

**EFFECT OF SUPPLY CHAIN COLLABORATION ON THE SUPPLY CHAIN
PERFORMANCE OF PETROLEUM COMPANIES IN NAIROBI**

BY

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DECLARATION

I declare that this dissertation is my original work and has not been previously published or submitted elsewhere for award of a degree. I also declare that this contains no material written or published by other people except where due reference is made and author duly acknowledged.

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ABSTRACT

Organizations today operate in highly competitive and globalized markets characterized by a rise in customer demands as well as an increase in the need for quality, efficient and flexible production of goods and services. As such, organizations have been forced to reconfigure their production strategies to be able to respond accordingly to these market forces by adopting practices that improve Supply Chain Performance such as Supply Chain Collaboration. This study was set out to identify how this practice has affected the Supply Chain Performance of Petroleum Companies in Nairobi County. The study's objectives included to examine the effect of Customer Collaboration, Supplier Collaboration and Internal Collaboration on the Supply Chain Performance of petroleum companies in Nairobi. This therefore means that the target population for the study was petroleum companies in Nairobi County. The study adopted a descriptive research design and collected data using self-administered questionnaires. Once the data has been collected, the study used both descriptive statistics and multiple regression analysis to present demographic information and to illustrate the effect of Supply Chain Collaboration on Supply Chain Performance respectively. This data was analyzed using SPSS (22). Results indicated that Supply Chain Collaboration has an effect on Supply Chain Performance of Petroleum Companies in Nairobi. Specifically, Customer Collaboration significantly increases Supply Chain Performance. Additionally, an increase in Supplier and Internal Collaboration results to a significant increase in Supply Chain Performance. An R-Square of 0.419 was also revealed, implying that 41.9% of the independent variables, i.e. Internal Collaboration, Customer Collaboration and Supplier Collaboration explained the independent variable i.e. Supply Chain Performance. The study therefore concluded that indeed, Supply Chain Collaboration has an effect on Supply Chain Performance of Petroleum Companies in Nairobi. It therefore recommended stakeholders to Petroleum Companies and other interested parties to collaborate their customers, suppliers as well as partake in internal collaboration so as to increase their Supply Chain Performance.

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ACCRINYMS AND ABBREVIATIONS

DRC	Democratic Republic of Congo
KPC	Kenya Pipeline Company
KPRL	Kenya Petroleum Refineries Limited
SCM	Supply Chain Management
KTDA	Kenya Tea Development Agency
ERC	Energy Regulatory Commission

OPERATIONAL DEFINITION OF TERMS

Supply Chain	Comprises of the suppliers, the organization, consumers and other partners involved in the business transactions (Prajogo, and Olhager, 2012)
Supply Chain Performance	The management of a Supply Chain network that serves to perform various activities in pursuit of product value and quality improvement (Prajogo, and Olhager, 2012).
Supply Chain Collaboration	Involves the Collaboration of internal processes across departments and externally across different organizations. This allows an organization to effectively meet customer demands, cut on production costs and efficiently improve the quality and value of goods and services (Prajogo, and Olhager, 2012).
Horizontal Collaboration	An inter-organizational relationship between two or more companies at the same level or stage in the supply chain in order to allow greater ease of work and cooperation towards achieving a common objective, it is an initiatives aimed at breaking cross functional boundaries through interdepartmental cooperation and coordination of activities (Prajogo, and Olhager, 2012).
Vertical collaboration	The Supply Chain Collaboration that it involves two or more supply chain partners from different stages in the supply chain that share their responsibilities, resources and performance information to serve relatively similar end customers (Prajogo, and Olhager,2012)

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Organizations are currently run in a highly competitive and globalized market characterized by a rise in customers' demands as well as an increase in the need for quality, efficient and flexible production of goods and services (Barratt, 2014). As such, organizations have been forced to reconfigure their production strategies to be able to respond accordingly to these market forces. One of the ways modern organizations have combated this issue is through the adoption of Supply Chain Management. Cooper, Lambert, and Pagh, (2017) define Supply Chain Management as the management of a Supply Chain network that serves to perform various activities in pursuit of product value and quality improvement. Through Supply Chain Management, organizations have been able to engage all supply chain agents as they seek to reduce the cost of production while at the same time increase the efficiency of the supply chain function.

Globally, the need for an improvement in the effectiveness of supply chain management practices is critical to organizations because of a number of reasons as identified by Verecke, and Muylle (2016). First, organizations are in constant pressure as a result of competition. This equally means that in order to stay cost competitive, organizations need to achieve cost efficiency. Secondly, the need to consider sustainability while at the same time mitigate risk has increased. Finally, the relationship between key suppliers and the organization needs to be maintained and strengthened. These key suppliers offer organizations the opportunity to develop new innovative products that will give the organization a much needed added advantage over their competitors. Additionally, they contribute to leveraging the expertise, experience, skills and

capabilities of the entire supply chain department. In the long run, this contributes to the overall performance of the organization (Houlihan, 2007).

Locally, the need to meet global expectations of supply chain management has pushed organizations to adopt the global perspective. According to Cooper, Lambert, and Pagh, (2010), Supply Chain Management has replaced traditional purchasing and logistic practices with broader strategic approaches. As such, in order to stay competitive, Kenyan organizations have learnt from global and well developed organizations that they have to overhaul their logistics and purchasing strategies in order to stay cost competitive, mitigate risks and to strengthen and maintain key supplier relationships. Moreover, local organizations in Kenya have to work closely with well-established organizations outside the country in order to achieve their goals and objectives, and ultimately meet greater profits. To achieve all these, Supply Chain Collaboration plays a major role and this is what has motivated the researcher to conduct this research.

1.1.1 Supply Chain Collaboration

Supply Chain Collaboration involves the collaboration of internal processes across departments and externally across different organizations. This allows an organization to effectively meet customer demands, cut on production costs and efficiently improve the quality and value of goods and services. This is achieved by bringing relevant departments and partnering firms of an organization closer together by managing supply chain related relationships.

Stank, Keller, and Daugherty (2011) assert that supply Chain Collaboration involves cross-functional and cross-business processes coupled with appropriate levels of information sharing and coordination of operational activities. As such, organizations use it as a tool to combat specific challenges within a specific set of environmental conditions. This follows that the need to collaborate arises due to reasons such as sharing common issues, goals and

objectives. According to Flynn, Huo, and Zhao, (2010), this is often driven by the need to satisfy customer demands and provide customer value. Cao, and Zhang (2011) also argue that by working together towards these shared ideas, organizations create a competitive advantage that eventually result to greater profitability through a ‘win/win arrangement.

It is important to note that the process of Supply Chain Collaboration covers the whole lifecycle of activities; from evaluating tenders, to identifying a need, purchasing and engaging in contract management (Houlihan, 2007). Collaboration is a transactional, cooperative and synchronized process. Transactional means that the process of collaboration is concerned with the efficient and effective execution of activities between the parties involved, thus improving the ease at which these activities are carried out. A cooperative transaction involves sharing of information on forecasts, inventory availability as well as purchase orders and delivery statuses between the partners involved (Lambert, Cooper, and Pagh, 2010). Basically, it includes the process of data exchange between both parties while relying on each other’s capabilities. A synchronized collaboration on the other hand involves a collaboration that covers critical business processes such as investments in joint research, developmental projects, intellectual project development as well as supplier development. Aviv (2011) adds that it is important to note that partners in a synchronized collaboration are jointly involved in a rather strategic vision of the future as opposed to near-term planning.

Min et al, (2015) illustrates that implementing Supply Chain Collaboration brings about much needed advantages to the chain members. This includes the fact that it helps organizations in mutual relationships to achieve mutual goals and objectives easily, as opposed to working alone. Additionally, collaboration allows organizations to go beyond simple coordination by focusing on determination of demand allocations, managing exceptions, monitoring performance

goals and participating in collaborative activities. They also lead to impressive cost reductions in production, improve service delivery and lead to better end-customer satisfaction. Lockamy III, and McCormack, (2014) however, point out that it is clear that there are barriers to its successful implementation. These include exposure to competition, trust concerns, fear of failure to maintain a meaningful and successful relationship, operational complexities as well as technological incompatibilities.

1.1.2 Supply Chain Performance

Supply Chain Performance on the other hand can be described as the extent to which supply chain activities that facilitate meeting end-customer requirements; such as product availability, on-time delivery and the necessary inventory qualify the efficiency and effectiveness of action (Beamon, 1999). In other words, it can be described as attaching a performance measure to supply chain. Neely, Gregory and Platts, (2010) pointed out that a performance measure can be defined as a metric used to quantify the efficiency and/or effectiveness of an action.

Supply Chain Performance measures should be linked with the strategies so that it can contribute much more to the management of business as well as the improvement of performance in the industry. This is because performance measurement provides the necessary information for management feedback for decision makers in an organization (Chan, 2013). Additionally, performance measurement provides an approach to identifying the success and potential of management strategies while at the same time facilitating the understanding of the situation. Moreover, it assists in directing management attention, revising company goals, and re-engineering business processes as time goes by (Nelly et al., 2013).

Many modern organizations are adopting supply chain measurement as a source of information that allows them to identify the strategies offering the highest potential for achieving

the objectives and goals of the organization. Management processes such as target setting, performance evaluation and decision making are easily aligned, making it easy for the organization to achieve its objectives (Shepherd, & Günter, 2006).

Hervani, Helms, and Sarkis, (2015) pointed out that corporate performance measurement continues to grow and encompass both quantitative and qualitative measurements and approaches. Most performance measurement approaches depend almost entirely on the nature of goals and objectives of individual organizations. Additionally, organizations must consider existing financial measures such as return on investment, profitability, market share and revenue growth at a more competitive and strategic level when measuring performance (Hervani et al., 2015)

1.1.3 Petroleum Companies

The Oil and Gas firms fall in the larger Petroleum industry in Kenya that is involved in the import, export and distribution of petroleum products in the country. Neighboring landlocked countries such as Uganda, DRC, Rwanda, Burundi and The Republic of South Sudan rely on the Kenyan Petroleum distribution networks and Infrastructure. It means that there are so many supply chain decisions that have to be made by locally incorporated companies that are directly involved in the distribution. An increase in the demand for petroleum products in this region has also resulted to a significant increase in the number of companies involved in the distribution of petroleum products to end-consumers.

According to the Kenyan Economic Survey (2016), there has been a significant increase in the demands for oil and gas products within the country. This increase in demand can be attributed to the growth in sectors such as the industrial, agricultural and infrastructure. An improvement in the industrial sector has seen a significant improvement in the number of

industries set up that require huge tones of petroleum products to run (Petersen, Ragatz, and Monczka, 2005). Additionally, an improvement in the agricultural sector means that more goods and services need to be delivered from farms to processing plants and eventually to the consumers. Finally, an improvement in infrastructure has seen the construction of more roads, a better railway transport system and improvements in the aviation sector. All these, as highlighted by Bechtel, and Jayaram, (2007), have increased the demand for petroleum products.

This increase has been most significant in Kenya's capital city, Nairobi. The Economic Survey (2016) reports that the total demand for petroleum products grew by 5.4%; from 3.6 million tons in 2012 to 4.02 million tons in 2016. This is attributed to a significant increase in the number of vehicles purchased within the city and its environs as a result of improved road infrastructure by 6.9% from 2010 to 2016. It is also important to note that there are 20 registered petroleum firms in the country that are actively participating in the distribution of petroleum products. Most of these companies are based in Nairobi (KPRL Entitlement Statement for May, 2016).

The Port of Mombasa serves as the main entry point for all petroleum products supplied into the country. These products come in the form of crude oil as well as refined petroleum products. The Kenya Pipeline Company (KPC) and the Kenya Petroleum Refineries Limited (KPRL) first receive refined products and crude oil respectively on behalf of all the petroleum distribution companies. KPC then transports the refined products to other destinations in the country i.e. Nairobi and Eldoret, after which petroleum companies take over. Crude Oil on the other hand is processed into various petroleum products by KPRL under a processing agreement that allows it to take custody of specific quantities and types of crude oil on behalf of the petroleum firms.

According to Ann, Wilhelm, and Searcy (2011), the supply chain process of petroleum products globally involves three main activities conducted by both parties. First, oil and gas is explored then the production of crude oil follows. Afterwards, the crude oil is procured and shipped to various vendors. These activities are called the upstream activities. The next sets of activities are called the internal organizational supply chain activities. These include the processing of crude oil into refined products. Finally, the third sets of activities are called the downstream activities which include transportation, packaging, marketing, warehousing and distribution of finished petroleum products.

However, locally, the process of procurement begins at the downstream activities. This is because KPRL in conjunction with KPC will only release refined oil and gas products from the port of Mombasa. The process can therefore be summarized as follows; receipt of refined petroleum products at KPC, KPRL or at the Oil firms' depot, the receipt of crude oil by KPRL for refining, the transportation of the petroleum products received from KPRL and product stored at KPC by the pipeline or by oil tankers, and lastly, the distribution of the petroleum products to the end users.

In order to achieve impressive cost reduction, improve service delivery and meet end-customer needs successfully, petroleum distributing firms in the city have opted to use Supply Chain Collaboration. This is also an effort aimed at increasing competitiveness, creating shorter lead times, improving information visibility of petroleum products and finally having a clear division of responsibility among partners to the market for petroleum products.

1.2 Statement of the Problem

Petroleum markets are changing globally thus affecting the demand and supply patterns for its products. Local companies, more so in developing countries, have had to adopt to the global

practices in an effort to maximize the performance of their firms financially while at the same time keeping all allies and competitors in check. The most effective and desired way to achieve this is by adopting a strategy in the form of Supply Chain Collaboration. This is because such a strategy will not only ensure a balance between all stakeholders' needs i.e. customers, the organization itself and its suppliers but also melts down the firm as a whole under one effective platform. However, this is not the case as described by the current state of affairs. This gap between the desired state of affairs and the actual practice is what led the researcher to conduct this study.

Supply Chain Collaboration plays a vital role in improving and maintaining high standards of Supply Chain Management through processes such as supplier collaboration, common information systems and shared information (An et al, 2011). There are key processes that can be collaborated across the supply chain and they include customer relationship; service and demand management; order fulfillment; manufacturing flow management and also procurement and product development. Additionally, Treville, Shapiro and Hameri, (2014) added that Supply Chain Collaboration may involve just-in-time delivery, reduction of the supplier base, evaluating suppliers based on quality and delivery performance, establishing long-term contracts with suppliers, and eliminating paperwork. All these can be summarized in three distinct groups; customer collaboration, internal collaboration and supplier collaboration.

Kimani, (2013) while studying the Supply Chain Management Challenges in Kenya Petroleum Industry highlighted that the petroleum companies in Kenya have not integrated their supply chains fully. Moreover, According to the Economic Survey (2016), an increase in the demand for petroleum products has resulted to an increase in the number of firms offering this service to 20, meaning that competition has stiffened over the last decade or so. It is equally

important to note that all these firms offer the same goods and services in the form of petroleum products. As such, in order to stay competitive, it is prudent for them to engage in Supply Chain Collaboration. This will not only improve their individual Supply Chain Performance, but will also go a long way in creating a favorable and competitively balanced business environment that will result in better provision of goods and services to the end-consumer.

Supply Chain Management has received in recent years a great deal of attention by researchers and practitioners. For instance, Bahaidar (2014) conducted a study on the factors affecting supply chain management by oil companies in Kenya. Kimani, (2013) also conducted a study on Supply Chain Management challenges in Kenya petroleum industry by taking a case of national oil corporation of Kenya. Across the border in Rwanda, Njeri and Kabachia (2016) conducted a multi-survey on the effect of supply chain restructuring on performance of oil marketing companies in Rwanda. Finally, Saad, Udin and Hasnan (2012) conducted a study on the dynamic supply chain by taking a case of the oil and gas industry in Indonesia.

From the above mentioned studies, it is clear that little has been done about the effect of Supply Chain Collaboration on the Supply Chain Performance of the Petroleum industry. This study will take a case of Kenya's Petroleum Industry. The study is also set out to explain how Petroleum Companies in Nairobi can use Supply Chain Collaboration to improve their Supply Chain Performances since it is clear that the extent of the implementation of Supply Chain Collaboration and its effect on Supply Chain Collaboration is a major concern to Petroleum Companies in Kenya. The study therefore has the following research objectives;

1.3 Research Objectives

1.3.1 General Objectives

The general objective of this study was to establish the effect of Supply Chain Collaboration on the Supply Chain Performance of the Petroleum Companies in Nairobi.

1.3.2 Specific Objectives

The specific objectives tackled by the study included the following;

- i. To examine the extent of Customer Collaboration on the Supply Chain Performance of petroleum companies in Nairobi
- ii. To examine the extent of Supplier Collaboration on the Supply Chain Performance of petroleum companies in Nairobi
- iii. To examine the extent of Internal Collaboration on the Supply Chain Performance of petroleum companies in Nairobi

1.4 Research Questions

- i. To what extent has Customer Collaboration affected the Supply Chain Performance of Petroleum Companies in Nairobi?
- ii. How has Supplier Collaboration affected the Supply Chain Performance of Petroleum Companies in Nairobi?
- iii. To what extent has Internal Collaboration affected the Supply Chain Performance of Petroleum Companies in Nairobi?

1.5 Justification of the Study

This study was conducted to highlight the extent of implementation of Supply Chain Collaboration among Petroleum Companies in Nairobi and its effect on their Supply Chain Performance. It therefore follows that Petroleum Companies within the city and its environs stand to be the first benefactors of the study. They would not only be able to understand the dynamics surrounding the implementation of Supply Chain Collaboration, but also get to understand the challenges they are likely to face in its implementation. The current dynamic and competitive market for petroleum products requires these companies to understand what can be achieved by integrating with their key supply partners. Moreover, the study also intends to make recommendations based on the study findings regarding the way forward for these companies. This would be useful in formulating long lasting strategies.

Finally, the study intended to add to the vast body of knowledge already in place as far as the relationship between Supply Chain Collaboration and Supply Chain Performance is concerned. Results obtained from this study can be used as reference for individuals performing researches on related topics.

1.6 Scope of the Study

This study focused mainly on Petroleum Distributing Companies in Nairobi as indicated by the Energy Regulatory Commission's license register.

CHAPTER TWO

LITERATURE REVIEW

2.1: Introduction

This chapter examined the theoretical framework on which Supply Chain Collaboration is based. A review of empirical studies was also provided alongside the operationalization of the variables included in the study. The chapter finally presented a conceptual framework linking the elements of Supply Chain Collaboration to Supply Chain Performance.

2.2: Theoretical Framework

In order to bring out the rationale underlying the collaboration of supply chains, the study adopted the following theories; The Agency Theory, Resource Based View Theory and the Knowledge based View of the Firm. These theories have a strong connection to Supply Chain Collaboration and Supply Chain Performance and will thus provide an insight to the principles and practices of Supply Chain Management.

2.2.1 *Agency Theory*

The Agency Theory is concerned with the relationship between principals and agents in business. It directly relates to business relationships that consist of a principle and an agent engaged in a cooperative behavior despite having different goals and attitudes towards risk. This relationship is controlled using a contract between the principal and the agent. A contract can either be behavior based or outcome based depending on the situation the two parties are involved in. The heart of principal-agent theory is the trade-off between the cost of measuring behavior and the cost of measuring outcomes and transferring risk to the agent (Eisenhardt 2012).

The differences in goals and desires between principals and agents often arise due to several reasons. Eisenhardt (2012) pointed out that problems occur because the principal isn't aware of the actions of the agent or is prohibited by resources from acquiring the information. For instance, if an organization's executive officials wish to expand the business operations of the organizations, they may decide to sacrifice the short-term profitability of the organization in order to pursue prospective growth that will see the organization earn more profits in the future. However, shareholders are in most cases interested in higher current capital growth as opposed to future growth. This may bring a conflict of interest between these two parties (Hill and Jones, 2008).

The agency theory is also used to solve issues related to third party relationships. These issues are common in a Supply Chain Management setting (Shapiro, 2008). They are characterized by a principal and an agent who represents the principal in transactions with a third party. In a supply chain, there exist relations characterized by one firm delegating various tasks to another. This predisposes such relationships to potential conflicts of interest (Logan, 2011). A tradeoff is required by supply chain players between actions that will enhance their performance versus those of other players. In well performing supply chains, tools such as reward structures and cultural competitiveness are important leverages in ensuring alignment among participants' interests. In these supply chains, it is recognized that the sequential nature of supply chains inherently casts them as agents in some links and principals in others. This implies that the incentive to engage in self-centered behavior is low given that such behavior may lead to adverse outcomes resulting from possible retaliation from other partners (Logan, 2011).

Njagi and Ogutu (2014) while investigating the role of Supply Chain Collaboration on the Supply Chain Performance of state corporations in Kenya used this theory to anchor the

study's relationship between Supply Chain Collaboration and Supply Chain Performance. Similarly, Cheruiyot (2013) used this theory to establish the impact of Supply Chain Collaboration on Supply Chain Performance by taking a case of Kenya Tea Development Authority. The two studies are however different because they focused on two different timelines and sectors too. This is in relation to its relationship with these areas of study. As such, this study will also base its analysis on this theory.

2.2.2 Resource-Based View of the Firm

The Resource Based View theory is anchored on the view that firm's sustained competitive advantage results from unique resources and capabilities held by the firm (Lynch et al., 2011). Resources can be classified into organizational capital resources, physical capital resources and human capital resources (Barney, 2011). In order to fully leverage its assets. An organization requires capabilities that will enable it to co-ordinate activities and make use of their resources effectively. Proponents of the resource based view argue that organizations should look inside the firm to find the sources of competitive advantage instead of looking at the competitive environment. It is much more feasible to exploit external opportunities using existing resources in a new way rather than trying to acquire new skills for each different opportunity

Supply Chain Collaboration can be seen as an initiative that could endow the firm with competitively valuable resources and capabilities by enabling it to share resources held by the supplier organizations, gain operational efficiencies through such ways as cost reduction that results from building long term relationships that provide entitlement to purchase discounts and obtain reputation from association with similarly reputable supplier brands. (Grant, 2008). Additionally, Das and Teng (2000) argued that Supply Chain Collaboration may create synergies

that could eliminate interdepartmental barriers that impede full realization of the potential held by an organization's resources.

Several studies have anchored their study on this theory given its unique relationship with Supply Chain Collaboration. They include Bahaidar (2014) whose study involved the factors affecting supply chain management by oil companies in Kenya. Additionally, Kimani, (2013) who conducted a study on Supply Chain Management challenges in Kenya petroleum industry by taking a case of national oil corporation of Kenya, used this theory to elaborate his point. These studies were however different in that they focused on different sectors of the economy. This therefore means that this study can also adopt this theory to explain the effect of Supply Chain Collaboration of the Supply Chain Performance of Petroleum companies in Nairobi.

2.2.3 Knowledge-Based Theory of the Firm

According to the Knowledge Based View Theory, knowledge is the most strategically significant resource of a firm (Grant, 2008). Knowledge-based resources are complex and difficult to imitate and as such they form the major determinants of sustained competitive advantage and superior Supply Chain Performance (Sveiby, 2011).

In an organization, knowledge is engrafted in multiple several entities. They include systems, employees, identify and culture, policies, routines and documents. This perspective builds upon the resource-based view of the firm initially promoted by Penrose (2013) and later expanded by others (Wernerfelt 2013, Barney 2012, and Conner 2013). In order to effectively carry out Supply Chain Collaboration, knowledge is important. The choice of whether to collaborate its supply chain functions or outsource an activity to influences the efficient supply chain functions and protection of valuable knowledge and capabilities of an organization (Grant and Baden-Fuller, 2007). This theory also recognizes different supply chain' performance

indicators hence bringing about the need to collaborate different functions in supply chain players in order to increase the overall supply chain' objectives.

Similarly, given its strong relationship to the topic of study, this theory was adopted to show the link between the knowledge and the effectiveness of Supply Chain Collaboration as far as the Supply Chain Performance of an organization is concerned. Previous studies such as those done by Gichuhi (2013) on the relationship between business integration and Supply Chain Performance among commercial banks in Kenya and by Ndambuki, (2013) on relationship between S.C integration and S.C. performance among international Humanitarian organizations in Kenya adopted this theory. They were however different from each other such that the result obtained by each uniquely described the nature of supply chain collaboration in the respective sectors.

2.3 Empirical Review

Supply Chain Collaboration has drawn the interest of several researchers both locally and internationally, from which interesting insights relating Supply Chain Collaboration to Supply Chain Performance have emerged. Supply Chain Collaboration comprises of customer, supplier and internal collaboration. Various studies have been conducted to evaluate the effect of each one of these aspects. This section presented an empirical review of these studies conducted by the researcher.

2.3.1 Customer Collaboration

Customer Collaboration is defined as the way an organization use customer feedback to improve the performance of its business operations, products and services offered. It is a central component of Supply Chain Collaboration process that contributes to a business's ability to

compete. The customer is an integral part of the Supply Chain Collaboration of any given organization. This is as far as sharing of information and knowledge among members in the supply chain. This helps the organization in key areas of production including sales forecasting, production plans, inventory status and product development plans (Schubert and Koch, 2012). As a customer care approach, customer collaboration ventures beyond traditional call and contact centers, allowing customers to make their voices heard through directly interacting with businesses and their employees. Customer collaboration combines contact center technology and processes with active, effective engagement between customers and company staff. Most recently, social media has provided an effective platform making it a major component of business-customer collaboration (Hoda, Noble and Marshall, 2011).

Previous studies have used customer collaboration to explain the relationship between Supply Chain Collaboration and Supply Chain Performance. Kimani (2016) studied Supply Chain Collaboration and Performance of Commercial Banks in Kenya. Her research was a cross sectional study that used questionnaires as the main data collection tool. The researcher also interviewed respondents to identify how customer collaboration impacted Supply Chain Performance of the banks. Results indicate that there is a strong relationship between Customer collaboration and Supply Chain Performance of Commercial Banks. Specifically, the study found that customer satisfaction was greatly affected positively by Customer Collaboration. Responsiveness, Security, Trust and Reliability are some of the other advantages concluded with collaborating customers.

Mbasasi (2016) also conducted a research on factors affecting Supply Chain Collaboration in Large Manufacturing firms in Kenya. The objectives of this study were to determine the extent of Supply Chain Collaboration in large manufacturing firms in Kenya, to

establish the factors affecting Supply Chain Collaboration on large manufacturing firms in Kenya, and to determine the effect of the identified factors on the implementation of SCI on large manufacturing firms in Kenya. The study adopted a descriptive research design. The study established that there exists a strategic partnership between large manufacturing firms, their suppliers and their customers. These companies consult their suppliers and customers when values of their firm are being developed. In addition, the study found that manufacturing firms provide their suppliers and customers with information so that they can improve their quality and responsiveness, they maintain long term relationships between their firm and their suppliers, and that their firm seeks assurance of quality from both customer and suppliers.

Finally, a study conducted by Soita (2015) on the factors affecting supply chain collaboration in Government Ministries in Kenya revealed that there is collaboration between the Ministries and with various stakeholders in the supply chain. The found that the factors affecting supply chain collaboration in the Kenya Government Ministries include legal framework, quality of personnel, compliance with Supply Chain Management Policies, information technology and stakeholders involvement. The study highlighted that supply chain collaborative efforts should reach across the entire supply chain to help streamline essential processes such as product development and pricing, as well as reduce costs and improve responsiveness to customer demand.

The above studies have necessitated the importance of Customer collaboration in a Supply Chain. This study intends to identify its relationship with Supply Chain Performance in the Petroleum industry in Kenya. Based on the results obtained by previous researchers, it is expected that the relationship will be positive too.

2..3.2 Internal Collaboration

Internal Collaboration involves all the activities in an organization that concludes with providing a product to the end-customer. It therefore is a process that involves different departments such as sales, production and distribution. Ellinger, Daugherty and Keller (2009) described internal collaboration as the quality of collaboration that exists between departments within an organization. By collaborating, these functions will help bring about a seamless customer service, which in turn leads to an improved company performance. Leading companies are plugging into current economic volatility to switch up their supply chains and make a connection between internal logistics departments.

Several studies have been put forth to explain how Internal Integration serves to improve Supply Chain Performance. For instance, Njagi and Ogutu (2014) investigated the role of Internal Supply Chain Collaboration on the Supply Chain Performance of state corporations in Kenya by establishing how the integration of internal operations, customers and suppliers into the supply chain affect Supply Chain Performance. The study employed a descriptive study design. Internal integration, customer and supplier integration boosted the performance of supply chain through cost reduction, short lead times and improved quality. The study used structured questionnaires to obtain responses from managers employed to take part in the study. Data collected was analyzed using descriptive and correlation analysis. Results indicated that most state corporations were indeed integrated, with the integration index at 57.4%. This was evidenced by the fact that most of them shared the same vision, interact with each other during meetings and are able to access each other's ideas, information and resources. As far as external integration is concerned, study results revealed that the corporations integrated suppliers through interactions via the internet such as placing orders through the internet. The study also pointed

out that customer information is utilized in demand management ball state corporations. This brought about a real time communication effect that made it easier to manage customer relationships and create room for quick and reliable customer response.

Cheruiyot (2013) also conducted a study to establish the impact of Internal Supply Chain Collaboration on Supply Chain Performance by taking a case of Kenya Tea Development Authority. The study was a survey of all 165 tea factories managed by KTDA in Kenya. Questionnaires were used for data collection. Data analysis comprised of demographic and regression analysis. Results indicated that Internal Supply Integration affected Supply Chain Performance positively reducing raw material purchasing costs, transport costs, distribution costs, asset turnover and inventory handling costs is concerned.

On the other hand, Gichuhi (2013) conducted a study to establish the relationship between internal business integration and Supply Chain Performance among commercial banks in Kenya. The study was first set to establish commercial banks that have integrated their business functions before identifying the relationship between the integrated business functions and Supply Chain Performance. The design employed was a cross sectional survey of all commercial banks in Kenya. Data was collected using questionnaires, after which percentages and frequencies as well as regression analysis was used to analyze it. Results indicate that most commercial banks in Kenya have integrated their business functions. An R-square of 0.789 implied that 78.9% of information sharing, on time supply chain decisions; better supplier relationship management and efficiency in supply chain management explained Supply Chain Performance.

2.3.3 *Supplier Collaboration*

Supplier Collaboration is defined as an external collaboration strategy that involves the organization and its suppliers in a bid to enable long-term competitiveness of the supply chain as a whole. Cao and Zhang (2011) argued that maintaining linkages with suppliers coordinates upward and downward material flow along the supply chain. This is a crucial aspect of ensuring that the supply chain management remains effective. It is also important to note that this kind of collaboration is a necessary prerequisite for internal collaboration. The collaboration of a firm with its suppliers is the result of a strategic collaboration between them. This is the result of a mutual and ongoing relationship that involves a high level of trust, commitment over time, long-term contracts, joint conflict resolution, and the sharing of risks and rewards (Vickery, Jayaram, Droge, and Calantone, 2013). Such joint efforts are essential for achieving time-based performance as well as product quality and innovation.

Several researchers have been interested to identify how Supplier Collaboration relates with organizational Supply Chain Performance. Ndambuki, (2013) was interested with establishing the relationship between Supplier Collaboration and Supply Chain Performance among international Humanitarian organizations in Kenya. The study adopted a census survey research design and chose seventeen (17) international Humanitarian organizations operating in Kenya. Data was collected through self-administered structured questionnaires. The data was analyzed and presented using mean and percentages. Correlation was undertaken to establish the relationship of the variables. Results indicate that humanitarian organizations in Kenya have integrated their supply chain practices. The study established that information sharing resulted in reduced lead-time in the organization, improving Supply Chain Performance and easy order processing. Integration resulted in increased efficiency, leading to the use of KPIs to measure

performance. The correlation analysis findings were that the performance of the humanitarian organizations was affected by sharing of information, faster decision making, supplier relationship management and efficiency in supply.

Odanga, (2014) also conducted a study on the factors that influence Supply Chain Collaboration in Public entities in Kenya. The study targeted National government public entities and collected data using questionnaires. Data was analyzed using descriptive statistics. Results indicated that many government institutions collaborated their supply chain in general. They had collaborated their supply of non-core functions such as transportation, food and catering, security and technology. Correlation of the factors that influence Supply Chain Collaboration established a weak to moderate relationship which was a confirmation that the factors are indeed independent. The study also established that public entities ensure that there is adequate technological infrastructure, high level of information sharing and progressive regulations in order to enhance competitiveness through Supply Chain Collaboration. Improvement in Supply Chain Collaboration can be nurtured through partnerships; creativity; awareness; regulations, performance and contracting. This will ensure that the organization's supply chain performance remains high.

Ijomba (2010) also illustrated how Supplier collaboration is important to Supply Chain performance through his study on the effects of integrated supply chain on the performance of Nairobi Bottlers limited. The study used a case study research design and analyzed data using content and descriptive analysis. The study established that the organization really benefited from integrated supply chain on its operations which was evident on increased profitability and increased customer satisfaction since its adoption.

The studies above have elaborated how Supplier Collaboration is key to having a successful Supply Chain Performance. This study intends to establish this relationship as far as Petroleum industry in Kenya is concerned. The study expects to establish a positive relationship.

2.4 Conceptual Framework

The conceptual framework adopted by this study was developed based on Closs and Savitskie's (2013) model of individual effects that presented a unique relationship between supply chain

Collaboration and Supply Chain Performance. The study's dependent variable is Supply Chain Performance while the independent variable is Supply Chain Collaboration. Supply Chain Collaboration includes the collaboration of customers, suppliers and internal collaboration into the supply chain. This is captured in figure 2. The study will collect qualitative data on all the four variables. Respondents will be issued with 5 Point Likert Scaled questionnaires containing statements regarding individual variables.

Independent Variable

Dependent variable

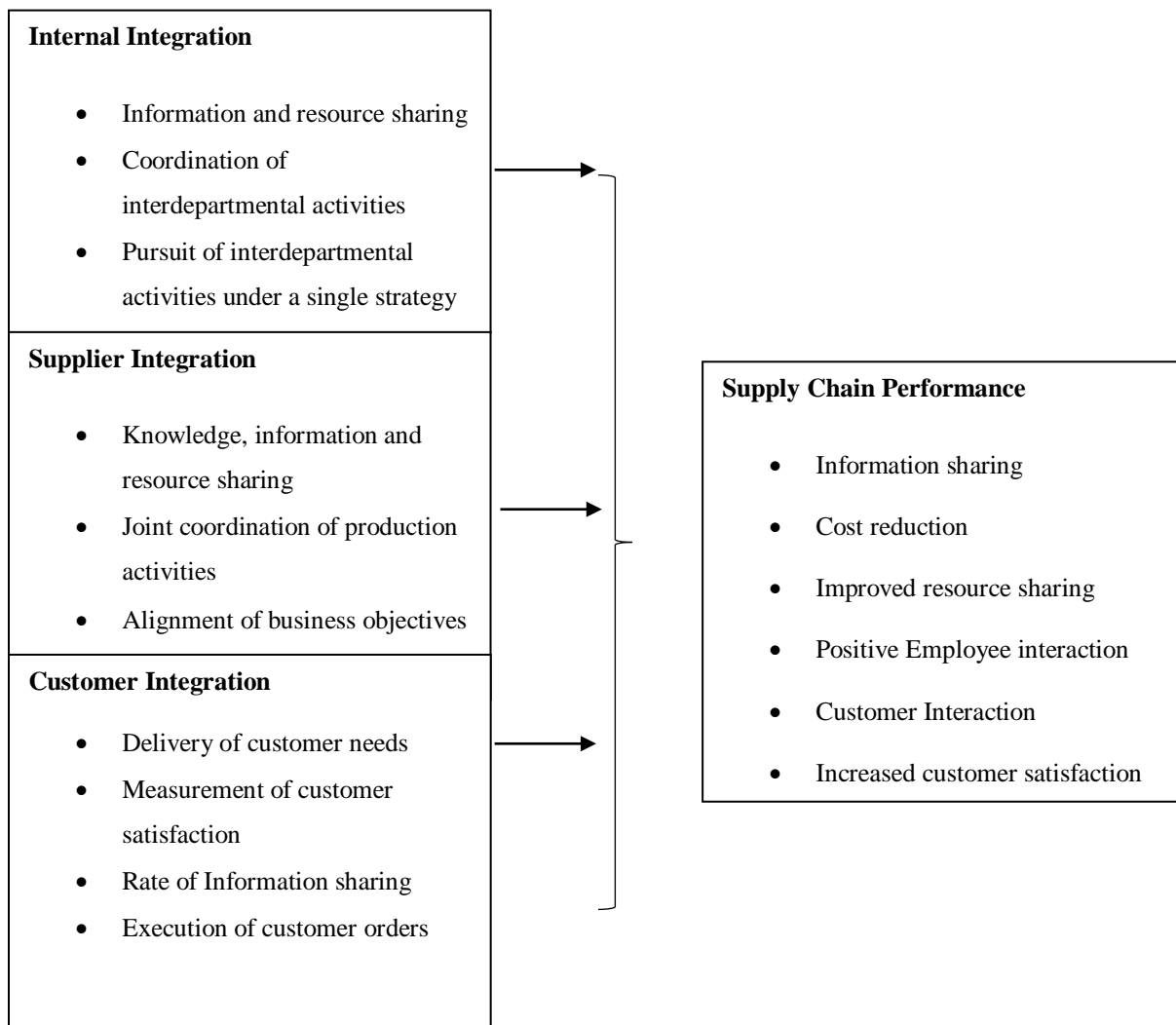


Figure 2. 1 Conceptual Framework.

2.5 Critique of the Literature Review

Discussions on theoretical review revealed three main philosophical theories that the study adopted in an effort to establish the link between Supply Chain Collaboration and Supply Chain Performance. These include the Agency Theory, the Resource Based View theory and Knowledge Based theory of the firm. While the Agency theory advocated for a better relationship between the principal and the agent by acting as the negotiator, the resource based view and knowledge based theories of the firm highlighted the importance of having the main assets in the form of resources and knowledge.

However, critics are quick to point out that the Agency theory presupposes the view that human responsibility and freedom are logically incompatible (Fontrodona and Sison, 2016). On the other hand, Kraaijenbrink, Spender and Groen, (2010) feel that the Resource Based View community has clung to an inappropriately narrow neoclassical economic rationality, thereby diminishing its opportunities for progress. The Knowledge Based View theory of the firm has attracted great interest as it reflects that academia recognizes the fundamental economic changes resulting from cumulatively and availability of knowledge in the past two decades. However, there is still no common language or unifying paradigm that gathers all those researching in organizational knowledge, so there is the necessity to develop a largely accepted vocabulary able to unite researchers (Curado, 2016).

The empirical literature reviewed by this study also illustrated a research gap as far as the effect of Supply Chain Collaboration on Supply Chain Performance of petroleum companies is concerned. Many researchers have studied on the overall Supply Chain Management and how it affects the performance of various organizations in various sectors. By taking a case of the

petroleum industry in Kenya, this study will seek to add knowledge on Supply Chain Collaboration to the body of academia

2.6 Operationalization of the Variables

Table 2. 1 Operationalization of the variables

Type of Variable	Variable	Indicator	Level of Measurement	Data collection Method
Dependent	Supply Chain Performance	<ul style="list-style-type: none"> •Information sharing •Cost reduction •Improved resource sharing •Positive Employee interaction •Customer Interaction •Increased customer satisfaction 	Ordinal	Structured Questionnaire
Independent	Internal Collaboration	<ul style="list-style-type: none"> •Information and resource sharing •Coordination of interdepartmental activities •Pursuit of interdepartmental activities 	Ordinal	Structured Questionnaire
Independent	Supplier Collaboration	<ul style="list-style-type: none"> •Knowledge, information and resource sharing •Joint coordination of production activities •Alignment of business objectives 	Ordinal	Structured Questionnaire
Independent	Customer Collaboration	<ul style="list-style-type: none"> •Delivery of customer needs •Measurement of customer satisfaction •Rate of Information sharing •Execution of customer orders 	Ordinal	Structured Questionnaire

2.7 Research Hypothesis

The following were the research hypothesis for this study:

- i. *H₀₁: Customer Collaboration does not have a significant effect on Supply Chain Performance*
- ii. *H₀₂: Supplier Collaboration does not have a significant effect on Supply Chain Performance.*
- iii. *H₀₃: Internal Collaboration does not have a significant effect on Supply Chain Performance*

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter presented the research methodology that was adopted by the study. This included the research design, target population, sampling and sampling procedure, research instrument, validity and reliability of the instrument and finally the data collection procedures, processing and analysis.

3.2 Research design

This research adopted a descriptive design and focused on describing Supply Chain Collaboration in Petroleum companies in Nairobi. This research design was preferred because it allowed for accumulation of information of findings from all forms of data such as personal accounts, case studies or observations made by the respondents concerning the topic of study. This therefore made it possible to best describe the nature of the topic in hand and allowed for a complete and accurate assessment (Lambert, 2012).

3.3 Target Population

The unit of analysis for this study is petroleum companies. As such, this study included all petroleum companies based in Nairobi, Starehe Constituency. There are a total of 45 operational petroleum companies in Kenya. Of these, seven (7) constitute the largest market share. These are Total Kenya with 14.2%, Kenol Kobil with 13.8%, Vivo Energy with 13.0%, Gulf Energy with 7.8%, Hashi with 7.3%, OiL Libya with 4.6%, and finally National Oil Corporation of Kenya, NOCK with 4.5% (Appendix III). All these petroleum companies are all licensed under the Energy Regulatory Commission (ERC) (Energy Regulatory Commission, 2015).

There are three levels of Supply chain management in each company i.e. Senior Management, Middle Management and Supply Chain Managers. This is represented in the table below;

Company	Senior Management	Middle Management	Supply Chain Managers	Total
Total	5	4	4	13
Kenol Kobil	3	4	3	10
Vivo Energy	3	3	4	10
Gulf Energy	4	5	4	13
Hashi	4	4	6	14
Libya Oil	3	3	4	10
Nock	4	3	4	11
Total	26	26	29	81

Source: Annual Reports , (2015).

It is important to note that these individuals are considered because they are in the best position to explain Supply Chain Collaboration in their respective organizations.

3.4 Sampling and Sampling Procedure

As highlighted by Cooper and Schinder, (2006), representation is key to achieving the right results. Including more data in any given sample increases the accuracy of the results obtained and at the same time reduces the error of the parameter estimate (Cooper and Schinder, 2006). This study included the entire target population. As such, it was a census and a total of 81 respondents were included in the study.

3.5 Research Instrument

This study adopted questionnaires as its research instrument. Questionnaires were a suitable instrument because they gave the researcher a larger scope under which to conduct the research. It was also preferable to use them because they allowed respondents to give more candid and objective responses to research questions (Rowley, 2014).

The questionnaire adopted by this study consisted of structured questions. Structured questions were useful since they reduced variability in meanings possessed by questions. They also offered ways of ensuring comparability of the responses given by respondents (Orodha, 2004). The questions were also structured based on a 5 point Likert Scale so as to obtain the most complete and accurate information possible. This allowed easy analysis using descriptive statistics (Allen and Seaman, 2007).

3.6 Validity and Reliability of the instrument

A research instrument is valid if it can measure all the variables in the study (Golafshani, 2003). Being the research instrument, the questionnaire was vetted to make sure that its content measures all the variables involved in this study. The process of validation involves collecting and analyzing pilot data to assess the accuracy of the instrument. In this case, the researcher piloted test 5 questionnaires. The data collected was then used to validate the questionnaires.

Reliability on the other hand refers to consistency. It is used to determine whether the instrument consistently measures the variables involved in a study (Golafshani, 2003). This study employed the test-retest reliability test, where the consistency of the questionnaire was evaluated over time. The researcher administered the questionnaires to two different groups; one with individuals not selected in the sample, and another with individuals selected in the sample. The study then used Cronbach's alpha (Using SPSS version 22) to test for internal consistency. This revealed whether the scale used in the questionnaires is reliable. A Cronbach's alpha of 0.7 was found to be acceptable.

3.7 Data collection procedure

The data collection procedure includes the distribution and collection of self-administered questionnaires. This study used the drop-and-collect-later method of data collection. The researcher first sought permission from authority i.e. management of individual petroleum companies. Once this permission was given, the researcher went on to inform all those individuals who had been selected in the sample that they would be partaking in a research. The purposes of the study as well as the objectives were communicated to the respondents on time. The next step involved distributing the questionnaires to the sampled individuals. Respondents were then given time to fill and submit the questionnaires back for analysis. This process took approximately 2 weeks. After this process, the data collected was ready for analysis.

3.8 Data Processing and analysis

The process of data processing and analysis began after all the questionnaires had been submitted back for analysis. The data collected was then be analyzed using descriptive statistics and multiple regression analysis. Descriptive statistics, which includes means, frequencies, standard deviation and percentages was used to describe the demographic factors of the target population. The data was then presented in the form of tables and graphs. A multiple regression equation was used to explain the effect of the components of Supply Chain Collaboration on Supply Chain Performance. The analytical model that was adopted by the study was as follows;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

Where ;

Y= Supply Chain Performance

X₁= Customer Collaboration

X_2 = Supplier Collaboration

X_3 = Internal Collaboration

β_1 - coefficient for Customer Collaboration

β_2 - coefficient for Supplier Collaboration

β_3 - coefficient for Internal Collaboration

ϵ - Error term

The researcher used Statistical Packages for Social Sciences (SPSS) version 22 to analyze data.

3.8 Diagnostic tests

Diagnostic tests were conducted to assess the validity of a regression model. These test procedures are necessary so as to detect violations of the linear model's assumptions, gauge the severity of the violations and take appropriate remedial action.

3.8.1 Ramsey Regression Equation Specification Error Test (RESET)

RESET tests whether linear combinations of the fitted values explain the response variable (Cohen, West and Aiken, 2013). The test will investigate if the regression model adopted by this study satisfies multiple linear regression assumptions, such that no non-linear functions of the independent variables should be significant when added to the equation. Results from this F-test was also used to check for any omitted variables or irrelevant variables.

3.8.2 The Breusch-Pagan Heteroscedasticity Test

The Breusch-Pagan Test for heteroscedasticity was used to check that there is a constant variance in the fitted variables. This was achieved by testing the variances and standard deviations of the model (Cohen, West and Aiken, 2013). The test statistic for this study approximately followed a

chi-square distribution. A small chi-square value along with an associated small p-value will indicate that the null hypothesis is true, which means that the variances are all equal.

3.8.3 Variance Inflation Factors (VIF)

A variance inflation factor (VIF) was used by the researcher to detect multicollinearity in regression analysis. Multicollinearity refers to the relationship among the independent variables. Multicollinearity exists if the independent variables are highly correlated. Its presence can adversely affect the regression results of the study. (Cohen, West and Aiken, 2013). Multicollinearity can be detected by analyzing Variation Inflation Factors (VIFs).

The VIF was also used to estimate how much the variance of the study's regression coefficient is inflated due to multicollinearity in the model.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

The data analysis, presentation and interpretation were presented in this chapter. It included the results of both descriptive statistics and regression analysis. Regarding descriptive analysis, frequency distributions as well as percentages were used to present the demographic information about the respondents while the mean and percentages were used to present the analysis of the various components of Supply Chain Collaboration as reported by the respondents. Regression analysis on the other hand was conducted to establish the relationship between Supply Chain Collaboration and Supply Chain Performance of Petroleum Companies in Nairobi.

4.2 Reliability Test Results

Reliability refers to the consistency of measure. The Cronbach's Alpha is the measure of internal consistency. It provides an overall reliability coefficient for a set of variables and is most commonly used when you want to assess the internal consistency of a questionnaire or survey that is made up of multiple Likert-type scales and items. This test was identified to assess whether the Likert scale chosen for the study was reliable.

Table 4. 1 Reliability Test

Reliability Statistics		
Cronbach's Alpha	Cronbach's alpha based on Standardized Items	N of Items
0.805	0.796	41

From table 4.1 above, a Cronbach's alpha value of 0.805 indicated a high level of internal consistency. As such, the scale used by the study indicates that the questions are closely related as a group, consequently implying high reliability.

4.3 Response Rate

The total number of questionnaires administered to 81 respondents selected from various petroleum companies around Nairobi were to be analyzed. The researcher managed to get feedback from a total of 75 duly filled questionnaires, which constituted a response rate of 92.59%. This was deemed sufficient to draw conclusions for the entire population as indicated by De Vaus, (2013), who points out that a response rate of 80% and above obtained from a sample size is considered adequate for a study to draw conclusions.

4.4 Demographic Information

This section presented the results of the general information of the respondents regarding their gender, age bracket, highest level of education, job position held and the duration in that position in terms of years. This information was collected so as to enable the researcher determine if the respondents were the right fit for the study. Additionally, information regarding the components of Supply Chain Collaboration implemented by various petroleum companies was also sought by the researcher. This section therefore presents the analysis of these demographic statistics as well as their implication.

4.4.1 Gender of Respondents

As far as the gender of the respondents was concerned, the study found that 57.3% of the respondents were female while 42.7% were male. This signifies that gender parity was achieved during the study.

4.4.2 Age Bracket Respondents

The respondents also indicated their age bracket whose analysis is presented in Table 4.2

Table 4. 2 Age Bracket of the respondents

Age Bracket	Percentage
26-30 years	26.7
31-35 years	32
36-40 years	30.7
41-50 years	10.7
Total	100

Results revealed that most respondents were between the age of 31 and 35 years. This was represented by 32 %. Those between 36 and 40 years followed closely with 30.7% while 26.7% of them were between 26 and 30 years. Only 10.7% 18.3% were between 41 and 50 years. The implication of this is that majority of the respondents were eligible to take part in a research.

4.4.3 Level of Education

The study also investigated the level of education possessed by each respondent included in the study. It was revealed that 54.7% of the respondents were undergraduates while 45.3% had attained post-graduate level of education. The significance of this is that the respondents included in the study had the basic knowledge required to answer the answers provided to them.

4.4.4 Job Position Held

The researcher asked the respondents about their job designations. The results of the study area as shown in Table 4.2 below:

Table 4. 3 Job Position Held

Level of education	Frequency	Percent
Supply Chain Manager	24	32.0
Procurement Officer	21	28.0
Operations Manager	17	22.7
Logistics Manager	8	10.7

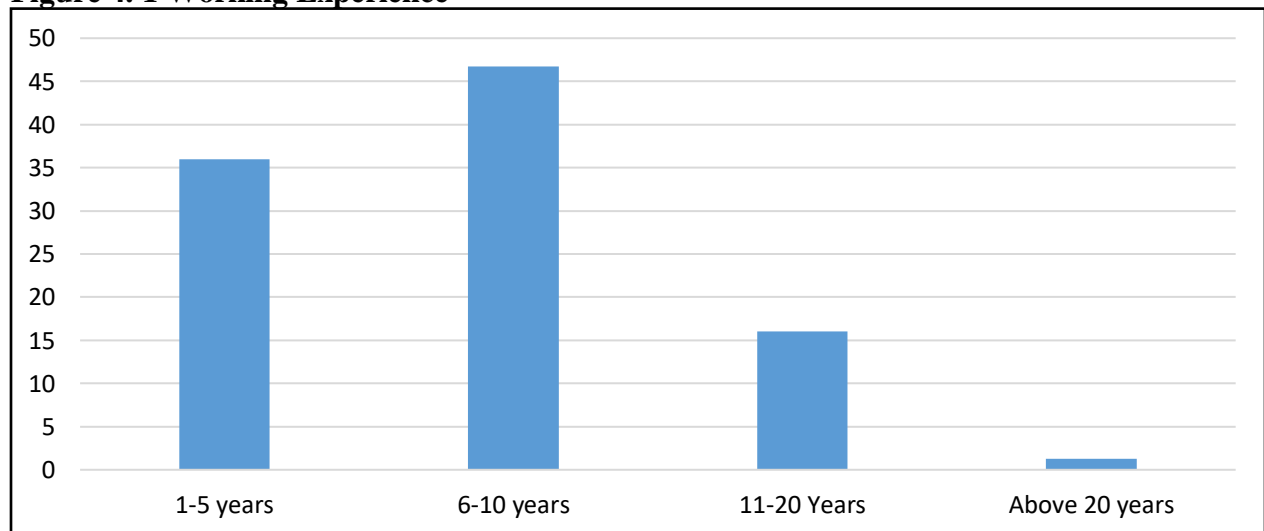
Marketing Manager	5	6.7
Total	75	100.0

From the table above, the majority of the respondents were supply chain managers at 32%. Next were procurement officers at 28%, operations managers at 10.7% and finally only 6.7% were logistics managers. This clearly indicated that all the respondents worked in areas that are closely related to the topic of study and would therefore be in the right position to answer the questions contained in the questionnaire. This meant that the researcher collected relevant information from relevant respondents.

4.4.5 Work Experience

The study further sought to know the duration of time the respondents had been holding their job positions. The study findings are as shown in Figure 4.2

Figure 4. 1 Working Experience



From the bar chart above, it was revealed that 46.7% of the respondents had worked in their designated job positions between 6 and 10 years, 36% between 1 and 5 years while 16% had

worked between 11 and 20 years. Only 1.3% had worked above 20 years. Never the less, this implies that the respondents have been in their designated jobs long enough to understand various issues outlined in the topic of study, and as such, are in the best position to take part in the study. It further strengthens the claim that the respondents chosen were the best to take part in the study based on the level of experience their experience indicates they have.

4.4.6 Extent to which the Supply Chain is Integrated.

The study also inquired on the extent to which the petroleum companies under study integrated their Supply Chains.

Table 4. 4 Extent to which the Supply Chain is integrated.

Extent	Frequency	Percentage
High	35	46.67
Very High	24	32
Moderate	12	16
Low	4	5.33
Total	75	100

From Table 4.4 above, majority of the respondents indicated that their supply chains are integrated to a high level at 46.67%. 32% indicated that their companies integrated their supply chains to a very high extent while 16% integrated them to a moderate extent. Only 4% of them indicated that they integrated supply chains to a low extent while none of them did so to a low extent. On average therefore, it established that the petroleum companies that took part in the study integrated their supply chains to a high extent.

4.5 Descriptive Statistics Results

This section presents the analysis of the main objectives of the study as presented by the respondents. The researcher constructed questions on each objective based on a Likert Scale. As

such, mean scores were used to analyze the responses as indicated by the respondents who took part in the study. The scale used as the interpretation key was as follows:

- 1-1.49 = Very Low Extent
- 1.5-2.49 = Low Extent
- 2.5-3.49 = Moderate Extent
- 3.5-4.49 = Large Extent
- 4.5-5 = Very Large Extent.

4.5.1 Effect of Customer Collaboration on Supply Chain Performance.

Table 4.5 presents that respondent’s feedback on the effect of effect of Customer Collaboration on Supply Chain Performance of petroleum companies as indicated by the respondents on each question.

Table 4. 5 Effect of Customer Collaboration on Supply Chain Performance.

Question	Mean
Customer data is systematically collected for aggregation into an integrated database	4.11
We share details of order status with our customers	4.00
Delivery status information is shared with our customers	3.99
Customer orders are tracked from the time of placement to execution	3.96
Our competitive strategies are based on customer needs	3.79
We interact with our customers on various internet enabled platforms	3.59
We share information with our customers regarding product usage and other details regarding the products	3.59
We have mechanisms for measuring customer satisfaction	3.49
We invite our customers to participate in the design of new products	3.43
We frequently measure customer satisfaction levels to track any changes	3.37
There are systems that track the progress of delivery of various goods to our customers	3.08
Average	3.67

From Table 4.5 above, an average mean score of 3.67 implies that majority of the respondents agree that customer collaboration affects Supply Chain Performance to a large extent. This is as far as systemization of customer data, order status sharing, delivery status information, increasing competitive advantage, customer interaction and product usage information is concerned. Additionally, customer collaboration also results to increased customer satisfaction and participation, as well as efficient tracking of the delivery of goods and services.

4.5.2 Effect of Supplier Collaboration on Supply Chain Performance.

Table 4.6 presents the findings as indicated by the respondents regarding the effect of Supplier Collaboration on Supply Chain Performance.

Table 4. 6 The Effect of Supplier Collaboration on Supply Chain Performance.

Question	Mean
We share inventory status information with suppliers	4.31
We provide our suppliers with helpful information regarding their operations	4.17
We share sales forecast information with our suppliers	4.09
Our business objectives are aligned to those of our suppliers	4.09
Our information systems are interlinked with those of our suppliers	4.04
Suppliers are provided with details of product design and manufacturing data	3.93
We share production plans with our suppliers	3.85
We regularly interact with our suppliers in mutual information exchanges regarding operating activities	3.80
Suppliers' input regarding product attributes are considered during product development	3.75
We have strategic suppliers for various product and service supplies	3.55
Average	3.96

Similarly, based on the mean score scale, an average mean score of 3.96 implies that majority of the respondents agreed that supplier collaboration affects Supply chain performance to a large extent. They agreed that supplier collaboration improves inventory status information sharing, provides suppliers with helpful information with regards to their operations, improve sharing of

sales forecast with suppliers and helps align business objectives with suppliers. It also helps to provide suppliers with the details of product design and manufacturing data, share company plans, interact regularly and get to engage their input regarding product attributes as well as have strategic suppliers for various product and service supplies.

4.5.3 Effect of Internal Collaboration on Supply Chain Performance.

The study also investigated the effect of Internal Collaboration on Supply Chain Performance.

Table 4.7 presents the results obtained.

Table 4. 7 The Effect of Internal Collaboration on Supply Chain Performance.

Questions	Mean
Information systems in different departments are connected into a single department	4.37
The pursuit of various departmental objectives is harmonized	4.28
All employees are allowed to access all information they may require in execution of their tasks	4.21
The resources required in task execution are shared among the different departments	4.17
Linkages have been established across various departments with the use of integration tools such as ERP systems	4.16
We utilize IT tools in facilitating information access	4.03
Different departments engage in information exchanges	4.03
Departmental plans and objectives are set jointly	4.00
Employees regularly interact with each other through such means as meetings, email	3.67
The activities in various departments are coordinated centrally	3.44
Average	4.04

Results in Table 4.7 above, an average mean score of 4.04 was attained, which implies that a majority of the respondents agreed that Internal Collaboration affects Supply Chain Performance to a great extent. Indeed, they agreed that it is through integrating internally that information systems in different departments are connected into a single department, the pursuit of various departmental objectives is harmonized, all employees are allowed to access all information they may require in execution of their tasks and the resources required in task execution are shared

among the different departments. Moreover, it allows linkages to be established across various departments with the use of integration tools such as ERP systems as well as the utilization of IT tools in facilitating information access. Finally, different departments engage in information exchanges, departmental plans and objectives are set jointly, employees regularly interact with each other through such means as meetings, email and the activities in various departments are coordinated centrally through it.

4.6 Regression Analysis results

The study conducted a multiple regression analysis to determine the relationship between the independent and the dependent variables. In this case, the dependent variable was Supply Chain Performance while the independent variables were Customer Collaboration, Supplier Collaboration and Internal Collaboration.

Table 4. 8 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.648 ^a	.419	.426	.17819
a. Predictors: (Constant), Internal Collaboration, Customer Collaboration, Supplier Collaboration				

The Model Summary Table 4.8 above provides information about the regression line's ability to account for the total variation in the dependent variable. From The table, the coefficient of determination was found to be 0.419 indicating that the independent variables, i.e. Internal Collaboration, Customer Collaboration and Supplier Collaboration account for 41.9% of the variability in Supply Chain Performance. This therefore means that the remaining 58.1% is explained by other factors that affect firm performance.

Table 4. 9 ANOVA Test Results

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.781	3	.260	8.202	.000 ^b
	Residual	2.254	71	.032		
	Total	3.035	74			
a. Dependent Variable: Supply Chain Performance						
b. Predictors: (Constant), Internal Collaboration, Customer Collaboration, Supplier Collaboration						
Critical F= 2.73365						

Table 4.9 above shows the Analysis of Variance (ANOVA) from the regression analysis. From the table, the F statistic was 8.202 with a p-value of 0.000 which is less than 0.05. The study therefore observed that the independent variables were significant in explaining the variations in the dependent variable. This implies that the regression model was significant in explaining the relationship between Customer Collaboration, Internal Collaboration, Supplier Collaboration and Supply Chain Performance.

Table 4. 10 Coefficient Table

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.232	.391		5.709	.000
	Customer Collaboration	.233	.088	.344	2.652	.010
	Supplier Collaboration	.266	.069	.126	3.855	.007
	Internal Collaboration	.308	.075	.423	4.108	.000
a. Dependent Variable: Supply Chain Performance						
Critical T=1.66571						

From the coefficient table 4.7, the following regression equation was obtained.

$$Y = 2.232 + 0.233X_1 + 0.266X_2 + 0.308X_3$$

Where Y= Supply Chain Performance

X₁= Customer Collaboration

X_2 = Supplier Collaboration

X_3 = Internal Collaboration

The coefficients obtained above are interpreted as follows;

β_1 - coefficient for Customer Collaboration= 0.233. This implies that holding Supplier and Internal Collaboration constant, a unit increase in Customer Collaboration will increase Supply Chain Performance of petroleum companies by 0.233 units.

β_2 - coefficient for Supplier Collaboration= 0.266. This implies that holding Customer and Integrating Collaboration constant, a unit increase in Supplier Collaboration will increase Supply Chain Performance of petroleum companies by 0.266 units.

β_3 - coefficient for Internal Collaboration = 0.308. Finally, this implies that holding Customer and Supplier Collaboration constant, a unit increase in Internal Collaboration will increase Supply Chain Performance of petroleum companies by 0.308 units.

β_0 –Constant =2.232. This implies that holding all components of supply chain collaboration constant, the Supply Chain Performance of petroleum companies would be at 2.232.

In reference to table 4.10 above, the study examined the significance of the independent variables.

Customer Collaboration had a p value of 0.010

Supplier Collaboration had a p value of 0.007

Internal Collaboration had a p value of 0.000

The three variables were all significant (p value less than 0.05) in predicting the dependent variable

4.7 Diagnostic Tests

4.7.1 Heteroscedasticity Tests

The Breusch-Pagan Test for Heteroscedasticity was used to check if there was a constant variance in the fitted variables. Table 4.11 indicates these results.

Table 4. 11 Breusch-Pagan test statistics and sig-values

	LM	Sig
BP	1.87458	.684

To test for heteroscedasticity, the null hypothesis was that heteroscedasticity not present. On the other hand, the alternative Hypothesis was that heteroscedasticity is present. The Rejection criteria in this case would be that if sig-value less than 0.05, reject the null hypothesis. Since the significant value (0.684) greater than 0.05 hence fail to reject null hypothesis. This implies that heteroscedasticity is not present.

4.7.2 Variance Inflation Factor

Finally, VIF tests were used to estimate how much the variance of the study's regression coefficient is inflated due to multicollinearity in the model. A VIF value of 5.0 and above indicates high levels of collinearity. As observed in table 4.12 below, VIF values for the variables is low, thus it was concluded that there was relatively low levels of multicollinearity.

Table 4. 12 VIF test results

Collinearity Statistics		
	Tolerance	VIF
Customer Collaboration	0.741	3.278
Supplier Collaboration	0.285	1.457
Internal Collaboration	0.178	4.487

4.8 Hypothesis Testing

This section presents the results of the hypothesis testing that was carried out by the study. Using the P-Value approach, if the P-value is less than (or equal to) α , then the null hypothesis is rejected in favor of the alternative hypothesis. If the P-value is greater than α , then the null hypothesis is not rejected.

4.8.1 Customer Collaboration does not have a significant effect on Supply Chain

Performance

The following procedure was used to test the first hypothesis for the study;

Null hypothesis: Customer Collaboration does not have a significant effect on Supply Chain Performance

Alternative Hypothesis: Customer Collaboration has a significant effect on Supply Chain Performance.

From the Coefficients table 4.10 above, $T = 2.652$, $p\text{-value} = 0.010$. Since $p\text{-value} = 0.010 < 0.05$, the study rejected the null hypothesis.

This implies that at $\alpha = 0.05$ level of significance, there exists enough evidence to conclude that Customer Collaboration is useful as a predictor of Supply Chain Performance.

4.8.2 Supplier Collaboration does not have a significant effect on Supply Chain

Performance.

The following procedure was used to test the first hypothesis for the study;

Null hypothesis: Supplier Collaboration does not have a significant effect on Supply Chain Performance.

Alternative Hypothesis: Supplier Collaboration has a significant effect on Supply Chain Performance.

From the Coefficients table 4.10 above, $T = 3.855$, $p\text{-value} = 0.007$. Since $p\text{-value} = 0.007 < 0.05$, the study rejected the null hypothesis.

The conclusion therefore becomes: Since, $p = 0.007 < 0.05$, Supplier Collaboration has a significant effect on Supply Chain Performance.

4.8.3 Internal Collaboration does not have a significant effect on Supply Chain Performance

The following procedure was used to test the first hypothesis for the study;

Null hypothesis: Internal Collaboration does not have a significant effect on Supply Chain Performance

Alternative Hypothesis: Internal Collaboration has a significant effect on Supply Chain Performance

From the Coefficients table 4.10 above, $T = 4.108$, $p\text{-value} = 0.000$. Since $p\text{-value} = 0.000 < 0.05$, the study rejected the null hypothesis.

This implies that at $\alpha = 0.05$ level of significance, there exists enough evidence to conclude that Internal Collaboration is useful as a predictor of Supply Chain Performance.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the study, discussion of the findings, conclusions, recommendations, limitations and suggestions for further study. Under the summary, a thorough review of the analysis has been presented where each key finding has been revealed in detail. The deeper meanings of the findings are then elaborated under the discussion of the findings after which conclusions drawn thereafter are outlined in the conclusions section. The study also made a number of recommendations to the stakeholders closely related to the study, gave out limitations that were experienced during the execution of the study and finally suggested areas of further study.

5.2 Summary of Findings

This study was set to investigate the effect of Supply Chain Collaboration on Supply Chain Performance of Petroleum companies in Nairobi CBD. To achieve this, the study set three objectives, which were aimed to investigate the effect of customer, supplier and internal collaboration on Supply Chain Performance. Using a descriptive research design, the study targeted seven (7) petroleum companies registered by the ERC with the largest market share in the industry which were Total with 14.2%, Kenol-Kobil with 13.8%, Vivo Energy with 13.0%, Gulf Energy with 7.8%, Hashi with 7.3%, Libya Oil with 4.6%, and finally Nock with 4.5%. Senior Management, Middle Management and Supply Chain Managers of these companies were then presented with questionnaires for purposes of data collection. Once this data was collected, the questionnaires were analyzed using SPSS version 22. Results obtained indicated that

customer, supplier and internal collaboration all affect supply chain performance. Upon analyzing the responses using means, the study found an average mean score of 3.67. This implied that majority of the respondents agreed that customer collaboration affects Supply Chain Performance to a large extent. This is as far as systemization of customer data, order status sharing, delivery status information, increasing competitive advantage, customer interaction and product usage information is concerned. Additionally, customer collaboration also results to increased customer satisfaction and participation, as well as efficient tracking of the delivery of goods and services. Regression analysis results on the other hand revealed a coefficient of 0.233, which was statistically significant, since critical statistic =1.66571 < Test statistic t= 2.652 (see hypothesis testing). This implied that holding Supplier and Internal Collaboration constant, a unit increase in Customer Collaboration will increase Supply Chain Performance of petroleum companies and that hypothesis tests confirm this claim by proving that indeed Customer Collaboration has a significant effect on Supply Chain Performance.

Similarly, the study also investigated the effect of Supply Collaboration on Supply Chain Performance. Based on the analysis of the responses from the respondents, an average mean score of 3.96 implied that majority of the respondents agreed that supplier collaboration affects Supply chain performance to a large extent. They agreed that supplier collaboration improves inventory status information sharing, provides suppliers with helpful information with regards to their operations, improve sharing of sales forecast with suppliers and helps align business objectives with suppliers. It also helps to provide suppliers with the details of product design and manufacturing data, share company plans, interact regularly and get to engage their input regarding product attributes as well as have strategic suppliers for various product and service supplies. Its regression coefficient was 0.266, which was equally statistically significant as

indicated by a test statistic greater than critical value (Test statistic $t = 3.855 >$ Critical statistic $= 1.66571$, see hypothesis testing). This implied that holding Customer and Integrating Collaboration constant, a unit increase in Supplier Collaboration will increase Supply Chain Performance of petroleum companies. This claim is further strengthened using hypothesis testing which revealed that Supplier Collaboration does not have a significant effect on Supply Chain Performance.

Finally, as far as the effect of internal collaboration is concerned, results also indicated an average mean score of 4.04, which implied that a majority of the respondents agreed that Internal Collaboration affects Supply Chain Performance to a great extent. Indeed, they agreed that it is through integrating internally that information systems in different departments are connected into a single department, the pursuit of various departmental objectives is harmonized, all employees are allowed to access all information they may require in execution of their tasks and the resources required in task execution are shared among the different departments. Moreover, it allows for linkages to be established across various departments with the use of integration tools such as ERP systems as well as the utilization of IT tools in facilitating information access. Different departments engage in information exchanges, departmental plans and objectives are set jointly, employees regularly interact with each other through such means as meetings, email and the activities in various departments are coordinated centrally through it. Regression analysis also revealed a coefficient of 0.308. It was equally statistically significant as indicated by a greater test statistic value than critical value (Test statistic $t = 4.108 >$ Critical statistic $= 1.66571$, see hypothesis testing). This implied that holding Customer and Supplier Collaboration constant, a unit increase in Internal Collaboration will increase Supply Chain Performance of petroleum

companies. Hypothesis tests also revealed the same conclusion, that Internal Collaboration has a significant effect on Supply Chain Performance.

5.3 Discussion of the findings

This section presents the discussion of the findings and their comparison from what other studies found.

5.3.1 Customer Collaboration on Supply Chain Performance.

Findings from this study revealed that customer collaboration has a positive and statistical significant effect of supply chain performance. Comparing this to what other studies have found, it was revealed that these findings are similar. For instance, while studying Supply Chain Collaboration and Performance of Commercial Banks in Kenya, Kimani (2016) found that there is a strong relationship between Customer collaboration and Supply Chain Performance of Commercial Banks. Just like this study, Kimani (2016) identified important advantages of customer collaboration such as responsiveness, security, trust, reliability and customer satisfaction to be important to improving supply chain performance. Mbassi (2016) also gave a similar conclusion by stating that customer collaboration is key to improving supply chain performance of large manufacturing firms. As such, this study is consistent with what other researchers have found as far as the effect of customer collaboration on supply chain performance is concerned.

5.3.2 Supplier Collaboration on Supply Chain Performance.

Similarly, the study also investigated the effect of Supply Collaboration on Supply Chain Performance and the analysis revealed that there exists a positive and significant effect. This is similar to what other studies have found e.g. Ndambuki (2013) found a positive relationship

between supplier collaboration and supply chain performance while studying the relationship between Supplier Collaboration and Supply Chain Performance among international Humanitarian organizations in Kenya. Similarly, Odanga (2014) found that supplier collaboration is one main factor that influences Supply Chain Collaboration in Public entities in Kenya. Ijomba (2010) also illustrated how important supplier collaboration is to supply chain performance of Nairobi Bottlers Limited Company. All these studies concur that supplier collaboration improves inventory status information sharing, provides suppliers with helpful information with regards to their operations, improve sharing of sales forecast with suppliers and helps align business objectives with suppliers, which in turn results to an improved supply chain performance, as indicated by the results from this study.

5.3.3 Internal Collaboration on Supply Chain Performance.

Finally, on the third objective, the study found that internal collaboration positively affects supply chain performance. Other studies also reveal the same result. For instance, Njagi and Ogutu (2014) found a positive relationship between supplier collaboration and supply chain performance while investigating the role of Internal Supply Chain Collaboration on the Supply Chain Performance of state corporations in Kenya. Cheruiyot (2013) also concluded that an increase in internal collaboration would increase supply chain performance in his study to establish the impact of Internal Supply Chain Collaboration on Supply Chain Performance by taking a case of KTDA. Gichuhi (2013) similarly concluded a positive relationship between internal collaboration and supply chain performance while studying the relationship between internal business integration and Supply Chain Performance among commercial banks in Kenya. As such, this means that the findings from this study tally with what others have researched from different sectors.

5.4 Conclusion

Based on the results, therefore, the study revealed that generally, Supply Chain Collaboration has an effect of Supply Chain Performance of Petroleum companies in Nairobi. This is because all the components of supply chain collaboration such as Customer, Supplier and Internal Collaboration have an effect on Supply Chain Performance. Specifically, Customer Collaboration significantly increases Supply Chain Performance. Additionally, an increase in Supplier and Internal Collaboration results to a significant increase in Supply Chain Performance.

It is however important to note that this study is unique given the fact that it brings forth the effect of supply chain collaboration to supply chain performance of the petroleum industry. Many studies have investigated supply chain collaboration in other sectors. Therefore it will be very important to all stakeholders of the petroleum industry in Kenya. Additionally it can be seen that other studies such as Gichuhi (2013), Cheruiyot (2013), Njagi, and Ogutu (2014) concentrated on one aspect of supply chain collaboration, i.e. internal collaboration, and supplier collaboration respectively. However, this study presented results from three fonts i.e. customer, supplier and internal collaboration, making it unique compared to the other studies.

5.5 Recommendations.

Based on the findings and the conclusion made, the study recommends all stakeholders of petroleum companies in Nairobi to collaborate their supply chains. This is because as was informed by the results, they will be able to significantly improve on their supply chain performances through supply chain collaboration. For instance, customer collaboration will help the companies systemize their customer data, order status sharing, delivery status information, increasing competitive advantage, improve on customer interaction and maintain effective

communication as far as product usage information is concerned. Additionally, just as the study found, customer collaboration also results to increased customer satisfaction and participation, as well as efficient tracking of the delivery of goods and services. On the other hand, supplier collaboration improves inventory status information sharing, provides suppliers with helpful information with regards to their operations, improves sharing of sales forecast with suppliers and helps align business objectives with suppliers. It also helps to provide suppliers with the details of product design and manufacturing data, share company plans, interact regularly and get to engage their input regarding product attributes as well as have strategic suppliers for various product and service supplies.

Finally, it is through integrating internally that information systems in different departments are connected into a single department, the pursuit of various departmental objectives is harmonized, all employees are allowed to access all information they may require in execution of their tasks and the resources required in task execution are shared among the different departments. Moreover, it allows for linkages to be established across various departments with the use of integration tools such as ERP systems as well as the utilization of IT tools in facilitating information access. Finally, different departments engage in information exchanges, departmental plans and objectives are set jointly, employees regularly interact with each other through such means as meetings, email and the activities in various departments are coordinated centrally through it.

As such, the findings of this study convincingly conclude that implementing supply chain collaboration in their companies will allow them to increase their supply chain performance in various ways, which will translate to improved overall performance of the companies.

5.6 Limitations of the Study

During its execution, the researcher noted a number of limitations that are presented in this section. First, during the process of data collection, some respondents were reluctant to answer them, citing confidentiality of company information. The researcher handled this limitation by making sure that the respondents understood the purpose of the study, which was mainly for academic purposes. As such, no information would compromise their respective organizations. The researcher also noted that the busy working schedules of the respondents in their organizations threatened to derail the entire process of data collection. As such, specific times were scheduled according to the respondent's timetable so as to give them ample time to answer the questionnaires.

5.7 Area for Further Research

Since this study concentrated mainly on Petroleum Industry, it recommends further studies to be conducted on the effect of Supply Chain Collaboration on Supply Chain Performance on other sectors such as the banking industry.

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APPENDICES

APPENDIX I; QUESTIONNAIRE

INTRODUCTION LETTER

Dear Respondent,

My name is, a student at KCA University, carrying out a study on the effect of supply chain collaboration on Supply Chain Performance of Petroleum Companies in Nairobi. This is a partial fulfillment of the Requirement for the Award of a degree in

This contains three sections, 'A', 'B' 'C', 'D' and 'E'. Section 'A' contains questions about yourself and the company you work for. Section 'B' 'C' and 'D' has statements regarding Supply Chain Collaboration activities i.e. customer collaboration, supplier collaboration and internal collaboration respectively. Section E on the other hand has statements that relate to Supply Chain Performance of your company. Please attempt all questions; there are no right or wrong answers.

Please note that this is strictly an academic exercise towards the attainment of the above mentioned purpose. You are hereby assured that the information will be treated with the strictest confidence. Your co-operation will be highly appreciated.

All questionnaires are to be collected within (2) weeks of receipt thereof.

Regards

.....

SECTION A: DEMOGRAPHIC INFORMATION

The following section contains questions that seek to gather demographic information about yourself and your company. Please tick as appropriate in the boxes using a tick or cross mark.

1. Gender

Male Female

2. Age Bracket in years

20-25 26-30

31-35 36-40

41 -50 51 and Above

3. Highest level of education

a) Undergraduate Level b) Post-Graduate Level

Any other (Specify)

4. Name of the Company.....

5. What is your Job designation in this company? (Tick as appropriate)

Supply Chain Manager Procurement Officer

Operations Manager Logistics Manager

Marketing Manager

Other (Specify).....

6. For how long have you held the position? (Tick as appropriate)

1-5 years [] 6-10 years []

11-15 years [] Over 20 years []

Other (Specify.....)

7. How do you rate the extent to which the supply chain of your company's products is integrated (tick where appropriate)

Very high [] High [] Moderate [] Low [] Very Low []

Don't Know []

SECTION B: CUSTOMER COLLABORATION

The following are statements reflecting specific aspects of customer collaboration in a supply chain. Kindly indicate your level of agreement with them according to the following scale:

1-Very Low Extent, 2-low extent, 3-moderate extent, 4-large extent, 5-very large extent

No.	Statement	1	2	3	4	5
1	Our competitive strategies are based on customer needs					
2	We have mechanisms for measuring customer satisfaction					
3	We frequently measure customer satisfaction levels to track any changes					
4	We interact with our customers on various internet enabled platforms					
5	We share information with our customers regarding product usage and					
6	We invite our customers to participate in the design of new products					
7	We share details of order status with our customers					
8	Customer orders are tracked from the time of placement to execution					
9	There are systems that track the progress of delivery of various goods to					
10	Delivery status information is shared with our customers					
11	Customer data is systematically collected for aggregation into an					

Any other? Please state.....

.....

SECTION C: SUPPLIER COLLABORATION

The following are statements reflecting specific aspects of supplier collaboration in a supply chain. Kindly indicate your level of agreement with them according to the following scale:

1-Very Low Extent, 2-low extent, 3-moderate extent, 4-large extent, 5-very large extent

No.	Statement	1	2	3	4	5
1	We share sales forecast information with our suppliers					
2	We share production plans with our suppliers					
3	We share inventory status information with suppliers					
4	Suppliers’ input regarding product attributes are considered during					
5	Suppliers are provided with details of product design and manufacturing					
6	We provide our suppliers with helpful information regarding their					
7	Our business objectives are aligned to those of our suppliers					
8	Our information systems are interlinked with those of our suppliers					
9	We have strategic suppliers for various product and service supplies					
10	We regularly interact with our suppliers in mutual information exchanges					

Any other? Please state.....

.....

SECTION D: INTERNAL COLLABORATION

The following statements describe elements of internal collaboration within an organization. Please indicate the extent to which you agree with each of them on the following scale;

1-Very Low Extent, 2-low extent, 3-moderate extent, 4-large extent, 5-very large extent

No.	Statement	1	2	3	4	5
1	All employees are allowed to access all information they may require in					
2	We utilize IT tools in facilitating information access					
3	Information systems in different departments are connected into a single					
4	Employees regularly interact with each other through such means as					
5	Departmental plans and objectives are set jointly					
6	The pursuit of various departmental objectives is harmonized					
7	The activities in various departments are coordinated centrally					
8	The resources required in task execution are shared among the different					
9	Different departments engage in information exchanges					
10	Linkages have been established across various departments with the use					

Any other? Please state.....

SECTION E: SUPPLY CHAIN COLLABORATION AND PERFORMANCE

8. The following statements describe the relationship between Supply Chain Collaboration and Supply Chain Performance within an organization. Please indicate the extent to which you agree with each of them on the following scale;

1-Very Low Extent, 2-low extent, 3-moderate extent, 4-large extent, 5-very large extent

No.	Statement	1	2	3	4	5
1	Real time information exchange with suppliers has led to a reduction in					

2	Less inventory holding needs have reduced costs associated with					
3	Information sharing with suppliers has improved the capability with					
4	Cost reduction in most activities has led to a decline in overall production					
5	Information access has increased the speed with which decision making					
6	Resource sharing has reduced resource requirements in tasks utilization					
7	Employee interaction has increased creative initiatives among employees					
8	Interaction with customers has positioned the firm to respond faster to					
9	Accurate demand forecasting has seen a reduction in the length of the					
10	Increased customer satisfaction levels has increased sales volumes					

Any other? Please state.....

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THANK YOU FOR YOUR TIME

**APPENDIX II; ENERGY REGULATORY COMMISSION LICENSED PETROLEUM
FIRMS**

SN	Company	Market Share (%)
1	Total	14.2
2	Kenol Kobil	13.8
3	Vivo	13.0
4	Gulf	7.8
5	Hashi	7.3
6	Libya Oil	4.6
7	Nock	4.5