

**LOGISTICS INNOVATIONS IN THE ROAD TRANSPORT SECTOR IN KENYA.**

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## DECLARATION

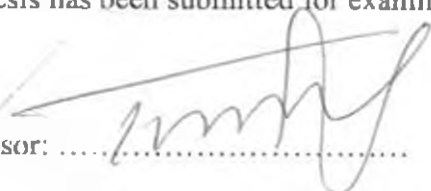
I, the undersigned, declare that this research project is my original work and has not been presented for the award of any other degree in any other university other than the University of Nairobi:

Signed:  .....

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This thesis has been submitted for examination with my approval as University Supervisor:

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Date: 9/11/2011 .....

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## **DEDICATION**

This research is dedicated to the Lord God Almighty for His grace and strength, my dear wife Catherine N. Matara and My children Joy, Jeremy, Jessie, and Jordan for their inspiration, support, encouragement and understanding throughout the research period. I also dedicate this project to my late mum, Agnes Kwamboka, My sister Mrs. V. Abuya and her Husband Dr. J. Abuya. I am completely overwhelmed by their support throughout this project period.

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## ABSTRACT

This study is on the logistics innovations in the road transport sector in Kenya. The researcher sought to know the adopted logistics innovation and the benefits that accrue by implementing the logistics innovations. In the 21st century businesses compete greatly to impress and attract customers. The growth of Kenya's economy hinges to a large extent on the road transport sector operating more efficiently and effectively in moving freight and goods. This study was on benefits which are achieved by the road transport companies which adopt logistics innovations technologies in Kenya. These benefits included in the study are operational efficiency, cost reduction, improved customer services, and competitive advantage. The logistics innovations are classified into data acquisition innovations, information and transportation technologies.

The study employed questionnaires as the primary data collection instrument. The questionnaire consisted of both open and close-ended questions aimed at obtaining information on the benefits of the adoption of logistics innovations in the road transport sector in Kenya. A content analysis and descriptive analysis was employed to analyze the collected data. The content analysis was used in analyzing the respondents' views. Tables and other graphical presentations as appropriate have been used to present the data collected for ease of understanding and analysis. The study found that logistics innovations when implemented by the road transport sector firms indeed increased the benefits of operational efficiency, reduction in costs of operating, customers were satisfied and competitive advantage is gained.

The government should encourage the adoption of innovations in the administration of regulatory mechanisms. It can also provide financial incentives, pilot projects, and tax breaks to stimulate logistics innovations for the road transport sector. Transporters too can take advantage of logistics innovations to enhance their service provisions.

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## ABBREVIATIONS

EDI	:	Electronic Data Interchange
EEC	:	European Economic Community
ERP	:	Enterprise Resource Planning
GPS	:	Global Positioning System
ICT	:	Information Communication Technology
JIT	:	Just – in – Time
RFID	:	Radio Frequency Identification
SCM	:	Supply Chain Management
USA	:	United States of America

## CHAPTER ONE

### 1.0 Introduction

This chapter introduces the subject of the study; in specific it covers the background of the study, logistics innovation, statement of the study, objective of the study and value of the study.

### 1.1 Background of the Study

In a dynamic environment, processes, operations and methods change to accommodate new discoveries and admit new ways of doing things. Logistics operations are no different. Every new occurrence creates new opportunities or new threats which have to be tackled by firms to remain in the market place (Grawe, 2009).

The transport sector is rapidly evolving. Its development includes regulatory reform, industrial restructuring, and technological innovation (Ongkittikul, 2006). All these are as a result of globalization, and digitized forces in today's world which has increased Competition pressures making innovation more crucial not only to survive but also to grow and flourish (Amidon, 1996).

#### 1.1.1 Logistics Innovation

Logistics is defined by The Council of Supply Chain Management Professionals (2007) as: "the process of planning, implementing, and controlling procedures for efficient and effective transportation and storage of goods including services, and related information from the point of origin to the point of consumption for the purpose of conforming to customer requirements".

Generally, Innovation has been broadly defined as an idea, practice, or object that is perceived as new by an individual or other unit of adoption (Rogers, 1995). While, logistics innovation refers to any logistics – related service that is seen as new and helpful to a particular focal audience (Flint, Larsson, Gammelgaard & Mentzer, 2005). Logistics innovations can be very basic to very complex and can be applied to internal operations or services with business partners (Flint, Larsson, Gammelgaard, & Mentzer, 2005). Innovation is a complex subject characterised as a change or adoption process of new technologies or techniques. Not only is it complicated to predict the consequences of such innovations, but it is even more difficult to measure its effects in a systematic way (Ongkittikul, 2006).

Logistics innovation is of paramount importance to the logistics operations when looking at the Supply Chain Management. SCM has become a critical factor for the firm's success. (Sweat, 2008). In this respect, Organizations and researchers have attempted to seek the best approaches of improving logistics operations to enhance efficiency and effectiveness (Cheng & Van de Ven, 1996). Global supply chain management encounters various challenges and competition which require firms to keep innovating to stay ahead of the competition. Due to technological advancements, the world is getting smaller (Grawe, 2009). This has enabled firms to source materials and to market their products in markets which there before far away (Flint, Larsson, Gammelgard & Mentzer (2005).

A firm needs efficiency, reliability, and predictability when engaging in moving goods around the world (Barney, 1991). Many factors can be associated with this, but there are those innovative changes which greatly impact across the entire industries. One such innovative change is intermodal transportation and the use of containers for shipping goods internationally. Intermodal transportation is the use of more than one mode of transport to carry a shipment from origin to its destination. This mode provides a flexible response to the changing requirements in SCM (Bontekoning, 2004).

A container is just a metal box, but it allows goods to be transported and stored in standard ways on larger vessels, vehicles and trains. Entrepreneurs exploited the potential, and this led to massive changes and productivity improvements in ship loading and unloading, to safety and security advances, and to huge transport cost reductions (Short, 2010). The history of the containers dates back to the year 1956. Malcolm Mclean shipped 58 aluminium truck bodies in frames on a ship from Newark to Houston, marking the introduction of containerization for moving cargo on the seas (Levinson, 2006).

Prior to that time ,cargo used to be loaded into crates for shipping overseas thus consuming significant amount of time and requiring a lot of labour to both load and unload each ship. This innovation of containerization reduced transportation costs related to importation and exportation of goods, which in turn led to opportunities of reaching new frontiers for sourcing and distributing products (Grawe, 2008).

Over the course of time, the logistics industry has seen many examples of innovation. The importance of finding a better way to move product was identified as early as 1776, when Adam Smith detailed the connections between manufacturers and markets and transportation inefficiencies .(Donovan, 2004). Since then, we have seen the steam engine,

containerization, electronic data interchange (EDI), cross-docking, radio frequency identification (RFID), and many more other innovations in the field of Logistics. An effective logistics operation can provide a competitive advantage for a firm's market share (Stank, Daugherty & Ellinger, 1998; Mentzer, Flint & Hunt 2001). Logistics has also been shown to enhance customer value and logistics executives believe that it adds value to firm's output (Novack & Langley, 1996; Stank, Daugherty & Ellinger, 1998).

Logistics innovations are a result of firms seeking more efficient and effective methods of delivering quality service as demanded by the customers. As lifestyle and taste of customers change, firms are compelled to improve their service delivery to retain on attract customers. The Customer is concerned with receiving quality service and products at affordable rates, this , thus puts pressure on the firms to develop better ways of doing things while reducing costs for the benefit of the customer. Logistics research is influenced by the economic and behavioral approaches. The economic approaches focus its attention on cost minimization and profit maximization while behavioral approaches focuses on psychological and sociological aspects (Mentzer and Kahn, 1995).

Road transport is the most common way to transport and distribute materials and products in Kenya. Road transport is the most flexible of all the transport modes. This enables organizations to move large quantities of goods, perform pick up services, as well as make distributions to many locations on one route. Heavy commercial transporters are used in the moving goods (Hakala, 2010).

The road transport sector is mostly for the domestic market in Kenya, but with the ever increasing markets and collaborations within the other East African countries, that is, Uganda, Tanzania, Rwanda, Burundi and even both the South Sudan and the Democratic Republic of Congo phenomenal growth has been experienced in this industry. This growth has created transport opportunities which the industry players have to take advantage of. Appropriate technology has to be adopted to bring about efficiency in operations. To avoid taking erroneous routes in new territory, installation of the GPS in trucks has to be done (Short, 2010). Transport Management systems to assist in scheduling, tracking and tracing loading order of goods and also in optimizing in the number of vehicles involved has to be done (I C G L R , 2006).

One area of major concern is of achieving cost advantage so that they can have better capacity utilization, reduce inventory and closely integrate suppliers and customers to

remain competitive. New patterns of freight and product are emerging to take advantage of the e-commerce. The Kenyan transportation industry is reshaping itself in response to powerful technological, economic and consumer forces. In today's scenario most of the large organizations have dispensed with the traffic department. The whole function connected with logistics and supply chain management or the movement of raw materials, finished goods, spares and other functions are assigned to a service provider who is a third party logistics provider (3PL) (McKenna, 2011). This is where services of the heavy commercial road transporters have come in to provide the services of transportation.

Exporting products to the European community (EEC) must meet specific set standards. Horticultural produce which Kenyan firms are famous in, has to be transported and stored in temperature regulated containers. These refrigerated containers must have well set coolers which must preserve the produce all the way to its ultimate destination (Levinson, 2006). The environment in which a firm operates can impact the firm's ability to innovate. In his research on the barriers to innovation in the railroad industry, Gellman (1986) pointed to federal regulation of the railroad industry as a significant barrier to innovative activities among the railroads. In Kenya the Traffic Act has set in place laws conducive for improving the performance in this industry.

Consumer demands determines how organizations set their expectations and justify adaptations of their operations. The "cult of the customer" (du Gay and Salaman, 1992; Keat 1994; New and Ramsay, 1994; Walter, 1985) is closely associated with the emergence of supply chain management mantras of time compression, flexibility and increased responsiveness (Beesley, 1995). The key point here is that developments in supply chain practice arise from complex nexus of social developments. The Kenyan market has not been left behind on this frontier, as the social developments become more complex, so are the demands from consumers. This has forced advancements to be made by the road transporters in order to meet these complex needs. Without appropriate innovations, it becomes almost impractical to meet the logistics demands of these consumers (Hakala, 2010).

The Logistics function involves the activities to support the flow of products and information between firms with the goal to provide time and place utility (Ballou, 1999; Stock and Lambert, 2001). The importance of logistics for corporate success has continued to increase based on management's ability to adjust sourcing, production and transportation activities in response to customer demands, together with technology enhancements that have enabled fast and accurate information flows (Shankar, 2001) As a functional business

area, logistical management activities within firms can be viewed as a complex system given that it involves interdependent actors with a high degree of interactions and trade-offs (Stock and Lambert, 2001).

## **1.2 Statement of the Problem**

Effective logistics leads to a competitive advantage for a firm and increases a firm's market share (Mentzer, Flint & Hunt 2001). Also, logistics has been shown to enhance customer value and adds value to a firm's output, which is generated from the ability to reduce costs and provide delivery solutions according to customer needs (Stank, Daugherty & Ellinger (1998). Logistics innovations are not just in technology alone, but in policy too. These include deregulation in trucking, aviation, and some rail systems and have brought large benefits to economies and consumers (Bontekoning & Priemus, 2004).

While the opportunity to create a competitive advantage through logistics has inspired researchers to consider various factors leading to higher levels of logistics performance, the broader concept of innovation has not been addressed in great detail (Fawcett & Farris, 1989). In 2005, Flint pointed out that logistics research has ignored innovation. This is true when looking at logistics innovations. Largely ignored innovations are logistics technologies (EDI, RFID.) and logistics programs (vendor-managed inventory, cross-docking,) and their roles in logistics operations and relationships (Grawe, 2008).

The road transport sector in Kenya is of great importance for the general growth of the economy. This is due to the fact that the railway network is grossly underdeveloped giving the road transport an advantage. This industry which is largely run by the private sector, and is very competitive need to be accorded the importance it deserves. The industry comprises of both large and medium sized Companies, with an estimated fleet of over 40,000 trucks of different loading capacities (Murithi, 2004).

Much of the research work done on logistics innovations has been conducted in the developed economies; in his study on logistics innovations, (Mung'onye, 2008) dwelt on the service innovation in the Tourism sector. The study mainly looked at innovations in reservations and bookings of tourists and guests at resorts and facilities and the delivery of the hospitality industry. On the other hand the study done by (Belzer, 2002) looked at the technological innovation in trucking industry emphasizing on information revolution and the effects of the work process in a developed economy. (Lin, 2008) in his paper "determinants of the adoption of technological innovations by logistics service providers in China" looked



at the factors influencing the adoption of technological innovations by logistics service providers.

This study will seek to fill the existing research gap by conducting a study on logistics innovation as adopted by road Transporters which has been ignored in previous studies. The study will try to establish the benefits that accrue from adopting logistics innovations to the road transport sector. While other researchers have looked into factors that influence the adoption of logistics innovation, none has done a study on the benefits of logistics innovation in a developing country. This study will seek to answer the following research questions: To what extent do logistics innovations derive benefits to the road sector? What benefits does the logistics innovation bring about? Do the logistics innovations adopted justify the investment spent?

### **1.3 Objective of the study**

The following objective will be explored:

- i) To establish the benefits of logistics innovations.

#### **1.3.1 Specific objectives**

- i) To find out whether operational efficiency is achieved.
- ii) To find out whether there is a reduction of costs
- iii) To find out the whether customers are satisfied
- iv) To find out whether competitive advantage is acquired.

### **1.4 Value of the Study**

This study will enable the heavy commercial transporters to be able to understand their comparative performance, competitiveness and promise opportunities to improve business performance and productivity through logistics innovations. Innovation in logistics context has not only benefited practitioners in the field of logistics, it has impacted practitioners in marketing, sales, finance, and even end consumers have immensely benefited a lot. Therefore a greater understanding of such innovations and their impact can help firms establish processes aimed at generating further logistics innovations, develop a research and development (R&D) department if it is non existent and invest more in information and communication Technology to help in operation and management.

Government policy will benefit from understanding more detailed operational logistics innovations being adopted thus contribute by putting in place specific strategies for sustainable distribution, reducing carbon emission, road safety and easing of road congestion.

The Supply Chain Management being a relatively new academic field, a lot of study has to be undertaken in virtually all areas along the Supply chain. The information this study will provide will be a vital basis for further research study in logistics innovation where gaps exist.

## CHAPTER TWO: LITERATURE REVIEW

### 2.1 Introduction

This chapter seeks to review the relevant literature available that focuses on the concept of logistics innovation in the supply chain as embraced by road carriers. It looks at how other writers and scholars view the concept of logistics innovation and its adoption in various organizations, also the benefits that accrue from such innovations.

### 2.2 Logistics innovations in supply chain

Supply Chain(SC) and Supply Chain Management (SCM) terms were introduced for the first time in the middle of 1980s and later became more widespread in the 1990s (Jones & Riley 1985). The concept of supply chains and supply chain management is a relatively recent managerial principle. The term supply chain also describes the network of suppliers, distributors and consumers. The field has evolved from a number of sources including purchasing, marketing (distribution channels), logistics, and operations management (Hakala, 2010). The main reasons contributing to this importance is the large share of logistics costs in the finished product costs, customer-orientation, intense competition, shrinking product life cycles, and improvement of inter-organizational communication tools (Stock & Lambert, 2001).

Due to the emergence of the concept of supply chain management, logistics management has attracted more and more attention. Logistics management has become a strategic factor that provides a unique competitive advantage (Christopher, 1993). Logistics service providers play an important role in the supply chain. One of the keys to effective supply chain management is to make the logistics function more efficiently in the supply chain (Bowersox, Closs & Cooper, 2002).

In addition to transportation and warehousing functions, logistics service providers can also provide other services such as materials management services, information related services and value added services. In order to keep the competitive advantage, logistics companies must make use of knowledge more efficiently to make them become innovation-based logistics service providers. (Chapman, Soosay & Kandampully, 2003).

Technology has traditionally been viewed as the key to productivity in manufacturing; however, technology has assumed greater significance in services recently. (Bitner, Brown and Meuter, 2000; Howells and Tether, 2004). Technology enables service firms to improve service efficiency and effectiveness. According to the logistics activities, technological innovations in the logistics industry can be classified into four categories: data acquisition technologies, information technologies warehousing technologies and transportation technologies.

Transportation is one of the most visible elements of logistics operations. Transportation functionality provides the major function of product movement. The major objective of transportation management system is to move products from an origin location to a prescribed destination while minimizing costs and damage expenses (Gevaers, Van de voorde & Vanellander, 2008). The movement at the same time, must take place in a manner that meets customer demands regarding delivery performance and shipment information availability .The technologies include transportation information system, global positioning system (GPS), geographical information system (GIS), radio frequency communication system and transportation data recorder (Lin ,2006).

According to Handfield and Nichols (1999), a supply chain encompasses all activities associated with the flow and transformation of goods from raw materials (extraction), through the end user, as well as associated information flows, material and information flow both up and down the supply chain. Chopra and Meindl (2001), state that a supply chain consists of all stages involved, directly or indirectly, in fulfilling a customer request. The supply chain not only includes the manufacturer and suppliers, but also transporters, warehouses, retailers, and customers themselves.

Burt, Dobler, & Starling (2003), found out that SCM mutated first into a commercial orientation with an emphasis on cost savings and then into a proactive strategic outlook that is fully integrated into the competitive strategy of the company and notes further that SCM is enjoying an increasing economic importance as for manufacturing companies bought-in components account for the largest share of total company economy. Thus, the flow of goods through the supply chain is the life-blood of the modern world.

Supply Chain Council (2007) defines SCM as a process which encompasses every effort involving producing and delivering a final product or service, from the supplier's supplier to the customer's customer. SCM includes managing supply and demand, sourcing raw

materials and parts, manufacturing and assembly, warehousing and inventory tracking, order entry and order management, distribution across all channels, and delivery to the customer. This definition fits well with the logistics operations.

Different sectors of various industries apply different supply chain practices in managing their supply chains. For example, Jaffee, Thoen, Dolan & Ba, (2005), found out that flowers are highly perishable and variable, hence the need for an effective and uninterrupted cold chain, highly efficient long and short distance freight transportation arrangements and mechanisms for rapid sales. Thus achieving growth and security within the dynamic cut flower supply chain, which is an export oriented supply chain, is quite a challenge.

The supply chain of the petroleum industry is extremely complex compared to other industries. Supply chain management in the petroleum industry contains various challenges, specifically in the logistics area, that are not present in most other industries. The logistics network in the petroleum industry is highly inflexible, which arises from the production capabilities of crude oil suppliers, long transportation lead times, and the limitations of modes of transportation. Every point in the network, therefore, represents a major challenge (Jenkins and Wright, 1998). When designing SCM solutions certain challenges are encountered with. (Karkkainen, 2002).

### **2.3 Logistic Activities**

These activities include customer service which is set by marketing based on operation capabilities. The routing and vehicle scheduling under transport activities. Inventory of raw materials, finished goods and the stocking policies are part of logistic activities. Warehousing issues are also handled as on of logistic activity (Hakala, 2010).

A warehouse is typically viewed as a place to store inventory. However, in many logistical systems, the role of the warehouse is more properly viewed as a switching facility as contrasted to a storage facility. Warehousing plays an important role in a logistical system. The design of a warehouse management system should address physical facility characteristics and product movement (Hakala, 2010).

The warehousing technologies that are commonly used in logistics industry include automated storage and retrieval system (AS/RS), automatic sorting system, computer-aided picking system, and thermostat warehouse. The automated storage and retrieval system is a mean to high density, hands free buffering of materials in distribution and manufacturing

environments. Automated storage and retrieval system can offer a quick and efficient way to search and move storages from a warehouse. Computer-aided picking system increases the accuracy and efficiency of picking orders in a warehouse environment. This system virtually eliminates both shipment errors due to incorrect picking and billing errors due to incorrect invoicing. (Lin, 2006).

### **2.3.1 Transport and distribution**

Road transport is still the most common way to transport and distribute materials in Kenya. This is affected by low population density, scattered settlement and the structure of industry. Road transport is the most flexible of all the transport modes. Organisations are able to move large quantities as end-to-end transports, perform pick up services, as well as distribute to many locations on one route (Murithi, 2004).

There is not one correct or general method to plan road transport, because road transport has many different categories. These include transit, pick up and distribution and return and random transports (Belzer, 2002). Special demands in road transport arise from restrictions and limitations of road networks, weight and size restrictions of the equipment and composition of transport capacity and demand. Legal and legislative rules pose general requirements for equipment, personnel and licenses. This system in practice means that trailers are loaded on trains at the border and are transported through the country by rail. At the other border the trailers are again connected to trucks. (Karrus, 1998).

The development of technology contributes to the efficiency of road transport. GPS in trucks reduces erroneous routes, weather monitoring helps in planning the route and time tables. Transport management systems assist in scheduling, tracking and tracing, loading order of goods and optimizing in number of vehicles involved. Challenges for road transport arise from congestion of cities. Safety, maintenance and traffic fluency are main concerns of connecting roads to main road network (Short, 2010).

### **2.3.2 Intermodal transport**

Intermodal transportation is the combination of two or more transport methods in transporting goods. This means that loading and unloading operations must be efficient and fast. This is imperative for intermodal transport. The time used to move the materials from a vessel to another must be minimized. Every extra hour in the harbor is very expensive and during that time the materials are not moving towards the customer (Bontekoning, 2004).

Intermodal transportation, with the option of integrating multiple modes, provides a flexible response to the changing supply chain management requirements in global markets and distribution systems. The integrating of modes requires a process or systems approach for execution and a higher degree of skill and broader knowledge of transportation processes, information, equipment and infrastructure. (Muller, 1999).

Several solutions have been developed for intermodal transport problems. One solution is to create logistic hubs near harbors which support rail, road and distribution activities. More attention has been given to the speed of handling of the materials. Activities that increase speed are ro-ro (roll-on roll-off) vessel solutions and using pallets and containers. The driver of intermodal transportation has been the container, which permits easy handling between modal systems. A container is a large standard size metal box into which cargo is packed for shipment abroad. It is designed to be moved with common handling equipment enabling high- speed intermodal transfers in economically large units between ships, railcars, and truck chassis using minimal labor. Advantages of containerization include: standard transport product, flexibility of usage, easy management, economies of scale, speed, easy to warehouse and security of cargo. (Levinson, 2006).

## **2.5 On- going trends in the logistics sector**

The logistics sector is growing due to the increasing outsourcing of logistics functions by companies that want to focus on their core business. High demands regarding organisation is also a major issue in the logistics sector. Key elements are time, quality, and high amount of customer relationships, languages, flexibility and reliability of performance (Gail, 2011). Growing pressure for greener logistics and environmental concerns are also today's trend which enterprises are taking seriously (Jaffee, Thoen, Dolan & Ba, 2005). Logistics traditionally does not have a very good reputation for environmental protection. This is demonstrated by emissions from heavy truck traffic and oil spills in the sea to mention just a couple. But logistics is clearly moving towards greener practices. One aspect of this is reverse logistics, which includes the collection and recovery of end- life products and return and reuse of packaging. There is a growing recognition that careful management can bring both environmental protection and lower costs. (Richey, Genchev & Daugherty, 2005).

The sector therefore demands a highly specialized infrastructure, especially, warehouse management system with advanced techniques, powerful software, capable and qualified personnel on all levels such as handling, desk functions, management and knowhow. The

ability to efficiently use these resources requires logistical knowledge whereby one should be able to locate and acquire this knowledge (Hakala, 2010).

## **2.5 Logistic integration**

Today most of the companies have integrated their logistic actions. There are three levels of integration. The first has logistic actions as separate activities within the organization; the second has internal integration to bring them together into a single function. The third has external integration, where organizations look beyond their own operations and integrate more of the supply chain (Waters, 2007).

Logistic integration makes it possible for organizations to respond rapidly to customer activities, which is vital for organization's competitiveness in the market. Efficient customer response (ECR) allows the organization to react immediately and send necessary information throughout the supply chain to keep the stocks, manufacturing and so on up to date in real time. Having an ERP system in the company will help the business to communicate in real time, not only within the company, but with customers and partners as well (Hakala, 2010).

### **2.6.1 Operational Efficiency**

Implementation of logistics innovations by road transporters leads to increased operational efficiency. Containerization which is one of logistics innovations creates great benefits of reduced susceptibility to pilferage and theft, elimination of multiple handling of individual items of cargo and cargo damage. (Donovan, 2004). This ultimately, reduces the cost of freight insurance, handling costs and compensation for damaged goods while in transit. As one of the logistics innovations, Tom S., (1999) states that an ERP system's impact on costs and operational efficiency can be startling. These dramatic improvements in efficiency can lead to lower costs and satisfied customers (Richey, Genchev & Daugherty, 2005). In their paper, "The role of resource commitment and innovation in reverse logistics performance", Asserts that, logistics innovations improves a firm's market effectiveness and internal cost efficiency. They further state that logistics innovations can also lead to increased revenues due to added services and improved customer satisfaction. Operation processes in most logistics companies evolve over time, based on accumulated knowledge and experience of best practice and thereby becoming a valuable intangible asset (Hunt & Morgan, 1996).



The challenge transport companies face is that these best practice methods are often compelled by a large extent by logistics innovations which are very dynamic. Most logistics companies, especially the road transporters' react to this fact in an ad-hoc manner, not having the resources for assessment, planning and logistics innovation sourcing. (Speakman, 2002).

### **2.6.2 Cost Reduction**

Establishing digital connectivity and automation of logistics business processes can eliminate the massive overtime cost caused by duplication of roles and responsibilities. In addition, equipment used in transportation which require no manual or minimal intervention, has a huge labour costs savings for the transporting companies such as cranes and forklifts. Use of email, intranet and workflows and automated processes enhance communication and drastically reduce operational costs such as communication; transport costs and stationery (Lin, 2008).

### **2.6.3 Customer Services**

Organizations expecting to find customers behind their desks must also develop new interaction models to guarantee being able to contact current and potential customers. The need to give better and more efficient services will be influenced by the adoption of logistics innovations. Customer service will be improved due to faster and more accurate transaction processing. Speedy and timely deliveries of freight cargo will be enjoyed by customers. Services will be brought closer to the clients reducing operational costs and benefiting clients in that they will not have to travel long distances to access data and information. (Kandampully, 2002).

Logistics innovation technology has provided self-service abilities to customers such that they can track and monitor movement of freight on real time (Gail, 2011). There are a few major areas in which technology now is able to help provide key advantages to businesses in engendering customer loyalty by improving customer service (Hakala, 2010).

**Websites:** Providing areas on your website where customers can answer their own questions or seek answers from others.

**E-mail:** Using e-mail as a way to improve customer service and more quickly respond to certain needs or help requests (Barney, 1991).

Communications: Unifying communications so that you know that the customer who left a voice mail also sent an e-mail with the same request a few days ago (Barney, 1991).

Software: Better managing customer relationships with more sophisticated data-gathering tools, such as customer relationship management software. (Karknainen , 2002).

#### **2.6.4 Competitive Advantage**

Porter (1990) Asserts that “Companies achieve competitive advantage through acts of innovation. They approach innovation in its broadest sense, including new technologies and new ways of doing things.” Adoption of logistics innovations has influenced the quality of transportation operations (Hunt & Morgan (1996). Investment in logistic technology is an important component in the overall strategy of logistics companies to ensure effective performance. This performance leads to a firm achieving some comparative advantage in the market over the competition (Barney, 1991).

To the heavy commercial transport company's management, it is imperative to intensify investment in logistics innovations products to facilitate speed, flexibility, visibility, secure, convenient, and accurate services, or otherwise lose out to their competitors (Daugherty, Stank, & Ellinger, 1998). Logistics innovations provide great opportunity to transport companies to market services. Success in this area however depends on how they can customize their services to appeal to the ready minds of various stake holders in the industry. Many logistics companies grow and evolve due to competitive environment and high productivity offered by best human resources and other resources (Jansen, 2003).

## CHAPTER THREE: RESEARCH METHODOLOGY

### 3.1 Introduction

This chapter provides the methodology of the study. It gives the specific procedures that will be followed in undertaking the study. The research design, population, sampling design, data collection methods and data analysis are described in this chapter.

### 3.2 Research design

The study employed a descriptive design. Mugenda and Mugenda (1999), states that a descriptive survey is a method which involves making decisions on what type of data is required, where the data is found, techniques of data collection, analysis and interpretation. It was considered the best research design since it gives total presentation thereby producing highly reliable information. However it was time consuming and utilized a lot of resource.

### 3.3 Population

The population of interest consisted of all the 87 heavy commercial transporters operating and based in Nairobi as listed in the Kenya Postal Directory (KPD 2011). The postal directory had a list of 87 heavy commercial transporters located in Nairobi in its yellow pages. Since the population was small, the researcher undertook a census survey.

### 3.4 Sample Design

The sample size of this study consisted of all the 87 transportation Companies currently listed in the Kenya postal directory and operating from Nairobi. This list of transport companies comprised of only those who have provided their information to be published in the directory. Despite their scattered nature in location, over a large geographical area spanning from Mololongo along Mombasa road to Baba Dogo in Ruaraka, these companies were a good representation of all the operators in the field. All 87 logistics managers were considered as respondents. Nairobi was selected because it is the commercial and capital city of Kenya and a crucial hub and transit point to neighbouring countries.

The true and exact number of transporters on Kenyan roads is unknown, due to the fact that some of the operators do not provide their information. Noting that the implementation of logistics innovations is across functional activity, the researcher interviewed the logistics managers and senior managers from the selected Transport companies. Where the transport

company had no logistics/Distribution/Transport manager, the General Manager was interviewed.

### **3.5 Data Collection**

In this project, purposeful questions were used, so that respondents could easily identify the relationship between the intention of the question and the objective of the survey.

In this project, closed questions with pre-selected answers varied on a Likert scale were applied. A 5 – point Scale was employed involving different scales for different statements on attitudes towards the logistics innovations in the transport sector, and the extent to which benefits accrue to both the customer and the firms. The 5 – point Likert scale included a neutral rating to obviate the problem of acquiescence bias. Follow ups were made to ensure collection of the questionnaires in time, as well as assisting respondents in any difficulties that they encountered in responding to the questionnaires.

### **3.6 Data Analysis**

The project was to establish the benefits which logistics innovations bring to the road transport sector in Kenya. The level of comparative advantage gained was measured by empirical analysis to show whether logistics innovation is related to comparative advantage. Content and descriptive analysis was used in analyzing the benefits of efficient routing, scheduling, asset utilization, reliability, cost reduction, operational efficiency, and meeting of customer needs.

The completed questionnaires were edited for completeness and consistency. The data was then coded to enable the responses to be grouped into various categories. Descriptive statistics such as means, median mode and standard deviation was used in data analysis. Tables and other graphical presentations as appropriate have been used to present the data collected for ease of understanding and analysis. Content analysis was used to determine the respondents' opinion on the benefits of logistic innovation and their impact on the reduction in operational cost, increase in visibility in the supply chain and flexibility to road transport and to determine the extent to which competitive advantage was gained through adoption of information technologies by these firms.

Use of frequencies and percentages has been used to determine the benefits of logistic innovation and their impact on the reduction in operational cost increase in visibility in the

supply chain and flexibility to road transport and to determine the extent to which competitive advantage is gained through adoption of information technologies by the heavy commercial transporters. The mean, standard deviations, variance correlation coefficient and frequencies generated from the various data categories have been computed and shown in different and tables. Permission was first sought from relevant authorities and a letter issued to allow this project to be carried out.

## CHAPTER FOUR: DATA ANALYSIS, PRESENTATION AND INTERPRETATION

### 4.0 Introduction

This chapter presents analysis and findings of the study as set out in the research methodology. The data was gathered exclusively through questionnaires as the research instrument. The questionnaire was designed in line with the objectives of the study. To enhance quality of data obtained, Likert type questions were included whereby respondents indicated the extent to which the variables were practiced in a five point Likerts scale. The data has been presented in form of quantitative, qualitative form followed by discussions of the data results. The chapter concludes with critical analysis of the findings.

### 4.1 Respondents' demographic characteristics.

#### 4.1.1 Response Rate

The study targeted 83 respondents in collecting data. Results in table 4.1 below, show that 82 out of 83 target respondents, filled in and returned the questionnaire contributing to a 98% response rate. This response rate was good and representative and conforms to Mugenda and Mugenda (1999) stipulation that a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and a response rate of 70% and over is excellent. This commendable response rate was made a reality by the researcher and the engagement of a research assistant to administer the questionnaires. This survey can therefore be said to be successful.

**Table 4. 1 Response Rate**

Response Rate	Frequency	Percentage
Responded	82	98
Not responded	1	2
<b>Total</b>	<b>83</b>	<b>100</b>

Source: Researcher, (2011)

The researcher sought to find out the number of years the respondent had worked in the company.

The study found out that 35.4% of the respondents had worked in the companies for 11 to 20 years, 34.1% for 6 to 10 years, 19.5% for 0 to 5 years and 11% for over 20 years. This shows that a most of the respondents had worked in the company's long enough to have an inner knowledge of the companies to answer the questionnaires.

**Table 4. 2 Years worked in the company**

Years Worked	Frequency	Percent
0-5	16	19.5
6-10	28	34.1
11-20	29	35.4
Over 20	9	11.0
Total	82	100.0

Source: Researcher, (2011)

#### 4.1.2 Employees in the company

The researcher sought to find out the number of employees in the respondents company.

The study found out that 28% of the companies had below 50 employees, 28% had 301 to 500 employees. 25.6% had over 501 employees, 15.9% had 101 to 300 employees and 2.4% had 51 to 100 employees.

**Table 4. 3 Employees in the company**

No of Employees	Frequency	Percent
below 50	23	28.0
51-100	2	2.4
101-300	13	15.9
301-500	23	28.0
above 501	21	25.6
Total	82	100.0

Source: Researcher, (2011)

#### 4.1.3 Presence of a R&D department

The researcher sought to find out whether the respondents company had a research and development department.

The study found out that 78% of the respondents indicated that they did not have a research and development department in their respective companies while 22% indicated that they did have a research and development department.

**Table 4. 4 Presence of a R&D department**

R&D	Frequency	Percent
yes	18	22.0
no	64	78.0
Total	82	100.0

Source: Researcher, (2011)

## 4.2 Logistics innovations benefits

### 4.2.1 Impact of logistics innovations on operational efficiency in the company

The researcher sought to find out the Impact of logistics innovations on operational efficiency in the company

The study found out that 52.4% of the respondents agreed that logistics innovations led to operational efficiency in the company, 35.4% neither agreed nor disagreed, 7.3% strongly agreed while 4.9% disagreed. This indicates that the majority of respondents indicated that logistics innovations led to operational efficiency in the company

**Table 4. 5 Impact of logistics innovations on operational efficiency in the company**

Rating	Frequency	Percent
strongly agree	6	7.3
agree	43	52.4
neither agree or disagree	29	35.4
disagree	4	4.9
Total	82	100.0

Source: Researcher, (2011)

### 4.2.2 Rating of logistics innovations in the improvement of operational efficiency

The researcher sought to find out the Rating of logistics innovations in the improvement of operational efficiency

The study found out that 50% of the respondents rated logistics innovations highly in the improvement of operational efficiency, 30.5% rated it moderately while 19.5% rated logistics innovations very highly. This indicates that logistics innovations led to the improvement of operational efficiency in the companies.



**Table 4. 6 Rating of logistics innovations in the improvement of operational efficiency**

Rating	Frequency	Percent
very high	16	19.5
high	41	50.0
moderate	25	30.5
Total	82	100.0

Source: Researcher, (2011)

#### **4.2.3 Effect of data acquisition technologies on quality and quantity of operations in the firm**

The researcher sought to find out the Effect of data acquisition technologies on quality and quantity of operations in the firm

The study found out that 56.1% of the respondents rated the effect of data acquisition technologies on quality and quantity of operations of the firms to a moderate extent, 31.7% to a great extent, 7.3% to a very great extent and 4.9% to a low extent. This indicates that data acquisition technologies led to quality and quantity of operations in the firm.

**Table 4. 7 Effect of data acquisition technologies on quality and quantity of operations in the firm**

Rating	Frequency	Percent
very great extent	6	7.3
great extent	26	31.7
moderate extent	46	56.1
low extent	4	4.9
Total	82	100.0

Source: Researcher, (2011)

#### **4.2.4 Effect of EDI software on operational efficiency in the firm**

The researcher sought to find out the effect of EDI software on operational efficiency in the firm.

The study found out that 61% of the respondents agreed that EDI software had operational efficiency in the firms, 31.7 neither agreed nor disagreed while 7.3% strongly agreed. This indicates that EDI software led to operational efficiency in the firms.

**Table 4. 8 Effect of EDI software on operational efficiency in the firm**

Rating	Frequency	Percent
strongly agree	6	7.3
agree	50	61.0
neither agree or disagree	26	31.7
Total	82	100.0

Source: Researcher, (2011)

#### **4.2.5 Effect of ERP on efficiency and effectiveness of operations**

The researcher sought to find out the Effect of ERP on efficiency and effectiveness of operations.

The study found out that 36.6% of the respondents agreed that ERP had an effect on the efficiency and effectiveness of operations, 35.4% strongly agreed while 28% neither agreed nor disagreed. This indicates that ERP software led to efficiency and effectiveness of operations in the firms.

**Table 4. 9 Effect of ERP on efficiency and effectiveness of operations**

Rating	Frequency	Percent
strongly agree	29	35.4
agree	30	36.6
neither agree or disagree	23	28.0
Total	82	100.0

Source: Researcher, (2011)

#### **4.2.6 Rating of global positioning system in carrying out business activities and giving customer service**

The researcher sought to find out the Rating of global positioning system in carrying out business activities and giving customer service

The study found out that 64.6% of the respondents highly rated GPS systems in carrying our business activities and giving customer service, 18.3% rated the moderately, 12.2% rated the systems very highly while 4.9% rated their effect as negligible in carrying our business activities and giving customer service. This indicates that global positioning systems led to benefits in carrying out business activities and giving customer service.

**Table 4. 10 Rating of global positioning systems in carrying out business activities and giving customer service**

Rating	Frequency	Percent
very high	10	12.2
high	53	64.6
moderate	15	18.3
negligible	4	4.9
Total	82	100.0

Source: Researcher, (2011)

#### **4.2.7 Rating of geographical information systems in carrying out business activities and giving customer service**

The researcher sought to find out the Rating of geographical information systems in carrying out business activities and giving customer service

The study found out that 40.2% of the respondents rated the effect of geographical information systems in carrying out business activities and giving customer service highly, 39% rated it moderate, and 15.9% rated it low while 4.9% rated it as negligible. This indicates that geographical information systems led to carrying out business activities and giving customer service in the firms.

**Table 4. 11 Rating of geographical information systems in carrying out business activities and giving customer service**

Rating	Frequency	Percent
high	33	40.2
moderate	32	39.0
low	13	15.9
negligible	4	4.9
Total	82	100.0

Source: Researcher, (2011)

#### **4.2.8 Rating of radio frequency communication system in carrying out business activities and giving customer service**

The researcher sought to find out the Rating of radio frequency communication system in carrying out business activities and giving customer service

The study found out that 65.9% of the respondents rated moderate the effect of using radio frequency communication system in carrying out business activities and giving customer service, 29.3% rated it high while 4.9% rated it negligible. This indicated that radio frequency communication systems led to benefits in carrying out business activities and giving customer service in the firms.

**Table 4. 12 Rating of radio frequency communication system in carrying out business activities and giving customer service**

Rating	Frequency	Percent
high	24	29.3
moderate	54	65.9
negligible	4	4.9
Total	82	100.0

Source: Researcher, (2011)

**Rating of containerization in carrying out business activities and giving customer service**

The researcher sought to find out the Rating of containerization in carrying out business activities and giving customer service.

The study found out that 63.4% of the respondents rated containerization in carrying out business activities and giving customer service very highly, 28% rated it high while 8.5% rated it moderate. This indicates that containerization led to benefits in carrying out business activities and giving customer service in the firms.

**Table 4. 13 Rating of containerization in carrying out business activities and giving customer service**

Rating	Frequency	Percent
very high	52	63.4
high	23	28.0
moderate	7	8.5
Total	82	100.0

Source: Researcher, (2011)

### 4.3 Cost Reduction

#### 4.3.1 Effect of logistics innovations in improving cost reduction at the company in optimizing customer service and minimizing costs as benefits

The researcher sought to find out the effect of logistics innovations in improving cost reduction at the company in optimizing customer service and minimizing costs as benefits

The study found out that 47.6% of the respondents strongly agreed that logistics innovations led to cost reduction at the company in optimizing customer service and minimizing costs, 26.8% agreed while 25.6% neither agreed nor disagreed that logistics innovations led to cost reduction at the company in optimizing customer service and minimizing costs. This indicates that logistics innovations led to improving cost reduction at the company in optimizing customer service and minimizing costs as benefits.

**Table 4. 14 Effect of logistics innovations in improving cost reduction at the company in optimizing customer service and minimizing costs as benefits**

Rating	Frequency	Percent
strongly agree	39	47.6
agree	22	26.8
neither agree or disagree	21	25.6
Total	82	100.0

Source: Researcher, (2011)

#### 4.3.2 If Intermodal transportation by using containers is beneficial in cost reduction

The researcher sought to find out if Intermodal transportation by using containers has been beneficial in cost reduction

The study found out that 92.7% of the respondents agreed that intermodal transportation by using containers had been beneficial in cost reduction while 7.3% of the respondents neither agreed nor disagreed that that intermodal transportation by using containers had been beneficial in cost reduction. This indicates that intermodal transportation by using containers had been beneficial in cost reduction.

**Table 4. 15 intermodal transportation by using containers been beneficial in cost reduction**

Rating	Frequency	Percent
agree	76	92.7
neither agree or disagree	6	7.3
Total	82	100.0

Source: Researcher, (2011)

#### 4.3.3 If new logistics innovations lowered costs of service provision to customers

The researcher sought to find out if new logistics innovations lowered costs of service provision to customers.

The study found out that 59.8% of the respondents agreed that new logistics innovations lowered costs of service provision to customers, 36.6% neither agreed nor disagreed while 3.7% strongly agreed that new logistics innovations lowered costs of service provision to customers. This indicates that new logistics innovations lowered costs of service provision to customers.

**Table 4. 16 New logistics innovations lowered costs of service provision to customers**

Rating	Frequency	Percent
Strongly agree	3	3.7
Agree	49	59.8
Neither agree or disagree	30	36.6
Total	82	100.0

Source: Researcher, (2011)

#### 4.3.4 Use of information technologies to achieve the benefit of improved productivity and competitiveness

The researcher sought to find out if Use of information technologies to achieve the benefit of improved productivity and competitiveness.

The study sought to establish the views of the respondents on various logistics innovations. From the findings on the respondent's rating of the innovations, most of the respondents rated very positively that logistics innovations has influenced the organization in increasing its competitive advantage as shown by a mean of 1.6951, that the internet has helped the company achieve the benefit of improved productivity and competitiveness as shown by a mean of 1.6951, real time tracking and tracing of cargo and equipment been beneficial in

improving the company's service as shown by a mean of 1.9390. Respondents also rated positively that electronic data interchange helps the companies achieve the benefit of improved productivity and competitiveness as shown by a mean of 2.0244, made flows of information more accurate and timely and internet services made real time transactions improve customer service as shown by a mean of 2.0366 respectively, enterprise information portals help the companies achieve the benefit of improved productivity and competitiveness and point of sale systems help the companies achieve the benefit of improved productivity and competitiveness as shown by a mean of 2.0488. The study further revealed that the respondents rated neither positively nor negatively that logistics information system helped the company achieve the benefit of improved productivity and competitiveness and smart phones help the company achieve the benefit of improved productivity and competitiveness as shown by a mean of 2.3659 respectively. The study also revealed that the respondents rated negatively the value added network in helping the companies achieve the benefit of improved productivity and competitiveness as shown by a mean of 2.8659.

**Table 4. 17 Use of information technologies to achieve the benefit of improved productivity and competitiveness**

Acquired Benefits	Mean	Std. Deviation
Has electronic data interchange helped the company achieve the benefit of improved productivity and competitiveness	2.0244	.66621
Has the internet helped the company achieve the benefit of improved productivity and competitiveness	1.6951	.76480
Has the value added network helped the company achieve the benefit of improved productivity and competitiveness	2.8659	.43779
Has the point of sale system helped the company achieve the benefit of improved productivity and competitiveness	2.0488	.81502
Has logistics information system helped the company achieve the benefit of improved productivity and competitiveness	2.3659	.48463
Has enterprise information portals helped the company achieve the benefit of improved productivity and competitiveness	2.0488	.71841
Has electronic ordering systems helped the company achieve the benefit of improved productivity and competitiveness	2.7195	.72477
Has smart phones helped the company achieve the benefit of improved productivity and competitiveness	2.3659	.48463
Has logistics innovations made flows of information more accurate and timely	2.0366	.59722
Have internet services made real time transactions improve customer service	2.0366	.39892
Has electronic real time in tracking and tracing of cargo and equipment been beneficial in improving your service	1.9390	.45400
Has logistics innovations influenced the organization in increasing its competitive advantage	1.6951	.73180

Source: Researcher, (2011)

#### 4.4 Competitive advantage

The project sought to find out if the use of logistics innovations leads to competitive advantage in the respondents companies.

The study sought to establish the views of the respondents on various logistics innovations. From the findings on the respondent's rating of the innovations, most of the respondents rated high containerization in helping gain competitive advantage as shown by a mean of 1.6098, the internet in helping gain competitive advantage as shown by a mean of 1.9146. The study also revealed that other respondents rated moderate the benefits in reducing damages and theft by logistics innovations as shown by a mean of 2.1341, global positioning system in helping gain competitive advantage as shown by a mean of 2.3049 while others rated low the global information systems in helping gain competitive advantage as shown by a mean of 2.5732, enterprise resource planning in helping gain competitive advantage as shown by a mean of 2.5976 and global information systems in helping gain competitive advantage as shown by a mean of 2.6707. The study further revealed that respondents did not vary greatly in their responses as shown by small standard deviation in most of the cases.

**Table 4. 18 Competitive advantage**

Acquired Benefits	Mean	Std. Deviation
Containerization in helping gain competitive advantage	1.6098	.49081
Global information systems in helping gain competitive advantage	2.6707	.56775
Rating of bar codes in helping gain competitive advantage	3.3780	.76401
Enterprise resource planning in helping gain competitive advantage	2.5976	1.29443
Global positioning system in helping gain competitive advantage	2.3049	.76480
The internet in helping gain competitive advantage	1.9146	.77302
Global information systems in helping gain competitive advantage	2.5732	.78615
The benefits in reducing damages and theft by logistics innovations	2.1341	.68064

Source: Researcher, (2011)

##### 4.4.1 Rating of logistics innovations in gaining competitive advantage

The researcher sought to find out if Use of logistics innovations lead to competitive advantage in the respondents companies.



The study found out that most of the respondents rated very important the use of logistics innovations in reducing theft and cargo damage in and in gaining competitive advantage as shown by a mean of 1.5488, respondents also rated important cargo tracking in gaining competitive advantage as shown by a mean of 1.6951 and speed shipments tracking in gaining competitive advantage as shown by a mean of 2.2927. The study further revealed that respondents rated neither important nor unimportant the virtual inspection tracking in gaining competitive advantage as shown by a mean of 2.5976. The study further revealed that respondents did not vary greatly in their responses as shown by small standard deviation in most of the cases.

**Table 4. 19 Rating of logistics innovations in gaining competitive advantage**

Acquired Benefits	Mean	Std. Deviation
cargo tracking in gaining competitive advantage	1.6951	.55974
theft and cargo damage in gaining competitive advantage	1.5488	.59114
speed shipments tracking in gaining competitive advantage	2.2927	.67564
virtual inspection tracking in gaining competitive advantage	2.5976	.76755
security and integrity in gaining competitive advantage	2.3171	1.06433

**Source: Researcher, (2011)**

## **CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS**

### **5.1 Introduction**

This chapter presents the discussion of the study findings, conclusion and recommendations. The following are the subsections that guided the study;

### **5.2 Summary of the findings**

The firms which participated were drawn from the Kenya postal directory, yellow pages and it was found that there were both large and small with different capabilities. The most notable thing is that the logistics innovations impact them all, more especially, the use of containers in intermodal transport. It is also quite evident that the benefits are there for the firms which have adopted logistics innovations. This is in conformity with the study by Lin which affirms that "the adoption of technological innovations exhibits significant and positive influences on both financial and non-financial company's performance (Lin, 2008).

The objective of the study is backed by findings which revealed that where logistics innovations are implemented a number of benefits are achieved beyond those companies which have not adopted logistics innovations. Advantages of logistics innovations include: standard transport product, flexibility of usage, easy management, economies of scale, speed, easy to warehouse and security of cargo. (Levinson, 2006).

.Porter (1990) Asserts that "Companies achieve competitive advantage through acts of innovation. They approach innovation in its broadest sense, including new technologies and new ways of doing things." Adoption of logistics innovations has influenced the quality of transportation operations (Hunt & Morgan (1996). Investment in logistic technology is an important component in the overall strategy of logistics companies to ensure effective performance. This performance leads to a firm achieving some comparative advantage in the market over the competition (Barney, 1991).

### **5.2.1 Logistics innovations benefits**

From the study, it was evident that logistics innovations provided benefits, in operational efficiency to the road transport sector. Operational efficiency in the companies was evident. Data acquisition technologies led to better quality and quantity of operations in the firm, EDI software led to operational efficiency in the firms, ERP software led to efficiency and effectiveness of operations in the firms, global positioning systems led to benefits in carrying out business activities and giving customer service. Further the study revealed that geographical information systems led to better business operations, and providing of better customer service in the firms, radio frequency communication systems led to benefits in carrying out business activities and giving customer service in the firms and containerization led to benefits in carrying out business activities and giving customer service in the firms.

### **5.2.2 Cost Reduction**

The study established that logistics innovations led to improving cost reduction at the company in optimizing customer service and minimizing costs as benefits, led to improving cost reduction at the company in optimizing customer service and minimizing costs as benefits and intermodal transportation by using containers had been beneficial in cost reduction and that that new logistics innovations lowered costs of service provision to customers.

### **5.2.3 Competitive advantage**

The study established that containerization in helped in gaining competitive advantage, the internet helped in gaining competitive advantage. This is consistent with the study done on logistics providers in China( Lin,2008) The study also revealed that logistics innovations led to benefits in reducing damages and theft, (Soosay and Kandampully, 2003)global positioning systems helped in gaining competitive advantage while global information systems, enterprise resource planning and global information systems did not help in gaining competitive advantage (Porter, 1990) and( Christopher,1993) both assert that competitive advantage is gained where innovations are adopted.

Further the study established that the use of logistics innovations in reducing theft and cargo damage, cargo tracking in gaining competitive advantage and speed shipments tracking was found to lead to competitive. Porter (1990) Asserts that "Companies achieve competitive advantage through acts of innovation. They approach innovation in its broadest sense,

including new technologies and new ways of doing things.” Adoption of logistics innovations has influenced the quality of transportation operations (Hunt & Morgan (1996). Investment in logistic technology is an important component in the overall strategy of logistics companies to ensure effective performance. This performance leads to a firm achieving some comparative advantage in the market over the competition (Barney, 1991).

(Shankar, 2001).

### **5.3 Conclusion**

From the discussions of the study, the researcher makes the following conclusion; Road transport companies have started to adopt innovative logistics technologies with the view to enhancing their services. Logistics innovations play a critical role in expediting growth of logistics industry in Kenya. This study has attempted to fill the knowledge gap by investigating the benefits of logistics innovations in Kenya's road transport sector. It has established that most of Kenya's road transporters tend to rely on containers in ferrying goods, intermodal transport, and information technologies to enhance their management. It also established that those road transporters who have adopted logistics innovations and technologies are reaping benefits and their performance is much more enhanced.

The research questions to be answered were to what extent do logistics innovations derive benefits in the road transport sector, and the what kind of benefits are they. These relate to the objective of the study as it is operational efficiency, cost reduction, customer satisfaction and competitive advantage that were investigated. The number of transport companies which have adopted the logistics innovation was used as the measure of the extent of logistics innovations. The Likert scale was used to rate the extent to which the adoption of the logistics innovations.

### **5.4 Recommendations**

From the findings, the study recommends that the government should encourage the adoption of innovations in the administration of regulatory mechanisms. The government can also provide financial incentives, pilot projects, and tax breaks to stimulate logistics innovations for the road transport sector. Therefore, governmental support can benefit the stakeholders a lot.

The study recommends that the road transporters should invest more in order to stay abreast with the latest innovations in the transport sector. By understanding the benefits which are

brought about by logistics innovations, the road transport can be able to embrace them and make quick strides in the industry and make remarkable contributions to the economy. Sticking to the same old processes, operations and methods will only make the road transport sector not competitive in a dynamic environment in which they do their business.

#### **5.5 Recommendation for further studies.**

The study investigated the benefits of logistics innovations in the road transport sector in Kenya. Further studies should be carried out to investigate the factors which influence the adoption of logistics innovations also the impact which these logistics innovations bring about in Kenya.

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## APPENDICES

### Appendix I: Questionnaire

#### SECTION A: COMPANY INFORMATION

1. How many years has your company been in operation?

0-5

6-10

11-20

over20

2. How many employees do you have presently?

Below 50

51-100

101-300

301-500

Above 501

3. Do you have a R & D department?

Yes

None

#### SECTION B: Logistics innovation benefits.

##### Operational efficiency

4. Would you agree that logistics innovations are important in the improvement of operational efficiency in your company?

Strongly Agree    Agree    Neither Agree or Disagree    Disagree    Strongly Disagree

Please give reasons for your answer

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

5. How would you rate logistics innovations in the improvement of operational efficiency as one of the benefits in your organization?

Very high    high    moderate    low    Very low

Please explain your answer

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

6. To what extent has data acquisition technologies improved the quality and quantity of information for operations in your firm?

Very great extent    Great extent    Moderate extent    low extent    Very low extent

Please explain your answer

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

7. Would you agree that the Electronic Data interchange (EDI) software has brought benefits in improving operational efficiency in your firm?

Strongly Agree    Agree    Neither Agree or Disagree    Disagree    Strongly Disagree

Please explain

.....

.....

.....

8. Do you agree that the Enterprise Resource Planning (ERP) improves the efficiency and effectiveness of your operations?

Strongly Agree  Agree  Neither Agree or Disagree  Disagree  Strongly Disagree

Please explain

.....

.....

.....

9. How would you rate the benefits acquired from the following transportation technologies in carrying out your business activities in giving service to customers?

10.

	Very high	High	Moderate	Low	Negligible
Global positioning system (GPS)					
Geographical Information system (GIS)					
Radio – frequency communication system (RFID)					
Transportation data recorder					
Containerization					

**Cost Reduction**

11. In your opinion has logistics innovations improved cost reduction at your company, in terms of optimizing customer service and minimizing delivery costs as benefits?

Strongly Agree  Agree  Neither Agree nor Disagree  Disagree  Strongly Disagree

Please explain

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

12. Do you agree that intermodal transportation by using containers is beneficial in reducing the cost of service delivery to your customers?

Strongly Agree  Agree  Neither Agree or Disagree  Disagree  Strongly Disagree

Please explain

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

13. In your opinion have new logistics innovations lowered costs of service provision by your company to customers or increased costs due to capital outlay required to implement them?

Strongly Agree  Agree  Neither Agree or Disagree  Disagree  Strongly Disagree

Please explain

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

14. In your opinion, how has the following information technologies helped your company achieve the benefit of improved productivity and competitiveness?

	Very Positively	Positively	Neither Positively nor	Negatively	Very negatively
Electronic Data interchange					
The Internet					
Value Added Network					
Point of Sale(POS)					
Logistics information system					
Enterprise information portals					
Electronic ordering system					
Smart phones					

15. In your opinion have logistics innovations made the flow of information more accurate and timely to your customers and vice versa?

Strongly Agree  Agree  Neither Agree or Disagree  Disagree  Strongly Disagree

Please explain your answer

.....

.....

.....

16. In your opinion have internet services made real-time transaction improve customer service?

Strongly Agree  Agree  Neither Agree or Disagree  Disagree  Strongly Disagree

Please explain your answer

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

17. Do you think electronic real time (on line) in tracking and tracing of cargo and equipment is beneficial improving your service?

Strongly Agree  Agree  Neither Agree nor Disagree  Disagree  Strongly Disagree

Please explain

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

18. Do you agree that collaborations in logistics innovations with your customers will greatly improve their satisfaction?

Strongly Agree  Agree  Neither Agree nor Disagree  Disagree  Strongly Disagree

Please explain your answer

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

19. Does your company have a way of getting honest feedback from its customers and other supply chain players?

Yes [ ] No [ ]

20. If yes for 19 above, how are your services rated by both the customers and supply chain partners?

21. ....  
.....

22. If no above, what measures in place to get to know of customer satisfaction with your logistics innovations?

Very low [ ]

Low [ ]

Moderate [ ]

High [ ]

Very high [ ]

23. If no above, what are the measures in place to get to know of customer satisfaction with your logistics innovations?

.....  
.....

**Competitive Advantage**

24. In your opinion, has logistics innovations influenced your organisation in increasing its competitive advantage?

- Strongly Increased  Increased  Neither increased nor decreased
- Decreased  Strongly Decreased

Please explain your answer

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

25. How would you rate the role of the following logistics innovations in helping gain competitive advantage?



	Very high	High	Moderate	Low	Very low
Containerization					
Smart phones					
Radio- frequency identifications					
Bar codes					
Enterprise resource planning					
Global positioning system					
The internet					
Global information system					

26. In your opinion, how would you rate the benefits in reducing damages and theft of cargo by logistics innovations?

Very high High neither low nor high Low Very Low

Please explain your answer

.....

.....

.....

27. How would you rate logistics innovations in gaining competitive advantage in the following areas?

	Very Important	Important	Neither Important nor unimportant	Unimportant	Very unimportant
Cargo tracking					
Theft and cargo damage					
Speed shipments					
Virtual inspection					
Security and integrity					