LOGISTICS MANAGEMENT PRACTICES AND PERFORMANCE OF LIQUEFIED PETROLEUM GAS FIRMS IN KENYA

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DECLARATION

This research project is my original work and has not been presented for a degree in any other university.

Signature..... Date.....
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This research project has been submitted for examinations with my approval as the university supervisor.

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DEDICATION

I dedicate this project to my mother Mrs. Kou TeakpahWalkie Luogon (Deceased); who prayed for this time but is not around to share in this joyful time, and to my dear wife Mrs. Pinky Oral Luogon and my lovely girls Abralene, Ruth and Joy who stood by me during to make sure that my dream is achieved.

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ABSTRACT

This study sought to establish the effect of logistics management practices on the performance of LPG firms in Kenya. The objectives of the study were to determine the logistics management practices used by LPG firms Kenya, to determine the relationship between logistics management practices and the performance of LPG firms in Kenya and to establish the challenges of logistics management practices of LPG firms of Kenya. Primary data was collected using the questionnaire as the main instrument of data collection. The collected data was sorted for completeness and cleaned for consistency before it was keyed into the Statistical Package for Social Science (SPSS) version 21 for analysis. Descriptive statistics such as means and standard deviations were used to analyze the data. The research findings are presented in the form of frequency tables, bar graphs and pie charts for easy understanding. Regression analysis was used to test the relationship between the variables under study. The study concludes that there is a strong relationship between the logistics management practices and the performance of the LPG firms in Kenya, and that packaging practices, information flow practices, warehousing practices, inventory management practices, customer service practices and transportation practices all had a combined positive effect on the firm performance. The study further revealed that the LPG firms faced challenges to a very large extent. Various limitations faced during the study are the respondents' reluctance to give information on their firms and the limited control over the data provided by the respondents. The study recommends further research into other factors influencing the performance of the LPG firms in Kenya since the study could not account for 20.4% of the firm performance. Additionally, the study recommends further research into logistics management practices in other industries and a research into how to tackle the challenges faced by LPG firms in Kenya while implementing the logistics management practices.

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ACRONYMS / ABBREVIATIONS

CSCM Council of Supply Chain Management

ERB Energy Regulatory Board

GoK Government of Kenya

ICT Internet Communication Technology

JILS Japan Institute of Logistics System

KERC Kenya Energy Regulatory Commission

KPRL Kenya Petroleum Refineries Ltd

LPG Liquefied Petroleum Gas

MOE Ministry of Energy

NOCKNational Oil Company of Kenya

OTS Open Tender System

PIEA Petroleum Institute of East Africa

ROAReturn onAsset

RBT Resource Based Theory

SCA Sustainable Competitive Advantage

CHAPTER ONE

1.1 Background of the Study

Firms exist in an external environment, and the turbulence of the environment and the level of competition tend to shift the strategies of firms and organizations operation. In a global world of business, firms and organizations looktowards someofthe manyoptions available in the form of opportunities and strategies to deal with the challenges that will deny them the chance of being market leaders. According to de Kluyver and Pearce (2006), the ultimate goal of strategy is "long-term, sustainable superior performance." Such superior performance now depends on the ability of a manufacturing firm to become a fully integrated partner within a supply chain context (Cooper *et al.*, 1997). Examples of business processes that must be integrated include manufacturing, purchasing, selling, logistics, and the delivery of real-time, seamless information to all supply chain partners (Cohen &Roussel, 2005).

Managing at the supply chain level requires a new focus and new ways of managing (Lambert *et al*., 1998). Of the many opportunities available, the effective and efficient management of the logistics practices or activities will put the prepared firms ahead of their competitors. Logistics describes the entire process of materials and products moving into, through and out of firm (Harrison &Hoek, 2011). Firms must have the ability to perform far better than other participants within the same industry, that is, sell and supply goods and services in a way that end consumers will become loyal to their products and services.

To have a superior performance, firms must have a long-term strategy that is focused on sustainability, and the issues of how superior performance is attained. The forces that drive such sustainability must also be addressed. Firms will need to look towards such ideas of managing their logistics operations and practices because doing this will lead to cost reductions, optimization of resources and even improved quality service delivery. Over the decades, traditional purchasing and logistics practices have emerged and shifted into broader strategies approach to materials and distributions management known as supply chain management (Kimani, 2013). Firms spend a great deal of time finding ways to differentiate their product offerings from those of their competitors. When firms enhance their value added activities in a more unique way that they cannot be imitated, then they will deliver differentiated product and services with a long-term focus, and the firm will have a superior performance that will lead to achieving sustainable competitive advantage (Porter, 1980).

1.1.1Logistics Management Practices

Logistics was initially a military activity concerned with getting soldiers and ammunitions to the battle front, but at present it is an integral part of product production and delivery process, as well as meeting customer requirements (Lyons& Farrington, 2012).According to the Council of Supply Chain Management, products have little value to customer until they reach to the place of destination or to the customer's point of consumption. To attain this, logistics management practices comes into achieve this supply chain efficiency and effectiveness on the firm competitiveness. Logistics management practices are those activities that are part of supply chain management that plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers'

requirements (CSCM, 2009).The firm Logistics management practice must create time and place utility for their customers; and it requires the flow of information and the reverse flow of information (Kydos, 1991 and Lysons& Farrington, 2012).

Logistics management is regarded as a subsystem of the larger enterprise or a system of which purchasing, manufacturing, storage and transportation are subsystems. It is the way of thinking about planning and synchronizing related activities (Lysons& Farrington, 2012).The logistical practices that firms will regard in its related integration processes are: planning, sourcing, warehousing, inventory management and the information flow. All of these logistical related practices must be managed effectively and efficiently in order for said logistics management practices to contribute to the performance (Wisner *et al*, 2011). For a petroleum firm in Kenya to achieve a performance that is superior and sustainable; the firm will require the effective logistics management that involves the management of logistics practices in the form of the customer service practices, inventory management practices, transportation practices, information flow practices, warehousing practices and packaging practices.

1.1.2 Firm Performance

The performance of the firm is the ability of a firm to provide the products and services as or more effectively and efficiently than relevant competitors. It is the advantage obtained through superior productivity, and said superiority can be measure by the firm's performance over its competitors. Firms will need to seek towards available resource optimization, costs reduction and quality service or product delivery to enable them become attractive such that they develop customer loyalty, and gain competitive advantage. Performance measures and metrics are essential for

effectively managing logistics operations, particularly in a competitive global economy (Livohi, 2012).

The global economy is featured with global operations, outsourcing and supply chain and e-commerce. The real challenge for managers of this new enterprise environment is to develop suitable performance measures and metrics to make right decisions that would contribute to an improved organizational performance (Gunasekaran & Kobu, 2006). Firms will perform and be sustainable if the resources resulting in the firm performance are kept alive and the firm establishes a set of managerial processes where these resources are flourished and utilized (Centindamar & Kilitcioglu, 2013).

Measuring the performance of the firm will provide the firm management with the insights of how to improve the things that matters to the firm existence and also find out those things that are value to the stakeholders and the customers as well.According to Santo and Brito(2012) firms measure their performance to obtain information that will enable the firm management to improve their operational and financial outcomes. Kaplan and Norton (1996) proposed that a firm that measures its performance identifies and improves the various internal functions and their resulting external outcomes; and by doing this the firm will redesign its corporate strategies and become a market leader within the industry Porter (1986).

1.1.3Petroleum Firms in Kenya

According to the (Kenya Energy Regulatory Commission, 2014), Petroleum fuels are the main source of commercial energy in Kenya. Kenya is a net importer of petroleum products and has a refinery owned and managed by the Kenya Petroleum Refineries Ltd (KPRL), an 800 km cross country oil pipeline from Mombasa to Nairobi and Western Kenya, with terminals in Nairobi, Nakuru, Eldoret and Kisumu, run by the

Kenya Pipeline Company and the Kenya Energy Regulatory Commission(KERC). In 2006, the Energy Act No. 12 of 2006 was enacted, giving Energy Regulatory Commission (ERC) to also regulate petroleum and renewable energy sectors in addition to electricity (KERC, 2014).

The importation of both crude oil and refined products is coordinated by the Ministry of Energy through an Open Tender System (OTS). The OTS winner allocates refined products based on calculated cargo participation. Data indicates that importation of crude is dominated by major oil companies Government of Kenya (GoK, 2005). KPRL is owned by government and Shell/BP and Chevron/Texaco on a 50 per cent basis. The other source of Kenya's petroleum products is imported, of which seventy per cent are conducted through OTS. The remaining 30 per cent is left to the discretion of licensed importers. Unlike OTS under the crude oil, cargo participation is based on the demand of licensed importers (GoK, 2005).

The imported crude petroleum is processed at the petroleum refinery plant at Mombasa and thereafter sold into the local market. Due to liberalization of the oil sector in 1994, the importation of crude oil as compared to refined oil has reduced because of the freedom to import oil either in crude or refined form. At the retail level, there are numbers of subsidiaries to foreign based and local based companies of varied sizes who have outlets through which petroleum products are sold directly to consumer. The subsidiaries of foreign markets companies are by far the largest players in the sub-sector despite liberalization of the industry which allowed for the entry of more players in the market Petroleum Institute of East Africa (PIEA, 2000). Total owns the highest market share at 16.8%, Kenol/Kobil own 12.8%, Vivo own

11.9%, Oil Libya own 6.11%, Hashi own 5.9% Gulf owns 4.7%, while the NOCK and other smaller players share the rest (PIEA, 2013).

1.2 Statement of the Problem

Inan industry thatfirms have equal market opportunities and resource capacities, and it is characterized by an ever changing environment of globalization, innovations and technologies, firms must seek to improve their service or product delivery in a way that is different from others within the industry they operate. According to Keebler & Durtsche (2001), for a firm to differentiate itself in product and service delivery, the differentiation must be accompanied by a well-managed logistics processes. Firm performance depends on the analysis of attractiveness of the industry and how the firm will use the five force analysis as strategic tool to become a market leader (Porter, 1980). For many companies, market logistics objectives aims at getting the right goods to the right places at the right time at the lowest possible cost. Making market logistical strategic decision on planning the infrastructure to meet demand, then implementing and controlling the physical flows of materials and final goods from points of origin to the point of use; to meet customer requirements are key to thefirm performance (Kotler &Keller, 2013).

Effective and efficient logistics management has in modern business experience other challenges; for example Keebler & Durtsche (2001) professed that while some firms look towards 3PL provider for logistics efficiency other focus on their internal logistics operations. According to GoK (1994) the petroleum industry in Kenya is characterized by intense domestic competition from multinational firms due to the liberalization of the sector; and the industry is also affected by numerous challenges ranging from illegal storage facilities, poor quality product, petroleum product

delivery, petroleum pricing, and cost of transportation as well as technology and distribution network. Lack of strategy, substandard products, and high prices are also attributed to some of product and service delivery constraints in the oil sector (PIEA, 2014, Kimani, 2013).

Although there are several challenges in the industry, some of the LPG firms continue to enhance their performance through other means like distribution channels technology and market share, for example Total Kenya and Vivo Energy have expanded the number of service stations to 178 and 138 in 2014 as compared to the previous year. Trinity Petroleum achieved a global award of consistent three years revenue growth due to its service provision through technology (PIEA, 2014). To respond to the challenges, the fierce competition and the expansion witnessed by petroleum firms beyond the regulations; there is a need for the petroleum firms to adopt an effective management of their logistics practices. It is from this perspective that the current research will seek to identify how logistics practices enhances a firm's superior performance.

Some of the international studies that have been done in the field of logistics includes Harrington (2002), who argued that although the system theory of Professor Stank appears in every organization logistics practice but there is a shift that have seen organization looking at customer service as a means to also compete. Her finding was logistics plays a vital role in making the organization integration possible and making customer service possible; and that business can offer competitive service at lower total cost by combining the efforts of integration of logistics related activities and meeting customer requirement.Tseng *et al* (2005) argued that transportation determines the efficiency of moving products. For them, transportation takes a crucial part in the manipulation of logistics, and it occupies one-third of logistics costs and

influences the logistics system hugely. They also found out that due to the trend of nationalization and globalization, logistics management is growing in various areas; and logistics helps to optimize the existing production and distribution processes of firms and industries. Omerzel and Gulev (2011) suggested in their findings that when firms have access to similar resources, it is the firm that maximizes the utilization of those resources to attain a competitive advantage.

Several local studies have been conducted and includes Njoroge (2006) who researched and found out that with the competitions from wood energy and kerosene whose price is lower than those of LPG, responses are such strategies as keeping low overhead costs, ensuring product availability, the use of exclusive distribution channels, investment in human resource development to ensure good customer care and extension of credit to ratable customers.Livohi (2012) posits that in the current business environment that is characterized by ever-increasing competition and economy globalization, firms can explore the means of innovative technologies and strategies to achieve and sustain competitive advantage. For her major actors in the petroleum industry measured the downstream or logistics activities using key indicators as unit costs of transportation, storage, quality of service, information and quality of products, and customer feedback. Oduol (2012) conducted a researched on the competitive method used by Lubricant marketers. He posits that the petroleum firms used varying method that included product quality control, operational efficiency, premium product quality and extensive customer care. He concluded that the independent Lubricant marketers who are the petroleum firms use largely differentiation and cost leadership strategy to achieve superior performance over their rivals.

In spite of the increased studies conducted on the strategies that are used by LPG firms in Kenya, none of the studies reviewed have endeavored to establish the impact of logistics management practices on the performance of these firms. Therefore, the research will attempt to fill the gap by seeking to answer the question: what is the impact of logistics management practices on the performanceofLPG firms in Kenya?

1.3Research Objectives

The objectives of this study are:

i. To determine the logistics management practices used by LPG firms Kenya;

ii. To determine the relationship between logistics management practices and the performance of LPG firms in Kenya;

iii. To establish the challenges of logistics management practices of LPG firms of Kenya.

1.4 Value of the Study

The result of the study will create insight to all LPG firms within Kenya. The identification of the challenges would enable managers to devise strategies to enhance efficient logistics management practices that will aimed at quality service and low cost, thereby achieving superior performance and competitive advantages. The study will also help national Government to access the logistics management practices by LPG firms and benchmark against others within the East African block and the world at large.

Government agencies and policy makers may use the results to formulate positive national policies on a framework that is relevant and sensitive to the market forces influencing the LPG firms in Kenya and the East African region. The study will also be useful to researchers and academia who will find interest in conducting further research in the field of logistics.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The chapter presents the logistics management practices. Also in this chapter, the research points out the theories relating to the topic and review past studies done by different researchers. The chapter reviews the objectives and findings of the research work by those authors and their recommendations. From this point, the research gap isbeing established. The last part of the research covers the conceptual framework of the study and further show the principles upon which the research is done.

2.2 Logistics Management Practices

Logistics management practices comprised of the core practices and the support practices. The core practices are customer service, inventory management, transportation, and information flow. The related practices that support the core practices include, but not limited to warehousing, and packaging (Ballou, 2003).

2.2.1 Customer Services Practices

Customer service practice is defined by marketing management efforts that are determined by the critical marketing elements. Marketing management efforts view the success of the firm by meeting the needs of its customer. The needs are met by the firm's ability to determine the needs and wants of the segmented market and delivering to the desired satisfaction more effectively and efficiently by its competitor (Pienaar & Vogt, 2006, Ballou, 2003).

The firm achieves its goals when it integrates the critical marketing elements of customer satisfaction, integrated efforts and the firm profitability. To achieve the customer satisfaction; marketing effort depends on getting the right product, at the right price, at the right place and with the right promotion. Also to achieve the firm overall goal; there must be an internal integrated efforts between the supplier and the end customer. The firm management must have the idea of making trade-offs among logistics alternatives to maximize the firm profitability (Pienaar & Vogt, 2006).

2.2.2 Inventory Management Practices

Inventory management practices provide for the upstream and down inventory visibility in the logistics or supply chain system. The aim of inventory is to provide both internal and external customers with the required service level, ascertain the present and future requirement for all types of inventory, keep costs at minimum and provide for the (Lysons& Farrington, 2012). In the firm, all inventory policies must be of benefit by driving period operating expenses and working capital requirements (Cox, 2011).

According to Lysons and Farrington (2012), to measure the effective and efficient performance of inventory depends on to what extent the firm has the right quantity of inventory in the right place and at the right time. The indicators to measure such inventory are the lead time, the service time (safety stock), the rate of stock turn, stock outs in a given period and stock cover.

2.2.3 Transportation Practices

Transportation has the overriding objective that moves the cargo from point A to point B.Transportation is a vital strategic link between firms in a supply chain and

must be managed effectively to meet customer due date and other shipping requirements at a reasonable cost (Wisner *et al*, 2011). In logistics it is transportation that provides the flow of materials, products and persons between productions facilities, warehouses, the distribution centers, the terminals and the customers (Kasilingam& Kluwer, 1998).

Transportation is the only activity that provides the time and place utilities through the outbound and inbound logistics. An inefficient transportation system may lead to the firm incurring high cost to deliver product to customer, and this may lead to loss to the firm; and the transport system must be able to address the major issues of the mode selection, route selection and fleet size because it is the vital force for competition for the firm (Goldsby*et. al*., 2014).

2.2.4 Information Flow Practices

With the emergence of ICT, information flow provide a special advantage to link one activity with the others and make real-time data created in activity widely available, both within the firm and with outside suppliers, channels, and customers. For information flow to be effective and efficient; it must enhance the firm's logistics processes by planning, controlling, coordinating and monitoring the logistics processAzevedo *et al* (2007).

According to Nowakowska & Grunt (2007) the effective functioning of logistics information system requires the use of hardware and technology transfer; andtheinformation system must be customized to serve the logistics system effectively to enhance the line of communication Wisner *et al* (2007).

2.2.5 Warehousing Practices

Warehousing includes space determination, stock layout, configuration, and stock placement (Ballou, 2003). In logistics; delivering the right product in the right quantity relies on warehousing picking and dispatching accurately. Warehousing ensures that products are delivered to the right customer at the right place, on time. It also ensures cost efficient operation by delivering the product at the right price, and in perfect order and condition (Richards, 2011).

Pienaar and Voght (2006) proposed that effective customer service depends on the firm warehousing operations. Warehouse has three operational functions of the firm; the function that receives and transfer customer orders, the information transfer function that ensure the use of technology for warehousing efficiency and the storage function that store product temporarily or permanently.

2.2.6 Packaging Practices

In logistics, packaging activities are responsible for designing, handling, storage and protection from loss and damage. Products are packaged to serve the marketing need of branding and promotional purposes, whereas protection from loss and damage requires the packaging to enable the product to reach its required destination in the right condition (Ballou, 2003).

Packaging must be seen as a coordinated system that support logistics by preparing the product for secure, efficient and effective handling, transport, distribution, storage retailing, consumption and recovery, reuse or disposal to meet the customer value (Sagir, 1998, 2004). Packaging supports logistics through protection, storage, transport, information and handling of the product and the correct design of the

packaging can lead to the overall low logistics costs or supply or service delivery (Pfohl, 2004).

2.3 Theoretical Review

This section reviews the relevant theories of logistics. The sections also review other researchers work relative to the theory and its application into current day logistics management context.

2.3.1 The Napoleon Theory of War

Antoine Henri Jomini states that the real knowledge of supply and movement factors must be the basis of every leader's plan; only then can he know how and when to take risks with those factors, and battles are won by taking risks. For him logistics was a strategy of art, and those materials and supplies that are move in military battle should be at a minimum to the amount of forces to ensure efficiency, and the force deployed should be kept to minimum in order to lower casualties, (Wikipedia, retrieved on 21/11/14, 10:00 PM, GMT).

According to Barnley & Clark (2007), the aim of a good strategy is to help a firm to achieve a superior performance. They posit that a firm has a competitive edge if it can create more economic value than the marginal competitor in its product market. Rushton *et al* (2006) suggest that a good logistics strategy will yield high performance of the firm, and it must be seen as a less creative process than developing the corporate strategy. To design a good logistics strategy, the firm must link the logistics plan directly with the corporate strategy, and this is achieved by integrating the logistics plan into the corporate plan and ensuring that all logistics functions are consider as inputs in the overall planning process.

2.3.2System Theory of Logistics

Professor Rainer Stank of the Michigan State University proposed that logistics is management of an organization as an integrated whole for the total optimal performance. He believed that organization is the integration of logistical related activities that are working together to achieve lowest total costs and optimum service level as opposed to managing discrete functions individually for the lowest costs. According to him, companies will realize that effective logistics is all about managing the trade-offs (Harrington, 2002). Logistics in business must identify and determine several cost trade-offs in order to provide a positive benefit to the logistics systems as a whole (Rushton *et al*, 2006). The sum of all outcomes is greater than its individual parts.

On the other hand, logistics scholars endorsed the relationship of logistics management to the firm logistics capabilities that is determined by the dynamics logistics capabilities. Teece*et al* (1997) defined dynamics capability as a firm's ability to integrate, build and reconfigure its internal and external competences to address the rapid changing environment. Abrahamson & Mat (2001) argued that extending the Resourced Based View (RBV) to the dynamics capabilities, the firm performance is linked to the dynamic logistics capabilities that is also defined by the operational capabilities. According to (Barnley& Clark, 2007 and Abrahamson & Mat, 2011), capabilities must meet the essential condition of rare, valuable, inimitability and organizational in order to offer sustainable competitive advantage. Abrahamson& Mat (2011) found out that logistics must be created from the firm's unique set of operational and dynamic capabilities, and the two must be combined and be used to attain the firm superior performance.

2.4Firm Performance

The concept of performance is a relative concept; and the measures used to determine the performance of the firm remains an issue of debate among researchers, academia and policy makers as well. According to the Longman Advanced Dictionary (2000) the firm performance is the ability of a firm or product to compete and be more successful than others in the industry. From the literature definitions, it is argued that a firm performance is its ability to compete in a homogeneous market or industry and succeed better than others.

Different researchers have supported the concept that the success of a firm depends on its superior performance; and that the performance of the firm can be measured by the financial and nonfinancial performance. According to Liargovas and Skandalis(2004) the firm performance can be measured using various financial performance like the return on sale, the return on assets and the return on equity because these results can be easily calculated. Hart &Ahuja, (1996), Konar& Cohen (1997) and Mallette& Fowler, (1992) all proposed that the firm performance can be measured using the financial performance. Using at least five years period of ROA is appropriate because it measures the long term strategy to survive and the structural variables of the firm (Wernerfelt & Hansen, 1989).

Using the nonfinancial measures, Kaplan & Norton (1996) posit that with the growing age of information systems, the financial or the accounting measures have become obsolete and inadequate to measure the firm performance because the financial measure or tangible asset measure addresses the industrial age firm and neglect the growing contribution factor or intangible assets that must be managed to gain financial health of the firm; therefore it is important and adequate to measure the firm

superior performance using the Balanced Scored Card that describes the method that a firm can measure and even managed to become financially healthy. Bezzel *et al* (1995) argued that the key determinants of a firm performance are the marketing expenditure, relative product quality and the level of productivity. According to (Gunasekaran *et al*, 2004, Panjehsouladgaran *et al*, 2010, Waweru, *et al* 2015) the logistics management or supply chain of a firm can be adequately measured using the qualitative measure because it allows the decision maker to introduce vagueness, uncertainty and subjectivity into the evaluation system. They opined that the Fuzzy Controller Logic qualitative parameters that are used to evaluate the firm performance are customer complaints, customer response time, lead time, on time delivery, fill rate, and the accuracy of good deliver to clients and stock-out probability. Ian (2005) posits that firm performance can be measured by those that relates to results i.e. output such as financial performance and those that focus on the determinants of the results such as quality service, flexibility, resource utilization and innovation.

The researcher supports the strands that nonfinancial measures are the more convenient measure that determines the information age firm performance even though the financial measures reflect the financial health of the firm. Building on the Fuzzy Controller Logic model and the empirical research of (Kaplan & Norton, 1996), Gunasekaran *et al*, 2004, Ian, 2005, Panjehsouladgaran *et al*, 2010, and Waweru *et al*, 2015), this study will measure the performance of the LPG firms by using the nonfinancial performance that includes timely delivery of products and services, the firm cost improvement, the use of up to date technology within the firm, the effective and efficient utilization of facility and the firm's ability to meet its shareholders requirements.

2.5Logistics Management Practices and Firm Performance

Today with the increased in global trade, diversified technologies and reduced trade barriers in a competitive business environment; companies are seeking to boost their performance by employing the word logistics. Ballou (2003) posits that logistics in business contributes to achieving maximum customer service level at a minimum possible cost, ensures high product quality and flexibility in the constant market changes. Aron (1999) argued that for most firms, a groundswell of activity has surged around logistics practices, encompassing a broad sweep of corporate supply-demand strategies that stretch from the raw materials to the ultimate customer and productivity-boosting tools. According to Sandberg & Abrahamson (2011) logistics is a firm's operationalpractices or activities that lie between the marketing function and the production functions, and it plays the secondary role of firm strategy that leads towards superior performance. Keebler & Durtsche (2001) argued that a firm can achieve a superior performance with its logistics practices by aligning its key logistics practices with business strategy and measured against predetermined performance objectives.

According to the Council of Logistics Management; the basic supply chain of all firms are focused to procure, make, move, store and deliver; and it is the effective and efficient management of logistics practices that enables the firm product to move from the origin to the final destination.Lysons& Farrington (2013) posit that from a production front, logistics is used as a buffer stock to support a production push philosophy, and from the marketing point, logistics is used to carry a speculation stock to support a market expansion philosophy with short lead times, which is intended to achieve an improved performance.

The Japan Institute of Logistics System (2011) found out that it is logistics management practice that synchronizes, and it enhances corporate performance and increases corporate value by realizing fulfillment of customer's satisfaction, cutback of unprofitable inventory and minimization of its transfer, and reduction of supply costs. To support corporate strategy, logistics practices through marketing effort integrate the idea of having the right product at the right place combined with the right promotion and available in the right place, and all leads to customer satisfaction (Pioneer& Vogt, 2006).

2.6 Challenges of Logistics Management Practices

Like any other field of study, logistics and logistics management practices are also affected by challenges that see firms experiencing difficulties while providing products and services to end customers. While some of these challenges have a long service effect on the performance of the firm and need overtime strategic efforts to deal with them; there are other challenges that the firm will require a rapid approach to address them. Logistics management is a customer focus management; that is logistics efforts must lead to customer satisfaction and it is this customer satisfaction that remains a high challenge for firms. According to Wisner *et al* (2011) customer satisfaction is determined by the level of customer service; and the challenges is the focus on how to avoid a misstep in providing the right product, in the right quantity, in the right condition, at the right place, at the right time, for the right customer and at the right cost. The World Bank Group (2005) and World Bank Group (2014) reported that improving logistics performing in low income countries mean reforming custom agencies and making investment in logistical infrastructures.

Vogt and Pienaar (2006) posit that many firms are faced with the challenge of how logistics interface with the production and marketing functions to achieve the firm objectives. Marketing means selling and production means making something, and it is logistics activities that must take place between the point and times of production or purchase and the points and times of demand, and they affect the efficiency and effectiveness of the two functions. For example different operating objectives between marketing and production/operations in the form of maximizing revenue versus minimizing cost may lead to fragmented interest that may subsequently lead to lower customer service or higher total logistics costs. Costs trade-off (place decision, price decision, product decision and promotion decision) between the marketing and logistics functions are other challenges that firms must address. For example, a firm will not be profitable and grow if there is a waste in the logistics system that results to the high price of product, since the costs of product cover the relevant costs of production, marketing, distribution and general administration.

2.7 Empirical Review

This section review what other researchers have done in the field of logistics management. The section considers the research arguments, their findings as well as their recommendations.

Waweru, *et al* (2015) opined that to gain superior performance, the logistics management or supply chain management must have the ability to meet customer satisfaction, response to customer complaints, deliver on timely basis, have a fill rate, stock-out probability and accuracy. According to Onyango*et al.*, (2009) structural reforms were targeted in energy, water, transport and telecommunication sector, and were aimed at introducing competition in commercial segments of electricity and

petroleum sub-sectors in order to attract private sector investments. They posit that since October 1994, the procurement, distribution, and pricing of petroleum products were liberalized with a view to enhancing operational efficiency of the industry and also attracting private capital. Since the liberalization, the oil industry has attracted a number of results in the forms of competitive pricing and improvements in the quality of products. Companies, organizations and firms have built their performance edge around some of these functions; in the case of Wal-Martlogistics allows them to provide good availability of relatively common products at very low cost, and at 7-Eleven, logistics allows them to provide a very high level of customer responsiveness at a reasonable cost (Pienaar& Vogt, 2006). The Japan Institute of Logistics System (2011) argued that, logistics management is an enhancement of corporate superior performance; and for management, logistics as a management strategy is required to contribute to gain profits. Panjehsouladgaran *et al*(2010), Aramyan *et al* (2007), Ian(2005) and Chan (2003) opined that the quality performance of a firm logistics management or the supply chain management are determined by qualitative factors of customer complaints, customer response time, on time delivery, lead time, fill rate and accuracy.

Logistics affects many procedures and activities in a business, bad logistics management leads to increasing operational costs and decreased customer service. Logistics interferes with many business areas and, thus it is suggested to identify and determine service cost trade-offs in order to provide a positive benefits to the logistics system as a whole (Rushton *et al*, 2006).A study done by Bailey*et al* (2005), suggest that increasing global competition is changing the environment facing most companies today. For them, as trade barriers fall and transaction costs decline, new global competitors are entering previously more isolated domestic markets. In

response to this intensified competitive pressure, local companies are pushed to enhance their performance by innovating and adopting process and product improvements(Panjehsouladgaran *et al*, 2010 and Ian, 2005),

However, Olavarrieta and Ellinger (2004) argued that in a turbulent and dynamic environment, firms must have agility in the market place to survive and succeed, and logistics has become an increasing area of strategic concern for firm performance, and important source of sustainable competitive advantage (SCA). Their finding was that a firm must combine its logistical resources (Input, Assets and Capabilities, its strategic resources) and organizational learning (information acquisition, information distribution, information interpretation and knowledge storage) to gain a relative superior performance. Wisner *et al* (2011) posit that for the supply chain or the logistics system to stay performing, costs management and containment must be an ongoing concern while also customers must be satisfied with the products and services they are purchasing.

2.8 Summary of Literature Review

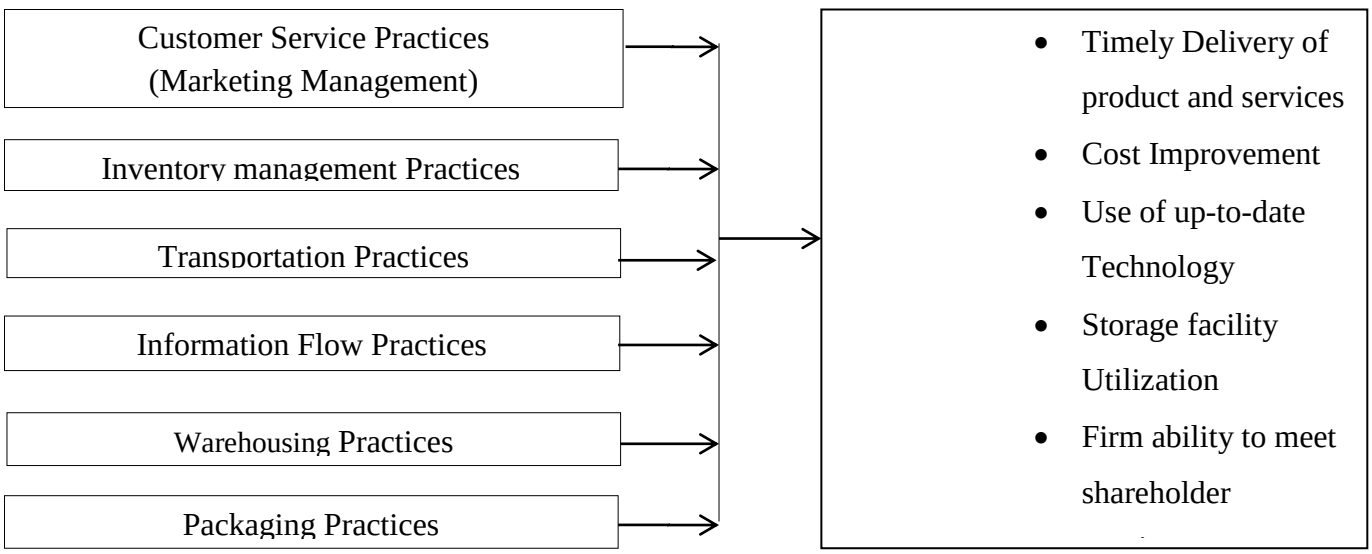
The Literature review introduces the reader to logistics management practices as a strategic tool. The chapter identifies six basic logistics management practices to manage in order for the LPG firms to have superior performance. From the conceptual framework the researcher views the independent variable as these logistics management practice as factors that the liquefied gas petroleum firms in Kenya can now consider in its holistic picture as variables/factors that will enhance their performance.

Several approaches have been suggested by different researchers on logistics management practices as a means of strategy to outperform their rivals. These studies

took broad view of strategy and viewing specific practices of logistics management practices that firms can be built on to outperform but did not focus on the logistics management practices as an integrated whole that must be managed to become superior performer. Most of the studies did not also focus on logistic management practices in the petroleum firm of Kenya. Therefore, thestudy examined the extent to which LPG firms measures their performance using logistics management practices as a strategy. Thechallenges faced by the petroleum firms are also analyzed.

2.9 Conceptual Framework

Figure 2.1: Conceptual Framework



Source: Author (2015)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The chapter presents the methodologythat was be used to conduct the study. The chapter covers the research design, the target population, the data collection and instruments, data collection and methods of data analysis.

3.2 Research Design

The study used a descriptive survey approach to collect data from respondents. Descriptive studies are used to describe phenomena associated with the subject population or to estimate proportions of the populations that have certain characteristics. Using the method, the researcher measured therelationships as accurately and objectively as possible (Cooper &Schindler, 2014). The descriptive survey study is preferred because it gives a complete description of the phenomena with little or no bias; and enables the collections of rich data that when used can lead to very important recommendations. Using this design derivesanswers to such questions as who, what, when, where and how about the phenomena.

3.3 Population of the Study

The target population for this study wastheentire Liquefied Petroleum Gas firms who are ideally the petroleum gas firms in Kenya, and they are 12 in number (Appendix II). A census is used for the study given that the population is small.

3.4 Data Collection

The study used a questionnaire to collect the primary data. Primary data is sought because of its closeness to the truth and its control over error (Cooper & Schindler, 2014). The questionnaire was used because it saves time and it is easier to administer. Accordingly the questionnaire included opened-ended and close-ended questions that sought the views, opinions and attitudes from respondents. The questions were designed to collect quantitative and qualitative data. The open-ended questions give the respondent an unrestricted means of answering. The questionnaire was divided into sections that represent the objectives of the study; where section A provided the general information, section represented the logistics management practicesand the performance of the firm and section C considered the relationship between logistics management practices and performance of the firm. Finally, section D addressed the challenges faced by firms in the management of their logistics. The respondents were the personnel in charge of logistics management and operation management functions or their equivalent because they possess the necessary knowledge of the information required for the study. The questionnaire was administered using a ‘’drop-and-pick later method’’.

3.5 Data Analysis

The data was collected, cleaned and checked for its completeness in preparation for coding. Once the data is coded, it was keyed into the Statistical Package for Social Sciences (SPSS) version 21.0 for analysis. The study used quantitative analysis to analyze the closed-ended questions because it is possible to quantify the data. Content analysis was be used to analyze open-ended questions to gather the respondent’s view about the challenges affecting the petroleum firms. The data was presented using

frequency tables, pie charts and bar charts. This ensured that the information gathered is clearly understood.

The data was analyzed as follows: section A, B and D of the questionnaire captured the general information, data on objective one, objective two and objective three respectively, and the results was analyzed using descriptive statistics. Section C which is on the relationship between logistics management practices and the performance of the firm was analyzed using a regression analysis. Pearson correlation was also used to determine the strength of the variable in the study, and Analysis of Variance (ANOVA) test was carried out to establish whether the model was fit as a predictor.

Table 3.1: Summary of Data Collections and Analysis

Objective	Questionnaire	Data Analysis
General Information	Section A	Descriptive Statistics
Logistics Management Practices	Section B	Descriptive Statistics
Relationship between dependent and independent variables	Section C	Regression Analysis
Challenges of logistics management Practices	Section D	Descriptive Statistics

Source: Author (2015)

To establish the relationship between logistics management practices and the performance of the firm, the study used the following multivariate regression model:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \varepsilon$$

Where:

Y – Firm Performance (Dependent variable)

X_1- X_6 – The independent variables

X_1- Customer service practices

X_2- Inventory Management practices

X_3- Transportation practices

X_4- Information flow practices

X_5- Warehousing practices

X_6- Packaging practices

β_0 - Is the constant of the model

β_1- β_6 – Are the regression coefficients

ε – Stochastic error term

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1Introduction

This chapter presents the analysis of the primary data collected from the administered questionnaires. The collected data was edited and cleaned for completeness and consistency in preparation for coding. Once coded, the data was keyed into the Statistical Package for Social Sciences (SPSS) for analysis. Descriptive statistics such as means and standard deviations were used to analyze the data. The study also used inferential statistics to discuss the findings. Regression analysis was used to test the relationship between the variables under study in relation to the objectives of the study. Analysis of variance (ANOVA) was also done to confirm the findings of regression analysis.

A total of 14 questionnaires were administered. The questionnaires contained questions that addressed the objectives of the study. The objectives of the study were: To determine the logistics management practices used by the Liquefied Petroleum Gas firms in Kenya, to determine the relationship between logistics management practices and the performance of LPGs firms in Kenya and to establish the challenges of logistics management practices of LPGs firms in Kenya.

Table 4.1: Response Rate

Response rate	Frequency	Percentage
Completed and Returned	10	71.4
Not Returned	4	28.6
Total	14	100

Source: Research Data (2015).

The study managed to obtain 10 completed questionnaires representing 71.4% response rate. This response was adequate to allow the researcher to continue with the analysis.

4.2 Data Presentation

4.2.1 Data Validity

The researcher issued3 questionnaires to respondents in the LPG firms so as to conduct a pilot test. The three respondents were not included in the sample size. Piloting of the research instrument was done to clarify the wording and grammar of the questionnaire so as to avoid misinterpretations; to avoid research bias; detect ambiguous questions; and to pick out in advance any problems in the methods of research. This helped to make the data used in the analysis valid.

4.2.2 Data Reliability

To test the reliability of the Likert scale used in this study, reliability analysis was done using Cronbach's Alpha as the measure. A reliability co-efficient of $\alpha \geq 0.7$ was considered adequate. The output of the reliability analysis is as shown in Table 4.2.2;

Table 4.2.2: Cronbach's Alpha

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.926	0.930	43

Source: Research Data (2015).

Cooper & Schindler (2008) has indicated that a higher value shows a more reliable generated scale. In this case, reliability co-efficient of 0.926 was registered indicating a high level of internal consistency for the Likert scale used in this study. This indicated that the scale was reliable enough to test the extent to which logistics management was practiced in the LPG firms.

4.3 General Demographics

This section covers the general demographics of the respondents' and the LPG firms that they are working for. The demographics discussed are firm ownership, years of operation in Kenya and outside Kenya and the job positions held by the respondents' in their respective LPG firms.

4.3.1 Firm Ownership

The study sought to know whether the LPG firms were foreign owned or locally owned. The results of the study are as shown in the Table 4.3.1.

Table 4.3.1: Firm Ownership

	Frequency	**Percent**
Local	7	70.0
Foreign	3	40.0
Total	10	100.0

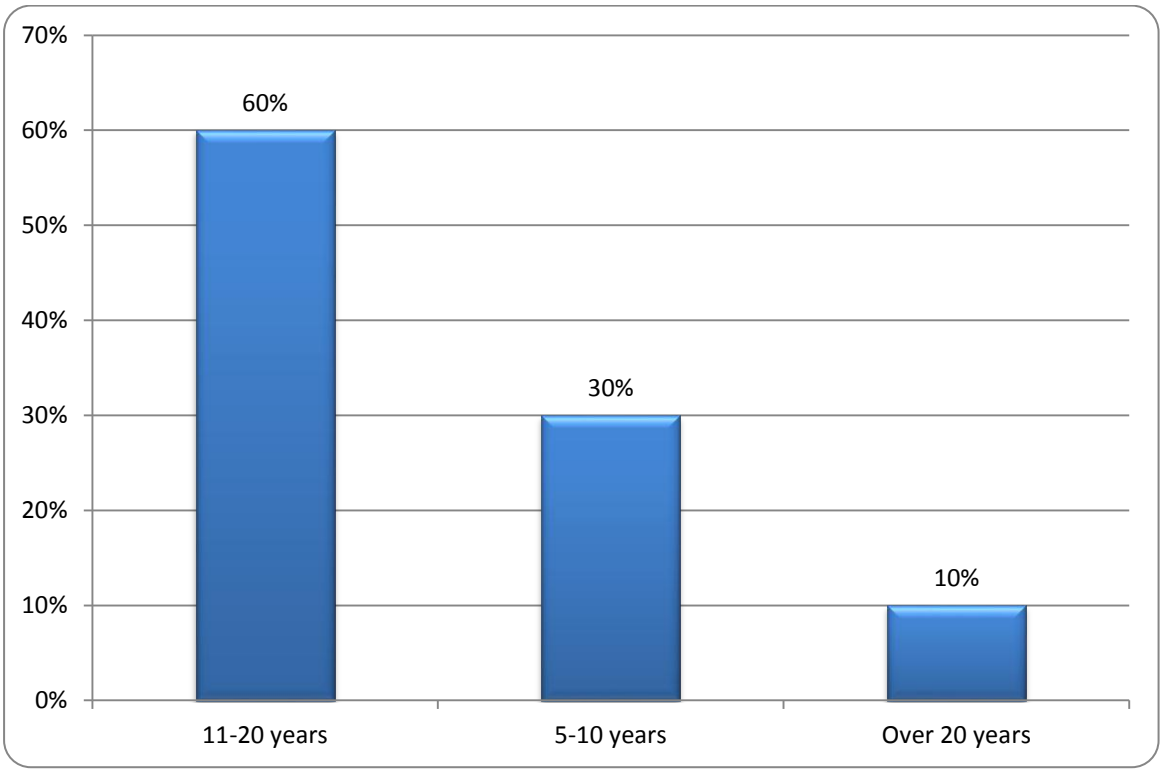
Source: Research Data (2015).

From the research findings, the study revealed that most of the firma as shown by 70% were locally owned whereas 30% of the firms engaged were foreign owned, this implies that most of the companies were locally owned.

4.3.2 Years of Operation in Kenya

The study further sought to establish the number of years the LPG firms had been operating in Kenya. The results of the study are as shown in Figure 4.3.2.

Figure 4.3.2: Years of Operation in Kenya



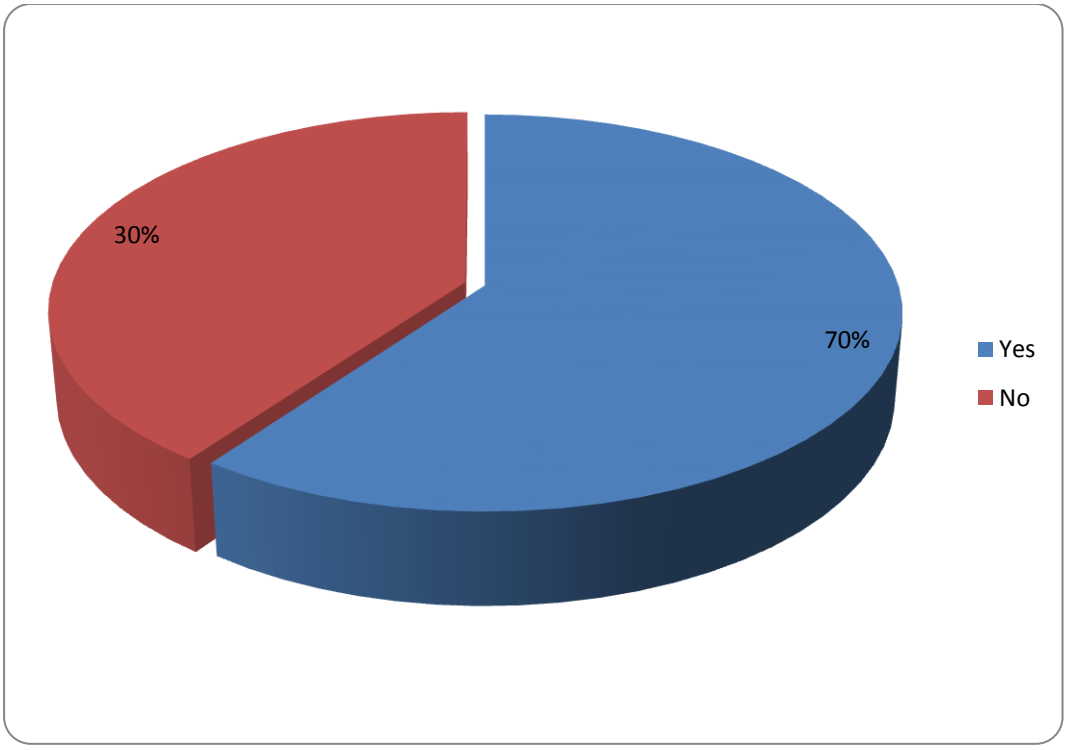
Source: Research Data (2015).

The study established that 60% of the LPG firm had been operating in Kenya for 11-20 years followed by those operating for 5-10 years at 30%. Those operations of above 20 years accounted for 10% only. This indicates that the researchers' obtained data from firms with many years of experience in the logistics management.

4.3.3 Operations outside Kenya

In this section, the study sought to know the number of LPG firms with operations outside Kenya. The results of the study are as shown in Figure 4.3.3.

Figure 4.3.3: Outside Kenya Operation



Source: Research Data (2015).

The study found out that 70% of the LPG firms have operations outside Kenya while 30% of the firms don't have operations outside Kenya. This implies that majority of LPG firms have regional networks that requires efficient logistics management.

4.3.4 Job Position

The study sought to know the various job positions held by the respondents. The results of the study are as shown in the Table 4.3.4.

Table 4.3.4: Job Position

	Frequency	Percent
Operations Manager	8	80.0
Logistics Manager	1	10.0
Business Development Manager	1	10.0
Total	10	100.0

Source: Research Data (2015).

The study found out that 80% of the respondents were Operations manager followed by Logistics 10%. Business Development Managers also accounted for 10%. This indicates that the respondents by virtue of their job titles were in a position to understand the logistics management issues sought by the researcher.

4.4 Logistics Management Practices

One of the objectives of the study was to determine the extent to which the LPG firms had been practicing logistics management and this section discusses the result. The analysis of the data was done using means and standard deviations. The means recorded were interpreted as follows: 1-1.49 = No Extent; 1.5-2.49 = Little Extent; 2.5-3.49 = Moderate Extent; 3.5-4.49 = Large Extent; 4.5-5.0 =Very Large Extent. The results of the study are as shown in Table 4.4.1.

4.4.1 Customer Service Practices

On the extent to which Customer Service is practiced by the LPG, the results of the study are as shown in Table 4.4.1.

Table 4.4.1: Customer Service Practices

Customer Service Practices	Mean	Std. Deviation
The firm customer service enables the quick response to customer complaints	4.70	.48
Customers are provided with the right product at all time	4.30	.67
The firm delivers customer product to the place needed	4.30	.82
The firm have the right people to offer customer satisfaction	4.30	.95
The firms has the proper promotion programs for its product and services	4.20	.03
Overall	**4.36**	**0.59**

Source: Research Data (2015).

From the table above an overall mean of (*M*= 4.36, *SD*= 0.59) was registered indicating that majority of the respondents agreed that customer service is practiced by LPG firms to a large extent. The statement that the firm customer service enables the quick response to customer complaints was the most rated with a mean of (*M*= 4.70, *SD*= 0.48) indicating it was practiced to a very large extent. It is followed by the statement the firm delivers customer product to the place needed with a mean of (*M*= 4.30, *SD*= 0.82) and customers are provided with the right product at all time with a mean of (*M*= 4.30, *SD*= 0.67) indicating theywere practiced to a large extent. The least rated statement was that the firms have proper promotion programs for its product and services with a mean of (*M*= 4.20, *SD*= 0.03) implies that it was rated to a large extent. However, the respondents had varying opinions as evidenced by the standard deviations recorded. For instance, the respondents differed more on the statement that the firms have proper promotion programs for their products and

services with a standard deviation of 0.03 while they agreed more on the statement that the firm delivers customer product to the place needed with a deviation of 0.48. These findings reflect the argument by Pienaar and Vogt (2006) that meeting customer needs and wants through marketing efforts leads to the success of the firm.

4.4.2 Inventory Management Practices

The results of the study on the extent to which Inventory Management is practiced by LPG firms in Kenya are as shown in Table 4.4.2.

Table 4.4.2: Inventory Management Practices

Inventory Management Practices	Mean	Std. Deviation
The firm uses Enterprise Resource Planning system (Barcode) to track its inventory	4.60	0.70
The inventory management practices enable the firm to avoid inventory bottleneck in production	4.40	0.97
The firm provide external customer with the required inventory level with its inventory management practices	4.30	0.48
The inventory management practices keep cost at a minimum cost	4.30	0.67
The firm uses the right inventory management technique (JIT, Kaizan, ABC analysis etc) to manage it inventory.	4.20	0.92
Overall	**4.36**	**0.75**

Source: Research Data (2015).

The study sought to determine the level at which the above inventory management services were exercised in the firm. The study established that inventory management in the LPG firms is done to a large extent as evidenced by the overall mean of (*M*= 4.36, *SD*= 0.75). The most rated statement was that The firm uses enterprise resource planning system (Barcode) to track its inventory with a mean of (*M*= 4.60, *SD*=

0.70),followed by the statement the inventory management practices enable the firm to avoid inventory bottleneck in production a mean of (*M*= 4.40, *SD*= 0.97) indicating that it was practiced to a large extent. The firm provide external customers with the required inventory level with its inventory management practices and the inventory management practices keep cost at a minimum cost were practiced to a large extent with the mean of(*M*=4.30, *SD*= 0.48) and (*M*=4.30, *SD*= 0.67)respectfully. The least rated statement was that the firm uses the right inventory management technique (JIT, Kaizan, ABC analysis etc) to manage it inventory with a mean of (*M*=4.20, *SD*= 0.97).The respondents had varying opinions as evidenced in by the registered standard deviations. The statement the firm uses the right inventory management technique (JIT, Kaizan, ABC analysis etc) to manage it inventory had the largest standard deviation (0.97) whilethestatement the firm provides external customer with the required inventory level with its inventory management practices registered the lowest standard deviation of (0.92).The findings above concur with the study findings of Lysons and Farrington (2012) who found out that the main aim of the firm inventory management is to keep costs at minimum.

4.4.3 Transportation Practices

The findings of the study on the extent to which transportation is practiced in the Liquefied Petroleum Gas firms in Kenya are as shown in Table 4.4.3.

Table 4.4.3: Transportation Practices

Transportation Practices	Mean	Std. Deviation
The transportation management practices enables timely delivery of products and services to customers	4.20	0.63
Through transportation management products are made available to the customer desire location	4.20	0.79
The firm spend at a minimum cost to transport product to customer	4.20	0.79
The firms uses electronic system to track all product that are transported to customer	4.10	0.88
The firm products and services are delivered using the right mode of transportation	4.00	0.94
Overall	**4.14**	**0.81**

Source: Research Data (2015).

From the table above the study established that transportation management is practiced by the firms to a large extent as evidenced by an overall mean of (*M*= 4.14, *SD*= 0.81). The statements the transportation management practices enables timely delivery of products and services to customers was practiced to a large extent with the mean of (*M*=4.20, *SD*=0.63). Thestatementsthrough transportation management products are made available to the customer desire location and the firm spend at a minimum cost to transport product to customer registered a mean of (*M*= 4.20*SD*= 0.79), indicating it was also done at a large extent in each case. The firms using electronic system to track all products that are transported to customer was practiced to a large extent with a mean of (*M*= 4.10, *SD*= 0.88), and the firm products and services are delivered using the right mode of transportation was practiced to a large extent with a mean of (*M*=4.00, *SD*=0.94). The respondents differed the least on the statement that the firm products are delivered using the

right mode of transportation as shown by the least standard deviation of (0.63) while they differed more on the statement that the firms uses electronic system to track all product that are transported to customer with a standard deviation of (0.94). The practice of transportation by LPG firms to a large extent concur with the arguments of Wisner *et al* (2011) that transportation is a vital link between firms in a supply chain and that it must be managed effectively to meet customer due dates.

4.4.4 Information Flow Practices

The study further sought to know the extent to which information flow is practiced by the LPG firms in Kenya. The findings of the study are as shown in Table 4.4.4.

Table 4.4.4: Information Flow Practices

Information Flow Practices	Mean	Std. Deviation
The information flow through ICT is used to communicate	4.40	0.70
The information flow through ICT is used to coordinate.	4.30	0.90
Logistics management process is monitored using information flow through ICT.	4.30	0.90
The information flow through ICT practice is used to plan logistics processes	4.20	0.80
The firm information flow through ICT is used to control the logistics process.	4.10	0.70
Overall	**4.26**	**0.80**

Source: Research Data (2015).

The study found that information flow was practiced in the LPG firms to a large extent as evidenced by the overall mean of (*M*= 4.26, *SD*= 0.80). Majority of the respondents agreed to a large extent that the information flow through ICT is used to communicate as shown by a mean of (M=4.40, SD=0.70).The information flow

through ICT is used to coordinate the logistics process, and logistics management process is monitored using information flow through ICT was practiced to a large extent as shown by a mean of 4.30 in each case, followed by the information flow through ICT practice is used to plan logistics processes as shown by a mean of (M=4.20, SD=0.80), and that the firm information flow through ICT is used to control the logistics process as shown by a mean of (M=4.10, SD=0.70).The finding of the study is in line with the findings of Azevedo *et al* (2007) that for information flow to be effective and efficient; it must enhance the firm's logistics processes by planning, controlling, coordinating and monitoring the logistics process.

4.4.5 Warehousing Practices

The findings of the study on the extent to which warehousing is practiced by the LPG firms in Kenya are as shown in Table 4.4.5.

Table 4.4.5: Warehousing Practices

Warehousing Practices	Mean	Std. Deviation
The firm warehouse is close to the proximity of the customer	4.70	0.48
Products are delivered in the right quantity to the customer	4.50	0.53
The firm label and load the right product to the right vehicle	4.50	0.53
Products leaves the warehouse clean and damage free for customer	4.40	0.52
The firm stores it products using its facility	4.40	0.52
Overall	**4.50**	**0.52**

Source: Research Data (2015).

The study established that warehousing practices is employed by the LPG firms in Kenya to a largeextent as evidenced by the overall mean of (M= 4.50, SD= 0.52). The

most rated statement wasthe firm warehouse is close to the proximity of the customer with a mean of (M= 4.70, SD= 0.48). The products are delivered in the right quantity to the customer,the firm label and load the right product to the right vehicle are practiced to a large extent with a mean of (M= 4.50, SD= 0.53) in each case, followed by the products leaves the warehouse clean and damage free for customer and the firm stores it products using its facility were also practiced to a large extent with the mean of (M=4.40, SD= 0.52) in each case. The findings concur with Richard (2011)that warehousing ensures the cost efficient operationsby delivering the right product to the right customer at the right price, and in the perfect order and condition.

4.4.6 Packaging Practices

The findings of the study on the extent to which packaging is practiced by the LPG firms in Kenya are as shown in Table 4.4.5.

Table 4.4.6: Packaging Practices

Packaging Practices	Mean	Std. Deviation
The firm product is easily identified from other competitors product	4.80	0.49
The firm products are designed in a way to protect it from losses	4.70	0.47
The products can be transferred from different locations to different locations without damage.	4.70	0.48
The firm products are packaged in a way to protect it from damages	4.60	0.52
The firm product information are easily identified according to their value and purpose	4.50	0.53
Overall	**4.66**	**0.50**

Source: Research Data (2015).

The study sought to determine the level at which the above packaging practices were exercised in the firm. The study established that packaging practices in the LPG firms was done to a very large extent as evidenced by the overall mean of (*M*= 4.66, *SD*= 0.50). The most packaging practiced aspect was that the firm product is easily identified from other competitors product was practiced at a very large extent with a mean of (*M*= 4.80, *SD*= 0.49).The firm products being designed in a way to protect it from losses and the products can be transferred from different locations without damage were also done to a very large extent as supported by a mean of (*M*= 4.70, *SD*= 0.47 and *M*= 4.70, *SD*= 0.48) respectively. The firm products are packaged in a way to protect it from damages was also practiced to a very large extent as shown by the mean of (*M*= 4.60, *SD*= 0.52). The firm product information are easily identified according to their value and purpose was the least rate statement as evidence by a mean of (*M*= 4.50, *SD*= 0.53). However, it was still practiced to a large extent. The study findings reflects the findings of Ballou (2003) that products are packaged to serve the marketing needs of branding and promotional purposes, and it also protect the product from loss and damage as it is reached to its required destination in the right condition.

4.5 Performance of the Firm

In this section, the study sought to know how the respondents rated the performance of the LPG firms they worked for. Different parameters were used to measure the performance of the firm. The performance parameters mean scores were interpreted as follows1-1.49 = No Extent; 1.5-2.49 = Little Extent; 2.5-3.49 = Moderate Extent; 3.5-4.49 = Large Extent; 4.5-5.0 =Very Large Extent. The results of the study are as shown in Table 4.5;

Table 4.5: Performance of the Firm

Performance Parameters	Mean	Std. Deviation
Effective and efficient logistics management practices have improved the utilization of the firm's storage capacity across its network	4.70	0.48
Logistics management practices has led to the adoption of up-to-date technology within the firm	4.50	0.53
Logistics management practices have led to timely delivery products and services to customers thus meeting the customer requirements	4.50	0.53
Through the implementation of logistics management practices the firm has improved it costs of producing a product.	4.50	0.53
Through logistics management practices the firm can facilitate on timely basis the delivery of order to customers	4.40	0.70
Through logistics management practices the firm has improved its performance and hence meet shareholders requirement	4.40	0.52
Overall	**4.50**	**0.55**

Source: Research Data (2015).

The study established that the LPG firms in Kenya were performing well to a large extent as evidenced by the overall mean of (M= 4.50, SD= 0.55). The most rated statement was that Effective and efficient logistics management practices have improved the utilization of the firm's storage capacity across its network as shown by a mean of (M= 4.70, SD= 0.48). The statements Logistics management practices has led to the adoption of up-to-date technology within the firm, Logistics management practices have led to timely delivery products and services to customers thus meeting the customer requirements andThrough the implementation of logistics management practices the firm has improved it costs of producing a

product registered the mean score of (M= 4.70, SD= 0.53) in each case; this implies that logistics management has improved the firm performance to a large extent.

The study further revealed that through logistics management practices the firm can facilitate on timely basis the delivery of order to customers and Through logistics management practices the firm has improved its performance and hence meet shareholders requirement have improved the performance of the firm to a large extent with a mean of (*M*= 4.40, *SD*= 0.70) and (*M*= 4.40, *SD*= 0.52) accordingly. The above finding reflects the findings of Keebler and Durtsche (2001) that a firm can achieve a superior performance with its logistics practices by aligning its key logistics practices with its business strategy and measured against predetermined performance objectives. This has been confirmed by the findings of this study.

4.6 Relationship of Logistics Management to the Firm Performance

The study sought to establish the relationship between logistics management practices and firm performance. The scores of the variables to be regressed were computed through factor analysis and then saved as dummy variables. The researcher then conducted a regression analysis to explain this relationship using SPSS version 21. The results obtained are presented and discussed below;

Table 4.6.1 Coefficients of Determination

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	1.543	.633		2.438	1.543
Customer Service Practices	.481	.108	.329	4.454	.000
Inventory Management Practices	.479	.113	.334	4.239	.001
Transportation Practices	.428	.106	.314	4.038	.011
Information Flow Practices	.483	.113	.323	4.274	.003
Warehousing Practices	.471	.107	.327	4.402	.000
Packaging Practices	.456	.110	.321	4.145	.001

a. Dependent Variable: Firm Performance

Source: Research Data (2015).

From the data in the above table the established regression equation is

$$\mathbf{Y = 1.543 + 0.481X_1 + 0.479X_2 + .428X_3 + 0.483\ X_4 + 0.471\ X_5 + 0.456\ X_6}$$

Where: Y – Firm Performance (Dependent variable)

X_1- X_6 – The independent variables

X_1- Customer service practices

X_2- Inventory Management practices

X_3- Transportation practices

X_4- Information flow practices

X_5- Warehousing practices

X_6- Packaging practices

β_1- β_6 – Are the regression coefficients

ε – Stochastic error term

From the table 4.6.1above it is evident that at 95% confidence level,all the predictors have positive relationship on the firm performance and are statically significant. The predictors in the study also registered high values above the critical value of 3.182; this implies that the predictors have a positive and statistical significant relationship on the firm performance. Positive effect was reported for all the independent variables withcustomer service practices (t= 4.454, p= 0.000), inventory management practices (t= 4.239, p= 0.001) transportation practices (t= 3.566, p = 0.038), information flow practices (t = 4.274, p= 0.001), warehousing practices (t=4.402, p=0.000) and packaging practices (t=4.145, p=0.001) produced statistically significant values for this study of (high t-values, $p \leq 0.05$). The constant value (1.543) shows that if the logistics management practices identified were all rated zero, the performance of LPG firms in Kenya would be reduce by 1.543. In this study, stochastic error term was assumed to be zero since the study captured the key logistics management practices.

The study further revealed that: a unit increase in customer service practices would lead to improvement in firm performance by 0.481, a unit increase in inventory management practices would lead to increase in firm performance by 0.479,a unit increase in transportation practices would lead to increase in the firm performance by 0.428, a unit increase in information flow practices would lead to a change in the firm performance by 0.483, a unit increase in warehousing practices of 0.471 while an increase in the packaging practices would lead to a change in the firm performance of 0.456.The above findings are consistent with the findings of Sandberg & Abrahamson (2011) and Aron (1999) that for most firms, a groundswell of activity has surged around logistics practices, encompassing a broad sweep of corporate supply-demand

strategies that stretch from the raw materials to the ultimate customer and productivity-boosting tools.

Table 4.6.2: Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.919	0.844	0.796	.223

Source: Research Data (2015).

The study sought to establish the impact of logistics management practices on the performance of LPG firms in Kenya. The research findings indicate that there is a strong relationship (R= 0.944) between logistics management practices and the performance of LPG firms. The result of the study also indicates that the value of adjusted R-squared is 0.796. This implies that 79.6% of the variance in LPG firms' performance can be accounted for by logistics management practices. The remaining 20.4% can be explained by other variables which were not included in the model and the chance of variations.

Table 4.6.3 Analysis of Variance (ANOVA)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	119.682	6	19.947	21.896	0.001[b]
	Residual	2.733	3	.911		
	Total	122.415	9			

a. Dependent Variable: Firm Performance (Main)

b. Predictors: (Constant), Packaging Practices, Information Flow Practices, Warehousing Practices, Inventory Management Practices, Customer Service Practices, Transportation Practices

Source: Research Data (2015).

Critical Value =3.86

From the ANOVA statistics, the study established that the regression model had a significance level of 0.1% which is an indication that the data was ideal for making a

conclusion on the population parameters as the value of significance (p-value) was less than 5%. The calculated value of the dependent variable was greater than the critical value (21.896>3.86); this indicates that all logistics management practicesidentified have a statically significant impact on the performance of the LPG firm in Kenya. Thesignificance value was less than 0.05 indicating that the model was significant and good fit for the data collected.

4.7 Challenges of Logistics Management Practices

Lastly, the study sought to know the extent to which the LPG firms faced challenges when implementing logistics management practices. The mean scores obtained from the analysis were interpreted as follows: 1-1.5 = No Extent; 1.6-2.5 = Little Extent; 2.6-3.5 = Moderate Extent; 3.6-4.5 = Large Extent; 4.6-5.0 =Very Large Extent. The results of the study are as shown in Table 4.7;

Table 4.7: Challenges of Logistics Management Practices

Challenges	Mean	Std. Deviation
There is slow custom clearance process at the Mombasa port.	4.60	0.52
There is inadequate storage capacity to manage customer future demand across the firm's service network.	4.60	0.52
A high level of insecurity impedes a 24 hour service to customers.	4.40	0.52
There is limited holding capacity for petroleum product at the Mombasa port Mombasa port.	4.30	0.48
There is slow movement of product due to a lack of efficient transportation system locally.	4.30	0.95
Bad road condition for the movement of product.	4.20	0.79
The cost of transporting product is high across the country due to container rate	4.10	0.88
Overall	**4.36**	**0.67**

Source: Research Data (2015).

The study established that the LPG firms are faced with challenges when implementing logistics management practices to a large extent as evidenced by the overall mean score of (M=4.36, SD=0.67). From the findings, majority of the respondents agreed to a very large extent that; there is slow custom clearance process at the Mombasa port and there is inadequate storage capacity to manage customer future demand across the firm's service network as shown by a mean of (M=4.60, SD=0.52) in each case. The others agreed that to a large extent that the high levels of insecurity impedes a 24 hour service to customers as shown by a mean of

(M=4.40,SD=0.52), there is limited holding capacity for petroleum product at the Mombasa port Mombasa port there is slow movement of product due to a lack of efficient transportation system locally was also practiced to a large extent as shown by a mean of (M=4.30, SD=0.95). Bad road condition for the movement of product was practiced to a large extent as shown by a mean of (M=4.20, SD=0.79), followed by the cost of transporting product is high across the country due to container rate as shown by a mean of (M=4.10, SD=0.88). The study further established that the LPG firms are faced with erratic demand that makes planning difficult and there is no designated route for the LPG product as evidenced by NOCK and Hass Petroleum (K).The study findings are consistent with the findings of Wisner *et al* (2011) that customer satisfaction is determined by the level of customer service; and the challenges is the focus on how to avoid a misstep in providing the right product, in the right quantity, in the right condition, at the right place, at the right time, for the right customer and at the right cost.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the key findings of the study as well as the conclusions, limitations of the study, and recommendations for further research.

5.2 Summary of Findings and Discussions

The main intent of this research was to establish the effects of logistics management practices on performance of liquefied petroleum gas firms in Kenya. On the question of whether the firms had adopted various forms of logistics management practices, all the respondents answered to the affirmative meaning that all the firms sampled had recognized the importance of logistics management practices as a catalyst to improving the performance of the firms.

From the findings the study established that customer service enables the quick response to customer complaints, others agreed that the firm delivers customer product to the place needed customers were provided with the right product at all-time case, and that the firms have the proper promotion programs for its product and services. On application of inventory management services, the study found thatthe LPG firms use enterprise resource planning system (Barcode) to track its inventory, and also enable the firm to avoid inventory bottleneck in production. The study further established that inventory management practices provide for the upstream and down inventory visibility in the logistics or supply chain system.

On transport practices, the study revealed that the transportation management practices enables timely delivery of products and services to customers through transportation management products are made available to the customer desire location. Relating to information flow in the firm, the study found that information flow through ICT is used by the LPG firms to coordinate their operations. It was also found that warehouses were located close to the proximity of the customer and the products are delivered in the right quantity to the customer. Relating to Packaging practices, the study established that firm products are packaged in a way to protect it from damages and the firm product is easily identified from other competitors' product through their packaging process. On performance parameters, the study found that effective and efficient logistics management practices have improved the utilization of the firm's storage capacity across its network.

The study established that there is inadequate storage capacity to manage customer future demand across the firm's service network. This was found to be attributed to a slow, custom clearance process at the Mombasa port, high levels of insecurity impedes a 24 hour service to customers, there is limited holding capacity for petroleum product at the Mombasa port and there is slow movement of product due to a lack of efficient transportation system locally. Bad road condition for the movement of product and that the cost of transporting product is high across the country due to container rate.

5.3 Conclusions

The study established that LPG firms Kenya employed logistics management practices including transportation management practices which enabled timely delivery of products and services to customers, inventory management practices

which enable the firm to avoid inventory bottleneck in production. In addition, the study found that warehouse management practices facilitated products delivery at the right quantity to the customers and packaging practices.

Based on the regression analysis the study established positive beta coefficients with all study variables, customer service practices (0.481) inventory management practices (0.479), transportation practices (0.428), information flow practices (0.483), warehousing practices (0.471), and packaging practices (0.456). In that vein the study concludes that any change made is expected to positively impact logistical effectiveness and efficiencies.

The study also noted that there is there is slow custom clearance process at the Mombasa port, there is inadequate storage capacity to manage customer future demand across the firm's service network, the high levels of insecurity impedes a 24 hour service to customers, there is slow movement of product due to a lack of efficient transportation system locally. Bad road condition for the movement of product and that the cost of transporting product is high across the country due to container

5.4 Recommendations

Based on the study findings the researcher recommends the following measures to ensure continued improvement in performance of LPG firms in Kenya. The main challenge faced by the firms is there is limited holding capacity for petroleum product at the Mombasa port. The management of Kenya Ports Authority should move in quickly to expand the petroleum storage capacity at the Mombasa port as a way of improving the performance of the LPG firms.

The study further established that a high level of insecurity impedes a 24 hour service to customers which hinders the LPG firms in Kenya to operate optimally. The researcher recommends that the state officers in charge of security apparatus should move in quickly to secure the routes used by the LPG firms when transporting petroleum to their customers. This will ensure that the firms don't make losses hence improving their performance.

LPG firms in Kenya needs to adopt an integrated ICT controlled system, this will enable clear monitoring and administration of logistical operations and therefore enhancing the overall efficiency of the firm.

5.5 Limitations of the Study

Most of the respondents approached were reluctant in giving information since firm information is proprietary and confidential. The researcher tackled the problem by assuring the respondents that the data will be used for academic purpose only and would be treated with utmost confidentiality.

Another limitation faced was that the researcher had no control of the accuracy of the data provided. The researcher used the data as provided but made calls to clarify any ambiguous answers provided by the respondents.

The respondents from the LPG firm were senior managers with busy working schedules which delayed the data collection process. The researchers used drop-and-pick-later method so as to give the respondents adequate time to fill in the questionnaires.

5.6 Areas for Further Research

A research into the other factors influencing the performance of LPG should be researched on since the logistics management practices used in this study could not account for 20.4% of the changes in firm performance.

Further, the study only focused on the petroleum industry, particularly the liquefied gas sector. The findings of this study cannot be adequately extrapolated to generalize the state of logistics management in the other industries. A similar research should be done focusing on other industries.

Lastly, this study only looked at the challenges facing the implementation of logistics management practices by LPG firm but never looked at the possible solutions. A future research focusing on this will serve to enlighten the management of LPG firms on how to tackle the challenges that undermine efficient performance of the firms.

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APPENDIX I: RESEARCH QUESTIONNAIRE

This questionnaire has been designed to assist the researcher collect data on the research topic: "the impact of logistics management practices on the performance of the Liquefied Petroleum Gas firms in Kenya''. You have been identified as one of the respondents in the study to provide information that will be used only for the purpose of the study. You are requested to complete the following questionnaire. The information you will provide will be held confidentially and in no way will you name or answer be revealed. Please answer all the questions to the best of your knowledge.

Section A: General Information

1. Is the firm (a) localfirm (b) foreign firm?.....
2. How long has the firm been in operations in Kenya?

   a) Below 5 years……. ( ) b) 5-10 Years……. ( )

   c) 11 – 20 Years…….. ( ) d) Over 20 Years……. ( )

3. Does the firm have operations outside Kenya?

   Yes ( ) No ( )

4. What job position do you hold?

   Operation Manager () Logistics Manager ( ) Other () please specify

_____

_____

SECTION B: Logistics Management Practices in the Firm

5. To what extent does your firm practice the following logistics practices? Tick as appropriate using the following Likert scale of 1-5 where: The means recorded were interpreted as follows: 1-1.49 = No Extent; 1.5-2.49 = Little Extent; 2.5-3.49 = Moderate Extent; 3.5-4.49 = Large Extent; 4.5-5.0 =Very Large Extent.

	Logistics Management Practices	**Respondents**				
		1	**2**	**3**	**4**	**5**
	Customer Service Practices (Defined by marketing activity)					
1	Customers are provided with the right product at all time					
2	The firm delivers customer product to the place needed					
3	The firm customer service enables the quick response to customer complaints					
4	The firms has the proper promotion programs for its product and services					
5	The firm have the right people to offer customer satisfaction					
	Inventory Management Practices					
1	The firm uses Enterprise Resource Planning system (Barcode) to track its inventory					
2	The firm provide external customer with the required inventory level with its inventory management practices					
3	The inventory management practicesenable the firm to avoid inventory bottleneck in production					
4	The inventory management practices keep cost at a minimum					
5	The firm uses the right inventory management technique (JIT, Kaizan, ABC analysis etc) to manage it inventory.					
	Transportation Practices					
1	The transportation management practices enables timely delivery of products and services tocustomers					
2	Through transportation management products are made available to the customer desire location					
3	The firm products and services are delivered using the right mode of transportation					
4	The firm spend at a minimum cost to transport product to customer					
5	The firms uses electronic system to track all product that are transported to customer					

	Information flow Practices					
1	The information flow through ICT practice is used to plan logistics processes					
2	Logistics management process is monitored using information flow through ICT					
3	The firm information flow through ICT is used to control the logistics process					
4	The information flow through ICT is used to coordinate					
5	The firm information flow through ICTis used to communicate					
	Warehousing Practices					
1	Products are delivered in the right quantity to the customer					
2	The firm label and load the right product to the right vehicle					
3	Products leaves the warehouse clean and damage free for customer					
4	The firm warehouse is close to the proximity of the customer					
5	The firm stores it products using its facility					
	Packaging Practices					
1	The firm products are packaged in a way to protect it from damages					
2	The firm products are designed in a way to protect it from losses					
3	The firm product is easily identified from other competitors product					
4	The products can be transferred from different locations to different locations without damage.					
5	The firm product information are easily identified according to their value and purpose					

What other logistics management practices does your firm practice?

_____

_____

Section C: Performance of the Firm

6. The following are some of the sources of a firm's superior performance. Please indicate the extent to which logistics management practices contribute to the firm performance. Tick as appropriate using the following Likert scale of 1-5 where: 1= No Extent; 2= Little Extent; 3= Moderate Extent; 4= Large Extent; 5=Very Large Extent.

Performance Parameters	Respondents				
	1	2	3	4	5
Logistics management practices have led to timely delivery products andservices to customers thus meeting the customer requirements					
Through the implementation of logistics management practices the firm has improved it costs of producing a product.					
Through logistics management practices the firm can facilitate on timely basis the delivery of order to customers					
Logistics management practices has led to the adoption of up-to-date technology within the firm					
Effective and efficient logistics management practices have improved the utilization of the firm's storage capacity across its network					
Through logistics management practices the firm has improved its performance and hence meet shareholders requirement					

Indicate any other measure of the firm performance which in your opinion that the firm must address in order to enhance its performance (Optional).

_____

_____

Section D: The Challenges of Logistics Management Practices in the Firm

8. The following are some of the challenges of logistics management practices in the firm. Please indicate the extent to which the below challenges affect the firm performance. Tick as appropriate using the following Likert scale of 1-5 where: 1= No Extent; 2= Little Extent; 3= Moderate Extent; 4= Large Extent; 5=Very Large Extent.

Challenges Parameters	Respondents				
	1	2	3	4	5
There is slow custom clearance process at the Mombasa port					
There is limited holding capacity for petroleum product at the					
Bad road condition for the movement of product					
The cost of transporting product is high across the country due to					
There is inadequate storage capacity to manage customer future demand across the firm's service network					
High levels of insecurity impedes a 24 hour service to customers					
There is slow movement of product due to a lack of efficient transportation system locally					

Indicate any other challenges which in your opinion that the firm must address in order to enhance the logistics management practices (Optional).

_____

_____

APPENDIX II: LIST OF REGISTERED LPG FIRMS IN KENYA

Company
TOTAL
VIVO
HASHI
LIBYAOIL
KENOLBOBIL
ORYX ENERGIES
GULF OIL
NOCK
JAGUAR
GALANA
FOSSIL
HASS
TOTAL

Source: (PIEA, 2014)