AUTOMATED TRANSPORT MANAGEMENT SYSTEMS AND LOGISTIC OPTIMIZATION AMONG THIRD PARTY SERVICE PROVIDERS IN KENYA

BY

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DECLARATION

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

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D61/81096/2015

This research project has been submitted with my approval as the University supervisor.

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DEDICATION

This project is dedicated to my niece the Late Regina Cynthia Akinyi, who was also pursuing her Masters' degree in Architecture at the same time, at the Limkokwing University of Creative Technology, Cyberjaya, Malaysia. Your passion for education and insistence on hard work and great achievements, your humility, persistence and passion were not in vain. I will never forget the talks we had and the encouragement on the way to work hard and achieve our dreams before you breathed your last. Rest in peace Regina

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABREVIATIONS AND ACRONYMS

BSC	Balanced Scorecard
CSR	Customer Service Relationship
GPS	Global Positioning System
ID	Identity Document
RBV	Resource Based View
RFID	Radio Frequency Identification
SCM	Supply Chain Management
SCOR	Supply Chain Operation Reference
TAM	Technology Acceptance Model
WMS	Warehouse Management System
YMS	Yard Management System

ABSTRACT

Logistics has been shown to add value to the output of a firm, which arises from the ability to cut costs and provide delivery solutions as per the customers' needs. Logistics innovations such as automated transport management systems are said to be of benefit to economies and consumers. Whereas the opportunity to create value through logistics has motivated the researchers to consider different factors resulting in higher logistics optimization levels, the broader concept of automation has not been addressed in great detail. The study sought to establish the effect of automated transport management system (route planning and optimization, yard management and order visibility and load optimization, freight audit and payment) on the logistics optimization on of third party logistic service providers in Kenya. Primary data was collected from the operational staffs (top, middle and low level managers) that are well conversant with the operations of third party logistic service providers in Kenya. Descriptive statistics such as means and standard deviations were used to analyse the data. The study results were presented using figures and frequency tables. The correlation between automated transport management system and logistics optimization was tested using regression analysis. The study concluded that third party logistic service providers in Kenya have implemented Route Planning and Optimization Systems, Freight Audit and Payment Systems,Order Visibility Systems and , Load Optimization Systems to a very great extent while Yard Management Systems has been implemented to a great extent and this has greatly improved their logistical optimization. The study also concluded that there was strong association between automated transport management system and logistical optimization with automated transport management accounting for 62.8% of the total changes in logistical optimization of third party logistic service providers in Kenya. Route planning and optimization, freight audit and payment, load optimization; order visibility and yard management were found to have a positive and significant impact on logistical optimization of third party logistic service providers in Kenya. This study therefore recommends that third party logistic service providers in Kenya that have not yet adopted automated transport management system should do so as this greatly improve their logistical optimization.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The dynamism in markets and competition in service and product provision has forced many businesses to look for innovative ways of delivering to their customers and revolutionizing the way business is done (Tiid, Keith & John, 2001). With continuous improvements and innovation of new technologies, technology has become important in the service industry driving growth and a major competition tool (Metcalfe & Miles, 2000). Most companies involved in sale of products and services where there is consumer interaction, have introduced technology into their operations tapping into the many advantages of engaging customer over the great World Wide Web.

The theoretical foundation of the study is anchored on the firm's resource based view theory, the technology acceptance model and diffusion of innovation theory. Resource based view is a theory of firm performance which is centered on how the resources and capabilities controlled by a firm enable it to achieve superior performance. The resources that are held by a firm together with the technological innovations have an extensive impact in the generation of improved performance (Davis, 1989). Technology Acceptance Model (TAM) clarifies the way clients embrace/acknowledge and utilize an innovation. The model says that once a client is given a new innovation, certain components influence their choice on the manner in which and the time upon which they will utilize it (Rogers, 2003). Diffusion of Innovation refers to the communication of an idea which is considered to be novel to the members of a social system through certain preferred channels. Of utmost

importance is that innovations have to gain acceptability in a wide area in order to be sustainable (Barney, 1991).

Many Logistics companies in Kenya however have not realized the need to employ technology in their operations and haven't implemented information and communication technologies and aligned their strategies with the changes in technology. Some of the challenges faced by logistics service providers include, managing the parcel records, difficulty in monitoring the riders, messengers, drivers and delivery activities and locations because of the myriads of variables involved such as traffic, lack of parking as well as effects of motor vehicle breakdowns (Peter, 2003).

1.1.1 Automated Transport Management Systems

Automated transport management systems are facilitators or systems that assist logistics organizations in managing their operations by managing their costs and improving their services-alignment throughout the entire supply chain. They allow for delivery of the raw materials on time, finished and semi-finished goods, whether internally or externally, through use of different transportation modes such as land, air or sea. Lack of proper automated transport system in place has led to most companies experiencing problems hindering their growth and expansion. Other problems and difficulties experienced by organizations in logistics business are poor delivery of services, reporting and notification, administrative headaches and escalating overheads (Short, 2010).

Automated transport management systems 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 and attract customers. The customer is concerned with receiving quality service and

products at affordable rates, thus puts pressure on the firms to develop better ways of doing things while reducing costs for the benefit of the customer. Transport research is influenced by the economic and behavioral approaches (Mentzer & Kahn, 2010). Bigger organizations that have fully automated their transport systems have been able to achieve: transparency in costs where there is real time insight of the financial status of the organization, intelligent communication tools that help share right information with partners, business intelligence monitoring among others.

Existing automated counting technology is attributed with many advantages and disadvantages. The most widely used type of monitor is the infrared sensors since they can monitor, mark date and time of passage, but are prone to errors as a result of environmental conditions; cannot distinguish among individuals or identify mode of activity, lack adequate and consistent reliability for use in open spaces and cannot detect more than one person passing at a time (Short, 2010).

1.1.2 Logistics Optimization

The principle of logistics is based on the acquisition of commodities at the most fair price, within the shortest time possible with the highest value quality per cent for each organization, private or public (Khataie & Bulkak, 2013). There has to be seen to have value for money in the investment put to that logistics process thus necessitating the need for procurement systems especially in the modern technological period. In accordance to CSCMP (2007), logistics system optimization is aimed at satisfying the needs of the customers by making plans, controlling and implementation and movement of products and services from the point of origin to their destination. The following are the logistics management activities ; fleet management, inbound and outbound transportation

management, warehousing, order fulfillment, inventory management, materials handling, logistics network design, third-party logistics services provider management and demand and supply planning, . Morash & Lynch (2012) explain that logistics optimization also include sourcing and procurement customer services, packaging and assembly and production planning and scheduling.

Logistics optimization enables an organization to enhance efficient flow of products and services in the least cost and to ensure on-time delivery of goods and services. This ensures that customer needs are met in a more efficient manner. Bowersox, Closs and Cooper (2009) indicate that organizations that have integrated their logistics management systems have significantly reduced and minimized their lead time and inventory management costs. Haag & Cummings (2010) maintain that organizations that use internet sources ship their merchandise in a more accurate and fast manner than competitors do.

Yu and Shen (2013) on need to carry out logistic optimization measurement stated that there is need to create measurement systems and processes that directly support corporate goals and objectives. Balance Score Card is a useful approach to logistics optimization measurement. It provides four linked performance areas including financial results, customer relations, internal processes, learning and development.

1.1.3 Third Party Logistic Service Providers in Kenya

The logistics industry in Kenya draws its origin from the Kenya Uganda railway. Like in much of sub-Saharan Africa, Kenya has a largely linear spatial logistics structure situated along a single corridor. Much of the economic activity and many cities and towns are located along the Northern corridor. According to World Bank (2005) the industry is

characterized by logistics firms struggling against a wave of physical and procedural impediments to transport goods across the corridor. Millions of tons of goods are moved along the corridor by road, railway and the Kenya pipeline. The location of Kenya as a gateway into the interior of Eastern Africa (Uganda, Rwanda, Burundi and Southern Sudan) through the port of Mombasa has created a much vibrant trade logistics industry. Many private logistics firms compete along this corridor.

The logistics industry in Kenya is growing very fast and is attracting more and more investors. The logistics industry contributes a lot to the economy of the country. Most logistics companies in Kenya however have not realized the need to employ technology in their delivery operation. Most logistics service providers have not aligned their strategies with the changes in information communication technology. Lack of proper technology in place has led to most companies experiencing problems hindering their growth and expansion. Other problems and difficulties experienced by organizations in logistics business are poor delivery, reporting and notification, Administration headaches and escalating Overheads (World Bank, 2015).

1.2 Research Problem

Logistics optimization leads to increased firm value and increases the market share of a firm (Mentzer, Flint & Hunt, 2001). Also, logistics has been found to enhance customer value and adds value the output of the firm, which arises from the firm's capability to provide delivery solutions and reduce costs in accordance with the customers' needs (Stank, Daugherty & El linger, 1998). Logistics innovations such as automated transport management systems are said to be of benefit to economies and consumers (Bontckoning & Priemus, 2004). While value creation using logistics has motivated the researchers to

take into consideration different factors contributing to high logistics optimization level, the concept of broader automation has not been properly addressed (Fawcett & Farris, 1989). In 2005, Flint stated that logistics study has ignored automation. This is evident while examining logistics automations (Grawe, 2008).

The Kenyan logistics Service Providers play a key role in moving inventories on behalf of organizations from one place to another. Currently, customers seeking the services of a logistics company have to call or visit, receive a quote and decide whether to use the service or not. While there has been increased access to internet and technology implementation by various sectors, the logistics industry has been slow in this uptake and customers have to call or visit to receive service while there is a chance of processing all this remotely. Automated transport management systems are not fully developed and so there is need to determine its effect on logistics optimization (World Bank, 2015).

Much of the research work done on logistics automations has been conducted in the developed economies; in his study on logistic automation, (Mung'onyc, 2008) dwelt on the service automation in the tourism sector. The study mainly looked at automations 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 automations 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 affecting technological innovations 'adoption by logistics service providers. All the above studies have been conducted on developed countries and they have considered different types of automations in differing contexts.

The aim of this study is to fill the already existing research gap scrutinizing automated transported management system and logistics optimization as adopted by third party logistics service providers in Kenya. The study tries to establish the benefits that accrue from adopting automated transport management system to the logistic service provision sector in Kenya. While other researchers have looked into factors that influence the adoption of automated transport management system, this study dwell on the effect of automation on logistics optimization. This study's aim is to answer the following research questions: What are the automated transport management systems applied by third party logistic service providers in Kenya? To what extent do automated transport management systems lead to logistics optimization among third party logistic providers in Kenya?

1.3 Research Objectives

The study seeks to determine the effect of automated transport management system on logistics optimization among third party service providers in Kenya. The study's specific objectives are:

i) To establish the automated transport management systems used by third party service providers in Kenya;

ii) To establish the association between automated transport management system and logistics optimization among third party service providers in Kenya

1.4 Value of the Study

Findings from the study form a foundation for implementing an effective automated transport management system. The study offer insight to the logistic sector in Kenya and other parts of the world that have implemented automated transport management system

but have not conducted Post Implementation Review, those planning to implement and those who would like to get insight on how automated transport management systems work.

The finding of this research forms a reference basis to researchers, scholars and students in the same area of study. The study will be valuable to them in identifying areas that need more research in the view of literature reviews and identifying existing gaps. The study significantly contributes to category management practices in the retail sector.

This study's primary findings enables the policy makers to understand how automated transport management system influence logistic optimization among third party service providers and consequently come up with a criteria that can be used by the regulators to attain better logistics performance among logistic service providers which is the main game plan for economic growth and development of the country as stated in vision 2030.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter focuses on reviewing the existing and relevant literature on automated transport management systems and their impacts on logical optimization among third party logistic service providers in Kenya. The accessible literature gives the basis of the research and consists of the broad outline of automated transport management systems and logistical optimization. The section also outlines the conceptual framework that shows the interrelationship between automated transport management system and logistical optimization.

2.2 Theoretical Framework

The theoretical framework refers to a structure of concepts that exists (tested) and is a ready-made map for a study. It constitutes theories, principles, generalizations and findings which have a close association with the current study under investigation (Sirkin, 2011). The study build on three theories: Technology acceptance model theory, Diffusion of innovation theory and the Resource based view theory.

2.2.1 Technology Acceptance Model (TAM) Theory

This theory clarifies the way clients embrace/acknowledge and utilize an innovation. TAM was invented by Davis in 1989. The model says that once a client is given a new type of innovation, certain components affect their on the manner in which and the time they utilize it. This assimilates its apparent convenience and seen helpfulness. Different variables like clients, contenders, monetary components and outside effects from the providers are not

integrated in the TAM (van Akkeren & Harker, 2003). TAM embraces settled causal chain of genuine conduct convictions, goal and disposition. This was produced by social clinicians from the contemplated activity hypothesis. In Davis' study, two vital parts are recognized; seen convenience and seen helpfulness (Davis, Pallister & Faxall, 2002).

These perceptions dictate the attitudes towards the adoption of a given system. The attitude triggers the intentions that cause actual system usage and the user intentions to use. In other studies regarding technology, TAM is widely applied and indicated that it contributes to the development of a prediction of an individual's usage of technology (Fishbein & Ajzen, 2010).

2.2.2 Diffusion of Innovation Theory

Diffusion of Innovation refers to the communication of an idea which is considered to be novel to the members of a social system through certain preferred channels (Rogers, 2003). The spread of new ideas is impacted by four variables which are: the innovation itself, time, social system and time. Of utmost importance is that innovations have to gain acceptability in a wide area in order to be sustainable. According to Fisher (1971), adoption of innovation when mapped in the long run forms an S shaped curve. The curve commences with the innovators, early adopters, early majority, late majority and the laggards.

The level of success of an innovation stems from the resolutions made within the constraints of a social system through five defined steps which include: Knowledge: i.e. awareness of the innovation and continuous learning on the same; Persuasion i.e. willingness to have detailed knowledge concerning the innovation; Resolution i.e. consideration of the advantages and disadvantages of the innovation and choice of whether to adopt the innovation; Application i.e. an examination of how useful the innovation was

and confirmation i.e. eventual decision on the continual use of the innovation (Rogers, 2003).

2.2.3 Resource Based View (RBV) theory

This perspective is dependent on the internal competence of the firm that is, the capabilities and resources-. Barney (1991) argues that the competitive advantage of a firm arises from the firm's unique capabilities that enables it to attain better performance .These capabilities define the firm's core competencies (Prahalad & Hamel, 1990). The resource-based theory argues that it is the desire of the organization to plug gaps in resources and capabilities and manufacture distinctive product (competitive advantage) using the most minimum cost (Krim, 2003). This theory identifies the firm's internal resources as the main strategic advantage and profitability determinants. The theory contradicts with the traditional economic assumption which argues that resources are perfectly mobile and homogenous. It rather presumes that there is heterogeneous resource distribution and that the distribution of resources between firms is imperfect (Barney, 1991).

According to Barney (1991), resources can be categorized into three groups: Physical resources for instance plant, organizational resources and human resources. The availability of adequate resources enables a firm to formulate and implement strategies that enable it to improve its productivity. Organizations are able to obtain optimal output if they can utilize the available resources to attain competitive advantage through the exploitation of market opportunities or curbing threats from the strategic resources of the competitor. Resources are perceived to be imperfectly imitable if they entail causal ambiguity, social complexity and unique history. Furthermore, if a different organization is unable to

implement the same strategies through use of alternative resources, then they are said to be non-substitutable.

The theory is applicable in this study since it appreciates organizational processes, close working associations and knowledge sharing as the resources that can be utilized to improve the organizations' competitiveness. New ideas capable of making operations run smoothly are better adopted as mentioned by Dobbins, Barnsley, Cockerill (2001); possible adopters thereby evaluate a new idea based on its competitive positioning (The predicted benefits of the innovation as compared to current methods and mechanisms in use).

2.3 Automated Transport Management Systems

Globalization, high customer expectations, higher level of increasing risks and high customer expectations lead to major constraints in supply chain management in a business environment struggling to face new and unpredictable financial challenges. Due to the above factors, each aspect of a company's value is affected by transportation management. Ambitious enterprises have adopted transportation management practices, and promoted more use of technology in order to manage their global supply chains more responsibly and profitably. Currently, customers are not only satisfied by on-time delivery at the lowest cost and to fill this gap consumer e-business has been introduced which has escalated the levels of expectation to a never anticipated level and individuals now anticipate the same equal services in their corporate undertakings. Sophisticated business processes are undertaken in this environment which exhibit the capability to effectively manage a global supply chain and manage many details quickly and accurately. Tasks cannot be adequately executed using manual processes. In order to create the most suitable market opportunities, global enterprises require integrated technology solutions (Lambert, 2005).

Well performing companies are currently adopting automated systems to add value to a global supply network, control transportation costs and streamline logistics. As a result of this, they are unveiling new ways to create new revenue streams, increase customer satisfaction and use transportation to gain a competitive edge. The main practices in automated transport management systems are discussed in this section and they include: route planning and optimization, freight audit and payment, load optimization, order visibility and yard management(Bowersox 2010).

2.3.1 Route Planning and Optimization Practices

Planning routes manually is a real pain in the rear. In addition to figuring out which roads drivers must take to reach customers, there are other factors that need to be accounted for such as traffic, construction, weather, customer availability, and other factors. However, the businesses environment is getting more dynamic, with the players being forced to undertake trade-offs between feasible and optimal routes and to adequately adjust to the changes. As a result of this, new real-time routing solutions have been formulated which allow for prompt communication between the drivers and routing application to so that the owners of the vehicles can track the locations and activities. Where appropriate, the routes of the drivers are changed "on the fly", which entails a trade-off between costs and services. This can be done through 'dispatcher-centric', with little interactions with the driver although more appropriate solutions precede this that can proactively and automatically respond to developments as they occur (Ulku, 2009).

The optimization software can adequately support route planning through creation of more efficient routes and improvement of utilization. It could also do this by widening the scope

of control and improvement and centralization of planning process. The Integration of real-time information into the optimization tool and use of mobile devices to keep customers drivers and the management informed increases service transparency and employee satisfaction. Examples include integrating inbound/outbound or domestic/international movements and integrating transport across multiple depots. Furthermore, optimization tools enable a firm to optimize the supply chain in the wider dimension rather diverting all the attention to transportation (Zamora-Torres, 2013).

2.3.2 Load Optimization Practices

Cost reductions are the sole of load optimization. This element enables an entity to effectively manage many different factors in order to enable their feet to operate more cheaply and efficiently. It basically entails how to load trailers, find the cheapest place to get fuel, minimize the miles needed to make deliveries, minimize out-of-route miles all and sequence stops while meeting time requirements of the customer transit. Whereas most fleets still combine their load plans through the drivers and dispatchers combing through watching truck stop fuel prices monitoring their movements using Google maps , software is increasingly being perceived as a tool can used the cost of operation of fleets (Hanouz, Geiger & Doherty, 2014).

This software has had a good acceptance due to its fascinating speed, since many things can change in a minute in the current trucking market. Through software application, organizations are able to handle the last-minute activities efficiently and swiftly without necessarily increasing their operation costs. The use of load optimization software systems is also helpful in the most challenging part of the process which include making delivery requirements and customer shipping at lowest possible costs (Helo, 2011).

2.3.3 Freight Audit and Payment Practices

Freight Audit is in its basic form checking and verifying of invoices to ensure that firms pay the right amounts to a carrier. However, applying that principle in a strategic way means that the firm has the correct and undisputed data which serves many purposes that bring savings, value and efficiency in all of their processes around logistics. Supply chain managers are more informed on the importance of having the appropriate data for analysis and decision-making. The availability of accurate data is vital in the firm for cost-reduction initiatives, development of business process improvement initiatives and minimize the miles needed to make deliveries.Over the past few years, successful organizations have been putting greater emphasis on attaining more transportation costs' feasibility so as to adequately manage profit margins based on the cost of goods sold . Freight audit and payment process has been a very important source of information for the business (Rane, 2015).

The best practices in freight audit and payment include: Keeping track of paper invoices as they arrive, logging, stamping, batching and imaging them, Asking carriers that send paper bills to use a trackable shipping method, Keeping track of electronic invoices as they arrive, logging the file ID numbers and creating a procedure to deal with duplicate or skipped files and building procedures to trap invoices that do not belong to the company (Kwon & Suh, 2004).

2.3.4 Yard Management Practices

The yard management system (YMS) software system is tailored to monitor movement of trailers and tracks within the distribution center, warehouse yard or manufacturing facility. The YMS shows the actual location of a track yard within the yard at any given and makes

possible for the yard personnel to move trailers to docks in order to make order deliveries in the most effective manner. The YMS is always used together with the TMS and the warehouse management systems (WMS). For faster and adequate tracking, it also has an inbuilt radio frequency identification (RFID) technology (Axsater, 2006).

A well designed YMS application allows for complex distribution operations to easy location and identification of trailers within the yard through complex distribution operations, in a manner that allows for quick unloading of the inventory that is already loaded in a track. RFID is built in some YMS application which is a tracking capability makes it possible to undertake a quick assessment of the trailers owned by the yard since all the incoming trailers a given a RFID tag at the entrance of the guard shack (Jacobs, 2010).

2.3.5 Order Visibility Practices

Prompt issue of the required information to the customers regarding the order status is a fundamental factor to note in the delivery of excellent customer service. To achieve this, there must be a clear visibility of the current order across the supply chain and and frequent monitoring of the Customer Service Representatives (CSR). Through Order visibility, companies have lost visibility and control of the processes they used to control through outsourcing. Businesses have been able to respond easily to technological changes through order visibility thus allowing the advantaged users to respond appropriately and redirect supply and reshape demand (Chopra, 2004).

An enterprise seeking to acquire order visibility software should seek to reduce the tough areas in certain business' logistics management areas. For instance, a manufacturer who engages in contract outsourcing must prioritize on acquiring visibility into interruptions

that could influence the delivery of products, while packaged goods' manufacturer might prioritize on attaining visibility into inventory shortages that might have a negative impact on the implication on the order fill rates. (Stephan & Boysen, 2011).

2.4 Logistics Optimization

Logistics is defined as strategic management of acquisition, transportation and storage of products, inventory and related information flow through the planning and its marketing channels in manner that maximizes both its expected profitability through fulfillment of orders in the most cost effective manner (Christopher, 2005). Logistics is that part of SCM that is involved in the formulation, implementation, and control the efficient, effective forward and reverse flow and storage of products and the process flow right from the production to the consumption point (Wood & Murphy, 2008)..

Through logistics, successful companies have globally have been able to transform costs into value, thus increasing an enterprises' competitiveness in the turbulent and dynamic global market. Many companies have undertaken a paradigm shift through viewing logistics as more of an opportunity rather than a cost center. This has been attained through leveraging of logistics to improve the customers the customer's service delivery level; enter both local and international new markets faster than before and to accelerate the speed of launching new products. At the macroeconomic level, logistical infrastructure for instance transportation equipment, modes of transportation, connectivity and information processing, storage facilities are highly contributing to the physical movement of goods produced in the agricultural, manufacturing and mining sectors (Sople, 2012).

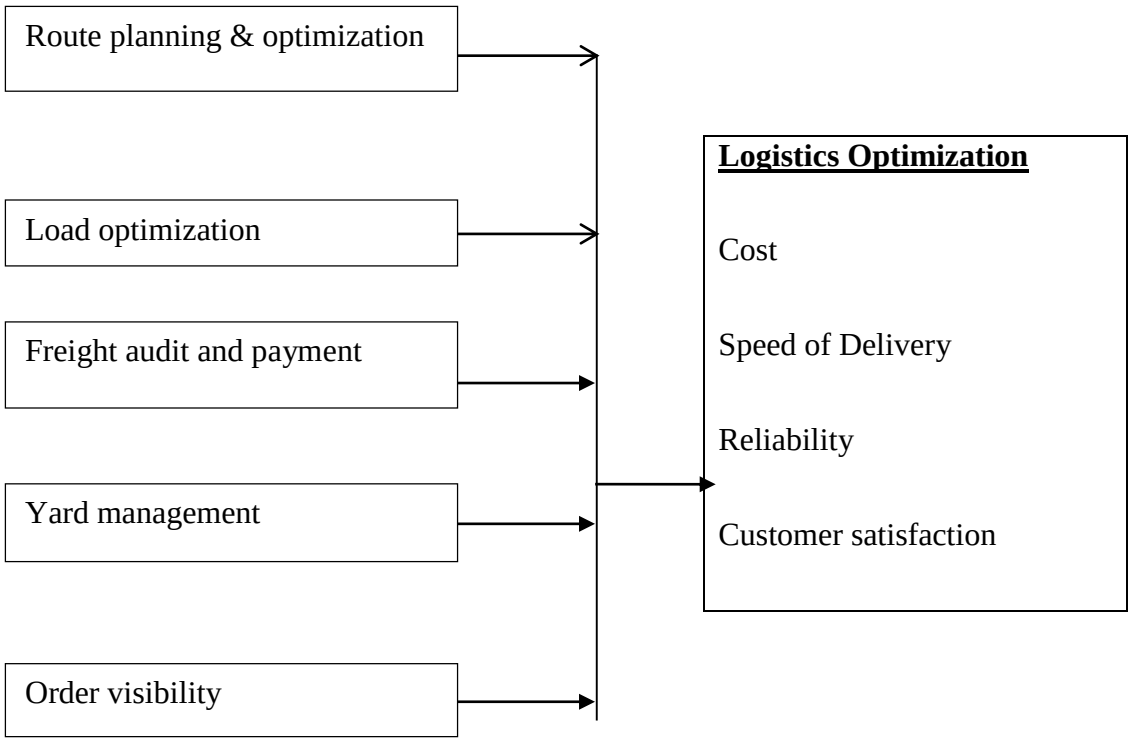
Logistics optimization is concerned with effective and efficient flows of materials and related organizational information, both in private and public sectors. Its main goal is to timely transport to the desired destination, while satisfying a given set of constraints and manufacturing. Logistics is a critical factor in the modern societies which is built on different correlated subsystems. The relationship between the subsystems and components takes the form of coordination and exchange of information and materials. The system seeks to efficiently supply customers with relevant products. Each subsystem dictates the amount of material flow through the system through storage, transportation and various stages of value adding and handling (Jonsson, 2008).

Due to the rising levels of competition in both local and international markets coupled by utilization of effective competitive advantage areas, many companies have shaped technological changes with innovation becoming part of running businesses as part of improving competitiveness. This has revolutionized the interaction and operations between companies and customers (Tidd et al., 2001). For a long time, information communication and technology is seen as driver to efficiency in both manufacturing and service offering sectors. Recently, information communication technology has taken greater appreciation and advantage in many sectors leading to growth by giving organizations critical competitive leverage with regards to customer interactions (Metcalfe & Miles, 2000).

2.5 The Conceptual Framework

The conceptual framework outlined below shows the influence of automated transport management system on logistics optimization. Automated transport management systems are conceptualized in five dimensions: Route planning and optimization, order visibility and freight audit and payment, load optimization and yard management.

Figure 2.1: Conceptual Model



Source: Author (2017)

2.6 Hypothesis of the Study

According to Cooper and Schindler (2008), a non- directional null hypothesis is relevant for every study so as to attain for the specific objectives of the research and to ensure consistency between the output and the conceptual model for the study .The research problem of the study will be addresses as per the hypothesis stated below:

Ho: Automated transport management systems have no significant influence on logistics optimization of third party logistic service providers in Kenya.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The information about the design of the research, population that was selected for the study is discussed in this chapter. Data collection, analysis and presentation techniques that were employed in the study are highlighted in this chapter.

3.2 Research Design

Khumar (2005) defines research design as that method that is procedurally acquired by the researcher and that which enables the researcher to be able to answers questions accurately, validly, objectively, and economically. This study employed a descriptive cross-sectional research design. A descriptive study involves a description of all the elements of the population. It allows estimates of a part of a population that has these characteristics.

Identifying associations among various variables is possible, to establish whether the variables are independent or dependent. Cross-sectional study methods are done once and they represent summary at a given timeframe (Cooper & Schindler, 2008).

3.3 Population

The definition of population by Mugenda and Mugenda (2003) is the whole group of events, objects or individuals having similar observable attributes. The population for this study is all the 70 third party logistic service providers in Kenya.

3.4 Sampling Design and Sample Size

Convenience sampling was used since the population is homogenous. Convenient sampling is used to simplify the procedures of data collection and avoid simple random method complications since the researcher only picks the available ones (Amin, 2005). The criterion for selection is the largest in terms of assets and operations. A sample of 15 third party logistic service providers was selected.

3.5 Data Collection Methods

Primary data gathered through semi structured questionnaire was utilized in the study. The questions are constructed in order to address particular objectives and offer a variety of possible responses. The questionnaires were directed to operational staffs that are well conversant with companies' operations. The questionnaires was administered through a pick and drop later method.

3.6 Data Analysis Techniques

To analyze the data collected from the administered questionnaires, the study use descriptive statistics. The data collected was tabulated, summarized and interpreted using descriptive measures. Tables were used for presentation of the findings and the mean, standard deviation; percentages and frequency was used for interpretation.

3.6.1 Analytical model

To quantify the extent of association between the variables, the Karl Pearson's correlation coefficient was used by the researcher. This enabled him to predict the strength of the association between automated transport management system and logistic optimization among third party service providers in Kenya. This generates quantitative reports through percentages, tabulations and measures of central tendency.

The model shown below was adopted in the study:

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

Where;

Y = the dependent variable Logistical optimization

α - Is a constant

β_1, β_2, β_3, β_4 and β_5 – Are regression coefficients' constants

X_1 – Route planning & optimization, X_2 – Load optimization, X_3 – Freight Audit and Payment, X_4– Yard Management, X_5 – Order Visibility, ε (Extraneous) Error term explaining the variability of other factors not accounted for.

CHAPTER FOUR

DATA ANALYIS, FINDINGS AND DISCUSSIONS

4.1 Introduction

The collected primary data from the third party logistic service providers in Kenya in regard to the effect of automated transport management system on logistics optimization among third party logistic service providers in Kenya is analyzed and presented in this chapter. The primary data was collected from the operational staffs that are well conversant with third party logistic service providers operations. Descriptive statistics such as means and standard deviations were used to analyse the data. The findings of the study were presented in form of figures and frequency tables. The correlation between automated transport management system and logistics optimization was tested using regression analysis.

4.2 Response Rate

The researcher distributed 30 questionnaires which were administered to the Senior, Middle and Lower Level Management staff of third party logistic service providers in Kenya. The researcher collected 28 questionnaires that were duly filled. This amounted to 93.33% response rate which the researcher considered an adequate representation compared to the 80% response rate suggested by Edwards, Clarke and Kwan (2002). The response rate is shown in Table 4.2.

Table 4.2: Response Rate

Response Rate	Frequency	Percentage
Filled and Returned	28	93.33%
Not Filled	2	6.67%
Total	30	100%

Source: Researcher (2017)

4.3 Reliability Test

The researcher conducted a reliability analysis of the questionnaire so as to ascertain its consistency. A Cronbach's Alpha co-efficient equal to or greater than 0.7 was used as an indicator of an internally consistent instrument. The reliability test findings are as shown in Table 4.3.

Table 4.3: Reliability Test

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.816	.794	40

Source: Research Findings (2017)

The above findings indicates that the study questionnaire had Cronbach's Alpha co-efficient of 0.816 which means that it was highly consistent and therefore reliable in establishing the effect of automated transport management system on logistics optimization among third party logistic service providers in Kenya.

4.4 General Information

This section presents the general information of the respondents. The researcher discusses management level, working experience and the department of the respondents. The findings are presented below.

4.4.1 Management Level

The study requested the respondents to indicate the management levels they belonged to in their respective firms. The findings of the study are as shown in Table 4.4.1.

Table 4.4.1: Gender of Respondents

Level	Frequency	Percent
Senior Level Management	11	39.3
Lower Level Management	9	32.1
Middle Level Management	8	28.6
Total	**28**	**100.0**

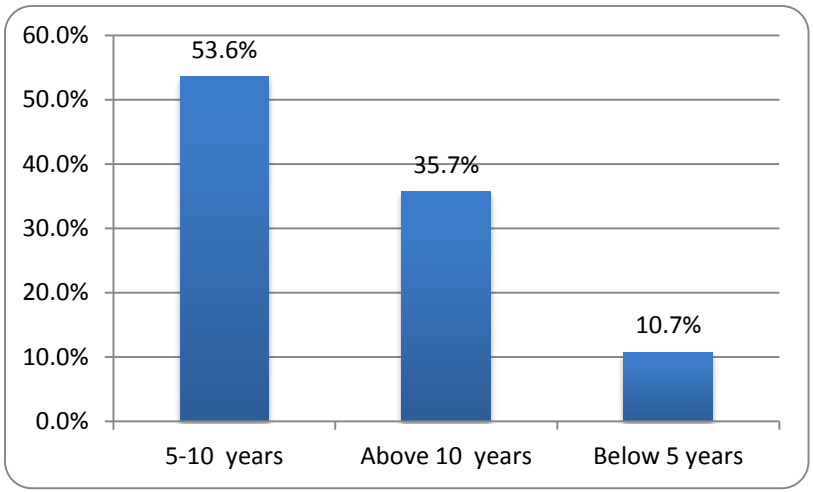
Source: Research Findings (2017)

The results revealed most (39.3%) of the respondents belonged to the Senior Level Management followed by 32.1% of the respondents who belonged to the Lower Level Management and then 28.6% of the respondents who belonged to the Middle Level Management. It can be concluded that the respondents held positions that allowed them to understand the how automated transport management system affects logistics optimization of third party logistic service providers in Kenya.

4.4.2 Working Duration

Further, the study examined the span in which respondents had been serving in their respective third party logistic service providing firms. The results are as illustrated in Figure4.4.2:

Figure 4.4.2: Working Duration



Source: Research Findings (2017)

It was noted that majority (53.6%) had a working duration of 5-10 years, those with a working duration of above 10 years. Only 10.7% of the respondents had a working duration of below 5 years working. These findings reveal that the respondents had been working long enough to know how automated transport management system affects logistics optimization of third party logistic service providers in Kenya.

4.4.3 Department

Further, the study sought to ascertain the departments that the respondents were engaged. The findings are as shown in Table 4.4.3 below.

Table 4.4.3: Department

Department	Frequency	Percent
Logistics	11	39.3
Operations	8	28.6
ICT	6	21.4
Procurement	3	10.7
Total	**28**	**100.0**

Source: Research Findings (2017)

The researcher found out that most (39.3%) of the respondents from third party logistic service providers in Kenya belonged to the logistics department followed by 28.6% who worked in the operations department and then 21.4% who belonged to the ICT department. That procurement department accounted for 10.7% only. These results indicate that respondents belonged to the operational departments and therefore have the requisite knowledge to understand the relationship between automated transport management system and logistics optimization.

4.5 Automated Transport Management Systems

The study further sought to determine the extent to which third party logistic service providers in Kenya have implemented automated transport management system. The respondents rated the implementation on a Likert scale of 1-5 where: “1- Very low extent,

2-Low extent, 3-Moderate extent, 4- Great extent, 5- Very great extent." The recorded mean scores were interpreted using the interpretation scale tabulated in Table 4.5:

Table 4.5: Mean Interpretation Scale

Scale	Interpretation
1.00 - 1.49	Very Low Extent
1.50 - 2.49	Low Extent
2.50 - 3.49	Moderate Extent
3.50 - 4.49	Great Extent
4.50 - 5.00	Very Great Extent

Source: Researcher (2017)

4.5.1 Route Planning and Optimization Systems

The study investigated the degree to which third party logistic service providers in Kenya had implemented Route Planning and Optimization Systems. The results are shown in Table 4.5.1.

Table 4.5.1: Route Planning and Optimization Systems

Component	Mean	Std. Deviation
Routes are optimized to ensure timely delivery	4.79	0.418
Deliveries are done by fewer tracks	4.61	0.497
Enhanced reporting capabilities drive effective decision-making	4.57	0.504
Prompt visibility into delivery status for stores and dispatch	4.54	0.508
Customer surveys can be done after undertaking a delivery	4.39	0.497
Overall Mean	**4.58**	**0.485**

Source: Research Findings (2017)

Third party logistic service providers in Kenya have implemented Route Planning and Optimization Systems to a very great extent as indicated by the overall mean of (*M*=4.58, *SD*= 0.485). The most implemented aspects are that "Routes are optimized to ensure on-time delivery" and that "Fewer trucks handle increasingly more deliveries" with (*M*=4.79,

SD= 0.418) and (*M*=4.61, *SD*= 0.497) respectively. The study also found out that the firms have "Enhanced reporting capabilities drive effective decision-making" to a very great extent (*M*=4.57, *SD*= 0.504) and that they have "Real-time visibility into delivery status for dispatch and stores" to a very great extent (M=4.54, SD= 0.508). The least rated was that "Customer surveys can be done immediately after a delivery" with a mean score of (M=4.39, SD= 0.497). These findings reveal that third party logistic service providers in Kenya have implemented route planning to a very great extent. Previous literature indicates that Route Planning and Optimization Systems can help to optimize the supply chain as a whole rather than focusing solely on transportation (Zamora-Torres, 2013).

4.5.2 Load Optimization Systems

The study examine the degree to which third party logistic service providers in Kenya had implemented Load Optimization Systems. The findings are as indicated in Table 4.5.2.

Table 4.5.2: Load Optimization Systems

Component	Mean	Std. Deviation
The firm aims at minimizing out-of-route miles	4.68	0.476
The firm works on minimizing the miles needed to make deliveries	4.61	0.497
The firm strives to find the cheapest place to get fuel	4.57	0.504
Cost cutting is the key consideration when loading trailers	4.54	0.508
The firm aims at meeting the customer's transit time requirements	4.46	0.508
Stops are sequenced in the most economical way	4.39	0.497
Overall Mean	**4.54**	**0.498**

Source: Research Findings (2017)

An overall mean of (M=4.54, SD= 0.498) indicated that third party logistic service providers in Kenya have implemented Load Optimization Systems to a very great extent.

Toa very great extent, “the firm aims at minimizing out-of-route miles” with an aggregate mean of (M=4.68, SD= 0.476) and that “the firm works on minimizing the miles needed to make deliveries” with a mean of (M=4.61, SD= 0.497). The firms also “strives to find the cheapest place to get fuel” and “cut cost when loading trailers” (M=4.54, SD= 0.498) and (M=4.54, SD= 0.498) respectively. The standard deviations indicate that there was minimal difference in the respondents’ opinions. Literature indicates that while several fleets still combined their load plans by hand with drivers and dispatchers combing through maps and looking up truck stop fuel prices, software is gaining more prominence as the tool that which open a fuller range of money-saving load optimization opportunities for fleets (Hanouz, Geiger & Doherty, 2014). Some experts however argue that load optimization software is not the ideal option for each fleet (Helo, 2011).

4.5.3 Freight Audit and Payment Systems

The study examined the degree to which third party logistic service providers in Kenya had implemented Freight Audit and Payment Systems. The results are as shown in Table 4.5.3.

Table 4.5.3: Freight Audit and Payment Systems

Component	Mean	Std. Deviation
The firm keeps track of electronic invoices as they arrive and log the file ID numbers	4.75	0.441
The firm creates a procedure to deal with duplicate or skipped files	4.71	0.460
The firm keeps track of paper invoices as they arrive, log, stamp, batch and image them	4.64	0.488

The firm asks carriers that send paper bills to use a trackable shipping method	4.61	0.497
The firm has built procedures to trap invoices that do not belong to the company	4.32	0.476
Overall Mean	**4.61**	**0.472**

Source: Research Findings (2017)

Freight Audit and Payment Systems have been implemented by third party logistic service providers in Kenya to a very great extent as shown by the overall mean of (M=4.61, SD= 0.472). "The firms keeps track of electronic invoices as they arrive and log the file ID numbers" to a very great extent (*M*=4.75, *SD*= 0.441). "The firms creates a procedure to deal with duplicate or skipped files" to a very great extent (*M*=4.71, *SD*= 0.460). The study also found out that "The firm keeps track of paper invoices as they arrive, log, stamp, batch and image them" to a very great extent (*M*=4.64, *SD*= 0.488). The least rated was that "The firm has built procedures to trap invoices that do not belong to the company" as shown by a mean of (*M*=4.32, *SD*= 0.476). The respondents had minimal differences in opinions as indicated by low standard deviations.

4.5.4 Yard Management Systems

The study examined the degree to which third party logistic service providers in Kenya had implemented Yard Management Systems. The findings are as shown in Table 4.5.4.

Table 4.5.4: Yard Management Systems

Component	**Mean**	**Std. Deviation**

The firm possesses a radio frequency identification technology in place for faster and more accurate tracking	4.79	0.418
The firm have invested in a software to monitor the movement of trailers and tracks in the yard	4.57	0.504
There is verification that yard jockeys are utilizing the right trailer every time.	4.32	0.476
There is instant identification and reconciliation of vehicles and loads as they arrive at the gate.	4.25	0.441
The firm has temporary RFID tags issued for non-owned assets to enable easy tracking of all non-owned assets.	4.21	0.418
A wireless LAN, allows for real-time communications across the yard.	4.14	0.448
Overall Mean	**4.38**	**0.451**

Source: Research Findings (2017)

Third party logistic service providers in Kenya have implemented Yard Management Systems to a great extent as shown by the overall mean of (*M*=4.38, *SD*= 0.451). "The firm have radio frequency identification (RFID) technology built in for faster and more accurate tracking" to a very great extent (*M*=4.79, *SD*= 0.418). Further, "The firms have invested in a software to oversee the movement of trucks and trailers in the yard" to a very great extent (*M*=4.57, *SD*= 0.504). The least rated was that "A wireless LAN, enabling real-time communications from anywhere in the yard is available" with a mean of (M=4.14, SD= 0.448). This shows that it was rated to a great extent. The low standard deviations that were

recorded indicated that minimal differences in opinions among the respondents. YMS is commonly used together with the transportation management systems (TMS) and the warehouse management systems (WMS). It could also exhibit an RFID technology more accurate and faster tracking (Axsater, 2006).

4.5.5 Order Visibility Systems

The study examined the degree to which third party logistic service providers in Kenya had implemented Order Visibility Systems. The findings are as shown in Table 4.5.5.

Table 4.5.5: Order Visibility Systems

Component	Mean	Std. Deviation
The firm employs technology that enables them to forecast demand and supply	4.79	0.418
The organization fosters collaboration with trading partners to enhance visibility responsive to customer trends	4.75	0.518
The firm employs technology that provides data in a quick, effective view that is relevant to specific users.	4.39	0.497
The firm has centralized data to ensure that partners in the supply chain has a common view of the truth	4.07	0.466
Overall Mean	**4.50**	**0.475**

Source: Research Findings (2017)

An overall mean of (M=4.50, SD= 0.475) indicated that third party logistic service providers in Kenya have implemented Order Visibility Systems to a very great extent. To

a very great extent, "the firms employ technology that enables them to forecast demand and supply" with a mean of (M=4.79, SD= 0.418). "The organization fosters collaboration with trading partners to enhance visibility responsive to customer trends" to a very great extent (M=4.75, SD= 0.418). "The firms have centralized data to ensure that partners in the supply chain has a common view of the truth" was the least rated statement (M=4.07, SD= 0.466). This indicates it was rated to a great extent. The respondents had minimal differences in opinions as shown by low standard deviations. The low standard deviations indicated that the respondents had little differences in opinions.

4.6 Logistics Optimization Extent

The study further sought establish the degree to which the respondents agreed that automated transport management system has influenced logistical optimization of third party logistics firms in Kenya. The recorded mean scores were interpreted using the following scale: 4.50 - 5.00 = Strongly Agree, 3.50 - 4.49 = Agree; 2.50 - 3.49 = Undecided; 1.50 - 2.49 = Disagree; 1.00 - 1.49 = strongly Disagree; the results are as shown in Table 4.6.

Table 4.6: Logistics Optimization Extent

Parameter	Mean	Std. Deviation
Cost reduction	4.86	0.356
Efficiency of asset utilization	4.82	0.390
Responsiveness	4.79	0.418
Service delivery	4.75	0.441
Customer satisfaction	4.71	0.460
Productivity	4.68	0.476
Flexibility	4.64	0.621
Overall Mean	**4.75**	**0.452**

Source: Research Findings (2017)

The respondents strongly agreed that automated transport management system has influenced logistical optimization of third party logistics firms in Kenya as evidenced by an overall mean of (M=4.75, SD= 0.452). Logistical optimization indicators were all rated to a very great extent. These are: Cost reduction (M=4.86, SD= 0.356), Efficiency of asset utilization (M=4.82, SD= 0.3.90) and Responsiveness (M=4.79, SD= 0.418). The least rated were Productivity (M=4.68, SD= 0.476) and Flexibility (M=4.64, SD= 0.621).

4.7 Logistics Optimization

Lastly, the study sought to know the level of logistical optimization indicators following the implementation of automated transport management system among third party logistics firms in Kenya. The recorded mean scores were interpreted using the following scale: 1.00 to1.49 = greatly reduced; 1.50 to 2.49 = Reduced; 2.50 to 3.49 = Constant; 3.50 to 4.49 = Improved; 4.50 to 5.00 = greatly improved. The findings are indicated in Table 4.7.

Table 4.6: Logistics Optimization

Parameter	Mean	Std. Deviation
Cost reduction	4.82	0.390
Efficiency of asset utilization	4.75	0.518
Responsiveness	4.71	0.460
Service delivery	4.68	0.548
Customer satisfaction	4.64	0.559
Productivity	4.61	0.497
Flexibility	4.57	0.634
Overall Mean	**4.68**	**0.515**

Source: Research Findings (2017)

The study found out that logistical optimization has greatly improved (M=4.68, SD= 0.634) following implementation of automated transport management system as evidenced by the overall mean. All the indicators were rated to have greatly improved. The most improved indicators were: Cost reduction (M=4.82, SD= 0.390), Efficiency of asset utilization (M=4.75, SD= 0.518) and Responsiveness (M=4.71, SD= 0.460). The least rated indicators were: Productivity (M=61, SD= 0.497) and Flexibility (M=4.57, SD= 0.634). Logistics optimization leads to increased value for a firm and increases the market share of a firm (Mentzer, Flint & Hunt, 2001). Also, logistics has been found to increase customer value and increase the value of firm output, which is derived from the ability provide delivery solutions and cut costs as per the customer needs of the customers (Stank, Daugherty & El linger, 1998).

4.8 Multiple Regression Analysis

The research sought to find out the effect of automated transport management system on the logistical optimization of third party logistics service providers in Kenya. The components of automated transport management system were: Order Visibility, Yard Management, Freight Audit and Payment, Load optimization, Route planning & optimization. Automated transport management system components were regressed against logistical optimization. The results regression findings are discussed below.

4.8.1 Model Summary

The model summary indicates the magnitude of the relationship between automated transport management system and logistical optimization for third party logistics service providers in Kenya. The findings are as indicated in the Tables 4.8.1.

Table 4.8.1 Model Summary

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.835[a]	.697	.628	.19376
a. Predictors: (Constant), Order Visibility, Yard Management, Freight Audit and Payment, Load optimization, Route planning & optimization				

Source: Research Findings (2017).

The study found out that there was strong relationship (R= 0.835) between automated transport management system and logistical optimization. Further, the study found out that automated transport management accounts for 62.8% of the total variance in logistical optimization as evidenced by an adjusted R-Square value of 0.628.

4.8.2 Analysis of Variance

The study further ascertained the reliability of the regression model in establishing the relationship between automated transport management system and logistical optimization using ANOVA. The results are as shown in Table 4.8.2.

Table 4.8.2 Analysis of Variance (ANOVA[a])

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.431	5	.086	3.739	.0133[b]
	Residual	.526	22	.023		

	Total	0.957	27			
a. Dependent Variable: Logistical Optimization						
b. Predictors: (Constant), Order Visibility, Yard Management, Freight Audit and Payment, Load optimization, Route planning & optimization						

Source: Research Findings (2017)

ANOVA recorded a p-value of 0.0133 which implies that the regression model had a significance level of 1.33%. Since this value is less than the threshold value of 0.05, it can be concluded that the regression model has goodness of fit and consequently reliable in establishing the relationship between automated transport management system and logistical optimization third party logistics service providers in Kenya.

4.8.3 Coefficients of Determination

The study further sought to know how individual components of automated transport management system affect logistical optimization of third party logistics service providers in Kenya. Regression coefficients of determination were computed and the results are as shown Table 4.8.3.

Table 4.8.3: Coefficients of Determination

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	4.977	0.801		6.213	.000

Route planning & optimization	.261	.078	.260	3.346	.003
Load optimization	.295	.095	.202	3.105	.005
Freight Audit and Payment	.309	.101	.340	3.059	.006
Yard Management	.165	.037	.153	4.459	.000
Order Visibility	.259	.078	.351	3.320	.003
a. Dependent Variable: Logistical Optimization					

Source: Research Findings (2017).

The coefficients of determination above reveals that at 95% confidence level all the components of automated transport management system had a positive and significant effect on the logistical optimization of the third party logistics service providers in Kenya. This is demonstrated by the high t-values and p-values < 0.05. The values recorded are as follows: Route planning & optimization (t= 3.346, p= 0.003), Load optimization (t= 3.105, p= 0.005), Freight Audit and Payment (t= 3.059, p= 0.006), Yard Management (t= 4.459, p= 0.000) and Order Visibility (t= 3.320, p= 0.003).

The following regression equation was derived:

$Y = 4.977 + 0.261X_1 + 0.295X_2 + 0.309X_3 + 0.165X_4 + 0.259X_5$

Where:

Y – Automated Transport Management System (the dependent variable)

X_1- Route planning & optimization

X_2- Load optimization

X_3- Freight Audit and Payment

X_4- Yard Management

X_5- Order Visibility

If Automated Transport Management System was absent among third party logistics service providers in Kenya, their logistical optimization would be a paltry 4.977. A unit increase in Route planning & optimization, Load optimization and Freight Audit and Payment would improve logistical optimization of the firms by 0.261, 0.295 and 0.309 respectively. A unit increase in Yard Management and Order Visibility would improve in logistical optimization by 0.165 and 0.259 respectively. In order to derive the regression equation, extraneous error term was assumed to be zero.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter gives a summary, conclusion and the study's recommendations. The chapter also presents recommendations for practice and policy as well as suggestions for further research. The objective of the study was to explore the effect of Automated Transport Management System on logistical optimization among third party logistics service providers in Kenya

5.2 Summary of Findings

The primary data was collected from the operational staffs that are well conversant with third party logistic service providers operations. Descriptive statistics such as means and standard deviations were used to analyse the data. The results were presented in form of figures and frequency tables. The correlation between automated transport management system (route planning & optimization, freight audit and payment, load optimization, order visibility and yard management) and logistics optimization was tested using regression analysis.

The study established that third party logistic service providers in Kenya have implemented Route Planning and Optimization Systems, Load Optimization Systems, Freight Audit and Payment Systems and Order Visibility Systems to a very great extent. However, Yard Management Systems was established to a great extent. It was also noted from the study that logistical optimization of third party logistic service providers in Kenya has greatly

improved due to implementation of automated transport management system The most improved indicators of logistical optimization were: Cost reduction, Efficiency of asset utilization and Responsiveness while the least rated indicators were Productivity and Flexibility. However, the two were also rated to have improved to a great extent.

Regression analysis established that there was strong relationship (R= 0.835) between automated transport management system and logistical optimization automated transport management accounting for 62.8% of the total variance in logistical optimization of third party logistic service providers in Kenya. Further, the study found out that components of automated transport management system (route planning & optimization, load optimization, freight audit and payment, yard management and order visibility) have a positive and significant effect logistical optimization of third party logistic service providers in Kenya

5.3 Conclusion

The study concludes that third party logistic service providers in Kenya have implemented Route Planning and Optimization Systems, Load Optimization Systems, Freight Audit and Payment Systems and Order Visibility Systems to a very great extent while Yard Management Systems has been implemented to a great extent and this has greatly improved their logistical optimization.

The study also concludes that there was strong relationship between automated transport management system and logistical optimization with automated transport management accounting for 62.8% of the total changes in logistical optimization of third party logistic service providers in Kenya.

Further, the study concludes route planning and optimization, freight audit and payment, load optimization, order visibility and yard management have a positive and significant effect logistical optimization of third party logistic service providers in Kenya

5.4 Policy Recommendations

The study found out that third party logistic service providers in Kenya have implemented Route Planning and Optimization Systems, Load Optimization Systems, Freight Audit and Payment Systems and Order Visibility Systems to a very great extent and this has improved logistical optimization. This study therefore recommends that third party logistic service providers in Kenya that have not yet adopted automated transport management system should do so as this greatly improve their logistical optimization.

5.5 Limitations of the Study

Third party logistic service providers' information is considered confidential and sometimes proprietary. As a result, most firms were not very willing to divulge it for fear that it might leak to competitor or be used to tarnish the corporate image of the firm. However, the researcher convinced them that the data was sought to fulfill academic requirements and that it would be treated with utmost confidentiality.

Further, the researcher didn't have control over the accuracy of the data provided by the respondents in regard to the effect of automated transport management system on logistical optimization of third party logistic service providers in Kenya. However, the respondent had an opportunity to verify any information that looked biased.

5.6 Suggestions for Further Research

The study narrowed its scope to the effect of automated transport management system on logistical optimization of third party logistic service providers in Kenya. In future, a similar study should be conducted among different types of firms to compare how automated transport management system affects firm operational performance.

Further, the study found out that automated transport management accounted for 62.8% of the total changes in logistical optimization of third party logistic service providers in Kenya. In future, studies should be conducted to establish the other key factors that account for the remaining 37.2% of the changes if logistical optimization.

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APPENDICES

Appendix I: Questionnaire

This questionnaire seeks to collect information on the effect of automated transport management system on logistics optimization among third party service providers in Kenya. The information will only be utilized for academic purposes and confidentiality preserved.

Instructions

1. Tick appropriately in the box or fill in the space provided.

2. Feel free to give further relevant information to the research.

PART A: BIOGRAPHIC INFORMATION

1. The name of your organization

……

2. Your management level in the organization

Senior Level Management ☐

Middle Level Management ☐

Lower Level Management ☐

3. How long have you worked with the organization?

Below 5 years ☐

5 to 10 years ☐

Above 10 years ☐

4. Which department do you work in the organization? ……..

PART B: TO WHAT EXTENT ARE THE FOLLOWING AUTOMATED TRANSPORT MANAGEMENT SYSTEMS IMPLEMENTED IN YOUR ORGANIZATION

Use 1- Very low extent, 2-Low extent, 3-Moderate extent, 4- Great extent, 5- Very great extent

Route Planning and Optimization Systems

Component	**1**	**2**	**3**	**4**	**5**
Routes are optimized to ensure on-time delivery					
Fewer trucks handle increasingly more deliveries					
Real-time visibility into delivery status for dispatch and stores					
Customer surveys can be done immediately after a delivery is made					

Enhanced reporting capabilities drive effective decision-making					

Load Optimization Systems

Component	**1**	**2**	**3**	**4**	**5**
Cost cutting is the key consideration when loading trailers					
Stops are sequenced in the most economical way					
The firm works on minimizing the miles needed to make deliveries					
The firm strives to find the cheapest place to get fuel					
The firm aims at minimizing out-of-route miles					
The firm aims at meeting the customer's transit time requirements					

Freight Audit and Payment Systems

Component	**1**	**2**	**3**	**4**	**5**
The firm keeps track of paper invoices as they arrive, log, stamp, batch and image them					
The firm asks carriers that send paper bills to use a trackable shipping method					
The firm keeps track of electronic invoices as they arrive and log the file ID numbers					
The firm creates a procedure to deal with duplicate or skipped files					
The firm has built procedures to trap invoices that do not belong to the company					

Yard Management Systems

Component	**1**	**2**	**3**	**4**	**5**
The firm have invested in a software to monitoring the movement of trailers and tracks within the yard					
The firm has radio frequency RFID technology in place in easy tracking					
There is immediate identification and reconciliation of loads and vehicles as they enter the gate.					
It is verified whether the yard jockeys are picking up the right trailer at every instance.					
There is wireless LAN enabling real-time communications from anywhere in the yard.					

Order Visibility Systems

Component	**1**	**2**	**3**	**4**	**5**
The organization fosters collaboration with trading partners to enhance visibility responsive to customer trends					
The firm has centralized data to ensure that partners in the supply chain has a common view of the truth					
The firm employs technology that provides data in a quick, effective view that is relevant to specific users.					
The firm employs technology that enables them to forecast demand and supply					

PART C: AUTOMATED TRANSPORT MANAGEMENT SYSTEMS AND LOGISTICS OPTIMIZATION

a) Below are some logistical optimization indicators, indicate using a tick (√) to what extent do you agree that automated transport management system has influenced logistical optimization of third party logistics firms in Kenya. Rate using a scale of 1-5, where: 1 strongly disagree, 2 Disagree, 3 neither agree nor disagree, 4 agree, 5 strongly agree

Performance Indicator	**Strongly agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
	5	**4**	**3**	**2**	**1**
Cost reduction					
Responsiveness					
Flexibility					
Service delivery					
Productivity					
Customer satisfaction					
Efficiency of asset utilization					
Other (specify)					

b) In your own opinion how would you rate logistical optimization indicators below before and after implementing some automated transport management system in the firm?

Performance Indicator	**Greatly improved**	**Improved**	**Constant**	**Reduced**	**Greatly reduced**
	5	**4**	**3**	**2**	**1**
Cost reduction					
Responsiveness					
Flexibility					
Service delivery					
Productivity					
Customer satisfaction					
Efficiency of asset utilization					
Other (specify)					

Thank you for your co-operation

Appendix II: List of Third Party Logistic Service Providers Selected for the Study

1. AFRI LOG LTD
2. AIRCOM CARGO LOGISTICS LTD
3. DHL EXEL SUPPLY CHAIN (K) LTD
4. FOX INTERNATIONAL LOGISTICS LTD
5. GATES LOGISTICS
6. GLOBAL OUTSOURCING
7. MARA MOJA
8. MONDO RIDE
9. PEWIN CABS
10. SKYLAND LOGISTICS LTD
11. TAXIFY
12. TIANSHI K TRADING & LOGISTICS CO LTD
13. UBER
14. WISEWAY LOGISTICS LTD
15. WORLD CARGO LOGISTICS LT