

**THE EFFECTS OF MOBILE PHONE TECHNOLOGY ON
LOGISTICS PERFORMANCE OF CLEARING AND FORWARDING
FIRMS IN MOMBASA COUNTY**

**BY
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DECLARATION

This research project is my original work and has never been presented in any other university or college for an award of degree, diploma or certificate.

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

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DEDICATION

I dedicate my theses and special feeling of gratitude to my wife Fatma Mohamed Abubakar and my family members Wazir Abbas, Afifa Abbas and Khadija Abbas for their encouragement, guidance and support from the initial to the final level of my study.

I extend my sincere gratitude to my Parents Afifa Alamin and Mr Wazir Abbas who were always praying for me and always stood beside me and gave me both social and psychological support.

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Last but not the least I place a deep sense of gratitude to my friends and relatives who have been constant source of inspiration during the preparation of this project work.

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ABBREVIATIONS AND ACRONYMS

EDI:	Electronic Data Interchange
EOS:	Electronic Ordering System
ERP:	Enterprise Resource planning
GPRS:	General Packet Radio Service (GPRS)
ICT:	Information and Communications Technologies
PEOU:	Perceived ease-of-use
POS:	Point Of Sales systems
PU:	Perceived usefulness
RFID:	Radio Frequency Identification
TAM:	Technology Acceptance Model
VAN:	Value Added Network
WI-FI:	Wireless Internet Wireless Fidelity
NFC:	Near Field Communication
GPRS:	General Package Radio Service.

ABSTRACT

Mobile phone technology and the use of wireless technologies such as Radio Frequency Identification (RFID) and sensors are becoming ubiquitous in logistics firms performance. From the management of inventory movement within a warehouse to providing real-time status updates, it is becoming a requirement to use mobile phone technology to meet customer service expectations and raise the productivity of the workforce. The studies main objective was to analyze the impact of mobile phone technology on logistics performance in clearing and forwarding companies in Mombasa county. The study adapted a descriptive cross sectional research design which was exploratory in nature to obtain qualitative information. The target population was 535 clearing agents registered in Mombasa County. A questionnaire was the preferred instrument for data collection. The researcher gave out 269 questionnaires and received 180 for analysis representing 67% response rate which was considered adequate. Analysis of data is by the help of SPSS and it brought out the relationship between mobile phone technology and logistics performance. The findings revealed that mobile phone technology variables considered in this study namely flow of information, logistics integration, fleet management system and warehouse and inventory management had a positive relationship with logistics performance. The relationship was significant at 95% confidence ($p < 0.05$) for all the four independent variables. This shows that they are important factors affecting logistics performance albeit at varying degrees. Furthermore, the study found out that mobile phone technology has been adopted to a moderate extent. Also, mobile phone technology impacts logistics performance to a large extent. More importantly, information analysis and warehouse and inventory management were found to have a strong positive correlation with logistics performance while logistics integration and fleet management system had a weak relationship with logistics performance. The study therefore recommends that the firms should increase mobile phone adoption and make use of various fictions on offer in order to gain competitive advantage.

CHAPTER ONE: INTRODUCTION

1.1 Background to the Study

Mobile phone and wireless technologies use for example Radio Frequency Identification (RFID), sensors and others are becoming universal in managing logistics firms (Weil, 2013; Robinson, 2015). From inventory management within a warehouse to providing real-time status updates, it is becoming imperative to use mobile phone technology in addressing expectations of customer service and promoting workforce productivity. Firms that are not willing to adopt mobile phone technologies could as well find themselves lagging behind in the competition curve. As a matter of fact, users of mobile phones have high expectations about the gadgets addressing future challenges. Users of mobile phones including firms' pals to use it in understanding patterns of demand, reduce risks and complexities in supply chain and raise perfect-order rates. Firms in the logistics industry are not an exception in using mobile phone technology to enhance efficiency in operations, manage transit time, manage customer and suppliers relationships, be responsive and enhance communication (Fugate, Mentzer & Stank, 2010; Robb, Xie & Arthanari, 2008). Hence, the main task of clearing and forwarding firms is to bring together the three logistics performance constructs concurrently and encourage innovation by adapting mobile phone technology. In this context, Fugate et al. (2010) observed that logistics excellence is linked to enhanced organizational performance.

Certain theories have been employed in examining adoption technology. Technology Acceptance Model (TAM) which originated from Davies in 1986 is more profound (Bertrand & Bouchard, 2008). This model helps to predict acceptance by users of technology and usage in terms of technology perceived usefulness. Hence, TAM deals with users' perceptions and not real usage. This model shows that when people are presented with latest technology, the decision to make use of it is determined by factors like perceived usefulness and perceived

ease of use (Davis, 1989; Bertrand & Bouchard, 2008). Task Fit Technology theory is another theory which says that technology will by high chances have a positive impact on task done by individual and organizational performance will be readily accepted (Goodhue & Thompson, 1995; Irick, 2008; Furneaux, 2012). Lastly, Resource Advantage Theory of competition poses a challenge to practitioners and managers to engage in competition based on developing 'resource-advantage.' Resources unique to a firm are what enhance its competitive advantage over competitors (O'Keefe, Mavondo & Schroder, 1998; Hunt, 1997; Griffith & Yalcinkaya, 2010).

As far as clearing and forwarding is concerned, Mobile technology is linked not only the Kenya Ports Authority (KPA), Customs Authority, shipping agents but also the freight forwarding agents operating in Kenya. KPA's strategic objective is to transform the Mombasa port into a paperless Electronic Port. They introduced the Waterfront Automated Terminal Operating System (KWATOS), financial system called biller Direct portal. This KWATOS is interlinked with customs Authority SIMBA system and Shipping line cargo manifest and EDI systems. Cargo releases can be done through electronic data Interchnage (EDI) and Bills of ladings (BL) can be submitted electronically and reduce the need to courier original BL. Mobile technology has made this journey a success and efficient movement of cargo across the region.

1.1.1 Mobile Phone Technology

Mobile phone technology is often looked at as a subset and successor of electronic business (Link, 2003). Mobile phone technology in practice is often analyzed as an alternative to desktop computer in carrying out business operations through a wireless network. Unlike a desktop, mobile phones have additional benefits and possibilities unique to wireless world which may not be performed using fixed networks. Thus, mobile phone technology is the

exchange of services and goods with the help of mobile phone devices (Zhang, Yuan & Archer, 2003; Link, 2003). Because of the nature of the environment, most firms in the logistics sector are making use of ruggedized or commercial-grade and multipurpose mobile devices they allow efficiency in managing supply chains. They also allow managers to work remotely from any location. Some of the technologies that can be used together with mobile phones are: inbuilt cameras, tablets, handheld computers, label printers and barcode, scanners, RFID tags and network device can be shared. Since the technology is both wireless and mobile they allow utmost flexibility (Robinson, 2015). Presently, mobile devices are still advancing in terms of Whatsapp, messaging services, emailing, General Packet Radio Service (GPRS) tracking, transfer of money, phones that are wireless fidelity (WI-FI) enabled, blue tooth, Mobile banking, Electronic Data Interchange (EDI) technology, software applications available and many other features which have been particularly significant for enhancing services within logistics sector especially within the clearing and forwarding fraternity.

Mobile phones have been and will always be an indispensable and not unavoidably for making calls or sending text messages but also for social interactions/networking, shopping, tracking, managing businesses among other uses (Lin, 2006). In 2010 for example, smartphone usage stands at 20% and went up to 71.7% the year 2015 and is anticipated to become 80.9% the year 2017 (Robinson, 2016). This indicates increase in smartphone usage by practitioners. Mobile phone technology solutions are applicable in every part of the supply chain. They are an important aspect in many warehouse environments mostly directed picking applications. In logistics and transport sector, mobile phone technology has been predominantly important for accelerated carriers parcels that use the technology to enhance customer service and enhance operations continually. Motor carriers and private fleets make use of mobile gadgets to track shipments and collecting data on performance of drivers. Internet and mobile phone have brought about interactivity where firms using mobile

applications and technologies not just for relaying information, but also for cooperation across various chains of supply (Robinson, 2015; Lin, 2006).

This connectivity gives rise to significant competences and asset utilization maximization (Robinson, 2015). Second, capturing data and analyzing it allows companies to take advantage of the gathered data by mobile phone solutions for analytics which allows operations optimization on an ongoing basis. A good example is the shipping firms who have managed to apply mobile phone devices for remote operations management and daily activities impact assessment. Data analytics can be used for route management optimization, managing or checking fuel efficiency and others. Thus mobile phone computing technology gives such shippers a competitive advantage over the companies that have not made use of mobile phone technology. Mobile phone tools are important for collecting data from the field for example various manufacturing or warehouse facilities. These data can be used by companies for forecasting and predicting activities including their potential impact on the supply chain (Yoshimoto & Nemotom, 2005; Lin, 2006).

1.1.2 Logistics Performance

Logistics goes beyond functions that relate to movement of goods physically and includes suppliers and customers' relationship management. Nevertheless, logistics management is a way in which customer needs are met through integrating and coordinating of the supply chain activities. Hence logistics means moving goods from one point to another in a seamless manner while minimizing or doing away with inefficiencies. Logistics management is the foundation of supply chain activities (Schroeder, Pennington-Gray; Donohoe, 2013)

Overall, logistics performance involves satisfying customer needs, reducing transit time, minimizing of reducing costs, product/service differentiation and managing customer or supplier relationships. Bhagwat and Sharma (2009) observe that analyzing performance of

logistics is one of the main challenges companies face in today's ever changing business landscape. Other challenges include, strategic partnerships, customer service, management of logistics flow, inventory management, cycle times reduction, flexibility along with geographical coverage (Lin, 2006). Building on past studies such as Zykov (2006), Smith (2012) and Bowersox and Closs (1996), this study comes up with a logistics performance model based on mobile phone technology constructs.

Logistics has become the backbone in everyday business and is turning out to be a key differentiator in most markets in order to address customer needs (Bowersox & Closs 1996; Gunaseakaran & Ngail, 2003). Due to high competition, there is increased pressure to bring about products and services diversity and to function with reduced prices as a focal point. Logistics managers can succeed in managing these aspects which end up as a strategic tool for value-creation (Melnyk, Narasimhan & DeCampos, 2014).

Analyzing logistics performance is one of the main challenges faced by firm in this era (Bhagwat & Sharma, 2009). Other challenges are forming and managing strategic partnerships, cycle time reduction, customer service, managing inventory and logistics flow among others (Lin, 2006). These challenges arise majorly from the manufacture systems decentralization, basic skill development done by leading companies and the requirement of implementing effective and efficient logistics management tasks. As observed by (Neuman, 2006) and Poter, E. M (1985), analysis of logistics performance is a present trend, involving planning and monitoring so that connections can be established between the outcomes of the pointers and the organization, also the determination of how well firms reach their tactical goals as part of gaining competitive advantage.

Fugate et al. (2010) showed that logistics performance has various dimensions and depends on the resources employed in logistics in line with the objectives and results against other players. The authors observed that logistics performance analysis should be founded on evaluating a set of dimensions of tasks carried out by the logistics such as differentiation, effectiveness and efficiency. According to Fugate et al. (2010), the dimension of efficiency relates to how well a resource allocated to the logistic function is put into use, effectiveness is the extent to which organization objectives are attained and differentiation relates to value created by customer service elements compared to competitors.

The better the quality of the human resource in logistics joint work, preparation and implementing solutions to requests from customers, the lower will be the levels of redundancy, fights and the grievances lodged by customer. This will in turn lead to high level of efficiency as a result of faster response, reduction in wastes and capital invested, and thus higher efficiency in logistics and high chances of meeting targets and deadlines (Robb D, Xie B & Arthanari T, 2008).

1.1.3 Mobile Phone Technology and Logistics Performance

In assessing penetration of wireless and mobile penetration across various sectors, McCrea (2013) observes that logistics and transportation markets stand out as the segments that have invested in solutions and equipment consistently. The solutions and equipment are used in equipping delivery drivers with ruggedized devices, tracking inventory with hand held devices, use of mobile phones to monitor temperature of refrigerated goods among other uses. Present logistics professionals have developed an understanding and began to appreciate the value of wireless world in conducting business (Brogan, 2010). This is making the logistics industry to move closer to being a completely real-time and wireless supply chain. In addition, it is also assisting firms to work better, smarter and faster in a business environment that is increasingly competitive (Feng & Yuan, 2003).

As logistics and transportation executives look for new ways to compete in challenging markets, optimization of supply chains is being done through mobile technologies. It is not surprising that monitoring operations in the actual time brings about visibility of fine tuning them from storeroom to dock then to transportation and eventually delivery to clients (McCrea, 2013). Thus, mobile phone know-hows enable exporters and retailers to drive interaction near to clients which provide a huge advantage in understanding the market. Although information technology has been known to be limited solely to computers this may not be the case in the present era. Technologies are quickly emerging in the areas of mobile handsets, PDAs and other portable devices with IT field moving faster from classified computer-focused parts to other forms of portable technologies (McCrea, 2013; Robinson, 2015).

Overall, managers have come to the realization that mobile phones and handheld devices can assist in making logistics decision through provision of information faster or in real-time and at the same time ease the partnership between trading partners (Giménez & Lourenço, 2004). Most firms have the point-of-sales scanners in use, which can read what is sold. These firms can gather information in actual-time which helps in decision making about what and when to order or how to replenish the warehouse; sending the details through the email network to their suppliers in order to make them synchronize their manufacturing to actual sales (Giménez & Lourenço, 2004).

1.1.4 Clearing and Forwarding Sector

There were about 824 licensed and registered customs clearing agents by 2015 and they will form the population of the study. Kenya International Warehousing and Freight Association (KIFWA) is the sole representative of all freight and forwarding companies in Kenya formed in the 1996. The formation of KIFWA was because of the need to form one National body

which is cohesive enough to represent the interests of all its members. Clearing and forwarding involve clearing cargoes from port of Mombasa or containers freight stations to customers who are either within Kenya or East and central Africa countries. Improving the Countries logistics and infrastructure to the level of middle-income countries could boost yearly growth by greater than three percentage (KIFWA, May- Aug 2016). Kenya being the main point of entry into the East Africa, development of infrastructure is the main priority for the political and geo-economic agenda, and investments will have huge potential development impact (Ndonye, 2014).

The special challenges that firms in this industry face are: information flow; increase in waste in the logistics chain; fleet management; logistics integration; pilferage/theft; demand forecasting; poor communication/poor customer support worldwide; operational inefficiencies; providing a link between all key stakeholders; increased cycle times; tracking an aggregated bulk consignment in a container (visibility between shipping customer and haulier); redundant processes; costly marketing; optimization of warehouse space and manual processes (Roger, 2003).

1.2 Research Problem

Mobile phone technology application in managing logistics is relatively a new concept, it allows online information flow, communication and electronic exchange of data through the whole operation chain to become realistic time and cost effective (Car, Pilepic & Šimunic, 2014; Partridge, 2011). Most scholars, practitioners and policy makers agree that mobile phone technology is of value to managing logistics, however, the numerous effects and applications are not understood. It is important to understand that information technology has been made accessible for firms in transport, manufacturing and transport logistics organisations.

Relaying information seamlessly to all trade partners in the distribution chain through automation enhances performance (Disney & Naim, 2004; Lai, Ngai & Cheng, 2005; Ndonge, 2014). Automation development and application of logistics in the firms operation already had greater effects on many sectors specifically in the transportation industry. Ballou (2004) in a study on the Northern Corridor efficiency showed that the transport costs in East and Central Africa is almost 42% of the imports compared to 22% of what is targeted in the industry. This makes the region to have the highest cost of transportation in the globe. Besides the direct cost of transportation, there are various, time consuming and complex transactions at border stations and ports that contributes to high cost of logistics costs in East Africa region (USAID, 2011).

Some challenges experienced by transport and logistics firms in Mombasa County are efficiency of procedures and lack of utilizing of mobile phone technology in logistics. Improving on logistics performance is an important policy objective for firms operating in the sector including policy makers (Roth, Cattani & Froehle, 2008). Focus should be put on the performance of inland, customs, trade related infrastructure and transit logistics service provision, air and sea port efficiency, and the utilization of technology for timely trade in goods at low costs. Industry demands logistics solutions that can handle external pressures from the public, customers, governments, competition and the supply chain itself. There should be options for users to choose between modes, operators and routes (Kenya Shippers Council, 2014).

It is against this background that the debate on whether or not adopting mobile phone technology enhances logistics performance. Clearing and forwarding companies in Mombasa county and country at large must continuously establish ways to add value to customers by minimizing costs. Locally, studies have been done on logistics performance but focus on

Information Technology as a whole. For example, Ndonge (2014) in a study on Information Technology influence performance of logistics in cargo transportation, Kenya found out that the latter is impacted positively and significantly by the former. Kenya Shipper Council (2014) did a study on the effects of IT on performance of logistics firms in Nairobi County. Data collected from ten firms revealed that 50% of the companies are applying IT in their operation division and service delivering which indicate a low level of IT usage among logistic companies in Nairobi County. A study by Kithia (2015) revealed that e-logistics has a positive effect on the performance of the organisation and logistic firms are therefore encouraged to invest and adopt it in order to be more competitive in the market.

On this literature it shows almost little study which has been done on the effect of mobile phone technology on the performance of clearing and forwarding firms in Mombasa County. Nevertheless, the literature that is available has shown little about the direct effect of IT on the service delivery on the logistic companies. Many research which were done concentrated on the effects of IT on firms general and logistics performance. This paper tends to explore more on the effects of mobile phone technology on logistics performance by answering the following questions to what extent is mobile phone technology being used in the operations of clearing and forwarding firms? What is the effect of mobile phone technology on logistics performance? What factors hinder adoption of mobile phone technology among Clearing and Forwarding firms? This paper asks the following questions, to what extent is mobile phone technology being used in the operations of logistics firms? What is the effect of mobile phone technology on logistics performance? What factors hinder adoption of mobile phone technology among Clearing and Forwarding firms?

1.3 Research Objectives

The purpose of this study will be to analyze the impact of mobile phone technology on logistics performance. The specific objectives are:

- i. To establish the extent to which mobile phone technology are being used in the operations of clearing and forwarding firms in Mombasa County.
- ii. To determine the effect of mobile phone technology adoption on logistics performance of clearing and forwarding firms in Mombasa County.
- iii. To identify the factors hindering adoption of mobile phone technology in Clearing and forwarding firms in Mombasa county

1.4 Value of the Study

On the part of academicians, there is gap in the past literature on the use of mobile phone and how the same can be developed to benefit both clients and organisations. The studies done have concentrated mostly on the overall e-commerce platforms. Especially the use of computers forgetting that most people use their handset a lot. In essence, the handsets carry other like contacts; user diaries, messaging services, receiving emails, WIFI, internet compliant etc. which make people to shun its use for transactions. The dearth of literature on the benefits of mobile phones and internet gives this study impetus.

Also the policy makers would infer from the study on company initiatives especially the clearing and forwarding firms in making use of mobile phone and internet technology to enhance efficiency. The study will enable the policy makers to be aware of the effects of in efficiencies on performance on companies which will assist is setting policies which will accelerate the rate of growth in the transport and logistics through ICT.

On the practitioners perspective, mobile phone has helped to move products to consumers and it is an emerging trend. Some organisations have used mobile phones but many still

reluctant about it. Even clients are confused as to either continue using their traditional procedure or shift fully to mobile phone technology in doing their purchases. This study fills in this gap by trying to show whether mobile phone and internet technologies is applicable to logistics firms.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter looks at theoretical framework, and then analyzes the concepts of logistics management and performance including the relationship between mobile phone and internet technology on logistics management. This is followed by empirical evidence, conceptual framework and the chapter finalizes with a research gap.

2.2 Theoretical Foundation of the Study

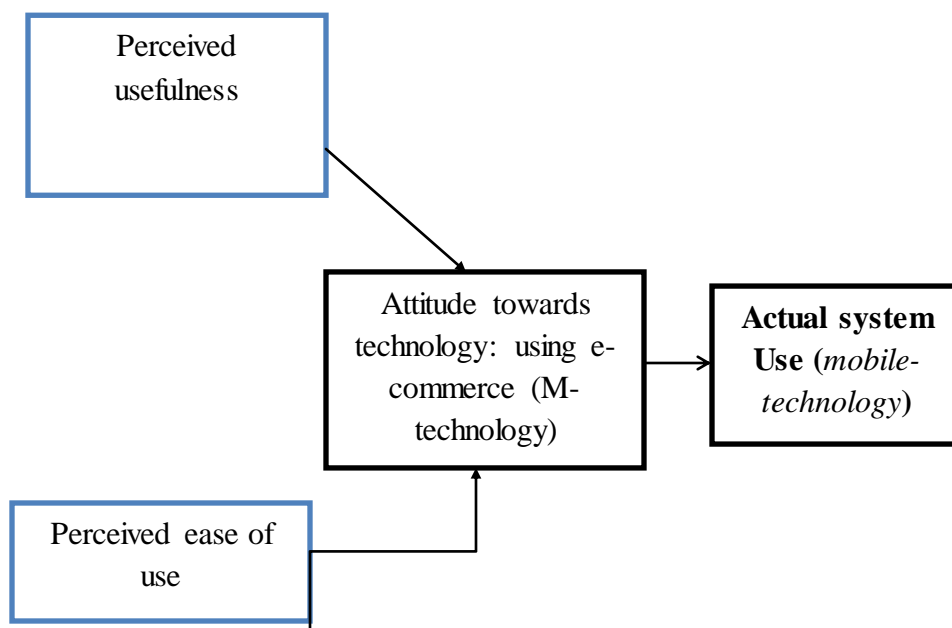
The debate on the mobile phone technology and its effect on logistics management and performance can be discussed in light of three theories in the subject area namely: Resource Advantage Theory of Competition, Technology acceptance model (TAM) and Task Technology Fit theory.

2.2.1 Resource Advantage Theory of Competition

This theory offers a challenge to practitioners and managers to look at competition based on what develops as 'resource-advantage.' Resources in an organization should be seen as unique, imperfectly mobile and heterogeneous (Hunt, 1997; O'Keefe, Mavondo & Schroder, 1998; Griffith & Yalcinkaya, 2010). According to Resource Advantage theory, a company should develop the required competencies or dynamic capabilities so as to address customer marketing needs and quality (Hunt & Lambe, 2000; Teece, 2007; Barney, 1991, 2001). In fact, Barney, Ketchen & Wright (2011) restates that resource Advantage theory is the foundation upon which organizational performance and strategic competitive advantage can be predicted and in this study the use of mobile phone technology. Thus, logistics firms can enhance logistics performance through the use of mobile phone technology in order to gain competitive advantage over competitors.

2.2.2 Technology Acceptance Model (TAM)

There are a number of models that have been used to investigate technology adoption. Technology Acceptance Model (TAM) by Davies in 1986 being the most profound. This model was designed originally to help in predicting the user's acceptance of IT in an organizational context. In addition, it also looks at the attitudes explaining the intention to use a certain technology or service and it has become a widely applied model for user acceptance and usage (Bertrand & Bouchard, 2008; Nganga and Mwachofi, 2013). For example, adoption of Mobile phone technology and e-commerce among clearing and forwarding firms is dependent on two factors as per the model namely perceived usefulness and perceived ease of use. This then forms the attitudes towards using a particular technology. TAM, shown in figure 2 below was also the first model that brings about external variables as important factors in studying technology adoption among various firms.



Source: Chuttur (2009, p. 2).

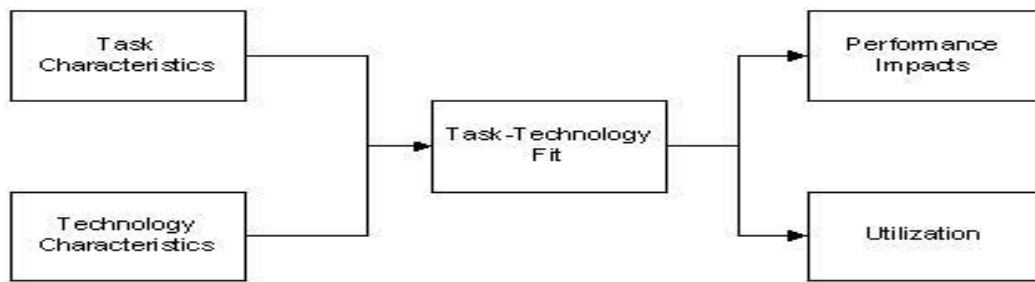
Figure 2.1: Technology Acceptance Model (TAM)

This model deals with perceptions as opposed to real usage, proposes that when users are faced with new technologies, two key factors influence their decisions about when and how they will use the technology (Davis, 1989). When compared to Task Technology Fit Theory, TAM looks at group level performance while the former is concerned with individual level tasks.

2.2.3 Task Technology Fit Theory

Another theory that can explain mobile phone technology adoption is Task Fit Technology fit theory. This theory states that new technology has a likelihood of impacting positively on employee performance and be used if the capabilities of the technology match the tasks that a user must perform (Goodhue & Thompson, 1995; Irick, 2008; Furneaux, 2012). Goodhue & Thompson (1995) came up task-technology fit measure composed of eight (8) factors: locatability, quality, the compatibility, authorization, ease of use and training, timeliness in production, system reliability and relationship with users. Each of the factors is measured using questions rated on a seven point scale which ranges from strongly agree to strongly disagree. Goodhue & Thompson (1995) found the task-technology fit measure in conjunction with utilization, to be an important predictor of user reports of improved job performance and effectiveness that was attributable to their use of the system under investigation.

In this study, mobile phone technology adoption by Clearing and Forwarding firms should match tasks performed by various people in order to enhance performance. This model looks at individual level contribution as opposed group contribution. As such, if individuals perform poorly in their tasks it will affect the entire organization. The capabilities of mobile phone technology must tally with the tasks a user must perform or be compatible in order for firms performance to improve.



Source: Goodhue and Thompson, (1995)

(Goodhue & Thompson, 1995, p.215, 217, 220)

Figure 2.2: Task Technology Fit model

2.3 Mobile Phone Technology

2.3.1 Information Flow

According to Partridge (2011), the time taken to handle any customer issues, timely delivery, operational flexibility and sustained quality have become fundamental in successful business today. The success of aligning a supply chain to attain these results depends largely on the use of efficient communication and information technology. Communication between members of supply chain requires that relevant information is transferred from its point of inception to the point of use. Robinson (2015) also noted that the transfer of information entails an efficient flow of information between systems, systems and human being which is directly associated with the effective interoperability between the various entities handling the relevant information. The future of the information technology to logistic performance is characterized by many upcoming challenges and opportunities, the logistics business has also become more volatile and uncertain (Melnik et al., 2009). The trend towards globalization has steadily increased with the effect that supply chains have become longer and more

complex (Ballou, 2004). Moreover, customer expectations have changed insofar as they demand quicker response times and more convincing offer (Bhagwat, 2003).

Although business-to-business electronic trading has been around for more than 20 years thanks to EDI, the complexity of early EDI packages, rival standards and its relatively high costs have traditionally excluded many companies, especially small firms (Giménez & Ramalhinho-Lourenço, 2004). The relatively easy access to the Internet (most organisations have a telephone, mobile phones and a PC) makes this technology have a bigger impact on information flows than EDI. This sharing of information affects all supply chain processes and some of its effects are: inventory can be reduced due to better forecasts, inventory allocation in different retail outlets can be done more effectively, advanced planning and optimisation tools can be used because there is more information available, collaborative planning and design can be implemented (Griffith & Yalcinkaya, 2010). Thus, the impact of internet and mobile phones on the information flows of a supply chain consists mainly on enabling companies to share information on real time. For years, ERP systems provided the ability to access information from various parts of the organisation. However, their potential could not be explored and expanded due to a lack of common standards and cost of access. The growth of e-business enabled to share information, made available from ERP systems, with other supply chain members (Swaminathan & Tayur 2003; Giménez & Ramalhinho-Lourenço, 2004).

Thus, automation has also resulted to smooth information flow providing easy links between employees, suppliers, forwarder, transporters and the clients. It lets real-time/online information communication and data exchange through the entire supply chain management to become realistic, speaking of time and cost (Weil, 2013). IT is generally divided into positioning, tracking, and communication technology infrastructure. With good

communication and cooperation along the supply chain, ICT and LIS enable the combination of operational and information flow, which provides transparent networks for suppliers and customers. According to Zhang et al. (2003), supply chain visibility can increase the collaboration among supply chain members via real-time data sharing and enhance time-based delivery (Lin, 2006). With sufficient information and with increased visibility and communication between various logistics operations and shareholders, different parties along the supply chain can promptly make appropriate decisions (Goodhue et al., 1995).

2.3.2 Logistics Integration

The logistics process involved through automation has made it easy to track goods from manufacturer/supplier, to forwarder and transportation finally to the customer's premises. This has enabled real time updates to customers thus improving efficiency and customer service. In the development of logistic electronic services, Logistic transparency has become one of the most critical logistic service qualities. Different functions are supported regarding orders, deliveries, shipments and inventories (Ndonye, 2014). With order and delivery visibility, collaborative order management coordinates transportation execution across organizations and enables the connectivity of order capture systems with multiple fulfillment systems (Link, 2003).

The successful integration of information within an organization is a powerful enabler for: reduced costs, increased productivity and improved customer service (Mansidao & Coelho, 2014). In integrated approach, business process viewed as an integrated chain of value-adding activities, reduction of costs of shipper and consignee, vertical co-operation vs. adversarial relationships with partners, reductions in direct transport costs, reduction of uncertainty and ICT used for internal operations and external integration. Logistics integration is an essential

and indispensable element of supply chain management without which value creation might be difficult to attain.

Moreover, the integration of logistics activities within other functional areas may help bring an enterprise to realize the full potential of its value-added activities and, hence, to gain a significant competitive advantage (Neuman, 2006). In addition, logistics integration leads to a reduction in operational costs and an improvement in customer services. It is argued in the literature that enterprises that consider logistics integration to be a strategic factor tend to develop long-term improved financial and organizational performance (Ballou, 2004). By and large, the received wisdom is that logistics integration eventually leads to improved business performance (Lai et al., 2005).

2.3.3 Fleet Management system

Walden associates defines a fuel management system as a technology-based tool that works with any pump-able liquid or gaseous fuel for attended or unattended fueling sites and that the system provides real-time visibility of all aspects of fuel management and fueling activities, using automation to free up drivers and capture information that's instantly available to any staff who may need it (Ndonye, 2014). Recent advances in fleet management allow for the addition of over-the-air (OTA) security and control of fleet vehicles. Fleet Security and Control includes security of the vehicle while stopped or not in operation and the ability to safely disable a vehicle while in operation. This allows the fleet manager to recover stolen or rogue vehicles while reducing the chance of lost or stolen cargo (Chapman, 2007). The additional of Fleet Security and Control to a fleet management system gives a fleet card manager preventative measures to address cargo damage and loss.

There are five main fleet management activities; routing and scheduling, fuel management, vehicle acquisition, vehicle maintenance, driver briefing and debriefing. The most important

thing in fleet management is cost management. The fleet manager has to ensure that his/her activities are cost effective. Fleet managers oversee delegation of duties to large groups of personnel responsible for operating the vehicles within the fleet. This may include coordinating the employee schedule, managing communication between the drivers and headquarters, planning driving routes or alternate routes as well as referring or solving problems that may crop up during the day such as accidents, absenteeism and automobile malfunctions (Ndonye, 2014).

Chuttur (2009) noted that fleet managers are responsible for ensuring that there are sufficient automobiles within the fleet to maintain the day-to-day-operations. This requires purchasing new automobiles if needed due to an increase in the workload, or to replace automobiles that need serious repairs or that have been involved in accidents, or have mileages too high to be considered road worthy. A vehicle schedule is a sequence of pick up or delivery points. This includes arrival & departure times. The vehicle must traverse the points in the designated order & at specified times. This route planning is done in order to cut costs.

2.3.4 Warehouse and Inventory Management

In the initial period every department tried to minimize the inventory by transferring it to the next level of the supply chain. Thus the total inventory cost in the supply chain was high as there was no transparency of the inventory held in the supply chain (Car et al., 2014; Ndonye, 2014). However with the advent of IT, techniques such as collaborative replenishment and vendor managed inventory were followed where manufacturer takes the responsibility to replenish the distributor inventory, resulting in inventory control and access to demand information. Inventory Management: Enabling tracking of raw materials, unfinished goods and final products with mobile devices and sensors from the moment they enter the factory to the moment they are sent to the customer. Replacing paper based quality management

systems with mobile ones (Car et al., 2014). In the initial period logistics was more manual intensive and there was no visibility of the movement of goods. However due to the advent of IT and technologies like RFID and GPS complete visibility in movement of goods is assured resulting into efficient logistic and warehouse management (Bhagwat, 2009). RFID-readers are installed at the entrances and exits of the warehouse automatically scanning cases, pallets, or individual products entering or exiting the warehouse. The perceived benefits are real-time information provision about current inventory levels, reduced labor costs, automated proof-of-delivery, eliminating stock verification and real-time tracking of products (Davis, 1989).

An inventory and warehouse management system is a process for managing and locating objects or materials. Modern inventory control systems often rely upon barcodes and radio-frequency identification (RFID) tags to provide automatic identification of inventory objects. According to Ballou (2004) Inventory management systems balance the cost of carrying inventory against the costs associated with ordering or shortfalls. Hunt (1997) noted that inventory levels are affected by customer service expectations, demand uncertainty, and the flexibility of the supply chain. Dooley further noted that for products with relatively certain demand and a long product life, it should be relatively easy to maintain desirable customer service standards even as inventories are reduced. However, for products characterized by erratic demand, a short life cycle, or product proliferation, a more responsive supply chain and larger buffer inventories may be needed to meet a desired customer service level. Firms with high customer service levels may gain a competitive advantage over those that do not have the supply chain capabilities in place or the ability to manage them. Firms who understand their demand recognize stock out costs and carry appropriate levels of inventory are ultimately better able to effectively manage inventory and provide the desired service level to customers (Doherty, 2011).

2.4 Effect of Mobile Phone Technology on Logistics performance

Since logistics is progressively anticipated to bring about enhanced performance in organizations, various researchers have looked at the effect of logistics performance, management of operations and practices in logistics on overall company performance. Some authors, such as Zhou and Benton (2007) and Mansidão & Coelho (2014) examined the connection between performance of logistics and technology adoption regarding dependability of service and conclusion were that practices related to the information sharing and distribution have a straight impact on logistics performance. Srivastava (2006) examined India's logistics and supply chain practices. The results showed that Indian decision-makers or managers are aware or educated on the need for integration and having partnerships among suppliers. This helps in coordinating the flow of goods from supplier's to customers. It also helps in sharing information among partners in the supply chain yet the infrastructure necessary to enable the seamless integration is not available. Upcoming markets are under immense pressure to adopt logistics and supply chain integration practices faster in an effort to develop competitive advantage globally.

Surveying the recent trend toward computerization and e-commerce in the trucking industry, Yoshimoto and Nemoto (2005) developed a framework for analyzing the effect of communication and information technology on transportation in terms of fleet management, commerce and logistics activities. The study recommends that fleet management systems could cancel out the adverse effect of e-commerce on transportation. Dawe (1994) did a study on assessing the effects of (ICT) on the performance of freight distribution. One of the major findings of the research is the impact level of ICT use by Freight industries in Lagos and Ogun State which falls into moderate impact on their performance as majority of them only use the low technology for information gathering. It was also discovered that the major barrier to use of ICT is the acquisition cost.

Lai et al. (2005) showed that activities related to logistics performance as a result of technology integration can have a positive impact on organizational performance. Link. (2007) found out that a large number of executives said that the perceived effect of mobile phone technology on performance of logistics consisted of improved performance in customer service, good control of inventory levels and minimization of cost through increased operational efficiency. Also Green et al. (2008), while analyzing the relationship between logistics practices and performance of organizations in the USA, showed that logistic practices influences performance positively and significantly in the following ways: Flexibility, high delivery speed, enhanced responsiveness to clients' needs and also the influence on performance of marketing which has a weighty impact on the average growth in profits from sales. The greatest contributor to better logistics management and performance is the use of mobile phone and internet technology.

2.5 Summary of Literature and Knowledge Gap

The concept of mobile phone technology and its effect on logistics management and performance has been discussed in detail both in the literature as well as from the empirical studies done on the subject area. It was evident that mobile phone technology has had positive effect on a firms performance-both financial and non-financial measure and in the present day competitive business environment, it used as a competitive tool. Porter (1985), based on published studies over the last 15 years about IT applied to transportation and logistics showed that research done to assess the use of IT to support logistics and transport are very few. This makes this study relatively important, due to its contribution to the literature review and also to businesses done because it addresses the practical experiences by organisations. This is also important when freight forwarding firms in Kenya are concerned. Rabinovich and Knemeyer, (2006) indicated that successful innovation creates a unique competitive position which gives a business competitive advantage and good performance.

The innovation in software and microelectronics has brought about universal technologies which have come to form a persistent cluster of information and communication technologies (Zykov, 2006). Whereas the link between technology use and logistics performance is theoretically justified, no empirical evidence related to the link has been identified in Kenya especially among clearing and forwarding firms. Thus, this study seeks to show that a logistics management strategy is positively associated with logistics performance which in turn relies on mobile phone technology and internet platforms. The end result of this seamless connection is enhanced firms financial performance.

2.6 Conceptual Framework

The variable that constitutes logistics performance varies from author to author. The conceptual framework in this study developed from past literature is shown in figure 2.3

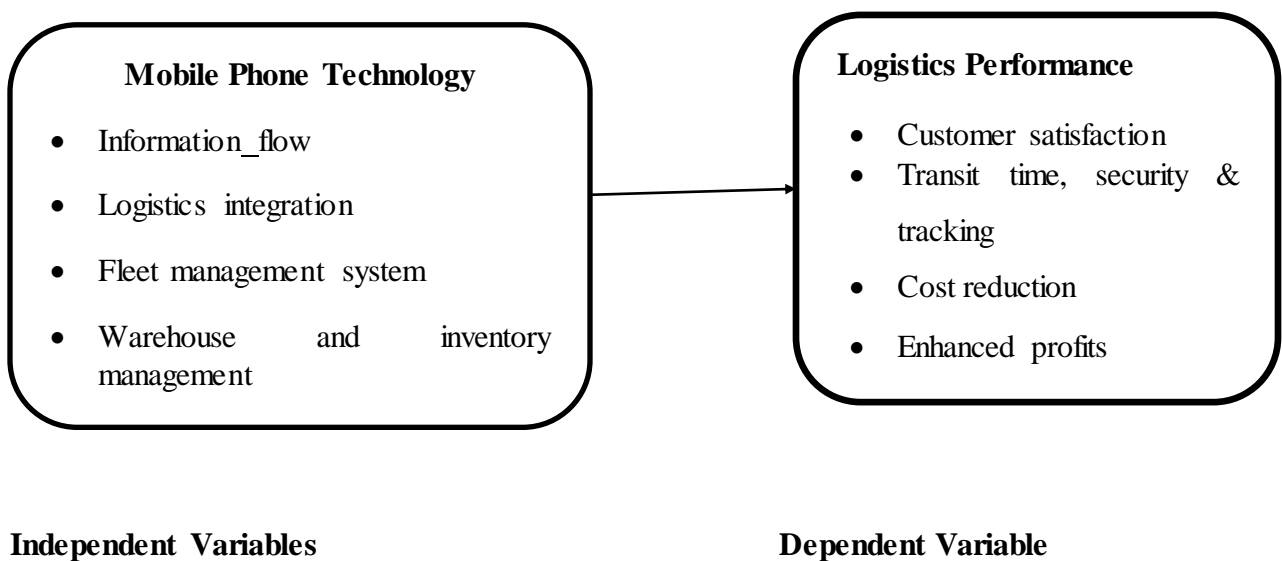


Figure 2.3: Conceptual Framework

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

The broad aim of this chapter is to provide the rationale for the research method to be used to explore the topic under study. Thus, this chapter provides the information on the methods that are used in carrying out this research, the research design used, the sample size, technique used in sampling, how the sample is obtained, the research instruments that will be used and the methods used in data collection. We will also discuss on ways of collecting data, how it will be organized and presented.

3.2 Research Design

Descriptive cross sectional research design will be used for this study. This is deemed appropriate for this study since it often answers the why, how, what and when of a phenomenon (Saunders, Lewis & Thornhill, 2012; Yin, 2013). In addition, it also enables a clear presentation of the variables under investigation. Descriptive statistics describe the basic features of the data in a study and also provide simple summaries about the sample and the measures. It will be describing what is or what the data shows and also will be used to present both the quantitative and the qualitative descriptions in a form that is manageable. Using the simple graphics analysis, they form the basis of virtually every quantitative analysis of data (Neuman, 2006). Because this research is both quantitative and qualitative, it uses descriptive design.

3.3 Population of Study.

The target population of this study will be the licensed and registered customs clearing agents in Kenya. According to (KIFWA Newsletter May- Aug 2016), in Mombasa county there are 535 clearing Agent registered.

3.4 Sample and Sampling technique

From the target population, a sample will be drawn. The study will use simple random sampling technique.

The formula is as follows:

$$n = \frac{N}{1 + N(e)^2}$$

Where: n is the sample size

N is the population

e is the level of precision assuming 5% or 0.05 for rates.

Land rates payers sample size

$$n = \frac{535}{1 + 535(0.05)^2} = 228.877 = 228$$

Therefore the total sample size will be 228 clearing and forwarding firms and this sample size is considered adequate. Gravetter and Forzano (2012) recommends a sample size of greater than the 1% for large populations while Mugenda & Mugenda (2003) observes that a sample size of 30% is adequate.

3.5 Data Collection

The study will involve collection of primary data from the firms. Primary data will be collected in this study because the study seeks to obtain views from one officer in charge of logistics in the firms. This will be collected through a structured questionnaire administered to the manager and or experienced officer with over three years' experience in the industry. Collection of data will be by the use of questionnaires which will generate both the quantitative and qualitative data. Measurement of the questionnaire will be on a likert scale of

1-5. The questionnaire structure will be organization profile, questions on Mobile Phone technology use and Logistics Performance. Prior to the main study, a pilot study will be carried out to determine the instrument's content validity validity and reliability. The questionnaire will be divided into four part. Part one is respondent profile, part two will be how the company adopts the mobile phone technology. Part three will be questions on adoption of mobile phone technology and the impacts on the company performance. Part four will be the mobile phone technology implementation challenges.

3.6 Reliability and Validity.

Any test will be reliable if will measures what it intend to measure consistently. Precision consistency and accuracy of the research instrument will make the study reliable. It will measure the degree to which a research instrument will yields consistent result of data after several repeated trials (Meyers, Gamst & Guarino, 2006). When doing the pilot study the researcher will adopt the test-retest technique to test reliability of the questionnaires. The questionnaires will be administered to the 10 respondents, within a span of two weeks. After administration of the questionnaires, Cronbach's test will be used to check the reliability of the data collection tool. Cronbach's alpha ranges from $r = 0$ to 1 , with $r = 0.7$ or greater considered as sufficiently reliable (Nunnally & Bernstein, 1994).

Prior to the main study, a pilot study was carried out to determine the instrument's content validity.

3.7 Data Analysis

Data processing will involve the cleaning of the raw data to ensure that it is consistent with the requirements for estimation and evaluation of accrual quality. The data collected using the questionnaires will be checked, edited and later computer coded to simplify the hugeness of data obtained into a form suitable for size for analysis. We will use Statistical Package for

Social Sciences (SPSS) 20.0 to analyse data. SPSS will help us to generate tables which can help in making ease interpretation and will assist in making conclusion and recommendations. Analysed data will then summarized using frequencies and percentages and presented in tables. The percentages and frequencies will be used to explain, discuss and interpret research findings obtained, conclusion and recommendations. Analysis will be done as per the research objectives. To recue the data to a amangeable size we will use descriptive statistics and to provide an insights into the pattern of the trend of the data. The descriptive statistics techniques that will be used will the sum, mean and standard deviations. Correlation analysis will be carried out on the data.

Relationships between the variables of this study will be statistically treated using multivariate regression analysis. According to this study we will use statistical technique given that the study’s model has more than one variable and also the relationship existing on these variables is assumed to be linear relationship.

From the regression model the following regression equation is derived:

$$LP= \beta_0 + \beta_1X_1+ + \beta_2X_2+ \beta_3X_3+ \beta_4X_4+\varepsilon \dots\dots\dots 3.1$$

Where;

LP= Logistics Performance

ε = Error term

β_0 is the intercept of the model.

X1 information flow, X2=Logistics Intergration, X3=Fleet management system and

X4 warehouse and Inventory management.

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ are the coefficients of model.

The ε = error term or variable represents all the factors or variables that will affect the dependent variable but were not included in the model either because they were difficult to measure or not known.

T-tests will also be used to test the significance of the relationship between the dependent and independent variables. A key statistic is R^2 which is a measure of goodness of fit will show the percentage variance in the dependent variable (logistics management and performance) that can be explained by the independent variables (mobile phone and internet technology). Also, the F-Statistic (ANOVA table) will be used to show how independent variables significantly explain the variance in logistics performance. The F critical at 5% level of significance will be compared with F calculated to show if the model is significant or not. The significance should be less than 0.05 in order to indicate if predictor variables strongly explain the variation in the dependent variable.

3.6. Operationalization of Study Variables

The table below shows how the variables have been operationalized

Table 3.1 shows the variables, components and how they will be measured.

Table 3.1: Operationalization of Study Variables

Variable	Nature of Variable	Components and Indicators	Measurement	Scale	Question item
Mobile Phone Technology (MPT)	Independent variable	<ul style="list-style-type: none"> Perceived ease of use (usability) Perceived usefulness (technical reasons); 	Ordinal	1-5 where 1= Strongly disagree, 2=Disagree, 3=Moderate extent, 4=Agree and 5=Strongly	

		<ul style="list-style-type: none"> • Mobile applications (accessibility , functionality , and conveniency) • Awareness Level • Security and trust • Perceived risks 		agree.	
Logistics Performance (LP)	Dependent variable	Effectiveness Communication Efficiency Flexibility Responsiveness Quality Transit time Customer relationship management	Ordinal	1-5 where 5) Greater extent; 4) Great extent; 3) Moderate extent; 2) Low extent; 1) Very low extent	

CHAPTER FOUR: DATA ANALYSIS AND INTERPRETATION OF FINDINGS

4.1 Introduction

The study helps to analyze the effects of mobile phone technology on logistics performance of clearing and forwarding firms in Mombasa County. The specific objectives of the study were to establish the extent to which mobile phone technology are being used in the operations of clearing and forwarding firms in Mombasa county; to determine the effect of mobile phone technology adoption on logistics performance of clearing and forwarding firm in Mombasa county and to identify the factors hindering adoption of mobile phone technology among Clearing and Forwarding firms in Mombasa county. This chapter presents findings from the data analysis in line with the research objectives. The analysis is divided into three parts. Part 4.2 shows the response rate, 4.3 present the demographic information such as education level, gender and age. In part 4.4 the analysis as per the research objectives is presented and 4.5 present results from multiple regression analysis and factor analysis.

4.2 Response Rate

The study was carried out on 228 clearing and forwarding firms based in Mombasa County. In order to collect data, 228 questionnaires were issued out to one officer in charge of logistics in the firms. Out of the 228 questionnaires, 180 questionnaires were received and analyzed representing 78.9% response rate which was considered adequate.

4.3 Demographic Information

4.3.1 Gender of The Respondents

Each person responding was told to indicate their gender. Results are shown in table 4.1

Table 4.1: Gender of the respondents

	Frequency	Percent
Male	123.00	68.00
Female	57.00	32.00
Total	180.00	100.00

Source: Research Data (2016)

As shown in table 4.1, most respondents were male at 68% then female at 32%. This could imply that there are more male employees in Clearing and forwarding firms based in Mombasa County although it may entirely be attributed to researcher's selection bias.

4.3.2 Age of The Respondents

The researcher believed that age and experience in the company and industry go hand in hand. Experience comes with age and better understanding of mobile phone technology impact on logistics performance. Results are shown in below figure 4.2

Table 4.2: Age of the respondents

	Frequency	Percent
Less than 20 years	0	0
21-30 years	31	17.2
31-40 years	77	42.8
41-50 years	38	21.1
More than 50 years	34	18.9
Total	180	100

Source: Research Data (2016)

As shown in figure 4.2, most of the respondents with 42.8% were aged above 31-40 years, followed by 21.1% aged 41-50years then 18.9% aged more than 50 years and finally respondents aged 21-30 years at 17.2%. The results show that none of the respondents was aged less than 20 years and this shows that the respondents were mature to respond to questions related to mobile phone technology impact on logistics performance.

4.3.3 Length of Continuous Service With The Company

The researcher believed that length of service in the company and industry measured in terms of years worked can be equated to better understanding of mobile phone technology impact on logistics performance. Results are shown in table 4.3

Table 4.3: Length of service with company

	Frequency	Percent
Less than 2 years	13	7.2
2-5 years	18	10
6-10 years	95	52.8
More than 10 years	54	30
Total	180	100

Source: Research Data (2016)

As shown in figure 4.3, most of the respondents in the study 52.8% have worked between 6-10 years followed by those who have worked for more than 10 years at 30% then 2-5 years at 10% and finally less than 2 years at 7.2%. This shows that the respondents had enough experience to respond to questions relating to mobile phone technology impact on logistics performance.

4.4 Mobile Phone Technology Adoption and Logistics Performance

This section carries out an analysis of mobile phone technology impact on logistics performance in line with research objectives.

4.4.1 Extent To Which Mobile Phone Technology Is Being Used.

First, the respondents were asked to give an indication if their companies have adopted mobile phone technology in managing logistics and operations. All the respondents 100% said yes and none said no implying Clearing and forwarding firms based in Mombasa County make use of mobile phones to perform various functions.

The respondents were told to indicate the extent to which the following uses of mobile phone technology have been implemented in their firms. The responses were measured on a scale of 1-5 where 5) Greater extent; 4) Great extent; 3) Moderate extent; 2) Low extent; 1) Very low extent and results are shown in table 4.4

Table 4.4: Mobile Phone Technology uses in their Firms

Mobile Phone Technology Uses	5	4	3	2	1
Data capture and analytics for ongoing operational optimization	0	0	22%	55%	23%
Data analytics to optimize fuel efficiency, route management and time per stop	0	0	10%	65%	25%
Data capture to predict and forecast activities and their potential impact on logistics	0	0	14%	86%	0%
E-Commerce (Electronic money transfers, email electronic publishing, electronic data interchange, processing images, electronic bulletin boards, shared	0	23%	66%	11%	0%

databases and magnetic/optical data capture)					
Place orders	0	91%	9%	0%	0%
Make payments/pay bills	14%	64%	22%	0%	0%
Car tracking, fuel management, diver management, routing, mapping and scheduling	33%	51%	16%	0%	0%
Launch of complains and get services online by customers	23%	26%	51%	0%	0%
Evaluation of major suppliers	0	0	23%	51%	26%

Source: Research Data (2016)

Table 4.4 shows the responses on the prominent uses of mobile banking to customers. As the result reveal, it appears that most Clearing and forwarding firms in Mombasa County use mobile phone technology for placing orders at 95% great extent responses followed by make payments/pay bills at 64% great extent responses then car tracking, fuel management, diver management, routing, mapping and scheduling at 51% great extent responses. On the contrary, data capture to predict and forecast activities and their net effects on logistics ranked low on uses with 86% low extent responses followed by data analytics to optimize fuel efficiency, route management, and time per stop at 65% low extent responses then data capture and analytics for ongoing operational optimization at 55% low extent responses. Electronic Commerce is used to a moderate extent at 66% moderate extent responses. Thus, the firms should try to make optimum use of mobile phone technology especially for data analytics, data capture, car tracking, market research and managing customer complaints.

In addition to the basic uses of mobile phone technology, the respondents were asked to write the extent on which mobile phone technology has been adopted in their firms. The responses

were measured on a scale of 1-5 where 5) Greater extent; 4) Great extent; 3) Moderate extent; 2) Low extent; 1) Very low extent

Table 4.5: Level of Mobile Phone Technology adoption

Information flow	1	2	3	4	5	Mean	S.Dev
Sharing information	0	24%	14%	62%	0	4.17	.559
Communication channels	0	10%	13%	72%	5%	4.67	.630
Tracking and tracing	0	0	21%	79%	0	4.11	.715
Overall mean						4.31	
Logistics integration	1	2	3	4	5	Mean	S.Dev
Electronic data interchange	0	6%	84%	10%	0	3.17	.377
Enterprise resource planning	0	74%	3%	23%	0	2.63	.694
Logistics information management system	0	17%	83%	0	0	3.58	.647
Overall mean						3.13	
Fleet management system	1	2	3	4	5	Mean	S.Dev
Route planning and scheduling	0	24%	14%	62%	0	4.17	.565
Tracking systems (Radio Frequency Identification)	0	10%	13%	72%	5%	4.67	.477
Fuel management system	0	79%	21%	0	0	2.21	.594
Container leasing, cargo security, loading and offloading	0	0	21%	79%	0	4.11	.347

Overall mean						3.79	
Warehouse and inventory management	1	2	3	4	5	Mean	S.Dev
Receive and identify goods	0	0	21%	79%	0	4.21	.466
Dispatch of goods to storage	0	20%	60%	20%	0	3.51	.564
Pick goods and dispatch for shipment	10%	15%	22%	53%	0	4.13	.654
Documentation, duty payment and inspection	0	20%	21%	59%	0	4.25	.457
Overall mean						4.03	

Source: Research Data (2016)

Table 4.5 shows the results for level of mobile phone technology adoption. The mean score reveals that information (mean: 4.31) flow ranks high or has been adopted to a great extent. This was followed by warehouse and inventory management (mean: 4.03) then fleet management system (mean: 3.79) and finally logistics integration (mean: 3.13). The result imply that Clearing and forwarding firms in Mombasa County have adopted information flow to a large extent while logistics integration to a moderate extent. Overall, the result shows that adoption of mobile phone technology is moderate.

The scores of low extent and very low extent were taken to represent a component that had been adopted to a small extent (S.E) equivalent to a mean score of 0 to 3.0 on a continuous likert scale; ($0 \leq S.E \leq 3.0$). Scores of moderate extent (M.E) were taken to represent a component that had been adopted to a moderate extent (M.E) equivalent to a mean score of 2.1 to 4.0 on the continuous likert scale: ($2.1 \leq M.E \leq 4.0$). The scores for both great extent and very great extent were taken to represent a component which had been adopted to a large

extent (L.E) equivalent to a mean score of 4.1 to 5 on a continuous likert scale; ($4.1 \leq L.E \leq 5.0$).

Additionally, when the individual factors under each mobile phone technology adoption element was considered communication channels and tracking systems (Radio Frequency Identification) with a mean of 4.67 each ranks high while fuel management system (mean: 2.21) and enterprise resource planning (mean:2.63) ranked low.

4.4.2 The Effect of Mobile Phone Technology On Logistics Performance.

The study also sought to find out extent to which Mobile Phone Technology has affected logistics performance in the respondents firms. Responses were measured on a scale of 1-5 where 5) Greater extent; 4) Great extent; 3) Moderate extent; 2) Low extent; 1) Very low extent and results are shown in table 4.6

Table 4.6: Effect of mobile phone technology on logistics performance

	1	2	3	4	5	Mean
Customer satisfaction/ Efficiency of customer service delivery/ Improved customer relationship management	0	0	0	80%	20%	4.78
Reduced transit time	0	0	23%	67%	10%	4.54
Cost reduction in operations	0	0	14%	76%	10%	4.68
Increased profits	0	20%	66%	14%	0	3.77
Improved security and tracking of cars	0	12%	13%	60%	15%	4.46
Reduced transit time	0	10%	30%	56%	4%	4.13
Overall mean						4.39

Source: Research Data (2016)

Table 4.6 shows the effect of mobile phone technology on logistics performance. The overall mean of 4.39 implies that mobile phone technology impacts logistics performance to a great extent. Furthermore, when individual impact are considered, customer satisfaction/ efficiency of customer service delivery/ improved customer relationship management ranks high with a mean score of 4.78 or 80% great extent responses while increased profits ranks low with a mean score of 3.77 or 66% moderate extent responses. Overall, it appears that although mobile phone technology impacts logistics performance to a large extent, it might not enhance profits as expected by Clearing and forwarding firms in Mombasa County.

The scores of very low extent and low extent is representing a component that had been adopted to a small extent (S.E) equivalent to a mean score of 0 to 3.0 on a continuous likert scale; ($0 \leq S.E \leq 3.0$). Scores of moderate extent (M.E) were taken to represent a component that had been adopted to a moderate extent (M.E) equivalent to a mean score of 2.1 to 4.0 on the continuous likert scale: ($2.1 \leq M.E \leq 4.0$). The scores for both great extent and very great extent were taken to represent a component which had been adopted to a large extent (L.E) equivalent to a mean score of 4.1 to 5 on a continuous likert scale; ($4.1 \leq L.E \leq 5.0$).

The respondents were asked to indicate other tangible benefits they hope to achieve through the continuous use of mobile phone technology. Results show that the improved customer and supplier experience ranks high with 100% responses followed by more efficient operations at 87% then Better, fact-based decision making at 78% followed by new product innovations at 75%, increased sales/profits at 70%, increased customer numbers/accounts at 67% and finally higher quality products and services at 60%. Overall, the improved customer and supplier experience is a key tangible benefit the firms hope to achieve through continuous use of mobile phone technology.

4.4.3 Factors Hindering Adoption Of Mobile Phone Technology.

The respondents were asked to indicate factors which have hindered or continue to hinder adoption of mobile phone technology in their firms. The responses were measured on scale of 1-5 where 5) Greater extent; 4) Great extent; 3) Moderate extent; 2) Low extent; 1) Very low extent. Results are shown in table 4.7.

Table 4.7: Factors hindering adoption of mobile phone technology

	1	2	3	4	5
Lack of top management commitment to technology implementation	0	0	23%	77%	0
Lack of resources	0	0	10%	70%	20%
Resistance to change	0	0	46%	54%	0
Lack of all stakeholder engagement	0	0	65%	25%	10%
Lack of effective measurement of quality improvement	0	65%	35%	0	0
Inadequate Human Resource Development or lack of proper training.	0	0	0	0	100%
Inadequate managerial skills	0	15%	20%	60%	5%
Organization culture	0	7%	16%	77%	0
Compatibility with existing systems	0	11%	30%	36%	23%
Systems reliability	0	0	0	0	100%

Source: Research Data (2016)

As shown in table 4.7, all the respondents 100% greater extent responses stated that systems reliability and lack of proper training/inadequate human resource development are the important factors which have hindered or continue to hinder the adoption of mobile phone technology in their firms. In addition, lack of top management commitment to technology

implementation at organization culture, lack of resource and inadequate managerial skills at 77%, 77%, 70% and 60% great extent responses are also important factors which have hindered or continue to hinder the adoption of mobile phone technology in their firms.

4.5 Pearson Correlation Analysis

In this study, it was expected that there will be a positive and linear relationship between mobile phone technology adoption and logistics performance. The task for this study was to establish the strength of the relationship between mobile phone technology (information flow, logistics integration, fleet management system and warehouse and inventory management) and logistics performance. Pearson correlation coefficient tests the strength of the relationship between variables. The correlation coefficient ranges from -1 (perfect negative correlation) to +1 (perfect positive correlation) and 0 (no correlation at all). Table 4.8 shows the Pearson correlation coefficients

Table 4.8: Pearson correlations

Logistics performance	Pearson Correlation	1
	Sig. (2-tailed)	
Information flow	Pearson Correlation	.767
	Sig. (2-tailed)	.016
Logistics integration	Pearson Correlation	.488
	Sig. (2-tailed)	.037
Fleet management system	Pearson Correlation	.576
	Sig. (2-tailed)	.013

Warehouse and inventory management	Pearson Correlation	.677
	Sig. (2-tailed)	.003

Source: Research Data (2016)

Correlation is significant at the 0.05 level.

Table 4.8 shows that there is a positive relationship between mobile phone technology (flow of information, logistics integration, fleet management system and warehouse and inventory management) and logistics performance. None of the variables had a zero (0) correlation with logistics performance. Information flow and warehouse and inventory management have a strong positive and significant correlation with logistics performance at $r=.767$, $P<0.05$) and $r=.677$, $P<0.05$) respectively. Logistics integration has a weak correlation with logistics performance at $r=.488$, $P<0.05$. Fleet management system has a moderate correlation with logistics performance at $r=.576$, $P<0.05$. Overall, the relationship between the independent variables under mobile phone technology and logistics performance is significant. The implication is that logistics integration, flow of information, fleet management system and warehouse and inventory management impact logistics performance to a large extent.

4.6 Reliability Test

Table 4.9 shows the Cronbach's alpha which is used to find out the internal consistency of the research components and how closely are they related to the set of components as a group. A reliability coefficient of 0.70 and above is considered "acceptable" in most social science research situations (Mosadeghrad & Yarmohammadian, 2006; Cronbach, 1951).

Table 4.9: Reliability test

Variable	Cronbach's Alpha
Flow of information	.834
Logistics integration	.746
Fleet management system	.711
Warehouse and inventory management	.754

Source: Research Data (2016)

The findings in table 4.9 reveal that most of the elements have relatively high internal consistence since they had Cronbach's Alpha's higher than 0.70 recommended by Cronbach (1951).

4.7 Model Summary and ANOVA

Table 4.10: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.640 ^a	.410	.314	3.4373

Source: Research Data (2016)

a. Predictors: (Constant), information flow, logistics integration, fleet management system and warehouse and inventory management

The R^2 (coefficient of determination) which tells us how information flow, logistics integration, fleet management system and warehouse and inventory management impacts on logistics performance. With R^2 .410 for the model, this means that the independent variables (predictors) in the model (information flow, logistics integration, fleet management system

and warehouse and inventory management) could offer about 41% explanation of the variation in the dependent variable (logistics performance). The 59% remaining is explained by other variables or factors not included in the model and represented by the error term. Thus, The R-value (0.410) shows that the mobile phone technology affects logistics performance of Clearing and Forwarding firms in Mombasa County.

Moreover, table 4.11 shows the ANOVA results which were done to test the model fit in relation to quality of loans portfolio and NIM. The F statistic and its significance (p-value) are presented and interpreted.

Table 4.11: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3043.466	1	3043.466	1.646	.047 ^b
	Residual	2114.951	179	11.815		
	Total	5158.417	180			
a. Dependent Variable: Logistics Performance						
b. Predictors: (Constant), information flow, logistics integration, fleet management system and warehouse and inventory management						

Source: Research Data (2016)

The results in table 4.11 show that the F statistic was 1.646 and was significant at 5% level of confidence (p = 0.047) i.e. P<0.05. This means that the model was fit to explain the relationship between mobile phone technology (information flow, logistics integration, fleet management system and warehouse and inventory management) and logistics performance.

4.8 Distribution of Coefficients

Table 4.12 shows distribution of coefficients that gives an indication of how each variable affects logistics performance.

Table 4.12: Distribution of Coefficients

b. Predictors: (Constant), information flow, logistics integration, fleet management system and warehouse and inventory management						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.523	.072		1.601	.021
	Information flow	.878	.364	.094	2.412	.025
	Logistics integration	.479	.229	.276	2.092	.022
	Fleet management system	.532	.199	.041	2.673	.043
	Warehouse and inventory management	.732	.275	.051	2.662	.047
a. Dependent Variable: Logistics Performance						

Source: Research Data (2016)

Note Sig. (Testing hypothesis accept $p < 0.05$), p-value

The model shows a statistically significant positive relationship between information flow ($\beta = 0.878$, $t = 2.412$, $p < 0.05$) and Logistics Performance. There is also statistically significant positive relationship between warehouse and inventory management ($\beta = 0.732$, $t = 2.662$,

p<0.05) and consumer protection. Fleet management system ($\beta = 0.532$, $t= 2.673$, $p<0.05$) and logistics integration ($\beta = .479$, $t= 2.092$, $p<0.05$) also have a weak and positive relationship with logistics performance. Overall, all the independent variables had a positive impact on logistics performance since the t-values were positive. The positive relationship and impact was also significant at 95% confidence level, $p<0.05$ for all the variables.

From the regression model the following regression equation was derived:

$$LP= \beta_0 + .878X_1+.479X_2+.532X_3+.732X_4+\varepsilon$$

Constant = 1.523, shows that if mobile phone technology factors are rated as zero or held constant; logistics performance would be a factor of 1.523.

$X_1 = 0.878$, shows that one unit increase in information flow results in an increase in logistics performance by a factor of 0.878

$X_2 = 0.479$, shows that one unit increase in logistics integration results in an increase in logistics performance by a factor of 0.479

$X_3 = 0.532$, shows that one unit increase in fleet management system results in an increase in logistics performance by a factor of 0.532

$X_4 = 0.732$, shows that one unit increase in warehouse and inventory management results in an increase in logistics performance by a factor of 0.732

From the above regression model, holding the flow of information, logistics integration, fleet management system and warehouse and inventory management constant, logistics performance would be 1.523.

CHAPTER FIVE: SUMMARY CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The general objective of this study was to analyze the effects of mobile phone technology on logistics performance on clearing and forwarding firms in Mombasa County. This chapter gives out a summary of findings in line with the specific objectives of the study. These findings are based on descriptive statistics, factor analysis and Pearson's correlation.

5.2 Summary of Findings

The discussion of findings has been structured around each research objective and findings made from the analysis. Ideally, it was expected that the relationship between mobile phone technology and logistics performance would be positive and significant. The study used a simple linear regression model of the form $LP = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$ where LP=logistics performance, X_1 =information flow, X_2 =logistic integration, X_3 = fleet management system, X_4 = warehouse and inventory management and ε = error term.

The study analyzed the relationship between mobile phone technology and logistics performance. The correlation results and descriptive statistics showed that the relationship was significant at 95% confidence level. Information flow and warehouse and inventory management had a strong positive and significant correlation with logistics performance. Logistics integration had a weak correlation with logistics performance and fleet management system had a moderate correlation with logistics performance.

In addition, all the independent variables (X_1 =information flow, X_2 =logistic integration, X_3 = fleet management system, X_4 = warehouse and inventory management) had a positive impact on logistics performance. Thus, it can be seen that although all the independent variables have a positive influence on the dependent variable, information flow and warehouse and inventory management have a large effect on logistics performance compared to fleet

management system and logistics integration. Overall, the respondents felt that there was a strong influence of mobile phone technology on logistics performance.

5.2.1 Extent to Which Mobile Phone Technology Is Being Used

The study sought to find out the extent to which mobile phone technology is being used in the operations of logistics firms. The findings revealed that information flow with a mean of 4.31 had been adopted to a great extent followed by warehouse and inventory management with a mean of 4.03 then fleet management system at 3.79 and finally logistics integration at 3.13. Pearson correlation results also showed that information flow at $r=.767$ had a strong positive correlation with logistics performance while logistics integration with $r=.488$ had a weak but positive correlation with logistics performance. Additionally, overall mean for mobile phone technology adoption was 3.82 showing that it has been adopted to a moderate extent by Clearing and forwarding firms based in Mombasa County. Furthermore, the findings reveal that Clearing and forwarding firms in Mombasa County use mobile phone technology for placing orders, payments/pay bills and car tracking, fuel management, diver management, routing, mapping and scheduling to a great extent. Although Weil (2013) stated that data capture and analytics is among the most prominent uses of mobile phone technology where companies are in a position to leverage the data accumulated by hand sets for analytics which allows ongoing operational optimization, this study found out that data analytics ranks low among mobile phone uses by Clearing and forwarding firms based in Mombasa County.

This shows that the firms recognize that mobile phone technology impacts on logistics performance to a large extent. The findings that the firms have adopted mobile phone technology are in line with resource advantage theory of competition which challenges executives in this industry to engage in the talks of competition based on what develops as resource-advantage (Hunt, 1997; O'Keeffe, Mavondo & Schroder, 1998; Griffith & Yalcinkaya, 2010). Firms should optimize on available resources in order to gain competitive

advantage over competitors and one way of achieving this is by making use of mobile phone technology. Technology Acceptance Model (TAM) by Davis (1989) also shows that technology will only be accepted due to perceived usefulness. In essence Clearing and forwarding firms based in Mombasa County have realized that mobile phone technology is usefulness in performing some functions such as paying bills, placing orders and communicating with customers.

5.2.2 The Effect of Mobile Phone Technology On Logistics Performance

The study tends to establish the effect of mobile phone technology on the logistics performance. As indicated earlier in this study, it was assumed that the relationship between mobile phone technology and logistics performance would be positive which was proven by the Pearson correlation. The findings of the study revealed that mobile phone technology impacts logistics performance to a bigger extent with an overall mean score of 4.39. In addition, one of the main impacts of mobile phone technology impacts logistics performance was enhanced customer satisfaction/ efficiency of customer service delivery/ improved customer relationship management with a mean score of 4.78. Others effects were cost reduction in operations reduced transit time and improved security and tracking of cars including increased profits. Thus, mobile phone technology functions have a huge impact on logistics performance which in turn affects overall business performance. Goodhue and Thompson (1995), Irick (2008) and Furneaux (2012) while explaining Task Fit Technology fit theory, stated that the more the technology is used the it will have positive effects on the individual performance and also if it is used when the capabilities of the technology used matches with the task that a user must perform.

The findings concur with past studies such as Larson et al. (2007) and Green et al. (2008) that the perceived impact of mobile phone and internet technology on logistics performance comprised of improved performance in customer service level, better inventory levels and

costs optimization. They further state that mobile phone technology has a positive impact on business performance in terms of speed of service delivery, faster response to customer queries, flexibility and increased sales performance.

5.2.3 Factors Hindering Adoption of Mobile Phone Technology.

The study also sought to establish the factors hindering adoption of mobile phone technology among Clearing and Forwarding firms. Then findings revealed systems reliability and lack of proper training/inadequate human resource development are the most important factors which have hindered or continue to hinder the adoption of mobile phone technology in their firms. Other factors are lack of top management commitment to technology implementation at organization culture, lack of resource and inadequate managerial skills. Boye (2015) discovered that the major barrier to use of ICT is the acquisition cost which concurs with this study finding that lack of resources hinders adoption of mobile phone technology.

Perhaps lack of resources leads to lack of top management commitment to technology implementation. Furthermore, Molla and Licker (2005) observe that key company components such as its available resources, processes which are used and business infrastructure affects technology adoption among firms in developing countries.

5.3 Conclusions

The theorized logistics performance model fits the data moderately well providing support for the three objectives. As a focal point, the performance of logistics companies is positively impacted by mobile phone technology. The study found out that the relationship between the four mobile technology variables and logistics performance was positive and significant $p < 0.05$. Information flow and warehouse and inventory management had a strong correlation with logistics performance while fleet management system and logistics integration had a weak correlation with logistics performance. Additionally, the analysis revealed that the

mobile phone technology attributes identified in this study namely information flow, warehouse and inventory management, fleet management system and logistics integration could offer 41% explanation of total variation in logistics performance with 59% explained by other factors not considered in the study. The mobile phone technology variables are strong predictors of logistics performance among Clearing and forwarding firms in Mombasa County.

This study successfully found answers to the three research objectives: first the firms have adopted mobile phone technology to a moderate extent although some uses such as paying of bills and placing orders are being done to a large extent. Second, mobile phone technology impacts logistics performance to a large extent. Third, mobile phone technology adoption faces various challenges to a great extent some of them being systems reliability, lack of proper training/inadequate human resource development and lack of top management commitment to technology implementation.

5.4 Policy Recommendations

This study will be very resourceful for the academicians and the practitioners. The practitioners are provided with some insights regarding uses of mobile phone technology, challenges hindering mobile phone technology adoption and the impact of mobile phone technology on logistics performance. Thus, the study results have important implications for executives in clearing and forwarding firms. The sustained long-term success of the firms will depend upon developing competitive advantage as a member of one or more supply chains. While the executives in the manufacturing sector have embraced various technologies and strategies to enhance performance, they continue searching for better tactical approaches to implement strategy and achieve organizational goals. The logistics processes linking the firms, customers and suppliers play a crucial role in supporting a logistics management

strategy. As the firms work to improve the logistics procedures, they support their company supply chain strategy resulting in better performance for the general supply chain and ultimately overall performance. Continuous adoption of mobile phone technology will go a long way in increasing logistics performance and in turn financial performance.

5.5 Limitations of Study

The objectives of the study were successfully accomplished and also we should note all the limitations encountered during the study.

There was lack of Cooperation during data collection exercise. Collecting the required information was challenge because some of the respondents were not co-operative and they were refusing to offer the information and therefore some queries went unanswered. Some respondents were fearing to be victimized by their bosses and others said they did not have time and this affected the accuracy of the results. The researcher gave them more time to fill out the questionnaires.

Most companies feared that their information will be exposed out to competitors because of confidentiality privacy policies. We had to promise the organisations that we will treat their information with utmost confidentiality and not to worry at all. This encouraged them to respond honestly.

Lack of information exposed out by the respondents who were not able to give out proper information. This was contributed by lack of experience in the area of study. We had to give the respondents time to consult with their superiors so as they can give proper and honest answers.

Lastly, this study is limited in scope. The study focused on the impact of mobile phone technology on logistics performance. In addition, Clearing and forwarding firms in Mombasa

County constituted the study population and inference from the findings should be done albeit with caution.

5.6 Suggestion For Further Studies

First, a study can be done on the effects of logistics performance on organizational performance. Whereas this study was done on mobile phone technology and its impact on logistics performance, overall organizational performance measures were not considered.

Second, this paper employed a rather subjective measure of mobile phone technology impacts, i.e. the respondents' perceptions of their firms' mobile phone technology impact areas and levels. A further research is needed using more quantifiable measures of mobile phone technology impacts.

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APPENDICES

APPENDIX I: RESEARCH QUESTIONNAIRE

Dear respondent, am conducting a research study on the influence of mobile phone technology on logistics performance of clearing and forwarding firms in Mombasa County. The questionnaire items are about the study and you are kindly requested to participate in responding to the questions below. The information given will be treated as confidential and the results of the study will be used for academic research purposes only.

PART A: Demographic and Respondents Profile

1. Name of the respondent (optional)

Name of your organization

(optional).....

Gender: Male [] Female []

2. What is your age bracket? (Tick as applicable).

Under 20 years []

21 – 30 years []

31 – 40 years []

41- 50 years []

Over 50 years []

3. Length of continuous service with the company?

Less than two years []

2-5 years []

6- 10 years []

Over 10 years []

4. For how long has your company been in existence?

Under 5 years []

6-10 years []

11-15 years []

Over 16 years []

Part B: Mobile Phone Technology Adoption

5. Has your company adopted Mobile Phone Technology in managing logistics?

Yes ()

No ()

6. To what extent have the following uses of mobile phone technology been implemented in your company? Use 1-5 where 5) Greater extent; 4) Great extent; 3) Moderate extent; 2) Low extent; 1) Very low extent

	Mobile Phone Technology Uses	5	4	3	2	1
1	Data capture and analytics for ongoing operational optimization					
2	Data analytics to optimize route management, fuel efficiency and time per stop					
3	Data capture to forecast and predict activities and their potential impact on logistics					
4	Electronic Commerce (electronic data interchange, e-mail, electronic fund transfers, electronic publishing, image processing, electronic bulletin boards, shared databases and magnetic/optical data capture)					
5	Place orders					
6	Make payments/pay bills					
7	Car tracking, fuel management, driver management, routing, mapping and scheduling					

8	Launch of complains and get services online by customers					
9	Evaluation of major suppliers					

Mobile Phone Technology Implementation

7. Please indicate your level of acceptance with the following statements relating to mobile phone technology adoption on a scale of 1-5 where 5) Greater extent; 4) Great extent; 3) Moderate extent; 2) Low extent; 1) Very low extent

		5	4	3	2	1
Information flow						
1	Sharing information					
2	Communication channels					
3	Tracking and tracing					
Logistics integration						
4	Electronic data interchange					
5	Enterprise resource planning					
6	Logistics information management system					
Fleet management system						
7	Route planning and scheduling					
8	Tracking systems (Radio Frequency Identification)					
9	Fuel management system					
10	Container leasing, cargo security, loading and offloading					
Warehouse and inventory management						
11	Receive and identify goods					
12	Dispatch of goods to storage					

13	Pick goods and dispatch for shipment					
	Documentation, duty payment and inspection					

Part C: Effect of Mobile Phone Technology on Logistics performance

8. To what extent do you agree with the following statements regarding the effect of Mobile Phone Technology on logistics performance in your company? 5) Greater extent; 4) Great extent; 3) Moderate extent; 2) Low extent; 1) Very low extent

	5	4	3	2	1
Customer satisfaction/ Efficiency of customer service delivery/ Improved customer relationship management					
Reduced transit time, and					
Cost reduction in operations					
Increased profits					
Improved security and tracking of cars					
Reduced transit time					

9. What other tangible benefits do you hope to achieve through continuous use of mobile phone technology?

- i. Improved customer and supplier experience
- ii. Increased sales/profits
- iii. Higher quality products and services
- iv. New product innovations
- v. More efficient operations

vi. Better, fact-based decision making

vii. Increased customer numbers/accounts

Part C: Factors hindering adoption of Mobile Phone Technology

10. What factors have hindered or continue to hinder the adoption of mobile phone technology in your company? Use 5) Greater extent; 4) Great extent; 3) Moderate extent; 2) Low extent; 1) Very low extent

	5	4	3	2	1
Lack of top management commitment to technology implementation					
Lack of resources					
Resistance to change					
Lack of all stakeholder engagement					
Lack of effective measurement of quality improvement					
Lack of proper training/inadequate Human Resource Development					
Inadequate managerial skills					
Organization culture					
Compatibility with existing systems					
Systems reliability					

END