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Factors Affecting Performance of Inventory Tracking and Tracing System at Mechanical Stations in North Rift, Kenya

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Abstract

This research aims to evaluate the factors affecting effectiveness of a modern inventory tracking system in improving the logistics performance in public sector.A survey in the ministry of transport and infrastructure stations in the northern rift valley formed area for this study. In today's competitive marketplace which is characterized by rapidly changing business requirements, leveraging leading edge technologies and adopting best practices are essential in order to ensure sound logistical support that guarantees both effectiveness and efficiency in the transportation processes.

The main purpose of this research project is therefore to establish that the use of information technology is feasible in transport industries, explain possible obstacles and also any major advantages of its implementation. Secondly, as regards the theoretical aspect, a broadened view on the use of various positioning, and factors affecting effective inventory management systems. Within north Rift region, the division has no visibility progress on inventory while on transit, ware houses (stores) and relay heavily on manual information processing. Likewise, monitoring of whereabouts of its road working equipment to ensure they are not being misused. The region under the study has poor road network and inadequately cellular base station coverage. Quantitative statistical methods of analyzing limits will also be employed on the data collected from the field. Quantitative research, known as 'number-crunching', uses techniques that apply more to numerical data, where researchers develop variables or concepts which can be measured, and transform them into specific data-collection techniques. Questionnaires that were collected from the field were assigned unique identity number (coded) to represent various respondents. They were tabulated and subjected to a statistical analysis. Charts and graphs were generated to enable the researcher to make sufficient conclusions.

The study shows that an information Technology, Infrastructure and supply chain activity on the performance of inventory tracking systems has an effect on performance of inventory

tracking system. This implies that information Technology, Infrastructure and supply chain activities influence the activities on inventory tracking systems.The study also should that majority of personnel involved in mechanical division lack basic necessary skill s, and essential facilities to handle supply chain related activities.

Introduction

1.1 Background

The increase in the concomitant management requirements of vehicle fleet operations has outweighed the human mental capacity as advances in the technology of vehicular dynamics and design increase year after year. Over the past decade, firms have faced unprecedented change, namely, globalization and internationalization, the rapid advance of information technology (Chan & Peel, 1998), higher value of competition (Carr, 2002), increased availability and flexibility of products/services (Ahmad &Schroeder, 2001:16) as well as greater internal and external customer needs (Marjanovic, 2000).

Firms are, thus, no longer able to satisfy the various demands of their customers effectively with just product and price. Today, information technology (IT) is recognized as one of the most prevalent facilitators of such process changes (Chan & Land, 1999). IT not only enables firms to redesign their internal processes but it also helps them to improve their competitiveness in both local and international markets (Motwani& Kumar, 1998). The ability to track and control the movement of vehicles every minute may translate into hundreds of dollars as regards an organization's bottom line. Necessary costs, such as fuel and employee overtime, may be closely monitored and verified to ensure that a company is operating at optimal efficiency. For example, excessive vehicle idling not only uses fuel, but also causes unnecessary engine wear and tear.

In many advanced countries, there are several logistics projects taking place, with firms implementing new, advanced technologies such as global positioning system (GPS) and other wireless technologies (Shugan, 2004). In the same vein, in the developing countries, and especially in the East African community, the use of wireless technology is growing rapidly. For example, there are many such projects being undertaken in Kenya. While numerous studies concerning the technical aspects of GPS use have been conducted in developed countries in Europe and America (Adriansen& Nielsen, 2005; Bodamer, 2001; Stopher, FitzGerald &Xu, 2007), there is little information available on the use of the fleet management systems in Kenya and the only readily available information is on the marketing of different options of various equipment and software systems. There is, thus, little conclusive research evidence of the way in which the implementation of GPS fleet management system has changed internal processes in Kenyan firms.

The American Production and Inventory Control Society (APICS) define inventory management as the branch of business management concerned with planning and controlling inventories (Toomey,2000). Inventory management is a critical management issue for most companies – large companies, medium-sized companies, and small companies.Logistics is all about managing inventory, whether the inventory is moving or staying, whether it is in a raw state, in manufacturing, or finished goods (Goldsby&Martichenko, 2005). Logistics and inventory management are embedded in each other and tied up closely.The "Bill of 'Rights'" that logistics professionals often repeat is to deliver the right product to the right place, at

the right time, in the right quantity and condition, and at the right cost (Goldsby et al., 2005). To make it happen, effective inventory management is a cornerstone.

Supply chain management coordinates and integrates all of these activities into a seamless process. During the process, inventory holding and warehousing play an important role in modern supply chains. A survey of logistics costs in Europe identified the cost of inventory as being 13 per cent of total logistics costs, whilst warehousing accounted for a further 24 per cent (European Logistics Association/AT Kearney, 2004). As well as being significant in cost terms, they are important in terms of customer service, with product availability being a key service metric and warehousing being critical to the success or failure of many supply chains (Frazelle, 2002).

At Present the growth of small businesses and their impact on the entire economy is becoming clear (Chapman, Ettkin & Helms, 2000). Based on The European Observatory for SMEs-Fifth Annual Report (ENSR, 2004), more than 99% of the total number of enterprises in all EU countries is small and medium-sized enterprise (SME). In Sweden, for example, SMEs contribute 99.79% of all enterprises and they provide 96 percent of all employment. The average employment size for these SMEs is around 7 people. And SMEs account for approximately 50% to the UK gross domestic product and nearly 70% of employment (CBI, 2000; cited in Quayle, 2003). SMEs obviously become a vital part of national economy.

The research study was centered in the Kenyan North Rift region, in the ministry of transport and Infrastructure, in the division of Mechanical and transport. The provide capacity to small, Medium, and up-coming road contractors. The research is going to cover a total of six counties, namely Turkana, Uasin Gishu, Nandi, Trans Nzoia, Elgeyo-Markwet, and West Pokot.

The division of mechanical and transport has a network of road working equipment's (Machineries) that are pooled in a total of twenty two regions all over the republic. All these road machineries are hired for a fee. With mechanical, you do not need to own an equipment to be a contractor. The department also eliminates unnecessary costs of operation, maintenance, and owner off the shoulders of upcoming contractors. The research targeted engineers, stores or ware house managers, store keepers, mechanics, plant operators and truck drivers. These are the people who are actors in this supply chain.

1.2 Statement of the Problem

An organization's primary aim is to be able to determine the ongoing location of the equipment/ inventory within its facilities. However, the mechanical and transport division, ministry of transport and infrastructure is facing several tracking challenges during the process described here under.The division receives or issues of time when the inventories are dispatched from its central store in Nairobi, but has no visibility of its transportation progress until the time deliveries are recorded at its various regional warehouses. Therefore, although delivered, the parts (Machine parts) do not appear on the information system, as they are regarded to be still in transit or lost.

Furthermore, the manual inventory and documentation inspection along the manual booking into S3 cards creates a serious operational burden for the organization. The parts, oils, and lubricants again undergoes, manually issuing to the field stations, which leads to a significant

operational delays and causes the division to be temporarily outdated. Moreover, the division cannot monitor the location of equipment that has left the receiving warehouse and has not yet been received and booked in the field facilities. Monitored inventory have fewer possibilities to be defect and met specifications set by the firms, consequently ensure the quality to a certain level. Product monitoring enables cost saving against defective product recall (Lyles et al., 2008).

For this reason, tracking of inventory along the supply chain is fragmented. This information is not encoded in information system. It is therefore, managed in paper, which accompanies the parts and equipment to the field stations. This results in risk of data inaccuracies that need to be resolved during the stock taking. Manual inventory inspection, identification, and booking into the S3 cards create a significant operational bottle neck. Zsidisin et al., (2000) define supply chain risk as "the potential occurrence of an inbound supply incident which leads to the inability to meet customer demand.

1.3 Objectives

1.3.1 General Objective

The general objective is to investigate the factors that affect effective inventory tracking and tracing in public sector.

1.3.2 Specific objectives

The following form the specific objective of this study;

(a) To investigate the influence of information technology on inventory tracking and tracing system in public sector.
(b) To establish the effects of physical infrastructure effective inventory tracking and tracing system in public sector.
(c) To investigate how supply chain activities influences performance of inventory tracking and tracing system in public sector.

1.4 Research Questions

(a) How does manual information technology affect effectiveness of inventory tracking and tracing system in public sector?
(b) How does physical infrastructure affect effectiveness of inventory tracking and tracing system in public sector?
(c) How do supply chain activities influence the performance of inventory tracking and tracing system in public sector?

1.5 Justification

The first contribution of this research provides comprehensive knowledge to firms, especially in maintenance industry, to help them gain the understanding on how to reap benefits from the costs that they are forced to struggle with.

The second contribution of this research provides a holistic view to firms in supply chains on how they can mitigate their risks of increasing cost from traceability implementation to long terms economic sustainability.

Finally, this research can contribute to researchers in the supply chain and sustainability areas by providing a comprehensive review to make inspirations for further research areas.

1.6 Scope

For the purposes of this project, the researcher will concentrate his survey in North Rift Region of Kenya. North Rift covers a total of six counties, namely Turkana, Uasin Gishu, Nandi, Trans Nzoia, Elgeyo-Markwet, and West Pokot. The project will cover items like road construction machineries, machine parts, lubricants and related information, as items move from one place to another.

Ministry of transport and infrastructure in north rift region has a combined staff population of three hundred (300) in different categories.

1.7 Limitation

Due to limitation of time, it will be impossible for the researcher to conduct a thorough survey in the entire north rift owing to poor state of communication infrastructure. The dilapidated road network, the researcher may not visit all physical logical facilities that is core to this study. Each and every field station in this region, presented varying monitoring challenge worthy studying. Also, the inadequate financial resources available for this study, inventory situation monitoring systems may not be fully studied. Some parts forming scope of this study may be excluded due prevailing security. Areas like Baringo's Kapedo, Turkana, and parts of West Pokot are none go zone, hence posing limitation to this study.The poor road network lack proper physical logistical facilities like stores and warehouses, the result of this study may be compromised.

Since north rift region is extremely large, the number of data collection instrument may not be adequate with limited resources coming from researcher himself. Also a large number of data collection instrument send by post may not arrive in time to the identified respondent and returned, thus affecting the expected result. Practical implementation of the pilot study will be performed to a selected location that somehow presents a more representative of the entire region.

2.2 Theoretical framework

Uma Sekeran (2010) posit that a theoretical framework is a conceptual model of how one theorizes or makes logical sense of the relationships among the several factors that have been identified as important to the problem. The theory flows from logically from the documentation of previous research in the problem area by identifying the theories related to the study. This study will be guided by the following theories of; Cox theory, Transactional cost theory, Resource based view theory, Bensaou theory, and Industrial marketing and purchasing theory. The analysis of this theory linked other theories to this study and brings out research gaps.

2.2.1 Inventory theory

Inventories are materials stored, waiting for processing, or experiencing processing. They are ubiquitous throughout all sectors of the economy. Observation of almost any company balance sheet, for example, reveals that a significant portion of its assets comprises inventories of raw materials, components and subassemblies within theproduction process, and finished goods. Most managers don't like inventories because they are like money placed in a drawer, assets tied up in investments that are not producing any return and, in fact,

incurring a borrowing cost. They also incur costs for the care of the stored material and are subject to spoilage and obsolescence. In the last two decades there have been a spate of programs developed by industry, all aimed at reducing inventory levels and increasing efficiency on the shop floor. Some of the most popular are conwip, Kanban, just-in-time manufacturing, lean manufacturing, and flexible manufacturing**.**Nevertheless, in spite of the bad features associated with inventories, they do have positive purposes. Raw material inventories provide a stable source of input required for production. A large inventory requires less replenishment and may reduce ordering costs because of economies of scale. In-process inventories reduce the impacts of the variability of the production rates in a plant and protect against failures in the processes. Final goods inventories provide for better customer service. The variety and easy availability of the product is an important marketing consideration. There are other kinds of inventories, including spare parts inventories for maintenance and excess capacity built into facilities to take advantage of the economies of scale of construction

2.2.2 Resource based view theory

Krippendorf (2014) posits that resource-based view (RBV) has since become one of the dominant contemporary approaches to the analysis of sustained competitive advantage. A central premise of the resource-based view is that firms compete on the basis of their resources and capabilities. Srivastava, Franklin, &Martinette (2013) found out that most resource-based view researchers choose to "look within the enterprise and down to the factor market conditions that the enterprise must contend with, to search for some possible causes of sustainable competitive advantages" holding constant all external environmental factors.Galvin, Rice, & Liao (2014) posit that a firm's resource must, in addition, be valuable, rare, and imperfectly imitable and substitutable in order to be a source of a sustained competitive advantage. Rašković, Brenčič, Fransoo, & Mörec(2012),postulates that each firm is characterized by its own unique collection of resource of core competencies. Kirchoff (2011) established that the source of competitive advantage is the creation and exploitation of distinctive capabilities that are difficult to build and maintain, codify and make into recipes, copy and emulate, and can't simply be bought off the shelf. Kozlenkova, Samaha&Palmatier (2013) asserts that there are three basic distinctive capabilities; (a) corporate architecture (b) innovation (c) Reputation. Raškovićet al., (2012) identifies the following propositions on distinctive capabilities, (a) Arm's length relationships, which are associated with low asset specificity and low supplier competencies that can easily be bought off the shelf as there are many potential suppliers,(b) internal contracts, which is an in-house provision associated with high asset specificity and core competencies, (c) partnership relationships, which applies to assets of medium specificity and ascend in steps according to the distance of the complementary competencies provided by external suppliers from the core competencies of a particular firm. Karjalainea et al., (2013)posits that the issue of firm performance has been central in strategy research for decades and encompasses most other questions that have been raised in the field, as for instance, why firms differ, how they behave, how they choose strategies and how they are managed. Dowell et al., (2010) asserts that in the 1990s, with the rise of the resource-based approach, strategy researchers' focus regarding the sources of sustainable competitive advantage shifted from industry to firm specific effects.

2.2.3 Transactional cost theory

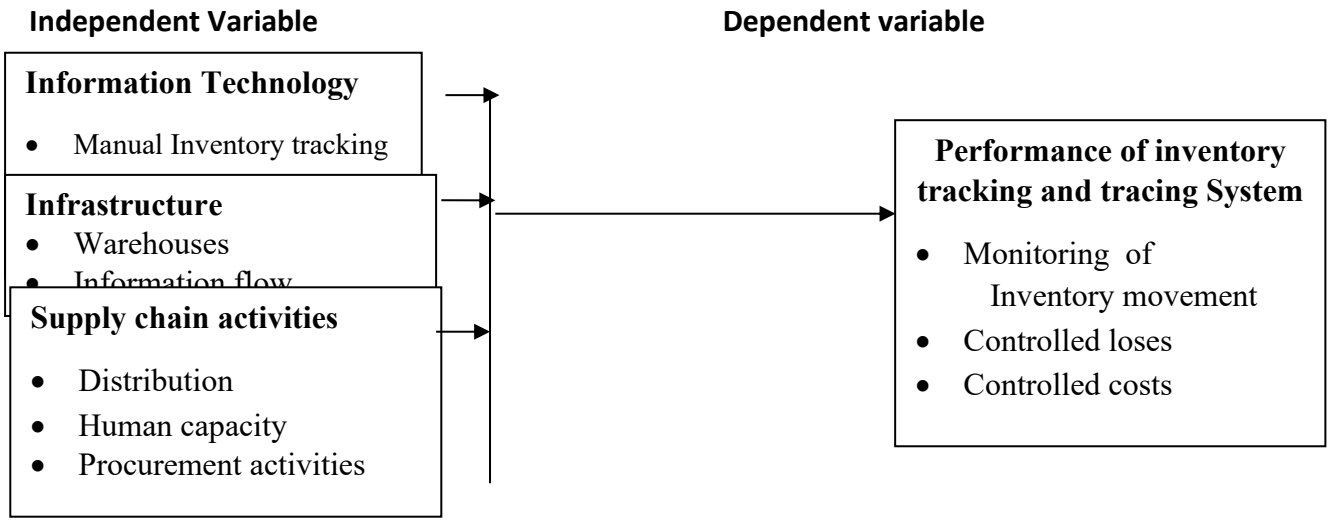
Chicksand (2012) defines transaction cost as the cost of providing for some good or service through the market rather than having it provided from within the firm. Greenwood &

Scharfstein (2013) contends that without taking into account transaction costs as it is impossible to understand properly the working of the economic system and have a sound basis for establishing economic Policy. Hart & Dwivedi (2010) avers that three key concepts are those of transaction costs, asset specificity, and asymmetrical information distribution. Oliver(2010), posits that in order to carry out a market transaction it is necessary to discover who it is that one wishes to deal with, to conduct negotiations leading up to a bargain, to draw up the contract, to undertake the inspection needed to make sure that the terms of the contract are being observed, and so on.

Beard, Sadri, Kangari, Augenbroe, Anumba & Roper (2011) avers that transaction costs are: (a) search and information costs, (b) bargaining and decision costs, and (c) policing and enforcement costs. Beard et al., (2011) avers that this can be decomposed further into four separate costs related to transacting: (a) search costs, (b) contracting costs, (c) monitoring costs, and (d) enforcement costs. Search costs include the costs of gathering information to identify and evaluate potential trading partners. Contracting costs refers to the costs associated with negotiating and writing an agreement. Monitoring costs refer to the costs associated with monitoring the agreement to ensure that each party fulfills the predetermined set of obligations. Enforcement costs refer to the costs associated with ex post haggling and sanctioning a trading partner that does not perform according to the predetermined agreement.

2.5 Conceptual Framework

Basing on literature review, a conceptual framework will be conceived where performance of tracking and tracing of inventory in mechanical stations of; Inventory theory, Resource based view theory, Transactional cost theory, and Supply chain activities , and moderating factor of Government regulations which distorts the dependent factor of performance of tracking and tracing of inventory as shown in figure 2.1 below.



3.0 Research Methodology

Research methodology comprises a body of knowledge that enables researchers to explain and analyses the research methods that will be used, indicating limitations and resources, identifying its presuppositions and consequences, and relating the potentialities to research advances (Miller, 1983). Research design may be viewed from many perspectives and is often seen as controversial (Knox, 2004). However, it underpins the types of questions that may be addressed and the nature of the evidence that is generated (Clark, Lotto &Astuto, 1984).

Accordingly, the issue of research methodology is essential to any study and an appropriation between the research paradigm, type of data, and collection methods has significant implications for the research findings. A research methodology is a systematic process which is followed in conducting a research study (Kothari, 2005).

The research methodology assists in fulfilling the purpose of the study in question. The methodology, tools and instruments must, therefore, be systematic, valid, reliable, neutral and objective. The choice of research method constitutes the foundation on which the entire research is conducted. In this chapter, the research methodology used in this study is described. The primary objective of this study is to investigate the factor that affects effectiveness of the inventory tracking and tracing in public sector in Kenya.

3.1Research Design

In this research, descriptive research approach was adopted. This is a kind of study that is concerned with describing the characteristics of a particular group of individual. The researcher used descriptive method of research to establish what difficulties were being experienced by parties involved in the supply chain while contacting their day to day activities. According to Bryman and Burgess (1999), there is a tendency for quantitative researchers to reach generalized findings while contextual understanding outlines the basis for qualitative research. Since the units that form this study fell in various categories, great care was taken to make sure proper sample representation is selected. Proper segmentation of the populations was exercised to make sure all necessary information was obtained.

The researcher applied recognized statistical methods of data analysis to a certain reliability and validity of the instruments to be used. These two facts were used to ensure the finding fell within what was intended should the research be done at a future time.

3.2 Target Population

The ministry of transport and infrastructure as a survey for this study has a population of three hundred (300) staff at its various field stations. Out of the total population, the research targeted about 10% (Mugenda O.M. and Mugenda A.G, 1999). For the purpose of this project, the researcher concentrated its survey in North Rift Region of Kenya. North Rift covers a total of six counties, namely Turkana, Uasin Gishu, Nandi, Trans Nzoia, Elgeyo-Markwet, and West Pokot.

The employees in this region are fall in various categories as follows; Engineers, Technicians, Clerks, Accountants, Storekeepers, Plant Operators, Plant Mechanics, Mechanics, Drivers, and subordinate staffs. The research used stratified sample design to make sure units to be selected contribute to the research objective. Questionnaires were prepared and a pilot study was conducted to ascertain that expected response was realized. The research mainly targeted staff (units) who were directly involved in the supply chain of the mechanical and transport fund.

3.3 Sampling Frame

The ministry of transport and infrastructure has a combined population of three hundred staff in different categories. The table below shows staff in their job description.

Table 3.1 Population as per job description

Category	Population Size	Percentage (%)
Engineers	6	2.00
Technicians	40	13.33
Plant Operator/Drivers/Mechanics	120	40.00
Procurement Officers/Storekeepers	30	10.00

Clerical/Subordinate Staff	114	34.67
Total	**300**	**100**

Source: Researcher (2016)

3.4 Sample size and Sampling Technique

Sampling is the strategy of selecting a smaller section of the population that accurately represented the patterns of the target population at large (Sarantakos, 2000). It was neither possible nor was it necessary to collect information from the total population. Instead, a smaller subgroup of the target population or a sample was selected for the purpose of the study and may be used to represent the population.According to Blumberg et al. (2005), there are generally two main types of sampling design, probability and non-probability. Probability sampling was a technique based on the randomly selected sample, there was a procedure to ensure that each and every population element was given a fair chance of being selected. Non-probability sampling, on the other hand, was purposive and subjective (Blumberg et al., 2005), there was no control mechanism to ensure each element in the population had equal chance of being selected.

This research considered only those job description whose activities were directly involved in supply chain. Those in the areas of accounts, clerical and subordinate were not considered, hence this study adopted one hundred and six (196) staff as its target population. The research used stratified sample design while selecting units for the study since staff population fell in different categories.

The research targeted approximately 44% (Solvin, 1960) of the entire workplace which was about fifty (300) for this study.

$n= \frac{N}{1+Ne^2}$, Where; n =?, N = 196, e = 8% as a margin of error,

1 = is a constant value.

$n=\frac{196}{1+196\times0.08^2}$

= 87 Respondents.

Also, Mugenda and Mugenda (1999) states, sample size can be as low as 10% for a homogeneous population that represents well the units of study. Some units in their category for the study were fewer; hence a whole population was considered.

Table 3.2: Sample Size

Category	**Population Size**	**Percentage (%)**
Engineers	6	6.89
Technicians	17	19.54
Plant Operator/Drivers/Mechanics	52	59.77
Procurement/Storekeepers	13	13.79
Total	**87**	**100**

Source: Researcher (2016)

3.5 Data collection procedure

The researcher mainly used questionnaire as instrument of gathering data. In this study various means were used to gather data as posting, emailing, and hand delivery Opportunity of hand delivering questionnaires helped the researcher to further have personal assessment of the situation was like. Survey was adopted as a way of collecting primary data because of its versatility. According to Blumberg et al. (2005), by surveying, we can learn much about opinions and attitudes as well as intentions and expectations. Since the purpose of this study

was to gain employee perception of the organization's resource commitment, and found out the link between customer perception and customer loyalty, survey is an appropriate approach to be employed in the study.

3.6 Pilot

Since time was not sufficient for this study to carry out thorough research, also due to inadequate resources to get a sample of optimum size, a pilot study was carried out just like parent research to find out among other things to adapt or check the feasibility of techniques, to determine the reliability of measures and or to calculate how big the final sample need to be. This was important to ascertain the accuracy of research instruments or to see if expected result could be achieved. Any error in the instrument of collecting data was corrected at this point. While conducting a pilot study, care had to be taken by designing sample that would be the main research.

3.7 Validity of the Research Instruments

Sekaran (2010) aver that validity is the degree to which a statistical instrument measures what it is intended to measure and it emphasis the accuracy of those instruments and the two types of validity are internal and external. External validity refers to the extent to which the findings and results of a study could be generalized to other particular research samples. In the context of internal validity, there are two kinds of validity; face and criterion validity. Face validity is the extent to which a logical relationship exists between the variables and the proposed measure in the study. It does not provide enough proof of validity since it is subjective. This validity was essential in this study because it's a logical measure of public procurement law.

Content validity is the extent to which research instruments adequately cover the constructs being studied. It is usually achieved by seeking opinion of other experts. To ensure that the public procurement law instrument has content validity, the study used factor analysis as the most powerful tool used to measure construct validity, where the more variance explained by the factors resulting from the factor analysis, the more powerful the instrument in measuring what is supposed to measure. Construct validity testifies to how well the results obtained from the use of the measures fit the theories around which the test is designed. This can be attested using convergent validity, which is established when using scores obtained with two different instruments measuring the same concept are highly correlated, and Discriminant validity.

3.8 Reliability of the research instrument

Reliability refers to the extent to which a statistic is without bias and hence ensures consistent measurement across time and the various items in the instrument (Sekaran, 2010). Rapp (2012) posit that internal consistency of a set of measurement items refers to the degree to which the items are homogeneous and can be estimated using a reliability coefficient such as Cronbach's alpha. Cronbach's alpha correlates each item with each other item, and the total score. Items with weaker correlations or low scores can be removed to leave an instrument with a high degree of homogeneity. Based on this, an internal consistency analysis will be performed for each statement corresponding to each of the identified multi-sourcing practices constructs and the various values of Cronbach's alpha for each construct of which a reliability co-efficient of 0.9 is excellent, 0.80 and above is considered good, 0.7 and above is acceptable, 0.6 and above is poor, and 0.5 above and below is unacceptable

3.9 Data analysis procedure

The data was presented in form of descriptive narratives, frequency tables, bar graphs and pie charts to explain the findings of the study. Quantitative techniques such as percentages,

and frequencies were used. Tables, graphs, and charts were used to present findings where applicable. Equally quantitative analysis used correlations among other tools such as chi-square to analyze relationship between the model;

$Y= \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3+\mu$, Where; Dependent variable was Y =Performance of inventory tracking and tracing System and Independent variables were:

information technology X_1
Supply chain activities X_2
Infrastructure X_3
Constant term, β_0
β Beta coefficients,
Error term. μ

Before running the linear multiple regression models, the model was tested for existence of multi-collinearity and heteroskedasticity at 95% confidence interval

Results And Discussion

4.1 Introduction

The objective of this study aimed at investigating the factors that affect effective inventory tracking and tracing in public sector of North Rift. Descriptive and inferential statistics were used to analyze the data which was collected through questionnaires. This included percentages, pie charts, graphs and tables.

4.2Response rate

The researcher issued 87 questionnaires to the respondent who filled and returned them. The table below shows how the respondents responded to the questionnaire

Table 4.1: Response Rate

Response rate	Frequency	Percentage
Response	72	82.8%
Non response	15	17.2%
Total	87	100%

Source: Field data 2016

4.3 Gender of the respondent

The study aimed to establish the gender of the respondents who participated in the study. As presented in figure 4.1 majority (70.8%) of the respondents were male, and 29.2% were female.

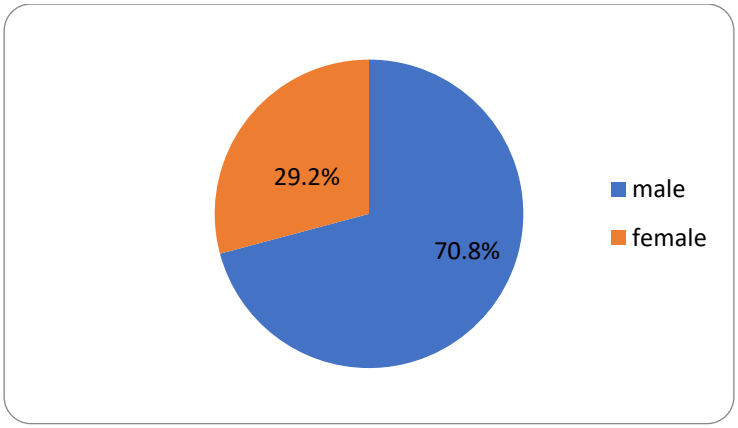


Figure 4.1: Gender of the respondent

4.4: Age distribution of the respondents

The figure 4.2 shows the age of the respondents. The figure shows that majority (54.2%) of the respondents were within the age bracket of 41-45 years, 2.8% of the respondents were within the age bracket of 26-30 years, 18.1% of the respondents were within the age bracket of 31-40years and 25.0% of the respondents were within the age bracket of 46 years and above. This results indicates that majority of the people who involve in the study are within the age brackets of 41-45years.

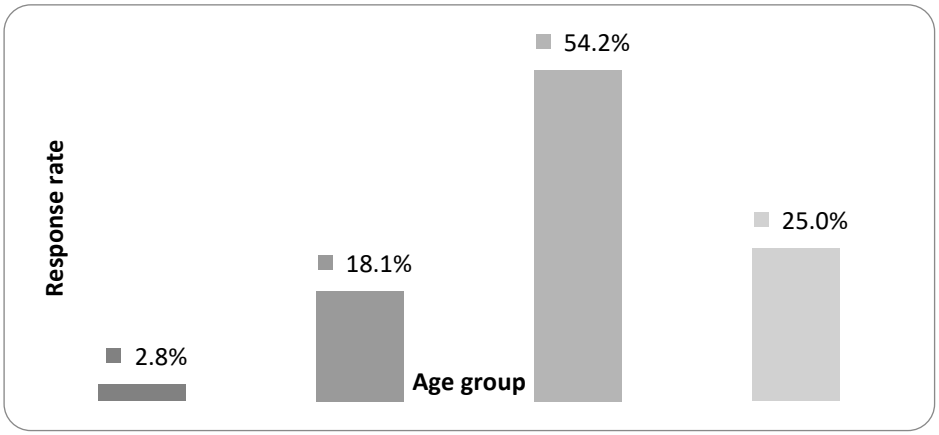


Figure 4.2: Age of respondent

4.5: Work Experience of the respondent

The Table 4.2 shows the number of years the respondents have worked in the organization. The figure shows that majority (47.2%) of the respondents have an experience of between 16-20 years, 1.4% of the respondents have an experience of 5-10 years, 22.2% of the respondents have an experience of between 16-20 years and 29.2% have an experience of 21 years and above. This results indicates that majority of the people who involve in the study have an experience of between 16-20 years.

Table 4.2: Work Experience

	Frequency	Percent	Valid Percent
5-10 years	1	1.4	1.4
11-15 years	16	22.2	22.2
16-20 years	34	47.2	47.2
21years and Above	21	29.2	29.2
Total	72	100.0	100.0

4.6: Training in inventory management

The figure 4.3 shows presence or absence of training in inventory management. As presented in figure 4.3 majority (75%) of the inventory management had no training, and 25% had inventory management training.

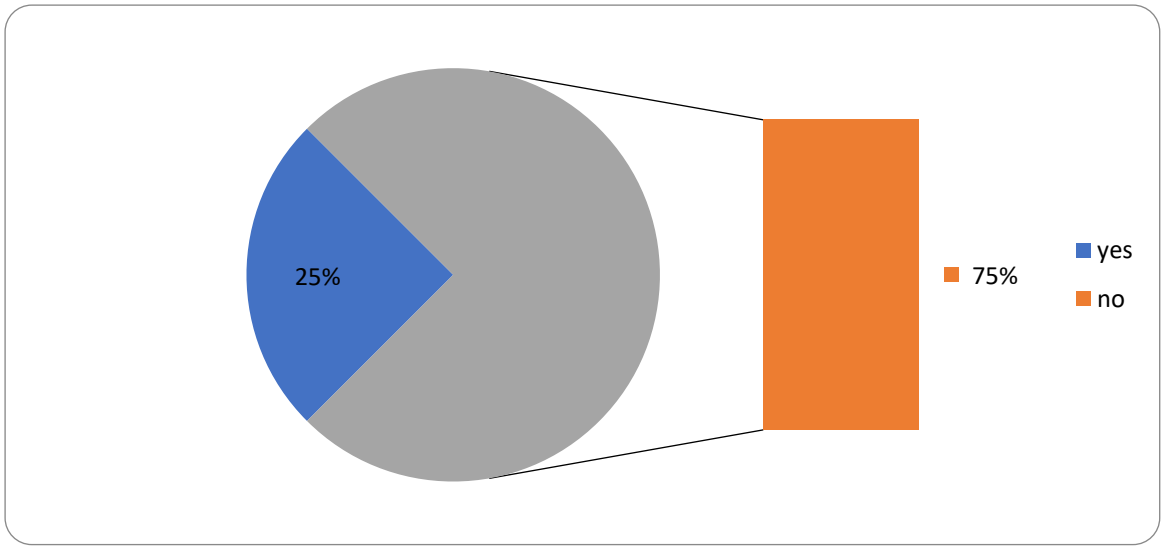


Figure 4.3: Training in inventory management

4.7: Use of IT in processing of product information

The figure 4.4 shows the use of information technology in processing of product information. From the figure majority (88.9%) of the respondents don't use information technology in processing of product information, only 11.1% of the respondents used IT. The result shows that, majority of the respondents used the manual ways in processing of product information.

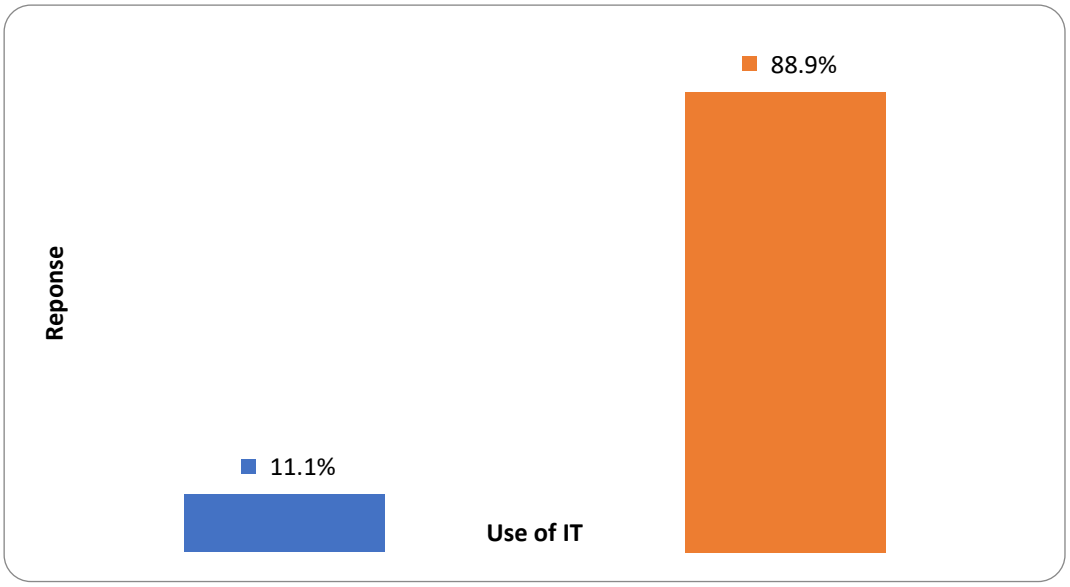


Figure 4.4: Use of IT in processing of product information

4.8: Wait time

The table 4.3 shows time taken between receiving inventory and the time central stores are notified of the receipt. As presented in the table below most of time was taken between 4 to 7 days which registered highest percentage of 61.1%, between 0 to 3 days had wait time of 27.8% and between 1 to 3 weeks there was less wait time. The results show that longer wait time, inventory is received very fast and also central store are notified of the receipt quickly.

Table 4.3: Wait time

	Frequency	Percent	Valid Percent
0-3 days	20	27.8	27.8
4-7 days	44	61.1	61.1
1-3 weeks	8	11.1	11.1
Total	72	100.0	100.0

4.9: How manual processing of inventory information affect the operation

The table 4.4 shows how manual processing of information affected operation. To greater extent majority (81.9%) of respondents were highly affected by processing information manually.

Table 4.4: Extent of manual processing of information on operation

	Frequency	Percent	Valid Percent
Great extent	59	81.9	81.9
Moderate	10	13.9	13.9
Low extent	3	4.2	4.2
Total	72	100.0	100.0

4.10: State of physical infrastructures in the station

The objective this study was to investigate the state of physical infrastructures which included: Road networks, Warehouses and Stores. This study showed that majority (40.3%) of infrastructures was fairly good, 22.2% of the infrastructures were very good and 37.5% of the infrastructures were very poor.

Table 4.5: State of physical infrastructure

	Frequency	Percent	Valid Percent
Very good	16	22.2	22.2
Fair	29	40.3	40.3
Very poor	27	37.5	37.5
Total	72	100.0	100.0

4.11: If the states of infrastructure affect the levels of inventory in the station

The states of infrastructures significantly affected the levels of inventory in the station by 97.2%, only 2.8% of the stations were not significantly affected by states of infrastructures.

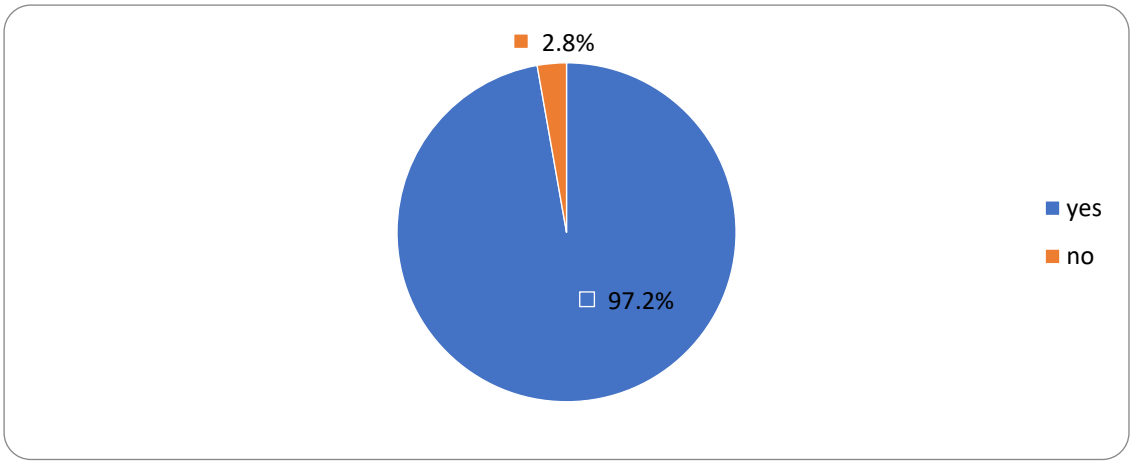


Figure 4.5: State of infrastructure

4.12: How physical infrastructure would improve effectiveness of inventory

The figure 4.6 shows how physical infrastructures would improve effectiveness of inventory. The results showed that good physical infrastructures would improve effectiveness of inventory by 93.1% and the moderate infrastructures would contribute to only 6.9%.

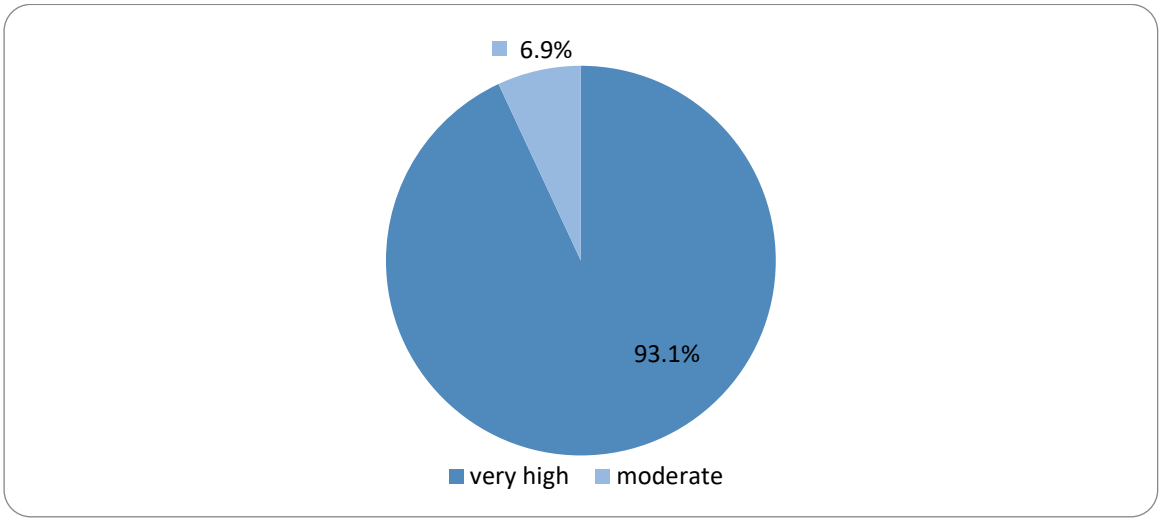


Figure 4.6: State of infrastructure

4.13: Inventory tracking system in the station

The figure 4.7 shows whether then station had inventory system. 91.7% of the stations had inventory tracking systems but only 8.3% of the stations had no inventory tracking systems.

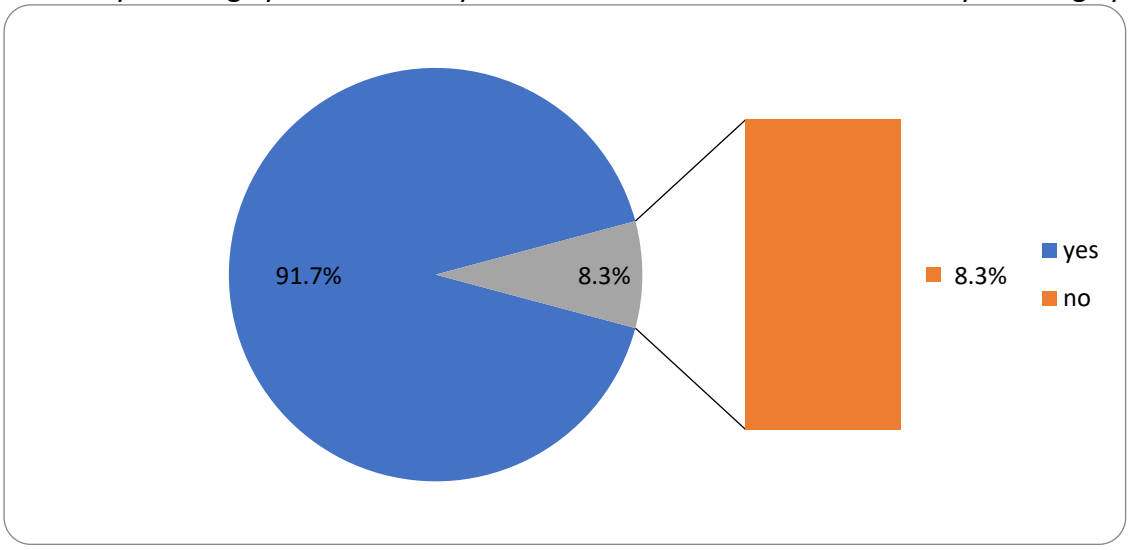


Figure 4.7: Inventory tracking systems

4.14: Instrument used to track inventory

The figure 4.8 shows that 13% of the stores use information technology systems to track inventory while 87% use

manuals.

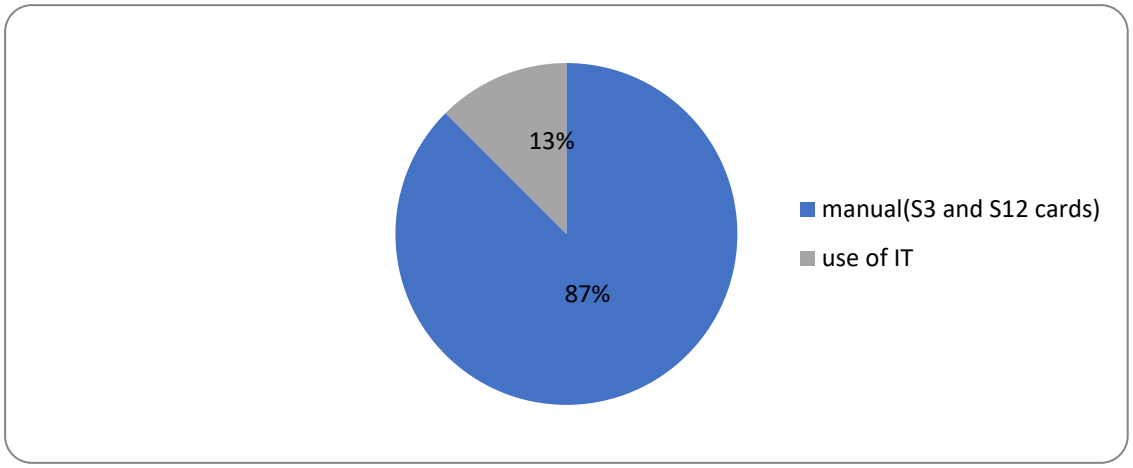


Figure 4.8: Instrument used to track inventory

4.15: If stations employ warehouse management systems

The figure 4.9 shows that 11% of the stations employed warehouse management systems to monitor various stocks and related information but the majority of the stations (89%) never used warehouse management systems.

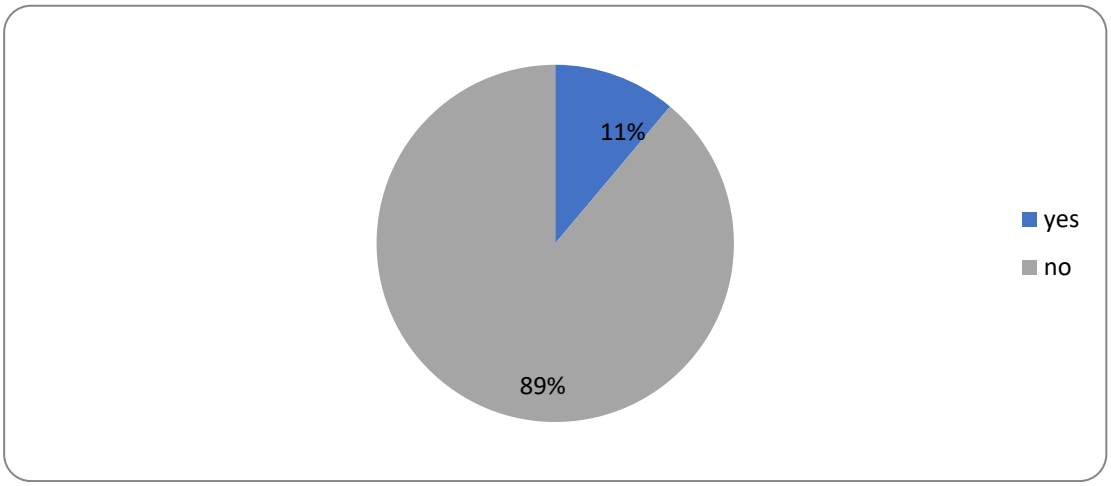


Figure 4.9: Use of warehouse management systems

4.16: How to rate importance of GPS (geographical positioning system)

The Figure 4.10 shows how respondents react on using geographical positioning system fleet tracking system in the improvement of efficiency in vehicle and plant operations. The figure shows that majority (83.3%) of the respondents rated the use of geographical positioning very high and there was an equal rating of use of geographical positioning system of 8.3% for both moderate and low rating. This results indicates that majority of the people were much interested in using GPS this showed that it was very important in vehicle and plant operation.

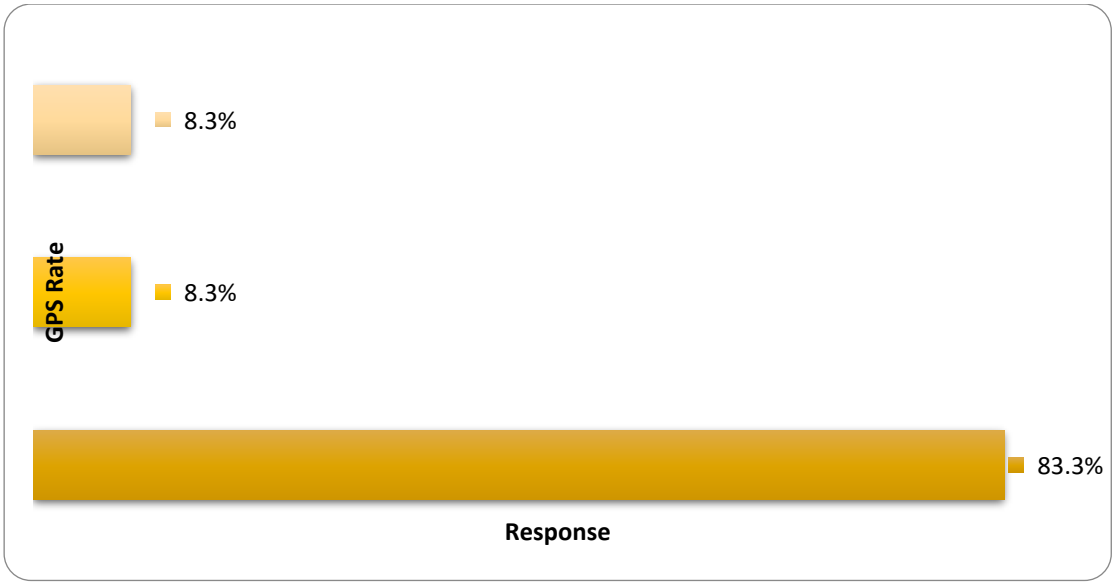


Table 4.10: Rate of GPS

4.17: Mobile phone coverage in the station

The study was to investigate the coverage of mobile phones in the working stations. The results from the table 4.6 showed that the coverage was fairly good with 44.4%, 22.2% of the mobile coverage was very good and 33.3% coverage was very poor.

Table 4.6: Mobile coverage

	Frequency	Percent	Valid Percent
Very good	16	22.2	22.2
Fair	32	44.4	44.4
Very poor	24	33.3	33.3
Total	72	100.0	100.0

4.18: Effect of cellular networks coverage to fleet management

The figure 4.11 shows how cellular network coverage affects the fleet management. The majority (87%) of cellular network coverage affected the fleet management and there was a small effect of 13% to fleet management.

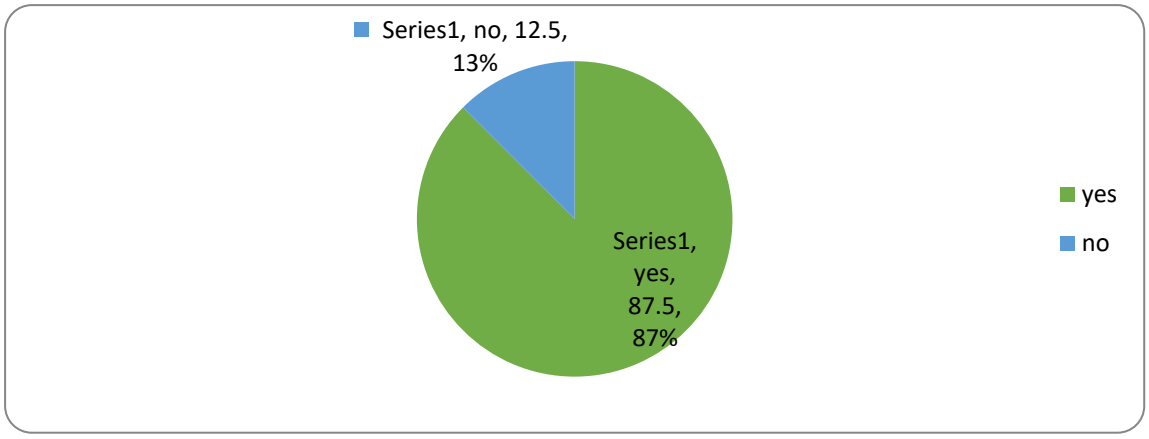


Figure 4.11: Effect of cellular networks coverage

4.19: How information technology influences performance of inventory tracking and tracing system

Table 4.7: How IT influences performance of inventory tracking and tracing system

STATEMENT	SD	D	UD	Agree	SA
Information Technology influences the performance of Manual Inventory tracking systems	80.6 %	6.9%	0%	5.6%	6.9%
Information Technology influences the performance of the cost of Inventory tracking systems	70.8 %	6.9%	0%	2.8%	19.4%
Information Technology influences the overall performance of Inventory tracking systems	1.4%	0%	0%	16.7%	81.9%
Information Technology Skills influences the overall performance of inventory system	0%	0%	0%	12.5%	87.5%
Information Technology Skills influences working of tracking system of inventory system	0%	0%	0%	9.7%	90.3%
Information Technology Network systems influences working of tracking system of inventory system	0%	0%	0%	11.1%	88.9%
Information Technology Network systems creates efficiency of inventory system	0%	0%	0%	5.6%	94.4%

4.20: Perception of staff towards the implementation of inventory tracking and tracing system

Table 4.8: Perception of staff towards the implementation of inventory tracking and tracing system

STATEMENT	1	2	3	4	5
Adoption of modern information technology in fleet management has led to improved efficiency in service delivery at Mechanical and transport division	0%	0%	0%	5.6%	94.4%
Adopting new technology equipments are a necessary tool for efficiency in service delivery.	1.4%	0%	0%	8.3%	90.3%
Increased use of modern IT solutions will result in longer term relationships with prospective customers	1.4%	0%	0%	11.1%	87.5%
Organizations must be able to integrate knowledge from Information technology to deliver new products or service efficiently	1.4%	0%	0%	9.7%	88.9%
In a fast moving world constant improvement on IT is essential for survival and success in efficiency in service delivery	1.4%	0%	0%	5.6%	93.1%

The questions were measured on a scale of 1-5, with 1 indicating strongly disagree, 2-Disagree, 3-Undecided, 4-Agree and 5 indicating strongly agree to the question that was asked.

4.21: Influence of infrastructure on the performance of inventory tracking and tracing system

Table 4.9:
Influence of infrastructure on the performance of inventory tracking and tracing system

STATEMENT	1	2	3	4	5
Warehouses influences the performance of Inventory tracking and tracing systems	0%	1.4%	0%	15.3%	83.3%
Warehouses allow wares to be monitored by the Inventory tracking and tracing systems	0%	0%	0%	9.7%	90.3%
Warehouses add value to wares by allowing controls in the form of theft and pilferage	0%	0%	0%	15.3%	84.7%
Information flow is essential in the monitoring of inventory and wares	0%	1.4%	0%	9.7%	88.9%

Information flow provides an essential component of tracing the wares	0%	1.4%	0%	12.5%	86.1%
Procurement activities provides an essential component of replacing prerequisite wares	0%	0%	1.4%	12.5%	86.1%
We use Procurement activities to manage all the activities that take place in the organization	0%	1.4%	0%	15.3%	83.3%

The questions were measured on a scale of 1-5, with 1 indicating strongly disagree, 2-Disagree, 3-Undecided, 4-Agree and 5 indicating strongly agree to the question that was asked.

4.22: Supply chain activities on the performance of inventory tracking and tracing system

Table 4.10:

How supply chain activities influence performance of inventory tracking and tracing system

STATEMENT	1	2	3	4	5
Distribution function influences the performance of Inventory tracking and tracing systems	0%	0%	1.4%	13.9%	84.7%
Distribution function enables the availability of wares	0%	0%	1.4%	12.5%	86.1%
Distribution function uses Inventory tracking and tracing systems to monitor wares	0%	0%	1.4%	13.9%	84.7%
Human capacity is essential on the performance of Inventory tracking and tracing systems	1.4%	1.4%	0%	15.3%	81.9%
Human capacity does not manipulate Inventory tracking and tracing systems	13.9 %	0%	1.4%	8.3%	76.4%
Alliances are essential in the management of supply chains	5.6%	0%	1.4%	11.1%	81.9%
Alliances allow competitiveness in the sourcing process	0%	0%	1.4%	9.7%	88.9%

The questions were measured on a scale of 1-5, with 1 indicating strongly disagree, 2-Disagree, 3-Undecided, 4-Agree and 5 indicating strongly agree to the question that was asked.

4.23: Performance of inventory tracking and tracing systems

Table 4.11:

Factors influence performance of inventory tracking and tracing

STATEMENT	1	2	3	4	5
Monitoring of movement of wares influences the performance of Inventory tracking and tracing systems	1.4%	0%	1.4%	16.7%	80.6%
Monitoring of movement of wares bring efficiency in the organization	0%	0%	0%	13.9%	86.1%
Effective use of Inventory tracking and tracing systems brings controlled loses	0%	0%	0%	16.7%	83.3%
Effective use of Inventory tracking and tracing systems creates efficiency	0%	0%	0%	19.4%	80.6%
Effective use of Inventory tracking and tracing systems leads to controlled costs	0%	0%	0%	6.9%	93.1%

4.24: Correlation And Regression Analysis

4.24.1: Correlation Analysis

In order to check whether the variables are related, the Pearson Correlation Coefficient (Pearson *r*) was used in this study (Jahangir & Begum, 2008). Pearson *r* is a measure of the magnitude and direction of the linear relationship between two variables (Mugenda & Mugenda, 2003). The values of the correlation coefficient always range from -1 to +1. If it lies near to -1, it shows a strong negative correlation but if it lies near to +1 it shows a strong positive correlation (Kothari, 2014). According to Gujarati & Porter (2008), correlation should not go beyond 0.8 to avoid multicollinearity. According to Nduati (2015), multicollinearity occurs when two or more variables in the model are correlated and provide redundant information and therefore values of r greater than 0.8 were used as indicator of multicollinearity problem in this study. According to Ngumi (2013), when significance level is very small (less than 0.05) then the correlation is significant and the two variables are linearly related and if the significance level is relatively large, for example, 0.50 or more, then the correlation is not significant and the two variables are not linearly related. As presented in table 4.12, there is a significant relationship between the dependent variable (Y) and other independent variables.

Table 4.12: Correlation analysis

		Y	X1	X2	X3
Y	Pearson Correlation	1	.537*	.499**	.253*
	Sig. (2-tailed)		.000	.000	.032
	N	72	72	72	72
X1	Pearson Correlation	.537*	1	.094	.120
	Sig. (2-tailed)	.000		.433	.315
	N	72	72	72	72
X2	Pearson Correlation	.499**	.094	1	.071
	Sig. (2-tailed)	.000	.433		.345
	N	72	72	72	72
X3	Pearson Correlation	.253*	.120	.071	1
	Sig. (2-tailed)	.032	.315	.345	

Where X1-information technology, X2- Infrastructure, X3- Supply chain activities and Y- the performance of inventory tracking and tracing.

4.24.8: Regression analysis of Information Technology, Infrastructure and Supply Chain Activities on the performance of inventory tracking

Table 4.20: ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	78.104	3	26.035	139.115	.000[a]
Residual	12.726	68	.187		
Total	90.830	71			

$R^2 = 78\%$, and $adjusted - R^2 = 75.9\%$

Table 4.21: Coefficient table

	Unstandardized Coefficients		t	Sig.
	B	Std. Error		
(Constant)	3.648	0.458	7.965	.000
X1	2.825	.537	5.263	.000
X2	1.303	.558	2.338	.003
X3	1.177	.674	1.746	.004

The R square value shown in Table 4.20 suggests that 78% of variation in the performance of inventory tracking is explained by the combined effect ofthe Information Technology, Infrastructure and Supply Chain ActivitiesThe ANOVA table 4.20 indicates that the model fitted is significant since p = 0.00 is less than 0.05 the level of significance, hence it is concluded that there is a significant effect of the Information Technology, Infrastructure and supply chain activitieson the performance of inventory tracking, therefore the null hypothesis of no combined effect is rejected. Also from the coefficient table 4.21 the model that was fitted on the data is given by

$Y = 3.648 + 2.825X1 + 1.303X2 + 1.177X3$.

From the table 4.21, it can be seen that Information Technology, Infrastructure and Supply Chain Activities have significant effect on the performance of inventory tracking because they all have P-Value which is less than 0.05 the significance level.

5.3 Conclusions

The study showed that an information Technology, Infrastructure and supply chain activity on the performance of inventory tracking systems has an effect on performance of inventory tracking system. This implies that information Technology, Infrastructure and supply chain activities influence the activities on inventory tracking systems. The study also should that majority of personnel involved in mechanical division lack basic necessary skill s, and essential facilities to handle supply chain related activities.

5.4 Recommendations

The study recommendsthat information technology, infrastructure, and supply chain activitieson the performance of inventory tracking systems has an effect on performance of inventory tracking system.

The study has established that for public sector to have effective inventory tracking and tracing system on real timebasis there is need to have necessary infrastructure, skilled personnel, and improve on necessary information technology linkages in place.

5.5 Recommendations for further research

The researcher suggests further studies in the following areas:

- Effect of organization structure on inventory tracking and tracing system in measuring supply chain agility
- Improving inventory monitoring in small and medium enterprises
- Centralization of distribution systems and its effects on organization performance
- The of transportation monitoring system in logistics chain

References

Chan, P.S. & Peel D. 1998. Causes and impact of reengineering. Business Process Management Journal, 4(1): 46–55.

Goldsby, T., & Martichenko, R. (2005). Lean Six Sigma Logistics: Strategic Development to Operational Success. Boca Raton: J. Ross Publishing, Inc.

Knox, K. 2004. A researcher's dilemma: Philosophical and methodological pluralism. Electronic Journal of Business Research Methods, 2(2): 119–128.

Kothari, C.R. 2005. Research methodology methods and techniques (2nd ed.). India New Age.

Lyles, MA, Flynn, BB and Frohlich, MT (2008), "All Supply Chains Don‟t Flow Through: Understanding Supply Chain Issues in Product Recall", Management and Organization Review, Vol 4, No. 2, pp. 167-182.

Marjanovic, O. 2000. Supporting the “soft” side of business process reengineering. Business Process Management Journal, 6(1): 43–55.

Miller, D. 1983. Handbook of research design and social measurement (4th ed.) London: Longman.

Motwani, J. & Kumar, A. 1998.Business process re-engineering.International Journal of Operations & Production Management, 18(9/10): 964–978.

Quayle, M. (2003). A study of supply chain management practice in UK industrial SMEs. Supply Chain Management: An International Journal, 8(1), 79-86.

Zsidisin, GA, Panelli, A and Upton, R (2000), "Purchasing organization involvement in risk assessments, contingency plans, and risk management: an exploratory study", Supply Chain Management: An International Journal, Vol 5, No. 4, pp. 187-198.