studies in the electronic sector, came to the conclusion that in the supply chains examined, less than 50 per cent of the challenges were visible to a focal company. With the oil marketing companies as study's specific context, the study also needs to clarify the nature of challenges in the supply chain management in the oil marketing companies.

## **2.1 Global supply chain in the oil marketing companies**

Energy makes the wheels of global supply chains go round (Bud La Londe, 2006). The oil marketing companies are 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 oil marketing companies offer classic model for implementing supply-chain management techniques.

The top world oil producers are Saudi Arabia, Russia, the United States, Iran, Mexico, China, Canada, United Arab Emirates, Venezuela, Norway, Kuwait, Nigeria, Brazil, Kazakhstan and Iraq. The Organization of the Petroleum Exporting Countries (OPEC) controls major crude oil by setting production quotas. The values are added by processing and chemically changing the crude oil, which is called refining. It is important to note that greater economic rewards can be gained only with well-integrated global oil supply chain management. While the separation of SC activities among different companies enables specialisation and economies of scale, many important issues and problems need to be resolved for successful SC operations ó the main purpose of supply chain management (SCM).

## **2.2 The oil marketing companies & supply chain management structure**

SCM encompasses a set of interdependent companies that work closely together to manage the flow of goods and services along with the value-added chain of oil and petrochemical products, in order to realize superior customer value at the lowest possible costs (Wood, 2004) as well as the associated information flow (Byrne 2006). The supply chain includes not only the processor and the suppliers but also the transporters, warehouses, retailers, and even the customers themselves (Chopra and Meindl, 2008). Exploring seriously the potential of SCM concept, a firm may realize a significant revenue growth (Gunasekaran, et al. 2008). Simchi-Levi et al. (2003) have shown that using more supply chain strategies, the firm can save about 10 percent of its annual operation. Application of SCM strategies have been widely pronounced in other manufacturing and service providing sectors such as in auto-mobiles, electronics, books, hotels, telephone companies among others.

According to Hussain et al. 2006, the downstream petroleum supply chain can be characterized as a global supply-driven structure with the following main actors: Suppliers of crude oil: as a natural resource the crude oil is located in certain areas of the World that usually are far from the main consuming countries, mostly the Organization for Economic Co-operation and Development (OECD) members. An important part of the crude oil supply and reserves is concentrated in the hands of a cartel: Organization of Petroleum Exporting Countries (OPEC) Thousand million barrels. Refiners: with plants located all over the world and closer to final consumers. The main reason for this fact is the economies of scale of transporting crude oil in big supertankers versus transporting the final product in smaller lots, and the strategic value of the refining assets. This latter fact makes governments prefer having some of the refinery operations in their territories. Consumers: as stated before they are divided into small consumers (e.g., car owners buying gasoline) and wholesale consumers (e.g., power stations using heavy oil, petrochemicals plants receiving feedstock). These actors are involved in the main activities that configure the downstream supply chain.

### **2.3 Oil Sourcing Decisions**

A key issue in the petroleum downstream supply chain is the procurement of raw materials for the refining units, especially crude oil. The market price of the crude oil is essentially based on two parameters: density and content of sulphur. The premiums or discounts applied to the international benchmarks (mainly Brent, West Texas Intermediate and Dubai grades) are based in those two qualities and also in the particular yield of products that can be obtained from a particular crude oil grade after processing. Refiners have to make the tradeoff between investing in more sophisticated units in the refineries and buying more expensive crude oils that do not need so much transformation to generate better margins.

Although the ERC is empowered by the Energy Act 2006 to regulate the importation, exportation, transportation, refining, storage and sale of petroleum and petroleum products, regulatory functions in the petroleum sector is basically shared among various players including the Ministry of Energy, the Kenya Bureau of Standards, the Petroleum

Institute of East Africa, the Provincial Administration and Local Authorities. For instance, the Ministry of Energy has since 2004 been coordinating importation of crude oil through an Open Tender System, whereby all licensed importers are required to participate through legal notice No. 197 of 2nd December 2003. Through this arrangement, the Kenya Petroleum Refineries Ltd (KPRL) is given protection to process 1.6 million tonnes of crude oil which meets about 50% of the local demand. The other 50% is met through importation of refined petroleum products. The Ministry of Energy coordinates another OTS for importation of 35% of refined products in which all licensed companies are entitled to participate. The companies are allowed to import the balance of 15% on their own outside the tender system. The licensing requirements for importers, exporters, wholesalers and distributors include the nature and value of businesses, areas of operations, estimated volume of throughput and proof of product sources Onyango et al. (2009)

## **2.4 Distribution and marketing**

This part of the petroleum supply chain comprises the transport of finished fuels from the door of the refinery to consumers and the sale of the products either in bulk or in small quantities in gas stations. The distribution of finished products is made by pipeline, tanker, truck, rail or barge. The quantities transported are smaller (typically 10 to 50,000 tons) than in the case of crude oil (generally over 100,000 tons) and therefore the economies of scale are less important than in the case of bigger crude oil tankers. Sales may target the direct delivery to big consumers (e.g., heating oil, heavy oil for power plants) or the retail selling through a network of service stations. In the case of the 17 network of service stations, fuel retailing is a well differentiated part of the business where marketing strategies are critical. Fuel retailing is similar in some aspects to the consumer products goods industry. Therefore, this part of the business presents rather different challenges in supply chain than the refining or upstream activities, less focused on final consumer needs.

## **2.5. Sales channels**

As stated before, the petroleum downstream industry serves basically two types of customers: Wholesale customers, composed by petrochemical facilities, power plants, big fuel consumers (airlines, shipping companies) and other industrial customers. Retail customers; who use the fuels essentially for transportation and domestic heating. In the case of fuel retailing, the main channel is the network of service stations. A first categorization for different types of gas stations is branded or non-branded, depending on whether the gas station is using the brand image of one of the major integrated oil companies or not.

According to Onyango et al. (2009), branded gas stations can be classified in five categories depending on the different combinations of the ownership of the physical assets and the management of the actual operations: CoCo - Company Owned Company Operated. These are the gas stations where the oil company (usually a major oil company) owns the assets and controls the operations through its own employees. CoDo - Company Owned Dealer Operated. In this case, the oil company is the owner of the gas station assets, but the operations are delegated to another entity through some kind of contract. DoDo - Dealer Owned Dealer Operated. Here the oil company may just decide to offer the brand and operate the gas stations through franchises. DoCo - Dealer Owner Company Operated. Similarly, the owner may ask an oil company to run the operations of its assets. And finally Independent - The owner of the gas station has no link with any oil company.

The oil companies try to differentiate their gas stations by offering mainly two kinds of Focuses: Service-focused: offering premium services (e.g., high quality convenience stores, mechanical repairing) or products (e.g., gasoline with high performance additives) and loyalty programs.

## **2.6. Challenges Facing Supply Chain Management**

The most important challenges that are impacting firms SCM are: (1) the challenge to manage knowledge within the firm, to maximize SCM goals (Klein et al, 2007;Wu et al. 2006; Shore and Venkatachalam, 2003); (2) the need to articulate with and integrate the



various nodes within the supply chain (e.g., other suppliers, buyers, customers, facilitating organizations) (Wu et al. 2006; Sahin and Robinson, 2002); and (3) the pressure to be green or environmentally conscious in word and deed (de Bakker and Nijhof, 2002).

The oil business as a whole faces a series of challenges. In many of the geographical areas, fuel demand growth is weak. However, product trading has increased as a result of insufficient refining capacity in the main consuming areas. This creates a pressure on margins in regions with a deficit, because finished products start flowing from the regions with a surplus. On the other hand, this situation creates new markets in other countries for local refiners and opportunities for increased efficiency in the overall supply chain.

The quality issues are becoming especially constraining as the new fuels specifications demand more complex processing and expensive investment in new equipment at the refining point. These investments do not always provide an attractive return but are in many cases required to keep the refinery operating. How well suppliers harness these forces or respond to market demands may be assessed through the Resource-based View (RBV) of the firm. While the resource-based view is not empirically superior to others (e.g., transaction cost, principal agent, network-based) in explaining SCM, it nonetheless presents itself as the most appropriate of existing theories of SCM for analyzing the capabilities both manifest and latent of firms and suppliers in managing knowledge; linking/interacting with other actors in the supply chain, and in responding to external pressures and mandates to be environmentally responsible.

Furthermore, the interrelatedness of these capabilities within the supply chain need to be realized by management and coordinated to reach the full potential of their resources Wu et al. (2006). How well firms and suppliers mobilize and manage resources, including managing knowledge, dealing with internal and external networks, and responding to the challenges of greenness, are of no less importance in fact, perhaps even more so than government policies, exchange rates, labour laws, and external competition from the Far East (Soler and Lopez, 2005; Power, Sohal and Rahman, 2001;).

The environmental regulations and compliance rules (greenhouse effect gases emissions, soil pollution, etc) are also becoming increasingly severe, making the operation of the existing facilities or the construction of new ones even more expensive and intricate. Moreover, the liabilities in case of environmental damage and public image vulnerabilities are becoming big hurdles for the industry. Finally, the geopolitical factors surrounding crude oil production and the mentioned high volatility of petroleum prices in the international markets introduce additional components of complexity and variability in the operations of the downstream SCM.

One of the most common challenges in SCM is the so-called bullwhip effect. Even small fluctuations in demand or inventory levels of the final company in the chain are propagated and enlarged throughout the chain. Because each company in the chain has incomplete information about the needs of others, it has to respond with a disproportional increase in inventory levels and consequently an even larger fluctuation in its demand relative to others down the chain (Forrester, 1961). Several authors (Forrester, 1961; Holweg and Bicheno, 2002) have shown that the production peak can be significantly reduced by transmitting information directly from the customer to the manufacturer. Another problem is that companies often tend to optimise their own performance, in so doing disregarding the benefits of the SC as a whole (local instead of global optimisation).

The maximum efficiency of each chain does not, however, necessarily lead to global optimisation (Gunasekaran et al., 2004). In addition, human factors should also be taken into consideration: decision-makers at various points along the SC do not usually make perfect decisions due to the lack of information or their personal hindrances, and their decisions are also influenced by employee reward systems (McGuffog and Wadsley, 1999).

Robert (2009) envisages five major supply chain management challenges; Cost containment ó Rapid, constant change is rocking this traditional area of strength and outstripping supply chain executives' ability to adapt. Visibility ó Flooded with more information than ever, supply chain executives still struggle to see and act on the right information. Risk ó risk management ranks remarkably high on the supply chain agenda as

well. Customer intimacy ó Despite demand-driven mantras, companies are better connected to their suppliers than their customers. Globalization ó Contrary to initial rationale, globalization has proven to be more about revenue growth than cost savings. As compliance mandates, suppliers and information flows multiply, supply chains are becoming more complex, costly and vulnerable. And executives are finding it increasingly difficult to respond to these challenges, especially with conventional supply chain management strategies and designs.

The logistics network in the petroleum industry is highly inflexible, which arises from the production capabilities of crude oil suppliers, long transportation lead times, and the limitations of modes of transportation. Every point in the SC network, therefore, represents a major challenge (Jenkins and Wright. 1998). The oil and petrochemical industries are global in nature. As a result, these commodities and products are transferred between locations that are continents apart.

The long distance between supply chain partners and slow modes of transportation induce not only high transportation costs and in-transit inventory, but also high inventory carrying costs in terms of safety stocks at the final customer location. The great distances between supply chain partners present a high variability of transportation times that can hurt suppliers in terms of service levels and final customers in terms of safety stock costs. Moreover, the transportation process is carried out either by ships, trucks, pipelines, or railroads. In many instances, a shipment has to exploit multiple transportation modes before reaching the final customer's location. "Very few industries deal with that kind of complexity in shipping," said Doug Houseman, a senior manager at the consulting firm (Morton, 2003). Such constraints on transportation modes in this type of industry induce long lead times from the shipping point to the final customer's location compared to other industries. Hence, considering the amount of inflexibility involved, meeting the broadening prospect of oil demand and its derivatives while maintaining high service-levels and efficiency is a major challenge in the petroleum industry.

The logistics function is only one of many areas that affect supply chain performance in the oil marketing companies. Integrated process management, information systems and information sharing, organizational restructuring, and cultural reorientation are as equally important (Ikram, 2004). The need for integrated processes all the way from procurement of raw materials to the delivery of the final product is crucial for a company's success. "Manufacturing efficiency alone does not ensure a competitive advantage anymore," said Paratorius, president of BASF's petrochemicals division (Whitfield 2004). The industry lags behind in using integrated planning across its SCM. This type of disintegration in the SC can increase the cost of acquiring crude oil, which will eventually affect gas prices for consumers (Coia, 1999).

Due to the globalization of the petroleum industry supply chain, sophisticated information technology is essential for smooth information flow considering the complexity of the logistics network in such an industry. Companies' relationships in supply chain networks are directly related to the effective use of information technology (Guimaraes, Cook and Natarajan, 2002).

Another challenge in the petroleum industry supply chain is the attitude and anxiety regarding collaboration and information sharing between supply chain partners in the oil marketing companies. While collaboration and information sharing represent a crucial factor for supply chain efficiency, companies in the petroleum industry are sometimes cautious when it comes to sharing their demand/costs information (Al-Kharraz, 2004). This type of parsimony regarding collaboration and sharing demand/costs information can waste opportunities for costs saving. Improved supply chain efficiency in the petroleum industry, therefore, needs a new philosophy in collaboration, even if this means working with competitors. "Collaboration, information sharing, and asset optimization require the greatest mind change because chemical producers and LSPs would have to work with their competitors, as well as with other operators in the supply chain," said Phil Browitt, CEO of AGILITY, a logistics firm (Young, 2005). The acquisition of sophisticated information technology, although necessary, can only do so much if it is not supported by a cultural change.

## **2.7 Best Practices in SCM in oil marketing companies**

Data flow diagram (DFD) was developed by Hull in 2001 to improve supply chain information flow reliability of the Alaskan North Slope Oil supply chain. The study showed that using the DFD helped to realize the importance of the relationship between scheduling and dispatching (synchronization). By using the DFD to examine the information flow, overall supply chain efficiency was improved and distortion, which is greatly related to supply chain structure, was greatly reduced. Moreover, the generic DFD developed offers a template for modelling any supply chain or logistics activity, whether it is a push, pull, or a hybrid push/pull system (Hull, 2001).

Sophisticated information technology is also essential for petroleum marketing companies due to security needs. Petroleum companies ship a great deal of hazardous products, and supply chain partners (suppliers and customers) must be aware of the locations of each shipment at any point in time. According to Houseman at Accenture, chemical companies are considering wireless technology to track their shipments (Morton, 2003).

In an effort to manage their supply chain and reduce costs, oil and petrochemical companies are outsourcing their logistics functions. Outsourcing takes place when an organization transfers the ownership of a business process to a supplier reliant on the services of third-party logistics companies for managing their supply chains (Collins, 1999). Companies in the petroleum industry, however, took the outsourcing idea one step further and found that one way of outsourcing their logistics functions is to ally and collaborate with competitors. This form of collaboration is referred to as a systematic cooperative reciprocal barter (also called "swaps" or "exchanges") of supplies, assets, market share, or even the entire business among competitors (O'Dwyer, 1988; Robert, 1995; Gain, 1997; Alperowicz, 2001; Sim, 2002).

However, despite the significant advantages this practice has generated for companies, a defined model for making such decisions does not exist. The subject has barely received any attention in the operations management literature. Currently, no specific method has been adopted to determine when companies should attempt to make swap decisions. An

interview with supply chain directors in two international petrochemical companies that have been involved in swapping with their competitors for the past few years revealed that the only methods used are judgmental methods and spreadsheets. Although judgmental approaches may improve accuracy in many decision-making problems, they should not be the only methods employed. The use of only such approaches cannot guarantee an optimal solution.

In a commodity-type industry such as oil and petrochemicals, the source of the commodity is often of no interest to the final customer as long as the commodity adheres to its required specifications and the delivery of that commodity is made by the promised due date. Therefore, competing oil and petrochemical companies form supply chain alliances when delivering commodities to customers in order to reduce transportation and inventory costs and improve customer service. In return, cost savings for transportation in the overall supply chain are shared among participating companies. This form of collaboration is referred to as shipment swapping. This kind of collaboration with competitors creates a shared solution to common supply chain obstacles and is predicted to be the Next Big Thing (Morton, 2003).

The swapping technique is currently applied by oil and petrochemical companies around the world in all of its different forms: asset swapping, business swapping, and shipment swapping. The supply chain includes not only the processor and the suppliers but also the transporters, warehouses, retailers, and even the customers themselves (Chopra and Meindl, 2008). Exploring seriously the potential of SCM concept, a firm may realize a significant revenue growth (Gunasekaran, et al. 2008). Simchi-Levi et al. (2003) have shown that using more supply chain strategies, the firm can save about 10 percent of its annual operation costs. Application of SCM strategies have been widely pronounced in other manufacturing and service providing sectors such as in auto-mobiles, electronics, books, hotels, telephone companies among others.

## **2.8 Summary**

More efficient and cost effective supply chain management practices in the petroleum industry represent important factors for maintaining continuous supplies of crude oil, the reduction of lead times, and lowering of production and distribution costs. Due to the inflexibility involved in the petroleum industry's supply chain network, cost containment, visibility, globalization, Risk, information technology logistics, knowledge management and greening the supply chains are some of the challenges facing the SCM in the oil marketing companies as advanced by other researchers. Integrated process management, Information systems and information sharing, organizational restructuring, and cultural reorientation are equally important.

Despite the great challenges in the oil marketing companies supply chain management, best practices for improvements, management of challenges and cost savings do exist along the supply chain. One major area for improvement and cost savings lies in the logistics function. Companies in the petroleum industry have become increasingly reliant on the services of third-party logistics companies to manage their supply chains. Companies in the petroleum industry took the outsourcing idea a step further to collaborate with competitors and found shared solutions to their supply chain challenges.

## **CHAPTER THREE: RESEARCH METHODOLOGY**

This chapter focused on research design, population and presentation.

### **3.1 Research Design**

The researcher carried out a survey. The researcher made use of pre-designed questionnaire during the survey. The researcher provided respondents with a brief description of the research problem, along with definitions of the key constructs. The questioning consisted of both open and closed ended questions.

### **3.2 The Population**

The study comprised of 23 oil companies in the oil industry in Kenya. The 23 companies are listed in the petroleum insight (2010) as in the list attached in appendix II

### **3.4. Data Collection**

Detailed structured questionnaires were designed to identify the way in which oil marketing companies manage their supply chain. Questionnaires were delivered physically and filled out on the spot. Two managers with decision making power within the supply chain management department in each oil marketing companies were eligible to respond to the survey questionnaires. The survey research method was chosen because it offers opportunity to study a phenomenon in its own natural settings where complex links and underlying meanings can be explored. It is also appropriate because the knowledge of challenges facing SCM in the oil marketing companies in Kenya is limited.

The method helps to generate in-depth contextual information which may result in a superior level of understanding that allows the researcher to draw reasonable conclusion. Furthermore, it avoids the bias of asking different questions from different processors by using the same formulation for all of the respondents; and it can be designed in advance to cover the desired areas of interest. The respondents were required to respond to the questions which were grouped into several sections addressing the research objectives. The questions focused on the knowledge towards SCM concept, inventory management,



customer service, marketing, order processing, application of information technology and the challenges facing the oil marketing companies. The survey captured detailed information from all the oil marketing companies in Kenya. The data collected was both quantitative and qualitative. To compliment the Primary data, secondary data was obtained through literature review of various international journals of supply chain management and production and operations management.

### **3.4 Data Analysis**

In analysis of data, the researcher employed both descriptive and content analysis since information gathered was both quantitative and qualitative in nature. The analysis on competitive challenges involved breaking down the complex information in part 2 into small units of manageable information and also synthesizing small pieces of related information into a piece of information. For the best practices that would address the competitive challenges (part 3), Microsoft excel 2007 was applied in analyzing the responses gathered during data collection. The research findings were presented by the use of graphs, charts and tables for easier interpretation. The final report was then compiled using MS-word after subjecting data into thorough analysis.

## **CHAPTER FOUR DATA FINDINGS, ANALYSIS AND INTERPRETATION**

### **4.1 Introduction**

The data collected was analyzed and interpreted along with the objectives of the study which were to establish the challenges facing the SCM in oil marketing companies in Kenya and to determine the extent to which the oil marketing companies in Kenya are adopting best practices to manage challenges in their supply chain. Data was collected by use of questionnaire (appendix III) and the responses were adequate to warrant a significant analysis. The self administered questionnaires were supplied to the purchasing and supplies managers, SCM managers and Operations managers with a view of arriving at viable and concrete responses. These in many organizations are the personnel charged with manning the supply chain management portfolio. The response rate was 65.2%.

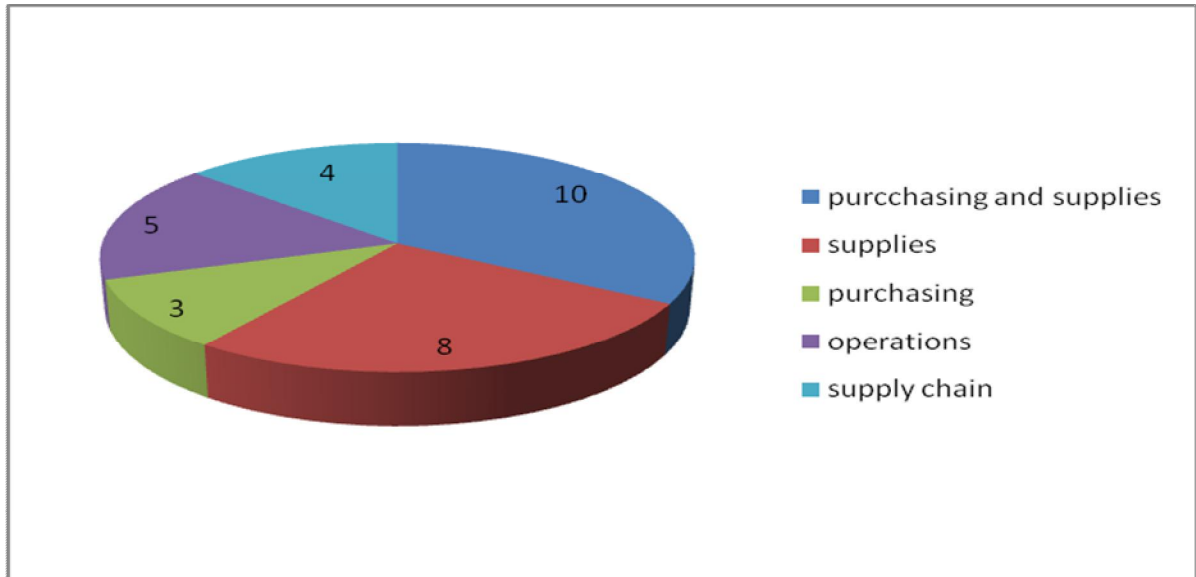
Below is the presentation and the analysis of the primary data collected through the questionnaires where the study was designed to answer the following questions; What are the challenges facing supply chain management in the oil marketing companies in Kenya and what best practices are the oil marketing companies adopting in managing their SC.

### **4.2 Demographic Information**

This section concentrates on the demographic information of the respondent and the oil marketing company. This was important in determining the appropriateness of the respondents to the study.

#### **4.2.1 Background of Respondents**

The target population was 46 respondents; two from each of the 23 oil companies listed in the appendix II. 30 questionnaires were responded to from 15 oil companies. Of the 30 respondents only 4 were supply chain managers. The rest were either purchasing managers, or supplies manager or operations managers as shown in the table below:



**Figure 1: Respondents to questionnaires**

The position of the respondents clearly indicates that supply chain management may not have taken substantive roles in the oil marketing companies in Kenya.

#### **4.2.2 Background of the Oil Marketing Companies**

The researcher sought to establish the sector type of the oil marketing companies i.e. whether downstream, upstream or both.

The study found out that all the oil marketing companies in Kenya engage in downstream activities i.e. marketing of finished products, filling stations etc.

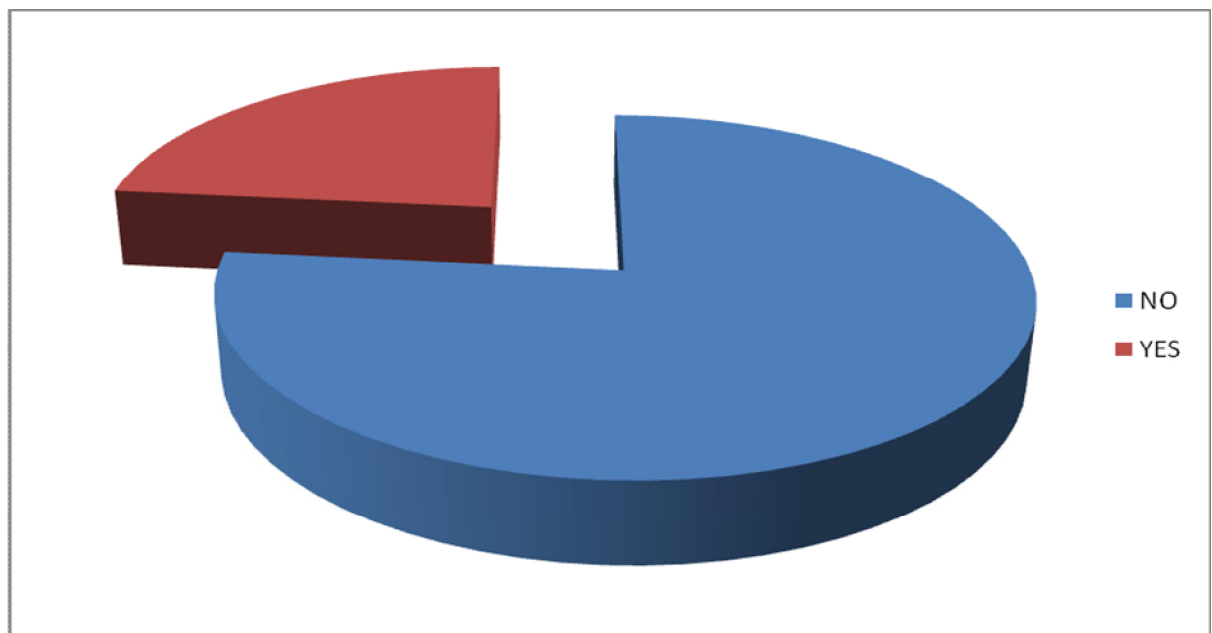
#### **4.2.3 The concept of supply chain management**

The researcher sought to find from respondents the understanding of the concept of supply chain management. While the study found no two responses alike among the purchasing, supply and supply chain managers and other functional operation managers, the study did find general agreement that supply chain management entails, at its minimum, a broad range of business functions and services including research and development, production, forecasting, logistics, marketing, sales, information technology, finance and customer

services. This understanding encompasses the model of SCM as advanced by Mentzer et al. (2001). While the interviewed oil companies may have placed varying degrees of importance to the aspects of supply chain management cited above, none discounted the importance of each of those elements. In general, almost all companies conceptualized and defined supply chain management as a coherent set of approaches for efficiently integrating suppliers, manufactures, warehouse and distribution centres and retail establishments for the purpose of producing and distributing oil and its derivatives in the right quantities to the right locations and at the right time in order to minimize cost while meeting service level requirements.

#### 4.2.4. Existence of separate SCM department

The researcher sought to establish if separate SCM department existed in the oil marketing companies in Kenya. There were 30 respondents as shown in the table below:



**Figure 2 showing companies with separate SCM department.**

The supply chain management department is yet to find its full place in the oil marketing companies in Kenya. The traditional purchasing and supplies departments are dominant

in the mainstream structures of oil marketing companies in Kenya. It is a sad fact that the level of understanding in the field of supply chain management is often low or not well balanced across the whole purchasing, production control spectrum. Without effective supply management, a business that markets products or services and that is supported by excellent manufacturing or R&D facilities and purchasing skills cannot survive since the impact supply chain management has on business performance and cost control is explicit.

### **4.3 Challenges Experienced in Managing SCM in Oil Marketing Companies in Kenya.**

The researcher sought to establish the challenges experienced by oil marketing companies in managing their SC. The table below gives a summary of the findings:

| number | Functional supply chain area | Challenges experienced by oil marketing companies  |
|--------|------------------------------|--|
| 1      | Transportation               | <p><b>challenges in the rail network include</b></p> <ul style="list-style-type: none"> <li>▪ The existing railway infrastructures is old and requires modernization to standard gauge</li> <li>▪ Capacity constraints</li> <li>▪ Management and governance issues, in particular the handling of the concession</li> </ul> <p><b>Challenges in the Road Transportation</b></p> <ul style="list-style-type: none"> <li>▪ Products transported by pipelines and rails are distributed by road tankers to reach the cities and towns not linked to the pipeline/railway and the final consumers.</li> <li>▪ The road tanker charges are dependent mainly on the tanker operating and maintenance costs. This costs are mainly influenced by the price</li> </ul> |

|   |                         |  |
|---|-------------------------|--|
|   |                         | <p>of fuel used by the tankers and the status of the roads</p> <ul style="list-style-type: none"> <li>▪ Poor road network</li> </ul> <p><b>Challenges in Lake Transportation</b></p> <ul style="list-style-type: none"> <li>▪ Lake transport is not fully developed.</li> <li>▪ Inefficient transfer of products from the pipeline Kisumu depot to lake vessels.</li> </ul> <p>Limited lake vessels</p> <p><b>Challenges on the pipeline transport</b></p> <ul style="list-style-type: none"> <li>▪ Only one refined petroleum products pipeline which traverses Kenya, Mombasa to Nairobi, Nakuru, Eldoret and Kisumu.</li> <li>▪ pipeline system has experienced capacity constraints,</li> <li>▪ The pipeline system has not been expanded to reach all the cities and / or economically active areas within the region.</li> </ul> |
| 2 | Equipment and utilities | <p>The pump equipment is old with very low discharge rate.</p> <p>Inadequate equipment</p>   |
| 3 | Suppliers               | <p>Long lead times, ever fluctuating prices as provided by the suppliers, oil cartels, and supply uncertainty.</p>   |
| 4 | Customers               | <p>Demand for quality, absence of mechanisms to determine the customer satisfaction demands</p>  |
| 5 | Information technology  | <p>Absence of electronic data interlink, outdated systems that reduce visibility,</p>  |
| 6 | Market                  | <p>Unfair and uneven oil playing ground, unfair allocation of</p>  |

|    |                      |  |
|----|----------------------|--|
|    | structure            | import tenders, Oil cartels  |
| 7  | Inventory management | Absence of adequate storage facilities, absence of just in time operations   |
| 8  | Storage facilities   | Demand is beyond what the companies can store, haulage at the refineries not adequate,                               |
| 9  | Government policy    | Fuel Pump Price Regulation, Entry Barriers, Lack of Proper Regulation  |
| 10 | Costs/prices         | Ever Fluctuating World Oil Prices,   |
| 11 | Environment          | Unstable political environment, supply chain greening as demanded by NEMA, environmental health and safety standards |
| 12 | Other                | Knowledge Management, Lack of Optimization Tools, Limited Resources and Poor Visibility of Demand and Resources      |

Due to the inflexibility involved in the petroleum industry's supply chain network, transportation of oil present a great challenge. However, it is only one of several challenging factors. Integrated process management, information technology and information sharing, organizational structuring, and knowledge management are equally important. Transport costs are a natural barrier to trade. Effective rates of protection arising from transport costs are analysed relative to a situation where there are no transport costs. Bulk transportation in Kenya is handled between Railways and private trucks. The Railway network operates on a two rates system, up direction from Mombasa to the mainland and down direction from the mainland to the port.

Other challenges advanced by respondents included the following: Knowledge management: more and more firms regard it as indispensable to their business's planning,

executing, monitoring and adjusting their operations. Oil marketing companies believe that the development, transfer and spread of organizational learning-tacit and explicit knowledge-throughout their networks can give them a competitive advantage in addition to improving operational efficiency, effectiveness and quality. Lack of optimization tools, limited resources and poor visibility of demand and resources compound the challenge. Unstable political environment: the 2008 post election violence in Kenya, caused oil marketing companies a nightmare. Trucks transporting oil were burnt, roads dug up and railway systems vandalized. The movement of oil from source to consumers was grounded.

Supply chain greening, environmental health and safety standards as demanded by National Environmental Management Authority (NEMA), is one other challenge the oil marketing companies have to contend with. All oil marketing companies ô both buyers and suppliers are required by law to integrate õgreenö in their plans, policies and operations. For some, it has become a core value of their company. This may include sourcing, packaging and labelling, minimization of waste in production, and disposal of by-products of the refining process as well as end-of-life goods. Regulation of health and environmental standards in the petroleum sub-sector is shared among various statutory bodies including the Kenya Bureau of Standards, the Ministries of Health and NEMA. The challenge is for these bodies to effectively monitor quality aspects yet ERC itself also does not have petroleum technical expertise to monitor industry players. Thus, adulterations, quantity measurements and related activities remain a challenge in the oil marketing companies.

Other challenges given by the practitioners included the ever fluctuating world oil prices; Fuels pump price regulation by the government, entry barriers, and lack of proper regulation. Demand is beyond what the companies can store, haulage at the refineries not adequate and not equitably shared, Absence of adequate storage facilities, absence of just in time operations, Absence of electronic data interlink, outdated systems that reduce visibility, Demand for quality by customers, absence of `mechanisms to determine the



customer satisfaction demands, Long lead times, ever fluctuating prices as provided by the suppliers, oil cartels and supply uncertainty.

Quality issues in the petroleum industry are closely related to infrastructure facilities, technological literacy and information technology and vary with amongst regulated and un-regulated firms. For instance, the poor quality services at the importation, refinery and storage are blamed on infrastructure limitations and old technologies which affect distribution and supplies. Further, despite ad hoc quality surveillance or inspection exercises concerns about the quality of petroleum products (including adulterations) were identified as a major challenge of the petroleum sector. The study also found that they faced challenges in sourcing for products. The main challenge faced by oil marketing companies in sourcing and consumption of petroleum were identified as frequent shortages/inadequate supply and high prices or fluctuations in prices.

On the market structure, respondents indicated that there was Unfair and uneven oil playing ground, unfair allocation of import tenders, Oil cartels. The responses were in tandem with Onyango et al. (2009) that the petroleum market in Kenya is largely oligopolistic despite the incorporation of numerous small independent oil companies. Prior to liberalization, multinational firms accounted for over 90% of all petroleum products imported into the country and virtually all retail businesses. By the year 2005, activities by independent petroleum dealers were still limited to the extent that four of the major petroleum market players (Total, Shell BP, Caltex, Mobil & Kenol/Kobil) controlled about 85.3% of the market (GoK, 2006). During 2008, the market Concentration Ratio was 76.7% controlled by Kenol/kobil (8%), Shell (20.9%), Total (19.5%) and Chevron (11.1%).

The performance of the domestic oil marketing companies heavily relies on global events and trends in international oil markets. These include the international oil prices, security related issues and other economic performance indicators. The strong links with external factors with multinationals playing leading roles in exportation, distribution and supply makes it even more challenging to effectively regulate the sector. The cartel like

behaviour of the multinational oil marketing companies in the petroleum sector affects supply and retail prices.

#### 4.4.0 Current Practices adopted by Oil Marketing Companies in Managing their Supply Chain

The researcher sought to find the practices the oil companies had adopted to manage their SC. The findings were as shown on the bar graph below:

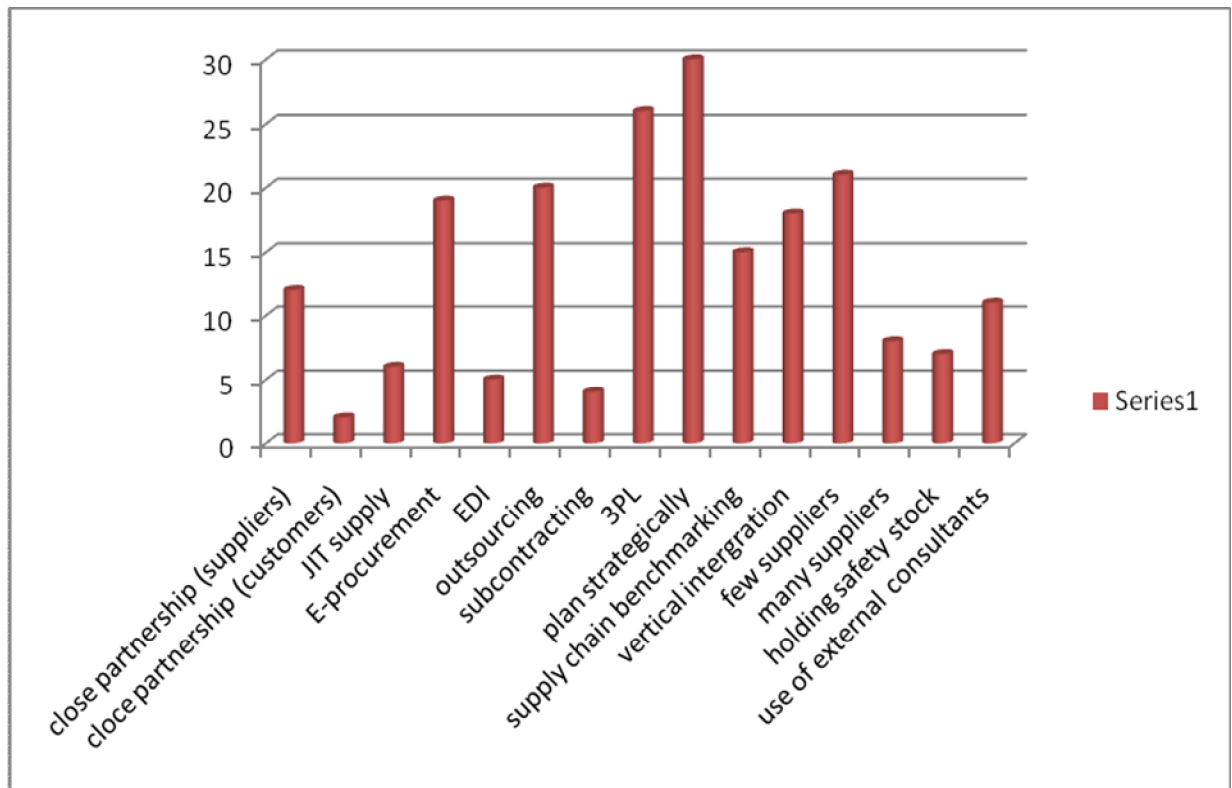


Figure 3: current practices adopted by oil marketing companies in managing their supply chain

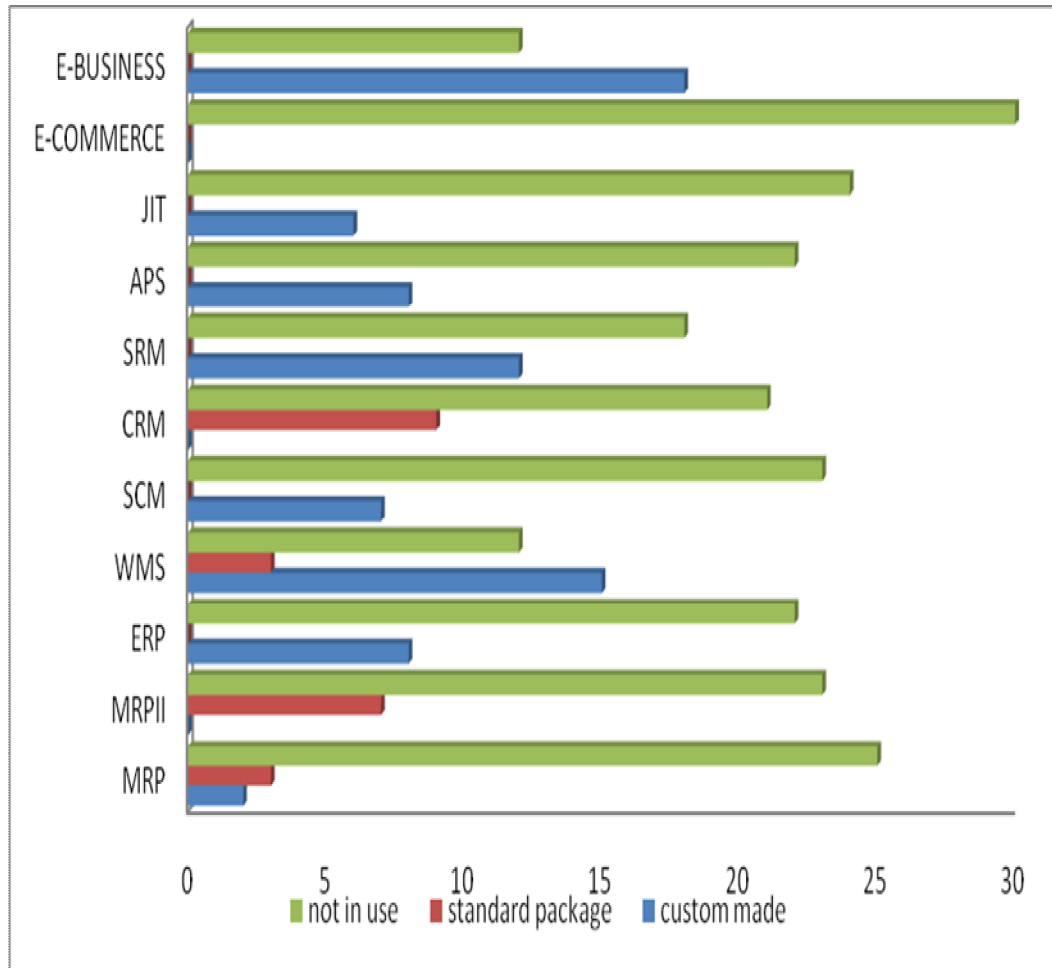
According to Wikipedia the free encyclopaedia, best practice is a technique, method, process, activity, incentive, or reward which conventional wisdom regards as more effective at delivering a particular outcome than any other technique, method, process, etc. when applied to a particular condition or circumstance. The idea is that with proper processes, checks and testing, a desired outcome can be delivered with fewer problems and unforeseen complications. Best practices can also be defined as the most efficient

(least amount of effort) and effective (best results) way of accomplishing a task, based on repeatable procedures that have proven themselves over time for large numbers of people.

The practitioners advanced that the main practice in managing SC was by strategic planning and 3PL among many other practices. It's worth noting that there was low safety stocking as a practice probably because of limited storage capacities by oil companies. Also worth noting is the finding that many oil marketing companies engage in e-procurement. This may be due to the distances involved between the oil marketing companies in Kenya and the suppliers.

#### 4.4.1 Systems Currently in Use in the Oil Marketing Companies in Kenya:

The researcher sought information on the systems currently available in the oil marketing companies in Kenya to support SCM. The findings were as shown on the graph below:



**Figure 4: systems currently in use in the oil marketing companies**

The respondents stated that most of the systems may not be in use in their organizations. This was probably because of limited knowledge on the system operations. However, a few systems are in use, which are mainly custom-made to suit the design of the organizations' operations. JIT may not be very practical probably because of the distance involved between the suppliers and the oil marketing companies due to long lead times and the uncertainties involved in the supply channel.

E-business seems to gain popularity with the oil companies. This could be because of existent technology to conduct the same and the concept of cost saving. Supplier relationship management (SRM) is one other systems oil companies are using. This could be to provide a closer network with the source of the oil. The rest of the systems are dismally used currently in the oil marketing companies in Kenya.

#### 4.4.2 Future Measures for Supporting Oil Marketing Companies Efforts in SCM

The researcher sought to find measures that would support oil marketing companies in SCM efforts. The figure below provides summary findings:

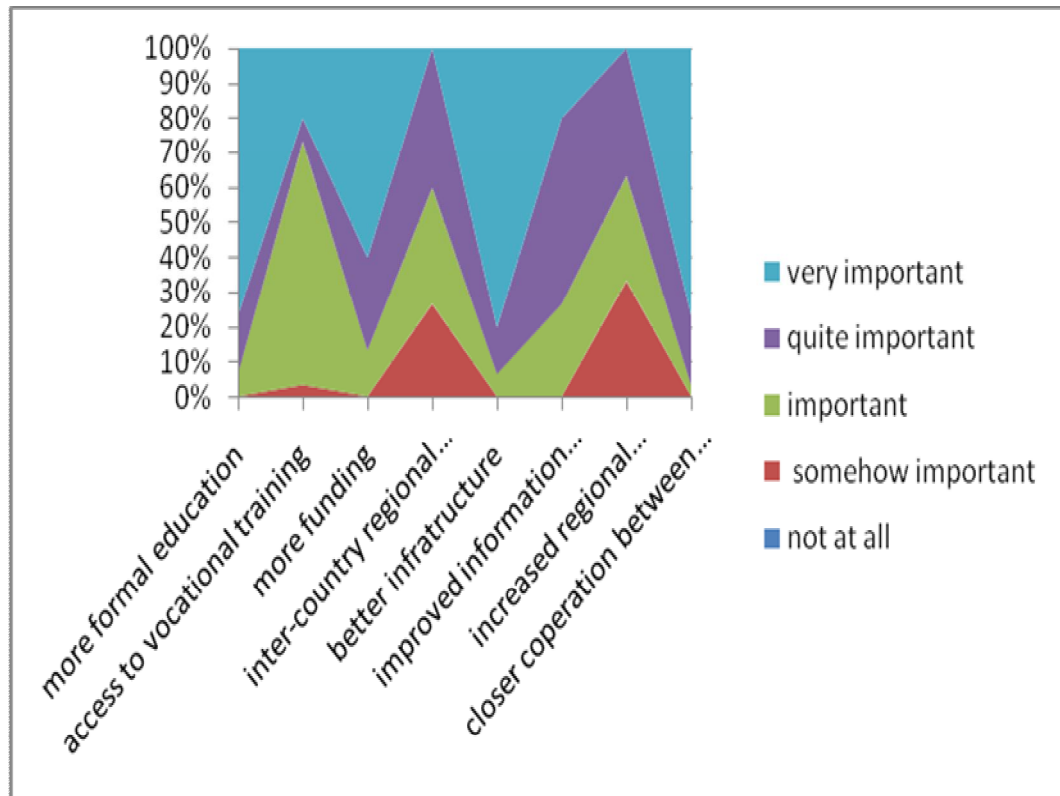


Figure 5: Future measures for supporting oil marketing companies' efforts in SCM

The respondents gave an outright nod to the desire of acquiring the formal technical skills in the field of management of supply chain. As such, acquisition of formal education and access to vocational training were seen by respondents as future measures that would support oil marketing companies' efforts in SCM.

SCM has been an important feature of industrial and economic life for years, but it is only in the recent past that it has been recognised as a major function in its own right. Distribution activities in the oil marketing companies make extensive use of the human and natural resources that affect a national economy. It is now accepted by both the academic and the business world that there is a need to adopt a more formal and global view of the many different supply chain and distribution-related functions. The appreciation of the scope and importance of distribution, especially with respect to new technology, has led to a more scientific approach being adopted toward the subject and to the recognition of the importance of managing the new technology and the changes that it can bring about.

One of the major features of the supply chain in recent years has been the speed with which the industry has advanced. Technology has developed, demanding a good knowledge of both physical and information technology, and the jobs span a much greater area of responsibility, requiring a good overall logistics perspective together with the traditional demands for management and communication skills. Supply chain management is therefore now recognised as being a vital part of the business and economy of a country. In recent years, industry has set out to develop a distinct professionalism to reflect this new-found importance. The respondents have recognised the need for established career structures and good education and training programmes to assist in better understanding the concept and the operations in SCM.

The improvement of infrastructure was seen by respondents as very important in SCM efforts. The infrastructure necessary include Roads, Rail systems, water transport increased pipeline capacity and penetration. This would be expected to drastically reduce the challenges experienced by the oil marketing companies in their SCM. Respondents also gave prominence to cooperation between oil marketing companies and also between the companies and the governments and regional partners.

## **CHAPTER FIVE: SUMMARY CONCLUSIONS AND RECOMMENDATIONS**

### **5.1 Introduction**

This chapter gives summary of findings, discussions, conclusions and recommendations drawn. The objectives of the study were to establish the challenges facing supply chain management in the oil marketing companies in Kenya and to determine the extent to which the oil marketing companies in Kenya are adopting best practices to manage challenges in their supply chain.

### **5.2 Summary and Conclusion**

In this section, the results of the study are summarised discussed and conclusion drawn in line with the research objectives.

One of the objectives of this study was to establish the challenges facing the supply chain management in the oil marketing companies in Kenya. The results show there are a myriad challenges facing the SCM which include challenges in the rail network i.e. capacity constraints, management and governance issues particularly the handling of the concession and the old nature of existing railway infrastructure. On road transport, the challenges include high transportation costs and poor road network. On the lake transport, the challenges include underdevelopment of the lake transport. Challenges in the pipeline transport include capacity constraints and limited number of pipelines.

Other challenges include old and outdated pump equipment, long lead times, fluctuating global oil prices, oil cartels and oil supply uncertainty. There is a further challenge of customer demand for quality, imbalanced market structure, inadequate storage capacity for inventory, unfair haulage allocation in the refinery, fuel pump price regulation, unstable political environment and environmental health and safety standards.

The petroleum market in Kenya is largely oligopolistic despite the incorporation of numerous small independent oil companies. Prior to liberalization, multinational firms

accounted for over 90% of all petroleum products imported into the country and virtually all retail businesses. By the year 2005, activities by independent petroleum dealers were still limited to the extent that four of the major petroleum market players which controlled about 85.3% of the market.

The second objective was to determine the extent to which the oil marketing companies in Kenya are adopting best practices to manage challenges in their supply chain. The study found out that the oil marketing companies engage in the following practices in managing their supply chains: strategic planning, 3PL, SC benchmarking, vertical integration, close partnership with suppliers, E-procurement and outsourcing. The oil marketing companies also have systems that are currently in support SCM: E-business, supplier relationship management (SRM) and WMS. Most of the other SCM and POM systems are not operational in the oil companies.

### **5.3 Conclusion**

The SC of tomorrow will continue to increase in complexity and sophistication. They will span the globe and incorporate many suppliers, wholesalers, retailers, distributors, and logistics providers. Because this web of players is so dependent on one another and so intertwined, assessing where challenges lie will become increasingly difficult. More efficient and cost effective supply chain practices in the oil marketing companies represent important factors for maintaining continuous supplies of petroleum and its derivatives, the reduction of lead times, and lowering of distribution costs. Due to the inflexibility involved in the petroleum industry's supply chain network, oil marketing companies in Kenya experience several challenges in their SCM.

Despite the great challenges in the oil marketing companies supply chain management, opportunities for improvements and cost savings do exist along the supply chain. One major area for improvement and cost savings lies in the adoption of best practices and systems to support SCM. Oil marketing companies have become increasingly reliant on the services of third-party logistics companies, outsourcing and strategic planning to manage their supply chains and thus reduce challenges that are experienced by the oil marketing companies in Kenya.



## **5.4 Recommendation**

Oil marketing Companies in the petroleum industry need to take the outsourcing idea a step further to collaborate with competitors so as to find shared solutions to their supply chain management challenges. Oil marketing companies in Kenya need to train their personnel so as to appreciate the concept of supply chain management and the best practices and systems that will be significant in mitigating the challenges in their SCM.

Oil marketing companies need to develop Customer relationship management policies which may include specific guidelines to aid employees in their interactions with customers. An example is guaranteeing product within promised duration of the order. Customer relationship management procedures ensure that customers are treated equitably and these policies help employees to know what actions are appropriate in each situation.

Oil marketing companies also need to engage in closer cooperation between companies and government. This cooperation would help bring understanding on policy issues, infrastructural improvement and maintenance and bring about equity in the open tendering systems on supply. Efficient provision of petroleum products heavily relies on the status of physical infrastructures for transportation, refining and storage. In this regard, there is need to Upgrade the oil receiving jetties at the Kenya ports authority (KPA) to avoid delays and cost overruns, Upgrade the facilities for oil refinery. The refinery is known to use old technology and is therefore not able to refine residue of its processing products. This cost is passed on to its users. Invest in more storage capacity at the oil storage facility. Upgrade the Kenya Pipeline. The oil marketing companies point out that the pipeline does not have adequate capacity and does not avail adequate products in all locations.

Disaster response procedures may include specific step-by-step procedures to be followed in the event of a major SCM disruption. Such procedures ensure that the firm and its employees take the most efficient actions needed to recover from SCM disruption. The creation of detailed response actions for specific SCM disruptions will

ensure that employees know what steps will be taken, when they will occur, and who will be responsible for each.

Investment in IT systems is a requirement in the modern business world and especially in the area of SCM. Such technologies have the potential to aid enterprises internally by aiding in inventory management, product quality and expiration monitoring, market trend analysis and by generally improving the information available to SC management. An advantage can be achieved by implementing IT to improve and enable external communications with other members of the SC by linking IT systems. By linking systems the human element can be eliminated from the equation and tremendous financial and operational efficiencies can be obtained. Upgrade IT systems so to improve information interchange. This would improve supply chain visibility. The IT upgrade will also improve the oil pumps at the pump stations that would provide efficient timely service to the customers.

### **5.5 Limitations of the study**

The respondents had dismal understanding of the SCM systems currently in use in organizations. The understanding of the systems would help the respondents provide more informed responses towards the study. The respondents had high apathy towards filling of the questionnaires.

### **5.6 Suggested Area for Further Studies**

This study explored challenges facing the SCM in oil marketing companies in Kenya. There is need to look into effects of those challenges in the organizational performance in the oil marketing companies in Kenya.

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## APPENDIX I- LETTER OF INTRODUCTION

Dear sir/Madam

**RE: Research Data**

I am a Postgraduate Student at the School of Business, University of Nairobi pursuing Master of Business Administration (MBA) degree. As part of the requirement to the degree, I am undertaking a Research Project on Challenges Facing Supply Chain Management in the Oil Marketing Companies in Kenya.

I would wish to collect primary data from your organization. Confidentiality is guaranteed

Yours sincerely

Joel Jeffrey Barua

## APPENDIX II LIST OF OIL MARKETING COMPANIES

| <b>Company</b> | <b>Company</b> |
|----------------|----------------|
| Total          | Trojan         |
| Kenolkobil     | Kamkis         |
| Shell          | Bakri          |
| Libya oil      | Petro oil      |
| Gapco          | Mgs            |
| National oil   | Global         |
| Hashi energy   | Sovereign      |
| Oilcom         | Orix           |
| Gulf energy    | Jade           |
| Engen          | Millennium     |
| Fossil         | Premium        |
| Rivapet        | Total          |

## APPENDIX III

### QUESTIONNAIRE

I am a student of University Of Nairobi pursuing Master of Business Administration (MBA) in Operations Management. The purpose of this Questionnaire is to seek information on **the Challenges Facing Supply Chain Management in the Oil Marketing Companies in Kenya**. The data collected shall purely be for academic purpose. Confidentiality is assured. For the research to yield valid results, it's important that you respond to all questions as honestly and truthfully as possible. Thank you for your willingness to participate in this study.

#### Part 1 – Company Profile

1. Name of Company \_\_\_\_\_

2. Address \_\_\_\_\_

3. Contact person: \_\_\_\_\_

4. Position in company: \_\_\_\_\_

5. Sector Types:     upstream             downstream             Both

#### Part 2

6. What in your opinion does supply chain management entail

.....  
.....  
.....  
.....

7. Does your company have a separate SCM department?  
.....

8. What challenges do you experience in managing your supply chain with regard to the following areas?

- a) Transportation  
.....  
.....  
.....
- b) Utilities/Equipment  
.....  
.....  
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- c) Suppliers  
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- d) Customers  
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- e) Information technology  
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- f) Market structure  
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- g) Inventory management  
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- h) Storage facilities  
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- i) Government policy  
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.....  
.....
- j) Environment  
.....  
.....  
.....
- k) Other(s) *please specify*  
.....  
.....  
.....

9 How do you manage your supply chain?

*Tick all that apply*

- <sub>1</sub> Close partnership with suppliers
- <sub>2</sub> Close partnership with customers
- <sub>3</sub> JIT supply
- <sub>4</sub> e-procurement
- <sub>5</sub> EDI
- <sub>6</sub> Outsourcing
- <sub>7</sub> Subcontracting
- <sub>8</sub> 3PL
- <sub>9</sub> Plan strategically
- <sub>10</sub> Supply Chain Benchmarking
- <sub>11</sub> Vertical integration
- <sub>12</sub> Few suppliers
- <sub>13</sub> Many suppliers
- <sub>14</sub> Holding safety stock
- <sub>15</sub> Use of external consultants

16 Other, please specify \_\_\_\_\_

10. What types of systems are currently in use in your company to support Supply Chain Management?

|  | Custom-made | Standard package | Not in use |
|--|-------------|------------------|------------|
| Material Requirements Planning (MRP)     |             |                  |            |
| Manufacturing Resources Planning (MRPII) |             |                  |            |
| Enterprise Resource Planning (ERP)       |             |                  |            |
| Warehouse Management System (WMS)        |             |                  |            |
| Supply Chain Management (SCM)            |             |                  |            |
| Customer Relationships Management (CRM)  |             |                  |            |
| Supplier Relationships Management (SRM)  |             |                  |            |
| Advanced Planning System (APS)           |             |                  |            |
| Just In Time (JIT)                       |             |                  |            |
| Theory of Constraints (TOC)              |             |                  |            |
| E-commerce                               |             |                  |            |
| E-business                               |             |                  |            |
| Decision support / expert system         |             |                  |            |
| Radio Frequency Identification (RFID)    |             |                  |            |
| Electronic Data Interchange (EDI)        |             |                  |            |
| Bar coding                               |             |                  |            |
| Other ( <i>specify</i> )                 |             |                  |            |



11. How important are the following future measures for supporting your company effort in SCM

|  | Not at all<br>(1) | somewhat<br>important<br>(2) | important<br>(3) | quite<br>important<br>(4) | very<br>important<br>(5) |
|--|-------------------|------------------------------|------------------|---------------------------|--------------------------|
| More education, e.g. formal qualification                |                   |                              |                  |                           |                          |
| Easier access to vocational training                     |                   |                              |                  |                           |                          |
| More funding and financial support                       |                   |                              |                  |                           |                          |
| More inter-country regional agreements                   |                   |                              |                  |                           |                          |
| Better infrastructure e.g. telecommunications, road, etc |                   |                              |                  |                           |                          |
| Improved information provision                           |                   |                              |                  |                           |                          |
| Increased regional cooperation between organizations     |                   |                              |                  |                           |                          |
| Closer cooperation between companies and government      |                   |                              |                  |                           |                          |