

**SUPPLY CHAIN INFORMATION SYSTEMS USAGE IN
INVENTORY TRACKING AMONG LOGISTICS SERVICE
PROVIDERS IN KENYA**

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DECLARATION

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

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D61/62994/2010

This management research project has been submitted for examination with my approval as the University Supervisor.

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DEDICATION

My study is dedicated to the following; My loving family for support and patience during the entire period of my study. For their encouragement and continued prayers towards successful completion of this course. My loving wife Maureen Yienya and my two beautiful daughters Sasha and Malia for being patient with me during the entire period of the study . Finally I pay glowing gratitude and tribute to my late father Abner Odadi Jeje for good upbringing and letting us know that hard work pays.

ABSTRACT

Logistics services are a lifeline for most business enterprises. These services cannot be effectively provided without having in place an effective inventory management system. The advancement in technology has made it possible to tap the use of information systems to improve business efficiency. Supply Chain Information Systems for Inventory tracking has been a key component among the Logistics service providers in Kenya. However, the adoption and usage of SCIS for inventory tracking has not been without challenges. Thus this study was geared towards investigating challenges associated with adoption of SCIS for inventory tracking among logistics service providers in Kenya. The specific objectives included; to determine the extent to which SCIS is used for inventory tracking among logistic service providers in Kenya. To determine the benefits of using a SCIS in inventory tracking among firms that provide logistic services in Kenya and To determine the" challenges in the use of the SCIS for inventory tracking among logistic service providers in Kenya. This study adopted survey research design that was seeking to gain an in-depth understanding of Supply Chain Information systems usage among logistics service providers in Kenya. The target population of this study was the logistics service providers in Kenya.

The study targeted operation managers, customer care supervisor and logistic fleet managers in each and every company. The completed questionnaires were edited for completeness and consistency. The data was then coded to enable the responses to be grouped into various categories. The researcher mainly used descriptive statistics to

analyze data. This included frequency distribution tables, mean and standard deviation. SPSS and Microsoft excel software was used to generate outputs. In addition to the above, inferential statistics especially multiple regression analysis was also used. Cronbach alpha test was used to test for the reliability or internal consistency of the study variable. The study found out that supply chain information system helps improve on the inventory tracking, Efficiency in business operations; improved agility of supply network and improved Customer Service while is face with the challenges of Lack of standardized processes in the company's supply chain information system; poor collaboration between the company and partners and poor investment in IT infrastructure where it recommends reasonable investment in IT and further studies on how to standardize the process of company's supply chain information system hinders the usage of Supply Chain Information Systems for inventory tracking.

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CHAPTER ONE: INTRODUCTION

1.1 Background of the study

Information is power and is used as one of the resources to develop a competitive edge in businesses today. Given that Logistics is an information based process of material (raw and finished goods) movement, it has a crucial role in Supply Chain competitiveness. Due to the advancement of Technology in information processing and communication, the speed of information flow has tremendously increased. Real time decision making is possible thanks to the information availability at the click of a button. Interestingly, with the advancement of the Technology, the cost of this important resource varies in inverse proportion to its capability (Sople, 2012).

Operational efficiency is a key factor in any business success, support for operational efficiency requires Information System (IS) that enable product and transaction cost to be controlled (Simons 1987). This can be achieved through IS that improve information coordination, reduce errors, and administrative cost and enable standardization of business processes (Gattiker and Goodhue 2000). An enterprise's degree of responsiveness can be increased through a proper Supply Chain information System (SCIS) for Inventory Tracking designed to satisfy the information requirements for decision making that reduces the element of uncertainty and risk. The SCIS operates for information needs at four levels namely the operating, tactical, control and strategic levels.

Logistics is that part of Supply Chain Management (SCM) 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 customer's requirements (Murphy and Wood, 2008). One of the objectives of Supply Chain optimization is to achieve maximum productivity from the resources expended or assets employed. Thus productivity is a ratio of Total Output to Total Input. Many organizations have therefore embraced Information Technology to reduce on the total input so as to maximize productivity of their Supply Chain (Lysons and Farrington, 2006), According to Lucey, (2006), ICT is not only used to carry out and improve business operations, but also used to support management in their key tasks of planning, decision making, organizing, coordinating and control.

As a result of Information Technology, Supply Chains in many organizations have been revolutionized. For example Cisco reported savings of \$500 million by restructuring its internal operations integrating with suppliers and customers with the help of Web Based Tools (Berger, 2000). Currently, 90% of Cisco's sales are facilitated on-line (Copacino & Dik, 2001).

1.1.1 Inventory tracking using SCIS

A supply chain is a network of suppliers, manufacturers, warehouses, distributors and retailers who, through coordinated plans and activities, develop products by converting raw materials to finished goods (Lysons and Farrington, 2006). The supply chain encompasses all organizations and activities associated with the flow and transformation of goods from raw materials to the end user and the information flows associated with it. Material and information flow up and down the supply chain. Supply chain management involves various approaches used to integrate suppliers, manufacturers and distributors in

performing their functions: materials procurement, materials transformation in intermediate and finished products, the distribution of these products to customers in the right quantities, to the right locations and at the right time to meet the required service level with minimal cost. Through collaboration and information sharing companies create high-performing value systems, providing member organizations an important competitive advantage (Sople, 2012).

Supply Chain Information System refers to an information technology, which enables information flow within a firm, between firms, and across the supply chain which goes a long way towards ensuring effective and efficient supply chain management. Supply chain information system implementation is as important as system selection - and can in fact be even more important. A less-capable supply chain system that's well implemented will deliver some advantages. But when poorly implemented, even the best supply chain systems are likely to produce few real benefits, and could even cause more problems than they solve. Selection process of a SCIS includes planning, Implementation management and post implementation optimization (Chandra and Grabis, 2007).

Inventory Tracking is the process of being able to use a SCIS to trace and locate the position of a particular inventory which then informs certain decisions. Manufacturers know the importance of fast and efficient delivery of goods to the intended users. It is of utmost importance for the manufacturers and suppliers to transport the goods to the people at the accurate time without any hassle. Shipping and logistics companies understand this fact and therefore offer high quality logistics and air freight services,

providing the ideal balance of time, space, frequency and cost. Manufacturers and business owners can trust upon them for delivery of their goods to any part of the world. Shipping and logistics companies mainly provide scheduled consolidation services, direct air carrier, airport-to-airport as well as door-to-door delivery services to the manufacturers and suppliers. Their real-time and reliable tracking system also empowers customers to monitor the status of their freight while it is moving from the source to destination. They are also committed to offer complete supply chain management services to the industries by storing, distributing, and moving their products to the intended end-user (Christopher, 1998).

There are various supply chain information systems used in different platforms of supply chain eg Enterprise Resource Planning (MRP/ERP), Warehouse Management Systems (WMS), Fleet Management Systems, E-procurement and Radio Frequency Identification (RFID). There are multiple benefits for supply chain information systems. They include; Lower operation cost, improved collaboration, improved cycle time and improved response to conflicts. Like any other system, SCIS have their own challenges including the high cost of acquiring and implementation, incompatibility of the software with the existing hardware or other software systems in place and training of the staff (Chandra and Grabis, 2007).

1.1.3 Logistics Service Providers in Kenya

Logistics service providers are facilitators, which help the organization in an easy and economical manner. They help to provide a timely delivery of the raw material, semi-finished and finished goods, whether externally or internally, using different modes of transportation such as sea, land or air. Logistics service providers in Kenya fall under the transport industry and it consist of 37 players (Kenya Yellow pages; logistics providers pg 637) See Appendix II. Logistics is an integral part of any organization and an effective logistics system can ensure efficient achievement of business goals of the organization. Logistics service providers in Kenya have grown in number in the last two years due to the high demand shown by many organizations. Previously, there was no focus on transportation of the products as the raw material suppliers were in proximity to the organization's premises. This approach to logistics was indeed limited in outlook, as the area in which logistics operate nowadays is surely bigger than this. In the modern work environment, logistics is not only concerned with internal movement of goods within the premises, but also extends to logistical material movement and covers a vast area that includes inventory control, re-ordering of products, and ensuring that the supplies are made at the right time and are in the right place (Logistics guide,2007).

Logistics nowadays is witnessing a trend of rapid long-term growth that is benefited by the booming global international logistics market and continued outsourcing in the field of manufacturing. The changes observed nowadays in the logistics sector are the result of stiff competition, favorable regulatory policies, and synergies resulting from mergers and acquisitions. Logistics is as important to an organization as its core principles for the attainment of maximization of profits and overall growth and development of the

organization. These days, with outsourcing and globalization being such familiar concepts, the concept of logistics has evolved to a greater height with ample job opportunities. The business enterprises of the modern-day economy now rely upon and want to develop logistics as an integral part of overall management. Parts, goods and even sub-assemblies are manufactured and moved from various parts of globe to manufacturing locations around the world with its help. The problems of movement, warehousing, distribution, storage and customer service are benefited through logistics. In the current global scenario, where serious competition is the norm, no organization wishes to be left behind (Dawson, A. (2002).

1.2 Statement of the Problem

Support for Supply Chain flexibility or agility requires IS that enable the rapid detection and response of competitive market opportunities (Sambamurthy et al. 2003). This can be enabled by IS that enable the modularization and reconfiguration of business processes as well as ease of information sharing with customers, suppliers, and other business partners (Bogucki, 1995; Sambamurthy et al. 2003).

Efficient and Effective SCIS can enhance Supply chain operational flexibility by automating routine tasks and freeing up resources to concentrate on non-routine tasks (O'Leary 2000). Similarly, SCIS supports flexibility by facilitating product and supplier searching (Bakos 1997; Kaplan and Sawhney 2000) and the management of multiple strategic sourcing and distribution relationships (Kalakota and Robinson 2001).

The logistics Service Providers in Kenya play a key role in moving inventories on behalf of the manufacturers and other organizations. The customers are usually concerned with the location and position of the market of the inventories. The logistics service providers therefore always need to track the inventory using certain SCIS compatible with the supply chain systems of the partners. These services are yet to be fully developed in Kenya and therefore there is need to determine the SCIS used in inventory tracking by logistics service providers in Kenya.

A number of studies have been done on technologies and Supply Chain Management. Some of the studies done include; Benefits of IT in supply chain management - an explorative study of progressive companies (Jaana Auramo, Juani Kauremaa, Kari Tanskanen 2006), Supply chain management information systems capabilities- An exploratory study of electronics manufactures (Tim S. McLaren, Milena M. Head, Yufei Yuan 2008). These previous studies have focused more on the benefits of ICT in inventory management as a general area without looking deep into the benefits and challenges of tracking inventory by the 3PL providers in Kenya.

The 3P logistics is currently a major part of the supply chain system and so it would be interesting to determine the kind of information systems they use for inventory tracking as well as the extent to which they are used. This study therefore focused on the supply chain information systems used for inventory tracking by the logistics service providers in Kenya. It was aimed at answering the following research questions; Which SCIS are used for inventory tracking among the logistics service providers in Kenya? What are the benefits of using SCIS in inventory tracking among firms that provide logistic services in

Kenya? What are the challenges in the use of the SCIS for inventory tracking among logistics service providers in Kenya?

1.3 Research Objectives

The research objectives were;

- (i) To determine the extent to which SCIS is used for inventory tracking among logistic service providers in Kenya.
- (ii) To determine the benefits of using a SCIS in inventory tracking among firms that provide logistic services in Kenya.
- (iii) To determine the challenges in the use of the SCIS for inventory tracking among logistic service providers in Kenya.

1.4 Value of the Study

The information obtained from this study would be useful to the government, logistics service providers as well as academicians. Firstly, the findings will be useful to the government in providing broad policy guidelines on use of information technology in logistics service provision that would enhance business efficiency and result to overall economic growth. Secondly, the findings would be useful to logistics service providers in identifying and implementing the best Supply Chain Information system within their respective business enterprises with an overall objective of gaining a competitive edge over competitors. Finally, the findings will be useful to academicians interested in conducting further research in relating areas.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of the related literature on the subject under study presented by various researchers, scholars, authors and analysts. It provides literature on supply chain information systems as well as the summary of research gaps.

2.2 Information & Communication Technology and Supply Chain management

There are a number of definitions of Supply Chain Management (SCM). According to Murphy and Wood, (2008), SCM encompasses the planning and management of all activities involved in sourcing and procurement, conversion and all Logistics management activities. Importantly Murphy and Wood, (2008) adds that it also includes coordination and collaboration with channel partners which can be suppliers, intermediaries, third party service providers and customers. In essence SCM integrates supply and demand management within and across companies. Mentzer et al state that the many published definitions can be classified into three categories; A management philosophy, implementation of management philosophy and a set of management processes.(Kenneth Lyons and Brian Farrington. 2006). ICT is a general expression covering computers, telecommunication and electronics and there is no doubt that it is having a profound influence in life including the organizations and MIS. (Lucey, 2005).

There are four key SCM enablers, all of which must be fully leveraged if SCM is to be successful. These four enablers can also become a barrier to effective SCM if they are not in place. ICT as one of the SCM enabler has assisted in the achievement of the four

essential supply chain requirements which include connectivity, integration, visibility and responsiveness.(Lysons and Farrington. 2006)

2.2.1 Logistics and Supply Chain Management

The American Council Of Logistics Management defines Logistics as the process of planning, implementing and controlling the efficient, cost effective flow and storage of raw materials in processed inventory, finished goods and related information from point of origin to the point of consumption for the purpose of conforming to customer requirements Logistics has helped many successful companies around the world to transform cost proposition into value proposition, therefore leveraging the companies for a competitive edge in a dynamic and turbulent global market . Several companies are making a paradigm shift by looking at the logistics as as an opportunity rather than a cost center. They are leveraging logistics to improve the service level of the customers, to accelerate the speed of launching new products and enter new markets faster than before within and beyond the national boundaries.(Sople, 2012). Indeed in the contemporary business environment, logistics is as much about the flow and storage of information as it is about the flow and storage of goods.

The importance of information in contemporary logistics is captured by Fred Smith CEO and chairman of FedEx (a leading logistics service provider), who believes that the information about the package is as important as the package itself. (Murphy and Wood,(2008). Logistics is one of the major enablers of growth of trade and commerce activity in a country. At a macro level, the logistical infrastructure such as modes of

transportation transportation equipment, storage facilities, connectivity and information processing, are contributing to a large extent to the physical movement of goods produced in manufacturing, mining and agricultural sectors. The speed and reliability in distribution from a place of production to the place of consumption contributes greatly to the growth of a country's domestic and international trade. (Sople, 2012).

The concept of market demassification suggests that, in contrast to mass markets, an ever-increasing number of market segments has distinct preferences. One way to address market demassification is through mass customization, which refers to the ability of a company to deliver highly customized products and services that are designed to meet the needs and wants of individual segment or customers. In mass customization, one size does not fit all needs and this means that logistics systems must be flexible and not rigid. To this end, logistics service providers such as FedEx and UPS offer variety of delivery options to the prospective customers. This may include; next day service, next business day service, same day service, etc. As a general rule, the earlier the delivery time the more expensive the transportation cost. (Murphy and Wood,(2008).

2.3 Supply Chain Information Systems (SCIS)

Supply Chain Information System refers to a computer system (essentially the software) that is used to coordinate information between internal and external customers, suppliers, distributors and other partners in the supply chain. Traditional supply chain systems supported only two organizations; for example, between the wholesaler and the retailer. Today, more sophisticated systems integrate three or more organizations, so that for

example a retailer can signal a reorder to its wholesaler and to its wholesaler's supplier at **the** same time. Like the Management Information System (MIS), which is designed for **general management** information needs, the SCIS caters for the information needs for **decision** making in the areas of SCM. SCIS consist of elements such as information **sources**, information collection system, storage, processing, retrieval and report **formatting**. **SCIS** can be summed as the vehicle for Supply Chain competency. (Sople, 2012).

Supply chain information system implementation is as important as system selection - and can in fact be even more important. A less-capable supply chain system that's well implemented will deliver some advantages. But when poorly implemented, even the best supply chain systems are likely to produce few real benefits, and could even cause more problems than they solve. Selection process of a SCIS include planning, Implementation management and post implementation optimization (Sanders, N.R. & Premus, R. (2002).

There are various supply chain information systems used in different platforms of supply chain eg Enterprise Resource Planning (MRP/ERP), Warehouse Management Systems (WMS), Transport Management Systems), E-procurement and Radio Frequency Identification (RFID) (Kenneth Lysons, Brian Farrington, 2006, Sanders, N.R. & Premus, R (2002)). ;

2.3.1 Radio Frequency Identification (RFID)

Radio frequency identification (RFID) is a generic term that is used to describe a system that transmits the identity (in the form of a unique serial number) of an object or person

wirelessly using radio waves. It's grouped under the broad category of automatic identification technologies. Unlike ubiquitous UPC bar-code technology, RFID technology does not require contact or line of sight for communication. RFID data can be read through the human body, clothing and non-metallic materials (Ronil Brown, 2011)

2.3.2 E-Commerce

Murphy and Wood (2008) define e-commerce as "any form of economic activity that can be conducted via electronic connections". The electronic connection in this context refers to the computer to computer connection such as EDI and the Internet. In the world of e-commerce, competition is a click away. Online information sharing, speed and accuracy in material movement and increased visibility form the core of e-commerce. (Sople, 2012).

With the advent of the Internet, many businesses now sell only via computer technology. It is an excellent way for businesses to cut overhead costs and reach a larger customer base. E-procurement is not only beneficial for businesses; customers can also find this method of purchasing advantageous. They have a wider choice of merchandise and can shop without leaving their home. With a little web research, they can easily find the lowest price when purchasing goods (Lysons and Farrington, 2006)

2.3.3 Global Positioning Systems (GPS)

This refers to a network of satellites that transmit signals that pinpoint the exact location of an object. GPS has become quite valuable to the transportation component of logistics in that at a minimum, GPS allows carriers to keep track of their vehicles. GPS systems

'de customers service benefits in the sense that carrier's customers can have real time visibility in terms of shipment location which can be very helpful if a shipment needs to be **diverted** or rerouted. At the same time GPS systems benefits carriers by providing data **n vehicle** speed as well as driver behavior. GPS systems can also help trace lost asset. (Murphy and Wood,(2008).

2.3.4 Enterprise Resource Planning (ERP) Systems

This is a SCIS that integrates internal operations of an enterprise with a common software platform and centralized database. In theory, ERP systems eg SAP allow all prospective users access to a single database when making decision. (Murphy and Wood,(2008).

2.4 Benefits of SCIS used by Logistics firms for Inventory Tracking in Kenya

IT in general, and IT in SCM, is argued to enable great opportunities: ranging from direct operational benefits to the creation of strategic advantage. McFarlan (1984). Porter and Millar (1985), in particular, advocate that IT changes industry structures and rules of competition, creates competitive advantage, and creates new business opportunities. In the logistics/supply chain context, Bowersox and augherty (1995) outlined that IT is key in supporting companies creating strategic advantage by enabling centralized strategic planning with day-to-day centralized operations.

The first benefit is the Improved Customer Service. SCIS enable firms to share information on the inventory's whereabouts with their customers. The customers can therefore make informed decisions based on the information shared. SCIS improve on

duct visibility where information sharing between different participants of supply chain is possible, leading to a collaborate planning in primary and secondary processes. **Supply Chain Planning** offers instantaneous information sharing and hence it is possible to provide management collaboration among different participants of supply chain. Information sharing not only eliminates the 'silo effect' when information is not shared, but also provides additional financial gain by allocating economic resource more efficiently.

SCIS also improves on efficiency. SCIS leads to a lean supply chain by eliminating non value adding activities in the system. For example e procurement reduces on order cost. Automation of Supply Chain Management brings significant saving in time and money,while ensuring quality goods and services are delivered through supply chain with speed and without errors.

Information technology improves accuracy and validation of information. SCIS therefore improves on the reliability of information within the supply chain network. Validation of information is possible with the SCIS and therefore the supply chain information become more reliable and more useful in the network.

Due to the speed at which information is shared within the supply chain network where the SCIS is used, the turnaround time is greatly improved. SCIS helps speed up sharing of information across the supply chain network and therefore enabling quick decision making and coming to a conclusion. (Christopher, M. (1998); Porter and Millar (1985))

2 5 Challenges in implementation of SCIS used for Inventory Tracking by logistics firms in Kenya.

Supply chain information Systems used for inventory tracking like any other system experience a lot of challenges during acquisition and implementation. These challenges are however outweighed by the long term benefits of implementing SCIS for tracking inventory. The challenges include;

The cost of acquiring the software and the hardware required for an effective SCIS for inventory Tracking can be very expensive and may be beyond reach to many logistics firms in Kenya. The cost of computers, software and training of users of such systems is still very high in Kenya and can therefore be a barrier to SCIS acquisition and implementation.

Another challenge is the incompatibility of hardware and software across the supply chain network. Incompatible systems hinder flow of information and therefore the purpose of SCIS is rendered useless in such an environment. Standardization of the systems will come a long way in resolving this problem.

I T infrastructure in Kenya is still poor compared to the developed countries and therefore the SCIS for tracking inventory may not be functional in certain parts of the country eg since there is no access to the internet or even computers (Bowersox, D.J. & Daugherty, P.J. - (1995); Ahmad, S. & Schroeder, R.G. (2001)).

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter sets out various stages and phases that was followed in completing the study. It presents details of the research design used in the study, the population, data collection and analysis techniques, ethical considerations and limitations of the study.

3.2 Study Design

This study adopted survey research design that was seeking to gain an in-depth understanding of Supply Chain Information systems usage among logistics service providers in Kenya.

3.3 Target Population

The target population of this study was the logistics service providers in Kenya. The study targeted operation managers, customer care supervisor and logistic fleet managers in each and every company as indicated in table 3.1.

table 3.1 Target Population

No.	Description	Number
1.	Operations Manager	26
2.	Customer Care Supervisor	26
3.	Logistic Fleet Managers	26
	Totals	78

3.4 Sample Design

The researcher did not use any sample design since the population under review is small, the whole population shall be taken for study. The researcher decided to use the entire population since it was less than 100 being that there are only 26 logistic companies in Kenya and the researcher targets only 3 officials from each and every company.

Table 3.2 Sample Population

No.	Description	Number
1.	Operations Manager	26
2.	Customer Care Supervisor	26
3.	Logistic Fleet Managers	26
	Totals	78

3.5 Data Collection

Data was collected by way of questionnaire see Appendix II. The questionnaires was hand delivered to the operation managers and customer care managers or their equivalent in the selected logistics service providers in Kenya. The completed questionnaire were then collected from the organizations after one week for analysis.

3.6 Data Analysis

Before processing the responses, the completed questionnaires were edited for completeness and consistency. The data was then coded to enable the responses to be grouped into various categories. The researcher mainly used descriptive statistics to analyze data. This included frequency distribution tables, mean and standard deviation. SPSS and Microsoft excel software was used to generate outputs. In addition to the

above, inferential statistics especially multiple regression analysis was also used. Cronbach alpha test was used to test for the reliability or internal consistency of the study variable.

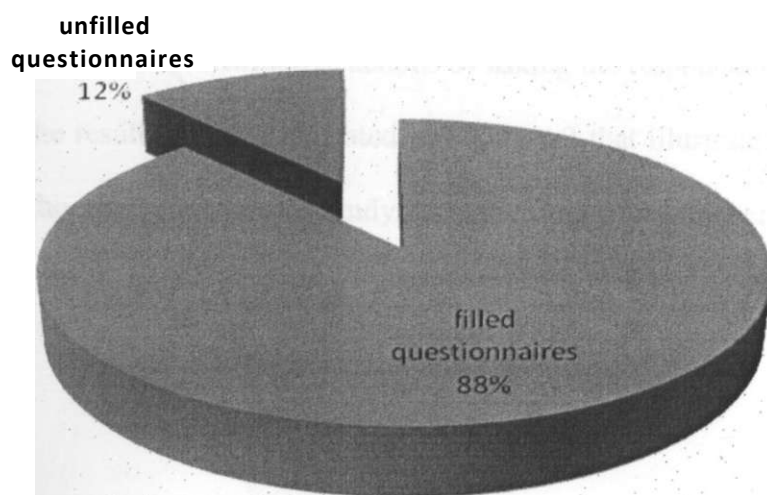
CHAPTER FOUR: DATA ANALYSIS, FINDINGS AND DISCUSSIONS

4.1 Introduction

The researcher analyzed the collected data using SPSS and Microsoft Excel as the main data analysis tool. The collected data in the questionnaires were coded in the SPSS editor where the researcher conducted the analysis to determine the frequency of response.

4.2 Response Rate

The study results under figure 4.1 gives the response rate of the respondents where the researcher has indicated the rate at which data was collected by the questionnaires.



The study results in figure 4.1 indicate that the researcher managed to collect data from 88% of the respondents while only 12% of the sampled population did not participated in the study. The response of 88% is a good work compared to the recommended 75% by ugenda (2003) on her discussion of the required sampled. The respondents of this study

were operations manager, customer care supervisor and logistic fleet managers of the logistic companies in Kenya where a total of 78 respondents were sampled by the researcher for the study.

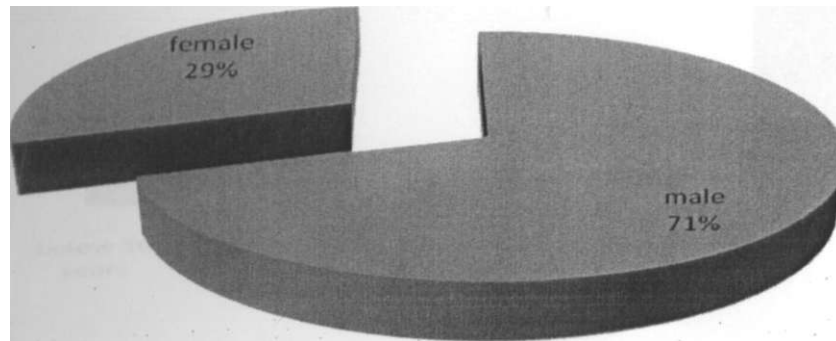
4.3 Demographic Information

In reference to the constitution on the gender requirement that at least 30% of the appointment in the public sectors should be women, the researcher looks at the gender representation of the logistic companies in Kenya although the study covered only private companies. The study then touches on the age of the respondents, duration of work of the respondents and highest education level of the respondents.

4.3.1 Gender

The study sought to check the affirmative actions by asking the respondents to participate in the study and the results were as indicated in Figure 4.2 that illustrates the gender of the respondents who participated in the study. It further indicates whether the study was gender biased or not.

Figure 4.1 Gender

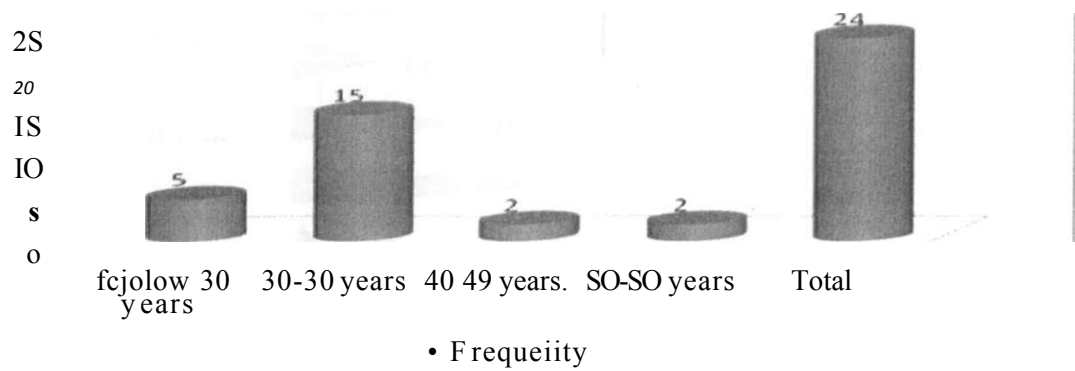


The result in figure 4.2 indicates that there were more male (71%) than female counterparts who participated in the study. This indicates that private companies do not borrow from the recommendations by the constitution on the gender requirement of the staff that at least 30% of the staff should be female.

4.3.2 Age

The researcher sought to determine the age group of the respondents where this would help indicates the experience of the respondents in logistic business. The results in figure 4.2 indicate the age group of the respondents that would also indicate the seriousness of **the** respondents as the old are always regarded to be giving good participation in their work.

Figure 4.2 Age



The results in figure 4.2 indicate that the age group of the respondents. It illustrates that majority (15) of the respondents were between 30-39 years then followed by those that fell (5) below 30 years of age of the total of 24 respondents. This indicates that those who participated in the study are very experienced people and are those that can be trusted as the aged are regarded to be competent in their work compared to the young task.

4.3.3 Durations of Work

The results under figure 4.3 indicate the duration of work of the respondents. It further illustrates the experience of the respondents based on their duration of work experience. This would be used to justify the findings that it is one that can be relied upon since the participants are more experienced people to participate in the study.

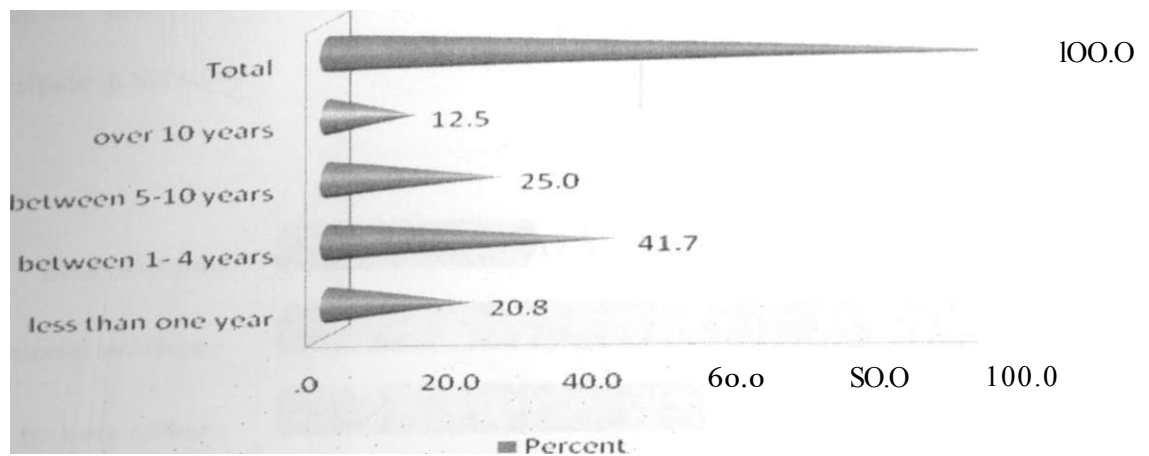


Figure 4.3 Duration of Work

The results in figure 4.3 indicate that duration of work of the respondents in their respective positions. It illustrates that the majority of (41.7%) of the respondents have worked in their positions between 1-4 years then followed those (25%) who have worked for between 5-10 years while the least are those (12.5%) who have worked for over 10 years. Since majority of the respondents are those that have worked for between 1-4 years, this indicates that the response got by the researcher is one that can be relied upon based on the experience of the respondents at their place of work.

4.3.4 Highest Education level

In an attempt to determine the literacy of the respondents, the researcher covered the respondent's education level to ascertain if those filing the questionnaires are intellectually qualified people to participate in the study indicated by the researcher. The study result in figure 4.4 indicates the highest education level of the respondents that

would be used to test if the respondents had the necessary skills and knowledge to participate in the study.

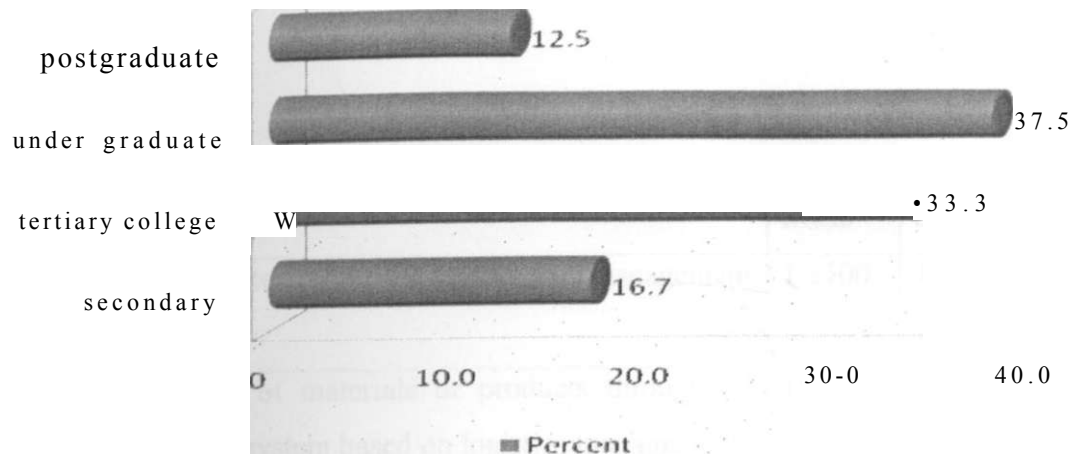


Figure 4.4 Highest Education level

The results under table 4.4 indicate that the highest education level of the respondents (37.5%) are undergraduates then followed by (33.3%) tertiary college while post graduate level of education (12.5%) was the least in response. Since majority of the respondents are those that have undergraduate level of education and tertiary, the researcher assumed that those who participated in the study had the necessary skills and expertise required to participate in the study indicated by the researcher.

4.3 Supply Chain Information System used for Inventory Tracking

Information system facilitates the management of supply and they are many that can support different levels of inventory tracking. The respondents were asked to indicate the extent to which their firms have adopted certain supply chain information systems in the

inventory tracking on a liker scale of 1-5 where 1-very much, 2-much, 3-not sure, 4-less extent and 5-very much extent and the response are as indicated in table 4.1 below.

Table 4.1 Supply Chain Information System used for Inventory Tracking

	Mean	Std. Deviation
Production of automated complex report for management decisions	1.2500	1.29380
Analysis of the flow of materials or products through an automated accounting system based on logistics management	1.3750	1.64690
Control of transportation systems operation and infrastructure	1.6667	1,73623
Order fulfilment and distribution facilities management	1.7083	1.30148
GPRS tracking system	1.7917	1.02062
use of E-Procurement	1.9583	1.08264
Use of information systems as the critical enabler of supply chain efficiencies and responsiveness	2.2083	1.10253
Management of inventory flow scheduling and control system	2.2083	1.06237
logistics-production coordination	2.2083	1.38247
use of radio frequency identification (RFID)	2.2917	1.19707
Electronic data interchange (EDI)	2.3333	1.43456
Use of strategic procurement and supply management	2.4583	1.53167
Enterprise resource planning (ERP)	2.4833	1.05981
use of excel sheet	2.5417	1.23167
Use of reverse logistics in recycle, and remanufacture	2.8500	1.63934
Customer demand fulfilment	2.9583	1.65448

Based on a scale of 1-5 where 1-very much, 2-much, 3-not sure, 4-less extent and 5-very much extent, the researcher established the extent of agreement of to which supply chain information system is used for inventory tracking. The value of standard deviation from the table that are all more than 1 indicate that there is variation of the responses of the study variables.

The study results indicate that the respondents of the study were not sure with the following methods of supply chain information system is it is applicable in their institution based on their mean response that is greater than 2.5 but less than 3.5 a value closer to 3: use of customer demand fulfilment and use of reverse logistics in recycle, and remanufacture. This response was supported by a study that was conducted by Scople (2012) that stated that most of the logistic companies to not consider customers demand or customers fulfilment but they consider their own gains as long as their own demands are met. This implies that logistic firms focus much on their own enrichment rather than customers demand and fulfilments.

However, the respondents agreed to a very much extent with the following statements based on the a mean response of between 1.1 — 1.49: analysis of the flow of materials or products through an automated accounting system based on logistics management; production of automated complex report for management decisions; logistics-production coordination; management of inventory flow scheduling and control system; use of information systems as the critical enabler of supply chain efficiencies and

responsiveness; use of electronic data interchange (EDI); enterprise resource planning (ERP); GPRS tracking system; management of inventory flow scheduling and control system; use of excel sheet; use of E-Procurement and use of radio frequency identification (RFID). Being that the majority of mean response were less than 2.5, the respondents agreed with the extent of usage of supply chain information system in inventory control in logistic companies in Kenya. This indicates that supply chain information system is widely used by the logistic firms to enhance their operations. In relation to the study by Lysons and Ferrington (2006) on the modern operations of logistic companies, he stated that the inventory of supply chain information system has greatly improved information sharing on inventory tracking. The study has then indicated that the entire logistic operation of the company has then been improved by the implementation of supply chain management information systems in the organisations.

4.4 Benefits of using supply chain information system for inventory tacking

The researcher sought to determine the benefits of using supply chain information system for inventory tacking in their organization where the researcher used a liker scale of 1-5. where 1-strongly disagree, 2-disagree, 3-neutral, 4-agree and 5-strongly agree where mean response of between 1-1.49 is strongly disagree, 1.5-2.49 disagree, 2.5-3.49 neutral 3.5-4.49 agree and finally 4.5-5 is strongly agree. These findings would be used to indicate how much logistic companies benefit from supply chain information systems in their organizations.

Table 4.2 Benefits of using supply chain information system for inventory tacking

	Mean	Std. Deviation
Quality of information is improved when using the Supply Chain Information System for inventory tracking	3.7083	.42887
Customer Service is improved when using the Supply Chain Information System for inventory tracking	4.2083	.25036
Turnaround time is improved when using the Supply Chain Information System for inventory tracking	4.3750	.96965
Efficiency in business operations is achieved when using the Supply Chain Information System for inventory tracking	4.8333	.00722
Improved agility of supply network is achieved when using the Supply Chain Information System for inventory tracking	4.910	.17954

The study results under table 4.2 indicate the benefits of using supply chain information system for inventory tacking based on a scale of of 1-5 where 1-strongly disagree, 2-disagree, 3-neutral, 4-agree and 5-strongly agree. The mean response of less than 1 indicate that there was no much variation of the mean responses from the actual mean as indicated in the table. The mean score of the respondents based on the statements that fell between 3.5 and 4.5 gave a response of agree. The respondents however agreed with the following benefits: customer service is improved when using the supply chain information system for inventory tracking; quality of information is improved when using the supply chain information system for inventory tracking and turnaround time is improved when using the supply chain information system for inventory tracking.

Further, the respondents strongly agreed that efficiency in business operations is achieved when using the Supply Chain Information System for inventory tracking and improved agility of supply network is achieved when using the Supply Chain Information System for inventory tracking based on a mean response of more than 4.5 as indicated in the table. These findings were supported by the findings by Chandra and Gabis (2007) on the implementation management and post implementation optimization; he found out that the efficiency of supply chain management information system. The study further indicated that the implementation of supply chain information system has greatly improved the performance logistic companies in Kenya.

4.5 Challenges in the use of supply chain information system for inventory tracking

The researcher further sought to determine the challenges faced by the implementation of supply chain information systems in the logistic companies in Kenya. The findings on the challenges are believed that they can help improve the operation of logistic companies in Kenya. The study results in table 4.3 indicate the challenges of using supply chain information system for inventory tracking based on a scale of 1-5 where 1-strongly disagree, 2-disagree, 3-neutral, 4-agree and 5-strongly agree where mean response of between 1-1.49 is strongly disagree, 1.5-2.49 disagree, 2.5-3.49 neutral 3.5-4.49 agree and finally 4.5-5 is strongly agree.

Table 4.3 Challenges in the use of supply chain information system for inventory tracking

	Mean	Std. Deviation
Lack of standardized processes in the company's supply chain information system hinders the usage of Supply Chain Information Systems for inventory tracking.	4.120	1.38313
Poor collaboration between the company and partners systems hinders the usage of Supply Chain Information Systems for inventory tracking.	4.8583	.65801
Poor document exchange formats in the company's supply chain information system hinders the usage of Supply Chain Information Systems for inventory tracking.	4.1667	1.12932
Poor access interfaces originating from different existing data models such as databases from IBM, Oracle, Sybase in the supply chain information system hinders the usage of Supply Chain Information Systems for inventory tracking.	4.6900	.58977
Poor investment in IT infrastructure hinders the usage of Supply Chain Information Systems for inventory tracking.	4.2583	1.28466

Table 4.3 indicate that the standard deviation of the respondents is less than 1 while some are more than one meaning that there was much deviation in the responses with a mean of more than 1 while the responses with a mean less than 1 had no much deviation. The study has indicated that the respondents agreed that supply chain information system is affected by lack of standardized processes in the company's supply chain information system hinders the usage of Supply Chain Information Systems for inventory tracking; Poor document exchange formats in the company's supply chain information system

hinders the usage of Supply Chain Information Systems for inventory tracking and poor investment in IT infrastructure hinders the usage of Supply Chain Information Systems for inventory tracking. The study had similar findings to the ones conducted by Kalakota and Robinson (2001) on the challenges of information system to stock monitoring where the respondents strongly agreed that supply information system is faced by the following challenges: poor access interfaces originating from different existing data models such as databases from IBM, Oracle, Sybase in the supply chain information system hinders the usage of Supply Chain Information Systems for inventory tracking and poor collaboration between the company and partners systems that hinders the usage of Supply Chain Information Systems for inventory tracking.

4.5.1 Other Challenges in the use of supply chain information system for inventory tracking

Looking at other challenges to use of supply chain information that would be used to improve the performance of logistic companies in Kenya, the researcher has indicated the results in table 4.4 on the challenges affecting supply chain information system for inventory tracking based on the respondents extent of agreement in a scale of 1-2 for 1 - 'yes' and 2-'no' where mean response of between 1-1.49 is 'yes', and 1.5-2.0 is 'no'.

Table 4.4 Other Challenges in the use of supply chain information system for inventory tracking

	Mean	Std. Deviation
existence of research before the implementation of supply chain information system in an organisation	1.8667	.48154
existence of recorded demand for frequent up-grading of the system due to changes in operations	1.2417	.50898
reported case of inaccurate or untimely data reported in organisation	1.3750	.49454

Supporting the findings by Tanskanen (2006), the study found out that there is little or no research that is ever conducted before the implementation of supply chain information system in an organisation as given by a mean response of 1.87 a value closer to 2 that stands for 'no' response. The study also found out that there is a recorded demand for frequent up-grading of the system due to changes in operations as given by a mean response of 1.24 that stands for 'yes' response and then finally the existence for reported case of inaccurate or untimely data reported in organisation as indicated by a mean response of 1.37 a value closer to 1 for 'yes' response.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter gives the summary of the study where it illustrates the study findings in comparison to the findings in the literature. It further gives the researchers observation in relation to the study findings during the study period.

5.2 Summary

The study found out that majority of those who hold positions of Logistic Fleet Managers; Customer Care Supervisor and Operations Manager are persons of age group 30-39 years. In relation to the objectives of the study, the researcher established that supply chain management is majorly used in logistic companies on the following: management of procurement; Enterprise resource planning (ERP) and use of strategic procurement and supply management as supported by the study by Murphy and Wood, (2008) on supply chain optimization where they found out that for an efficient operation of any logistic process, the use of electronic procurement method must be embraced. The study also had a similar finding to the study that was conducted by Lucey, (2006) on the use of Information Technology to maximize productivity of their Supply Chain; the study found out that the introduction of supply chain information system has promoted the use of reverse logistics in recycle and manufacture, the control of transportation systems operation and infrastructure and in the analysis of the flow of materials or products through an automated accounting system based on logistics management.

Looking at the benefits of using supply chain information systems for inventory tracking, the researcher established that Customer Service is improved when using the Supply Chain Information System for inventory tracking; efficiency in business operations is achieved when using the Supply Chain Information System for inventory tracking; quality of information is improved when using the Supply Chain Information System for inventory tracking; turnaround time is improved when using the Supply Chain Information System for inventory tracking and improved agility of supply network is achieved when using the Supply Chain Information System for inventory tracking as supported by other studies conducted by Sople, (2012) on the importance of information systems in the transport industry.

Finally, the study determined that there are many challenges affecting the use of supply chain information system for inventory tracking where the researcher established that among the challenges that are incurred by various organizations are poor document exchange formats in the company's supply chain information system hinders the usage of Supply Chain Information Systems for inventory tracking; poor investment in IT infrastructure hinders the usage of Supply Chain Information Systems for inventory tracking; poor access interfaces originating from different existing data models such as databases from IBM, Oracle, Sybase in the supply chain information system hinders the usage of Supply Chain Information Systems for inventory tracking and lack of standardized processes in the company's supply chain information system hinders the usage of Supply Chain Information Systems for inventory tracking as supported by the study conducted by Brian Farrington, (2006) on the weaknesses of supply information system in organizations.

5.3 Conclusion

The study found out that there is very little research done before implementation of supply chain information system among logistic companies in Kenya. The study also found out that the introduction of supply chain information system has helped improve customer care service; efficiency in the business operations; quality information and improved agility of supply network is also achieved. However, the supply chain managements is faced by various challenges such as lack of standardized process in the companies supply chain information system; poor document exchange formats in the company's supply chain information system hinders the usage of Supply Chain Information Systems for inventory tracking and poor investment in IT infrastructure hinders the usage of Supply Chain Information Systems for inventory tracking among others.

The study also established that the cost of acquiring the software and the hardware required for an effective SCIS for inventory Tracking is very expensive and is beyond reach to many logistics firms in Kenya. The cost of computers, software and training of users of such systems is still very high in Kenya and can therefore be a barrier to SCIS acquisition and implementation. The study then concludes that if the implementation of SCIS is well taken care of through intensive research and consultation, then the logistic companies in Kenya can start the realization of their goals through effective and efficient productivity.

5.4 Recommendations

The study recommends the following based on the study findings:

5.4.1 Investment in IT

There should be adequate investments in information system to aid the supply chain process for effective operation through efficient monitoring and tracking of inventory and customer fulfillment

5.4.2 Intensive Research

Before implementation of any SCIS, there should be intensive research to determine the best methods of implementation and how the existing program can be improved further to minimize resistance from the staff.

5.4.3 Further studies

The researcher recommends further studies on how to standardize the process of company's supply chain information system hinders the usage of Supply Chain Information Systems for inventory tracking

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APPENDIX I: QUESTIONNAIRE

My name is Odadi, as part of my academic requirement; I am conducting a study on the supply chain information systems usage in inventory tracking among logistics service providers in Kenya. I request you to fill in the questionnaire as required and the information provided will be treated as strictly confidential and at no instance will your name be mentioned in this research. The results of the study shall be available to the interested parties upon request.

SECTION ONE: DEMOGRAPHIC INFORMATION

1. Name of company
(Optional).
2. Gender Male • Female •
3. Age • below 30 years • 30-39 years • 40-49 years • 50-59 years
4. For how long have you worked in your current position?
 - i. Less than one-year ()
 - ii. Between 1-4 years ()
 - iii. Between 5-10 years ()
 - iv. Over 10 years ()
5. What is your highest level of education? (Please tick one)
 - i. Secondary o iii. Tertiary College(CH)
 - ii. Undergraduate () iv. Postgraduate ()
 - v. other (specify)_____

Section Two: The Extent to which Supply Chain Information Systems is used for Inventory Tracking

6. State the extent of usage of supply chain information systems given in the table below in inventory tracking by your organisation.

(1-Very much, 2-much, 3-not sure, 4-less extent and 5-very much less extent)

Description	1	2	3	4	5
Use of radio frequency identification (RFID)					
Use of E- Procurement					
Use of Excel sheet					
GPRS tracking system					
Enterprise resource planning (ERP)					
Electronic data interchange (EDI)					
Use of strategic procurement and supply management					
Customer demand fulfilment					
Use of reverse logistics in recycle, and remanufacture					
Use of information systems as the critical enabler of supply chain efficiencies and responsiveness					
Management of inventory flow scheduling and control system					
logistics-production coordination					
Control of transportation systems operation and infrastructure					
Order fulfilment and distribution facilities management					
Analysis of the flow of materials or products through an automated accounting system based on logistics management					
Production of automated complex report for management decisions					

Section Three: Benefits of Using Supply Chain Information Systems for Inventory Tracking

7. The following are statements about benefits of using Supply Chain Information Systems for inventory tracking. To what extent do you agree with these statements?

Guide: Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), Strongly Agree (5)

No	Description	Strongly Disagree(1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
i	Customer Service is improved when using the Supply Chain Information System for inventory tracking					
ii	Efficiency in business operations is achieved when using the Supply Chain Information System for inventory tracking					
iii	Quality of information is improved when using the Supply Chain Information System for inventory tracking					
iv	Turnaround time is improved when using the Supply Chain Information System for inventory tracking					
v	Improved agility of supply network is achieved when using the Supply Chain Information System for inventory tracking					

Section Four: The Challenges in the Use of the Supply Chain Information Systems for Inventory Tracking

8. Comment on the following issues on the challenges in the use of the Supply Chain Information System for inventory tracking. Guide: Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), Strongly Agree (5)

No	Description	Strongly disagree(1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
i	Lack of standardized processes in the company's supply chain information system hinders the usage of Supply Chain Information Systems for inventory tracking.					
ii	Poor collaboration between the company and partners systems hinders the usage of Supply Chain Information Systems for inventory tracking.					
iii	Poor document exchange formats in the company's supply chain information system hinders the usage of Supply Chain Information Systems for inventory tracking.					
iv	Poor access interfaces originating from different existing data models such as databases from IBM, Oracle, Sybase in the supply chain information system hinders the usage of Supply Chain Information Systems for inventory tracking.					
v	Poor investment in IT infrastructure hinders the usage of Supply Chain Information Systems for inventory tracking.					

9) Is there research conducted before the implementation of supply chain information system in the organisation?

Yes CHI No I I

Explain

10) Is there any recorded demand for frequent up-grading of the system due to changes in operations?

Yes CZ] No I I

Explain__

.11) Has there been any reported case of inaccurate or untimely data reported in your organisation

Yes HZ] No I I

12) What complains do you receive from customers based on information system used by your organisation programs?

13) Comment on the Challenges in the Use of the Supply Chain Information Systems for Inventory Tracking?

END

**APPENDIX II: LIST OF LOGISTICS SERVICE PROVIDERS IN
KENYA**

Number	Name
1	A TAYLOR HANDLERS
2	ABLE VIEW AGENCY
3	AFRI LOG LTD
4	AIR SEA CARGO LOGISTICS LTD
5	AIRCOM CARGO LOGISTICS LTD
6	CHAINS AND LOGISTICS LTD
7	CHARIOT LOGISTICS LTD
8	DELACOM SERVICES CO LTD
9	DHL EXEL SUPPLY CHAIN (K) LTD
10	FOX INTERNATIONAL LOGISTICS LTD
11	FRANCK LOGISTICS LTD
12	GATES LOGISTICS
13	GLOBAL OUTSOURCING
14	KHAN'S LOGISTICS SUPPLIES
15	KUEHNE + NAGEL LTD
16	LOGISTICS MODES AND MOVERS
17	M & S LOGISTICS
18	MARGITONS LTD

19	MUTHIANI AND SONS LOGISTICS LTD
20	MYNER LOGISTICS
21	SEASCAPES LOGISTICS LTD
22	SKYLAND LOGISTICS LTD
23	SPELLING TRADING LTD
24	TIANSHI K TRADING & LOGISTICS CO LTD
25	TRANSONIC LOGISTICS LTD
26	WISEWAY LOGISTICS LTD