

**THE EFFECTIVENESS OF ELECTRONIC CARGO TRACKING SYSTEM  
(ECTS) IN ENHANCING REVENUE COLLECTION ALONG THE KENYAN  
NORTHERN CORRIDOR**

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TECHNOLOGY.**

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**DECLARATION**

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

Signature: ..... Date: .....

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This research report has been submitted for examination with my approval as the university supervisor

Signature: ..... Date: .....

**Dr. Doris Gitonga, PhD**

## **DEDICATION**

I dedicate this research report to my husband Lawrence Siele and our children Cindy Chebet, Ian Kipkoech and Maya Cheptoo.

## **ACKNOWLEDGEMENT**

First, I give thanks to God Almighty for giving me the health and ability to undertake this study and the corresponding report in due course and under the apparent constraints. I am grateful to my supervisor Doris Gitonga for his insights and guidance throughout the research work. I also appreciate the assistance of my family and friends for their understanding and invaluable support during the period of this study.

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## **ABBREVIATIONS AND ACRONYMS**

<b>APICS</b>	-	American Production and Inventory Control Society
<b>CBR</b>	-	Community-Based Rehabilitation
<b>CIO</b>	-	Chief Information Officer
<b>DRC</b>	-	Democratic Republic of Congo
<b>ECTS</b>	-	Electronic Cargo Tracking System
<b>GPS</b>	-	Global Positioning System
<b>IT</b>	-	Information Technology
<b>IVM</b>	-	In-Vehicle Master
<b>JKUAT</b>	-	Jomo Kenyatta University of Agriculture and Technology
<b>KPA</b>	-	Kenya Ports Authority
<b>KRA</b>	-	Kenya Revenue Authority
<b>M&amp;E</b>	-	Measurement and Evaluation
<b>MCA</b>	-	Members of County Assembly
<b>NCTTCA</b>	-	Northern Corridor Transit Transport Coordination Authority
<b>RFiD</b>	-	Radio Frequency iDentity
<b>RTU</b>	-	Remote Terminal Units
<b>SCADA</b>	-	Supervisory Control and Data Acquisition
<b>TOC</b>	-	Theory of Constraints
<b>USA</b>	-	United States of America
<b>WFD</b>	-	Water Framework Directive

## OPERATIONAL DEFINITION OF TERMS

- Northern Corridor:** This is the most important transport route in East Africa providing a gateway through Kenya to the landlocked economies of Uganda, Rwanda, Burundi and Eastern DR Congo, as well as South Sudan.
- Transit Cargo:** This refers to containerized goods that are imported or exported through the road from the port of Mombasa to destination outside the country such as Uganda, Rwanda, Burundi or South Sudan.
- Revenue Leakage:** This refers to activities that are used by business community so that they pay lower revenue or none at all. In this study, it refers to activities that relate to transit cargo that do not pay due taxes; custom duty or transit levies.
- Trade Facilitation:** The simplification and harmonization of international trade procedures, which include activities, practices and formalities involved in collecting, presenting, communicating and processing data required for the movement of cargo.
- Electronic Cargo Monitoring:** This is the use of technology to locate cargo in motion in real time and ascertain visibility of its movement along a given trajectory.

## **ABSTRACT**

The main aim of this study was to establish how ECTS which was implemented by KRA to ease monitoring of transit goods has impacted on revenue collection along the northern corridor. The study focused on trade facilitation, monitoring of cargo movement and tax leakage. The study used descriptive research design comprising of quantitative research techniques. The data was collected from primary sources through the use of questionnaires, from a target population of 58 staff from northern corridor observatory team who formed the sample for this study. The finding from the study shows that trade facilitation and monitoring of cargo positively contributes to revenue collection by a factor of 0.222 and 0.314 respectively. Further, the study found out that tax leakage negatively influences revenue collection by a factor -0.146, though this has been greatly reduced by implementation of ECTS. From the findings, it can be recommended that the government and the investors should embrace the use of ECTS because of positively impacts on revenue through enhancement of monitoring and trade facilitation. It also protects the local market through stabilization of prizes of goods since it reduces diversion that leads to tax leakage. Further, there is need for further research to establish wholesome view of the factors that influence revenue such as policies and infrastructure.

# CHAPTER ONE

## INTRODUCTION

### 1.1 Background of the Study

Revenue collection is a critical function of every government, more so in the third world countries who depend majorly on government revenue. Cargo monitoring through electronic platforms is one of the inventions that have been used by government to seal tax loopholes and improve revenue collection along its transit routes. In Europe, the greatest challenge of transit goods is diversion of disallowed goods such as counterfeit items into the local market. In Africa, the most common transit goods diversion is occasioned by tax evasion, poor infrastructure and weak policies put in place. Electronic Cargo Tracking System (ECTS) was implemented to curb the challenge diversion leading to revenue leakage as well as transportation of illicit and disallowed items.

Traders, transporters and taxmen are persistently concerned by the need to ensure efficient and accurate delivery of goods. This is because efficient and accurate delivery of goods ensures the end-to-end integrity of the supply chain. To ensure effective delivery, the complete process beginning from packaging and consolidation, transportation and delivery to the port, storage and staging at the port and yard and all the way to de-consolidation and unpacking at the destination has to stick to schedule and standards (Miler & Bujak, 2014). Failure to observe schedules and standards will definitely lead to delays, loss of goods, loss of revenues to the taxman and an unsatisfied customer. Although transport systems of goods have in the recent decades been improved not all of them are sufficiently integrated to meet today's requirements as regards quality and safety. This is mainly due to lack of well-structured and organized intermodal transport chains. The use of Information Technology (IT) and incorporating communications technology is increasingly becoming a mechanism of ensuring the safety and operational efficiency of freight transport systems (Giannopoulos, 2004).

One way through which delivery of transit goods can be improved is by way of real-time tracking of the movement of goods en-route. In real-time system the correctness of the system is determined by both the logical result of computation and strict adherence to time limits. In a real-

time tracking system, a tracking technology is embedded in a product such as mobile phone or a navigational system. Such tracking systems consist of wireless nodes in the form of tags or badges that emit signals that enable readers to receive those signals. The signals are transmitted providing real-time information about location and security of goods using wireless technologies, such as Wi-Fi, Bluetooth, ultra-wide band, Radio Frequency iDentity (RFiD), and Global Positioning System (GPS). Transporters of goods across the globe are increasingly resorting to electronic tracking measures to ensure products are safe transporters stick to routes, cleared promptly and are delivered on time (Siror, Guangun, Kaifang, Huanye, & Dong, 2010).

Transporters of goods using the Northern Corridor which serves countries in the great lakes region in Africa have also adopted the real-time tracking technology for their goods on transit. Most of the transporters on the corridor use trucks with full covered bodies, tankers and containers on trailers or on rail. Transporters use manual seals to secure doors, valves or hatches before departure. When the seals are intact seals the assumption is that the cargo is not tampered with. Sometimes high risk cargo is physically escorted by customs officers. These methods have been largely ineffective (Siror, Guangun, Kaifang, Huanye, & Dong, 2010). Without the real-time tracking systems, the northern corridor has had a difficult time managing taxation, collusion by law enforcement agents, ever increasing volumes of trade, vast distances traversed by cargo trucks and the need to facilitate faster movement of cargo. Large quantities of export goods, for instance, still get diverted to the local market with minimal detection. Such challenges make it difficult for the Kenya Revenue Authority (KRA) to achieve its targets regarding tax revenues in effect having a negative consequence of Kenya's development agenda (Miler & Bujak, 2014).

### **1.1.1 The Concept of Electronic Cargo Tracking System**

An effective transit goods management system has to ensure that good are packed safely, transported on the required route, levies paid and arrive at their destination without being tampered with and on time. One method that can ensure that, given the ever increasing cargo on transit, is the use of electronic cargo tracking system which enables real-time geographical location of goods and their security. The tracking ensures electronic monitoring of good in transit.

The Northern Corridor is a term for the road, railway and pipeline network that links countries in the Great Lakes region in Sub-Saharan Africa. The transport network links Burundi, Democratic Republic of Congo (DRC), Rwanda, Uganda and Kenya to Mombasa seaport in Kenya. The network also serves Northern Tanzania, Southern Sudan and Ethiopia (Northern Corridor Transit Transport Coordination Authority, 2004). The Northern Corridor is under the management of the Northern Corridor Transit Transport Coordination Authority (NCTTCA), which was created in 1985 after the signing of the Northern Corridor Transit Agreement by Burundi, Kenya, Rwanda and Uganda and The Democratic Republic of Congo.

The Northern Corridor is made up of the Mombasa port, the road network, rail network and pipeline transport network and inland waterways. The Mombasa Port has 16 deep-water berths, a container terminal, two bulk terminals and two oil terminals. The port is connected to the hinterland by road, rail and pipeline. The port is the biggest in East and Central, with throughput capacity of over 20 million tons. The volume of cargo handled by the port has been growing at an average rate of 7% per annum. The road network radiates around the Mombasa-Nairobi-Kampala-Kigali-Bujumbura axis. The Eastern DRC connects from an extension from Kigali and goes through both Goma and Bukavu to Kisangani. The extension from Uganda connects the Eastern DRC via Bunagana, Mpondwe, Ishasha, Goli and Aru border posts. The main axis goes through Kasindi, Beni, Komanda, and Niania to Kisangani. The Northern Corridor road network, with almost 7000 km needs maintenance because its condition is generally poor (NCTTCA, 2004).

The railway network comprises of the 1660 km Kenya/Uganda sections running from Mombasa through Nairobi, Nakuru, Eldoret, Malaba, Jinja, and Kampala to Kasese in western Uganda. It also includes a 217 km branching line that runs from Nakuru to Kisumu on Lake Victoria. At the lake there is a wagon ferry link to Jinja and Port Bell in Kampala. Out of the total of approximately 1890 km of railway network, almost 800 km, representing 42% is in poor condition. The most affected are the segment between Nakuru and Kisumu (217 km), the segment between Malaba and Kampala (251 km) and the segment between Kampala and Kasese (333 km). The Northern Corridor rail network coverage is limited in scope. Consequently, Rwanda, Burundi, Eastern DRC and Southern Sudan have no links with the East Africa Railway

System. The Northern Corridor pipeline was initially limited between Nairobi and Mombasa but has extended to Kisumu and Eldoret from where Uganda, Rwanda, Burundi and Eastern DRC access their fuel supplies. Waterways in the corridor are in Lake Victoria, Lake Albert, Lake Kivu, the River Nile and the River Congo. However, the waterways are not fully exploited (Hanif & Kaluwa, 2016).

To ensure excellent performance of the northern corridor, the NCTTCA put in place the Northern Corridor Transport Observatory. The observatory was created to facilitate trade movement of persons, vehicles and goods in domestic, regional and international transport. The observatory was also to transform the northern corridor into a Development Corridor which, other than offering safe, fast and competitive transport and transit services, was to stimulate investment and encourage sustainable development. The observatory if fully operational and is tracking 25 key performance indicators related to volume and capacity, transit time and delays, rates and costs, efficiency and productivity (NCTTCA Transport Observatory, 2014).

In conducting the monitoring function, the observatory conducts several activities. First, it assists in the identification of areas needing improvement. Secondly, the observatory provides a set of tools that enable diagnosis of problems and bottlenecks on the corridor. Further, the observatory measures the evolution of the corridor and measures the effectiveness of programs designed to address identified problems and bottlenecks. The observatory also provides reliable information to policy makers in the region for facilitation of the formation of policies that may lead to better services and cooperation (NCTTCA Transport Observatory, 2014).

In the modernization program the NCTTCA put in place an electronic system to replace the manual tracking card for showing movements of containers of goods on transit. The manual system was found to be the source of abnormal practices due to the lack of reliability of the card systems forcing the consignees (or forwarders) to track their containers themselves. This forces them to source for profession of intermediaries to do the tracking. The competition created between the intermediaries and Kenya Ports Authority (KPA) stackers provides room for corruption. The automation of container tracking became a high priority project (World Bank, 2005). This study wishes to assess how the electronic container tracking system has affected the monitoring of goods on transit on the Kenyan section of the corridor.

### **1.1.2 The Concept of Revenue Collection**

The Northern Corridor is a term for the road, railway and pipeline network that links countries in the Great Lakes region in Sub-Saharan Africa. The transport network links Burundi, Democratic Republic of Congo (DRC), Rwanda, Uganda and Kenya to Mombasa seaport in Kenya. The network also serves Northern Tanzania, Southern Sudan and Ethiopia (Northern Corridor Transit Transport Coordination Authority, 2004). The Northern Corridor is under the management of the Northern Corridor Transit Transport Coordination Authority (NCTTCA), which was created in 1985 after the signing of the Northern Corridor Transit Agreement by Burundi, Kenya, Rwanda and Uganda and The Democratic Republic of Congo.

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Transit levies are the main source of revenue collected by the Kenyan government. The amount is significant because of the strategic location and the volumes of goods that pass through the corridor. More importantly, transit cargo ends up being used locally hence the due taxes that would be paid is significantly high. The impact that this good have on the local market in terms of price competition is massive and thus impact several other aspects of the economy which are directly linked to the amount of tax collected.

### **1.1.3 Cargo Monitoring and Revenue Collection**

Monitoring refers to an organization's internal activity of providing feedback to the managers of a project about the progress of the project, the problems it is facing, and the efficiency with which it is being implemented. Monitoring is a set of related activities involving regular collection of information, evaluation of that information, and using evaluation results in an institutional or project action. Usually, monitoring is initiated by project management and arises from specific questions regarding the expected or planned progress stated as standards (Plomp, Huijsman, & Kluyfhout, 1992).

Transit trade involves moving goods across borders and almost definitely with duty unpaid and without physical inspection. Such transportation is vulnerable to smuggling. Countries are forced to put strong measures in place in a bid to avoid smuggling and importation of unwarranted goods. Such measures include high guarantees to ensure the customs duties are paid and sometimes physical inspection of the cargo before allowing it to cross the country. However, while on transit a lot can happen: goods can get lost or cargo tampered with to the detriment of stakeholders, especially the owner. Stringent measures are usually put in place. These include using proper seal needs installed on the truck and/or container doors. Seals are also used to avoid separation of a trailer from truck. Electronic systems are able to electronically import and export customs declaration data from an automated customs system. Seals communicate by wireless technology with the tracking unit and send an alarm when tampering occurs (Alfitiani, 2010).

### **1.1.4 Global Outlook of Cargo Monitoring**

Monitoring of transit cargo is a common phenomenon across the globe. Traditionally, monitoring was done manually where escort vehicles accompanied transit goods from entry to exit points. Technological advancement has brought remote tools that gives real time location and status of cargo and is vast adopted by stakeholders in transit business.

The Electronic Cargo Tracking System (ECTS) is a real-time technology solution that tracks cargo from point of loading to the point of offloading. The ECTS system was introduced to help customs bodies and private transporters across the world to monitor movement of goods remotely. This technology is used to prevent theft of goods in transit and dumping. The ECTS uses Global Positioning System (GPS) and RFiD (Radio Frequency iDentity), while GPS

provides co-ordinates that enable accurate cargo location on the map RFIID provides the security of cargo. The aim of using ECTS is to provide cargo visibility through real-time positioning, expedite clearance at loading and off-loading points by enabling quick inspection and clearance and providing readily accessible data about movement and locations of trucks for decision making purposes (Borderless Tracking, 2017).

The ECTS enables Borderless Tracking which uses three technologies, namely, GPS, GPRS & RFIID. However, the system uses two hardware devices and two software platforms. The devices are IVM (or In-Vehicle Master) device and the iSensor device. The IVM sensor enables the owner or a third party to track a vehicle's location, collecting data in the process from the field and deliver it to the base of operation. The iSensor device protects the IVM by eliminating malicious inbound and outbound electronic traffic in real time.

For a management information system such as the electronic cargo tracking system to be effective there are five important variables to be considered. The variables are: people, business processes, data, hardware, and software. People are the users who use the information system to achieve set objectives. The users are usually qualified professionals and the support staff who ensure that the system is running properly. Business procedures are the agreed upon best practices that guide the users and all other components about how to efficiently use the system. Data are the facts and the statistics recorded by the system. Hardware refers to the set of all the devices such as computers, printers, networking devices, etc for collecting, storing and processing data into information. Software is the program that runs on the hardware. This study will focus on these variables when considering the electronic cargo tracking system (Alcamí & Carañana, 2012).

### **1.1.5 Regional Cargo Tracking System**

In Africa, trailer and cargo tracking provides multiple benefits for the logistics industry in the global and East Africa region. Transit business in the region has also been boosted by the improved infrastructure which has created potentially lucrative opportunities for both logistics providers and fleet management and vehicle tracking companies. In fact, industry players say the growth of Africa's logistics market is being driven by higher trade volumes as local economies diversify and expand, domestic consumer demand goes up, global demand for natural resources

escalates, and as infrastructure improves, boosting intra-African trade. This has brought about the need for fleet management and cargo-tracking systems also increases. The significance of this solutions to investors include monitoring and controlling all company vehicles, including cargo, public service vehicles as well as transport vehicles, while the government interest is mainly to curb diversion and dumping.

Solutions like the Electronic Cargo Tracking System (ECTS) have had a massive impact on Transit Trade in the region. The trade is a major source of revenue for governments but again, they represent one of the greatest security threats for these same governments because they are rarely inspected, and therefore could be used for smuggling.

An effective electronic cargo monitoring solution must facilitate the flow of accurate and timely information across supply chain partners and government agencies. It ensures optimization of container logistics processes. It also improves supply chain efficiency while reducing costs. An effective electronic cargo monitoring solution ensures efficient and individual container traceability and a significant reduction in theft, diversion and counterfeiting. Through an efficient electronic cargo monitoring solution, it is faster to receive notifications when an exception occurs in the transit process. In totality, an effective electronic cargo monitoring solution significantly improves the delivery of cargo to the designated destination.

#### **1.1.6 Cargo Monitoring in Kenya**

The railway network comprises of the 1660 km Kenya/Uganda sections running from Mombasa through Nairobi, Nakuru, Eldoret, Malaba, Jinja, and Kampala to Kasese in western Uganda. It also includes a 217 km branching line that runs from Nakuru to Kisumu on Lake Victoria. At the lake there is a wagon ferry link to Jinja and Port Bell in Kampala. Out of the total of approximately 1890 km of railway network, almost 800 km, representing 42% is in poor condition. The most affected are the segment between Nakuru and Kisumu (217 km), the segment between Malaba and Kampala (251 km) and the segment between Kampala and Kasese (333 km). The Northern Corridor rail network coverage is limited in scope. Consequently, Rwanda, Burundi, Eastern DRC and Southern Sudan have no links with the East Africa Railway System. The Northern Corridor pipeline was initially limited between Nairobi and Mombasa but has extended to Kisumu and Eldoret from where Uganda, Rwanda, Burundi and Eastern DRC

access their fuel supplies. Waterways in the corridor are in Lake Victoria, Lake Albert, Lake Kivu, the River Nile and the River Congo. However, the waterways are not fully exploited (Hanif & Kaluwa, 2016).

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Customs and Border control play a major role in facilitating trade between the neighboring countries in Kenya. This was because they facilitate entry and exit of transit cargo as well as export cargo from local industries. Transportation of transit and export cargo is a pain that affect not only the local but also global frameworks that govern transit and transport cooperation that operates between donor communities, transit developing countries and landlocked countries. There is need to implement actions and policy measures that strengthen transit systems. This calls for cooperation of all the stakeholders involved and involvement of donor organizations. In Europe, the greatest challenge of transit goods is diversion of disallowed goods such as counterfeit items into the local market. In Africa, the most common transit goods diversion is occasioned by tax evasion, poor infrastructure and weak policies put in place. This study particularly focuses on the East African region with particular focus on tax leakage, monitoring of movement of cargo and trade facilitation (Kamau and Mohamed, 2015).

Most of the cargo are transported by ships to the ports, although most of the cargo are transported by road. The bad state of east African railways system has made road transport to be a major means of transport for most cargo. Moreover, most of the countries in Africa are landlocked and therefore road transport remains a major means of transport for their imported and exported goods. In developed countries, custom duty is being removed but African countries largely depend on custom duty as part of state revenue. Owing to this, the countries are increasingly putting in stringent measures to curb any leakage of this revenue (Hunting, de Jong & Vijver, 2017).

## **1.2 Statement of the Research Problem**

Countries in the Great Lakes region in Africa agreed to co-manage the Northern Corridor under the NCTTCA which set up a unit called Northern Corridor Transport Observatory to conduct monitoring of transit cargo on the Northern Corridor. This was in response to the increasing volumes of transit cargo, the desire to improve the accuracy of clearing, preventing loss of cargo and smuggling and ensuring goods safely arrive at their designated destination. The benefit of the system should be realized through increased contribution to tax revenues collected, faster inspection of goods at check points, faster clearance process and faster delivery of cargo. However, at the KRA tax revenue collected still miss the target (Institute of Certified Public

Accountants of Kenya, 2016) goods are still lost while on transit, contrabands still find their way into the country, deliveries are still late while some still never arrive safely (Siror, Guangun, Kaifang, Huanye, & Dong, 2010).

There was need to understand how ECTS has transformed customs operations on transit and export cargo and how it has helped curb diversion of transit cargo into the local market. In order to achieve this, it is fundamental to study the effectiveness of implementation of ECTS in enhancing revenue collection directly and indirectly. It is with this unanswered question that this study is founded on, attempting to explore whether ECTS implementation achieved one of its core objective; enhancing revenue or not this was fundamental to all the stakeholders so that they can be in a position to understand and create policy and frameworks which will stimulate effective and efficient business processes. The use of technology is one of the mechanisms that has been widely studied to address the challenges faced by transport of transit cargo. The use of RFID is an important technology that has been harnessed in management of cargo. The main aim of this study is to explore the effectiveness of implementation of ECTS by KRA; particularly on tax leakage, monitoring of movement of cargo and trade facilitation. This provide the much needed literature on this area which is complementary to the existing literature on areas such as use of RFID on m-commerce and enhancement of supply chain management.

### **1.3 Objectives of the Study**

#### **1.3.1 General Objective**

The general objective of this study was to determine the effectiveness of electronic cargo tracking system in enhancing revenue collection along the northern corridor.

#### **1.3.2 Specific Objectives**

The specific objectives of the study were to:

- i. Evaluate the Influence of Monitoring movement of Cargo on Revenue collection. along the Northern corridor,
- ii. Determine the influence of trade facilitation on revenue collection along the Northern corridor and

- iii. Assess how Revenue leakage on revenue collection along the Northern Corridor has impacted

#### **1.4 Research Questions**

The study aimed to answer the following research questions:

- i. What is the Influence of Monitoring movement of Cargo on Revenue collection along the Northern corridor?
- ii. What is the influence of trade facilitation on Revenue Collection along the Northern corridor?
- iii. How does Revenue leakage on revenue collection along the Northern Corridor impact?

#### **1.5 Significance of the Study**

This study was significant to the management of the Kenya Revenues Authority (KRA), to the Northern Corridor Transit Transport Coordination Authority (NCTTCA) and to scholars. As for the KRA its main objective is ensuring achievement of tax collection objectives to facilitate the government budget and hence the development of the country. While this objective has been elusive, putting in place tracking mechanisms to enhance monitoring transit goods on the Northern Corridor. To the KRA this study is an assessment on how the use of the electronic real-time cargo tracking system is enhancing the achievement of its objectives. Findings may be used in making decisions regarding monitoring of transit goods in the northern corridor.

The study was also important to the NCTTCA, the manager of the real-time electronic transit cargo tracking system. It has the staff, the processes and the equipment required to ensure the tracking system works effectively. Effectiveness is measured by delivery of cargo to designated destinations accurately, in a timely manner with all requisite processes completed efficiently. This study is an evaluation of whether the NCTTCA is doing its function effectively. The study may be used in making future decisions regarding how to improve the tracking system.

Scholars are interested in knowing how real-time electronic transit cargo handling system is ensuring that the objectives of the stakeholders are met. For instance, whether clearing and forwarding is more efficient; whether it is possible to effectively manage the movement of the

goods on the roads or railways, whether it is easier to confirm the documentation of the goods and whether goods arrive at the premises of the owner in time and without damage or loss. This study provides reference that may be used by scholars when furthering discussions that may find this study relevant.

### **1.6 Scope of the Study**

The study was limited to the Northern Corridor Transport Observatory which is under the control of NCTTCA. The KRA staff working at the Northern Corridor Transport Observatory with its offices located in Mombasa, Kenya formed the population for this study. The study was limited to assessing whether the electronic cargo tracking system has improved the monitoring of transit goods along the northern corridor. While doing the assessment the study focused on staff, processes and the equipment and how they ensure accurate delivery of cargo. This study carried out in the financial year 2017/2018, thus the findings reflected the state of affairs on monitoring of ECTS and curbing at this time.

This study assessed the effect of electronic cargo tracking on monitoring on the Northern Corridor. The Northern Corridor is a transport system of road, railway, pipeline and water transport. The Northern Corridor begins from the port of Mombasa in Kenya into the interior with all the interconnections to cross Uganda, into Rwanda, Burundi and the DRC. The Northern Corridor also serves the Northern region of Tanzania. The map in the appendix shows the map of the Northern Corridor. The actual duty of tracking and monitoring is done by Northern Corridor Transport Observatory which is located in Mombasa. The staff that participated in the study work at the offices of Northern Corridor Transport Observatory in Mombasa.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter reviews the literature relevant to this study. The review focuses on two theories, the theory of constraints and the agency theory. The chapter also discusses the determinants of project monitoring. In the empirical review, the focus is on showing past findings regarding the effect of staff, business processes and equipment on monitoring. The chapter also identifies the research gaps before presenting the conceptual framework.

#### **2.2 Overview of the Literature Review**

The literature review will focus will encompass theoretical literature and the empirical analysis. The theoretical literature gives details of the theories that have been used in the past to explain similar scenarios or relationships in the past. In this study, economic theory, trade theory and location theory finds relevance. The literature review attempts to explore previous works that have been done on the study as guided by the objectives. The findings from this studies are particularly relevant because it informs conformity to the past results or departure from it.

#### **2.3 Theoretical Literature**

Two theories guide this study. The theories are economic theory, location theory and trade theory as discussed below.

##### **2.3.1 Economic Theory**

Economic theory, developed by the British economist John Maynard Keynes during the 1930s, is defined as the total spending in the economy and its effects on output and inflation. Economic theory is a common theory used by business community to shift their gains to optimal levels. They achieve the optima mode through the use of different methods, however it is still unclear which method is the best in leveraging the shift to desired mode. The desire for this theory is to generate high enough gains at minimal cost and to ensure that the chosen method would generate high enough net benefits to justify a shift. The objective of entrepreneurs is to create tasks and make recommendations on policy actions that will achieve desirable results.

This theory is applicable in this study in the sense that the business community in their desire to achieve optimal results can divert goods to the local market therefore evading tax and duty. This makes the company or individual to make the maximum gains. The desire to avoid the long process of transit goods clearance and controls imposed which increases the cost of doing business changes the operations of transit goods. In order to leverage optimal gains from transit goods, it means that the owners have to be very careful and in many cases they even escape taxes to remain competitive in the market (Krugman & Obstfeld, 1992).

### **2.3.2 Location Theory**

Location theory is defined as a model which solve optimization problems by choosing the preferred zone for a facility and consequently minimizing the transportation costs and often trading off between various inputs, different production balances, and between market delivery levels. Space and location are examined as factors that contribute to the choice of the transport means for transit cargo. The theory compares the space required for transporting transit goods and the distance between the two destinations across the transit country. The theory further looks at the size of the market to ensure that the transported goods can be consumed within a given time frame to avoid changes in market dynamics which may affect market prices thereby avoiding losses. The choice of transport means greatly determines the ease with which diversion of goods can be done. For instance, while it is easy to divert goods over the road, it is difficult to transport goods transported using planes. The method of transporting goods is also important since it determines the final cost price and hence determine the economic gain of transporting the goods (Richards, 1962).

Location theory is also applicable in this study in the sense that it tries to answer the question of who produces what and at what place as well as the reasons for producing that commodity. This theory influence the decisions made by governments before arriving at optimal locations for production. This consequently affects transportation of raw materials and finished products into the intended market. The theory suggests that the cost of production vis-à-vis the cost of transport are the major variables considered in this theory. As for diversion of goods into the local market, location of production centers is fundamental. In many cases goods produced in factories may be perishable or require a short time to reach the consumers, however as a result of

location, there may be challenges due to controls from the transit country. This situation necessitates the individuals to divert the goods to the nearest market to avoid losses. The theory assumes that production process is independent of location and that the demand and supply are separated (Nierat, 1997).

### **2.3.3 Trade Theory**

Trade theory is a collection of economic models found in international trade which focused on the role of increasing returns to scale and network effects, which were developed in the late 1970s and early 1980s. Trade theory helps in explaining the goods which are exported by different countries, the destination countries, the economic and geographical circumstances and its consequences. This gives an indication and prescription of the content, direction, and size of multilateral trade flows.

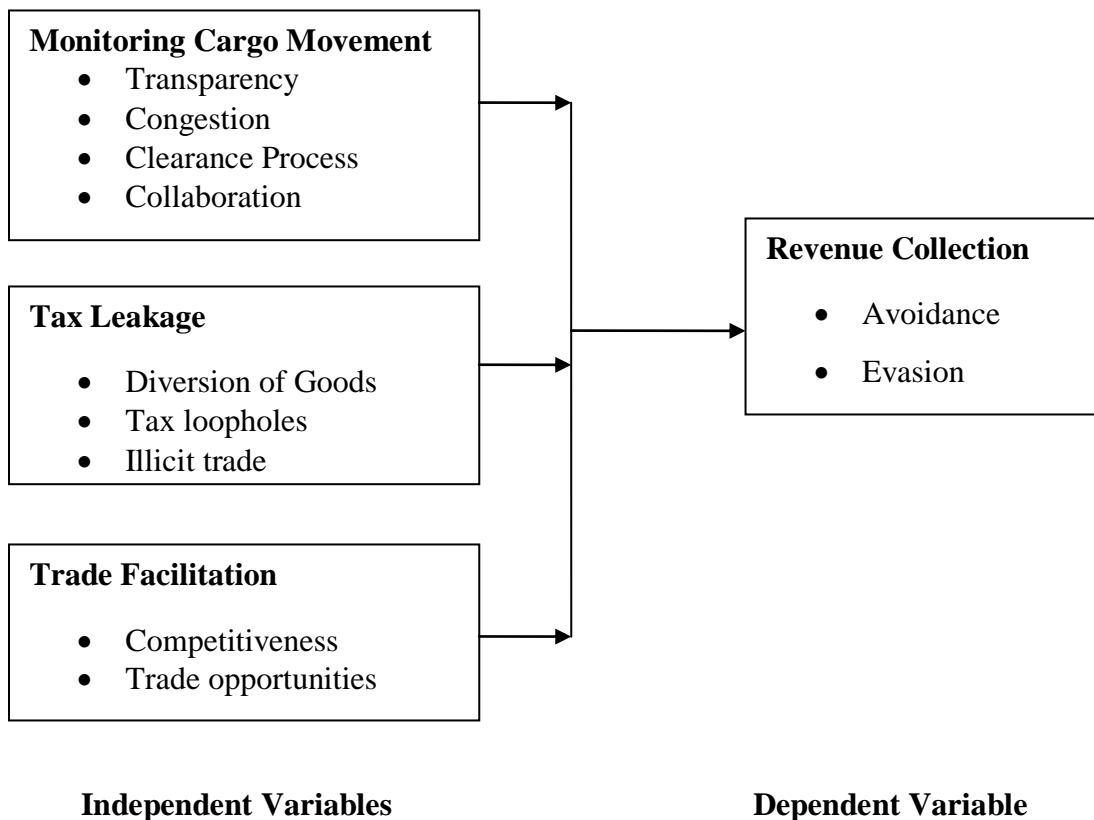
The theory has evolved over time from mercantilism where there were no fully developed financial systems and thus trade was mainly conducted nationally and very little trade occurs between countries to factor proportions. Other key stages in development of this theory were absolute advantage where some countries would use their economic power to take advantage of other nations by facilitating trade for their advantage.

Comparative advantage also happened on the process of trade theory development where nations would specialize in different commodity, consequently dominating in the market. The theory takes advantage of other nations to promote trade activities. This theory is applicable in this study in the sense that the transit country may be forced to exercise different controls depending on the economic power and political position of the destination country. This implies that the economic status of the country can help a country to promote diversion of goods into the local market. Further such countries can use third world countries as corridors for doing business and avenues of transporting disallowed products (Viner, 1937).

## **2.4 Conceptual Framework**

A conceptual framework is graphical presentation of the relationships between the dependent and the independent variables. A conceptual framework is an analytical tool for organizing ideas in a clear and brief way (Jabareen, 2009). Figure 2.1 below is the conceptual framework of the

variables guiding this study. The independent variables are Staff, Business processes and equipment. Staff will be measured by looking at training, skills, adequacy and motivation. Business processes at the Northern Corridor Transport Observatory will be measured by focusing on processes information, costs, flexibility, quality and innovativeness. Equipment will be measured by focusing on reliability, accuracy, ease of use and adequacy. The dependent variable is monitoring which will be measure by reports on outputs, clear indicators, cost-effectiveness, tracking and effectiveness and contribution to decision making.



**Figure 2.1: Conceptual Framework of Variables**

## 2.5 Review of Empirical Literature

According Spiro, (2005) diversion of goods remains one of the problems which is faced by tax administrations. One of the reason for diversion of goods is tax evasion mainly by unscrupulous individuals to gain undue competitive advantage. These are evidenced by several reports especially in countries like Ghana where goods have been diverted while others are removed

from the warehouse. It is believed that some of these acts are perpetuated as a result of weak institutional frameworks and various legal contract loopholes which some selfish business people would take advantage. This has however been reduced through formation of various conventions, laws and regulations. According to Ghana Revenue Authority-Customs Division (GRA, 2013), the challenges that causes diversion of goods include reliance on escort systems hence ineffectiveness in tackling diversion and increased cost. The governments, however are putting effort on dealing with this economic issue. One of the major steps towards this menace is the use of technology through the use of electronic monitoring systems which gives real time information on the location and state of cargo; monitored from a central location. This has been implemented by tax authorities and also private investors to ensure security of their cargo as it traverses across countries by land to the destination (Krugman and Obstfeld. 1992).

### **2.5.1 Trade Facilitation and Revenue Collection**

According to UNCTAD (2007), the cheapest and easiest way of transport between countries and continents, however there are countries which do not have such a facility. As a result of this, transportation of goods via the road and train remains a major form of transport for those countries that are geographically challenged. The landlocked countries therefore experience a major challenge in competitive integration of trading activities globally. The study further expounds that goods which are entering or leaving land locked countries are subjected to some lengthy procedures which prolong trading activities of such commodities. There are about 15 landlocked countries in Africa which lack territorial access to the sea, consequently face the constraints of high transit cost affecting social and economic development (Cambridge Systematics, 1995).

In most cases, procedural and regime context is followed where transit goods are always under custom control. The procedures are so long and costly and thus most countries have had economic cooperation through establishment of transit trade agreements that facilitate or enhance and shorten the clearance process of goods. The agreements shall apply at the borders of all the member states and are aimed at reducing directional powers which affect the transit activities. The main reasons why a country would exert pressure on transit goods is to avoid negative impacts such as illicit drug trade, infrastructural stress, degrees of crime and loss of revenue. The

crimes which are associated with transit activities include; toppling, bribery, abductions, murder and corruptions. This therefore introduces a major diversionary tactics from one corridor to another depending on the ease of transit, particularly for disallowed goods such as drugs and ivory. In some cases, some of the goods, which are disallowed, are diverted into the local market as a compensation to allow others to pass through the borders as the case is with West African countries (Federal Highway Administration, 2000).

There is need to understand that while it is important to support countries which have no access to the sea, it is important for pass through or transit nations to have some control to avoid crime and drug related activities. Wyler and Cook (2009), argues that Africa's relative peripheral status as compared to the global trade in illicit drugs seems to be coming to an end. This can be attributed to the fact that there has been numerous drug seizures and increased cases being reported.

Traffic congestion is one of the factors that increase the cost of doing business at the ports. This demands for expansion of transit facilities such as the port and clearing agents available. According to GRA (2013), transit cargo exerts pressure on the infrastructure of transit nations. Transmission of diseases is also another transit activity that is likely to occur since it takes time to clear the goods at the entry and transport them to the exit. Transit goods are exempted duties and taxes from the transit country, however, there are cases where such goods are diverted into the local market before it exits the transit country. In such cases, the government losses revenue. The government has therefore found a way of guarding themselves from such losses by using guarantors who pay the government of the transit goods the equivalent amount of the duty, taxes and interest. This will ensure that the goods indeed pass through the country. In such cases, the security that is given by recipient countries as a surety include insurance of the goods and bonds paid by transporters and claim after exit (Ayoki, Obwana and Ogowapus, 2005).

Business processes refer to the set of tasks that are linked to enable the provision of a service or a product to a client or a customer. Business processes also refer to the activities that enable organizational goals to be achieved once these activities are completed. Effective management of the processes can lead to effective monitoring.

In a study conducted by Kurucheti (2010) the aim was to assess the business procedures involved in modern petroleum refineries in Texas, United States of America (USA) and determine the contribution of the processes on the effectiveness of the processes on the monitoring of the pipelines. The study was an evaluation of the Supervisory Control and Data Acquisition (SCADA) system which has a master system that constantly communicates with the Remote Terminal Units (RTU) in collecting data and checking the values for the optimum functioning of the oil refinery. The system collects data on pressure, temperature, density of the oil inside the pipeline's and storage tanks. The study established the business processes used in the refinery and concluded that the SCADA system contributed effectively to the monitoring of oil in the oil refinery. The study showed the close relationship between processes and monitoring. A monitoring system not in tandem with project business processes would not satisfy the needs of the organization.

In another study by Peronja (2015) aimed at assessing the effect of business processes management on the performance of large companies in Croatia. The study adopted a descriptive research design that employed survey techniques. The study focused on the processes that involved the critical success factors of the companies. The study established that in the large companies, the management of the business processes had a great influence on the goals of the companies. When effective business procedures were put in place, it positively influenced achievement of objectives. This indicates that when business processes are effective, then the monitoring procedure may be effective too.

Study conducted by Kohlbacher (2009) sought to empirically explore the consequences of business process management in organizations. The study adopted a descriptive research design that employed survey methodology. The study was conducted on 44 Austrian corporations operating in metal and machinery industry and that had at least 50 employees. The 44 firms were selected using simple random method. Data from either the Chief Executive Officers, Chief Information Officer (CIO) or quality manager were collected by telephone interviews. The study established that business process management enhanced transparency, clarity of responsibilities, efficiency, structure and tidiness, product quality, throughput times, and customer orientation. The study suggests that using effective business processes can improve monitoring.

### **2.5.2 Effect of Tax leakage on Revenue Collection**

According to Economic Cooperation Organization (ECO, 1995), diversion of transit goods is a case where goods which have been declared as transit at the entry of a transit country end up being consumed or used within that country without reaching the declared destination. This is an illegality since the goods are not allowed to be used within that country. Diversion of transit goods is mainly aimed at evading tax or misdirecting disallowed goods into the country. Drug trafficking is one of the reasons why goods are diverted into the local market. This is part of goods which are disallowed and thus they are declared as goods destined for another country and the documents are forged to show they left the transit country (Richards, 1962).

Helmick, J. (2008), cites the long clearance procedures at the port and the border as one of the reason that stimulate diversion of goods into the local market. The goods are mainly diverted into the market because of avoidance of losses or high cost involved at clearing and storage. This has been heightened by the ready market along the highway and the weak government regulations on the black market which is on the rise. Transportation of prohibited and illicit goods is another factor that has led to diversion of goods. Goods often declared as transit goods but get diverted into the local market because they are disallowed in that country. Moreover, high value goods often attract high custom duty and consequently becomes an attractive item for tax evasion. The weak systems and the cost of diversion vis-à-vis the benefits has greatly stimulated diversion of goods in the region (Baumol, 2007).

Warehousing activities particular in third world countries are used as means for diversion of goods into the local market. The goods are stored in a bonded warehouse for long periods of time and consequently the goods are slowly diverted into the local country. Corruption is also one of the factors which influence diversion of transit goods into unintended market. The goods are diverted so that the individuals can get undue economic advantage in the market (Bird and Zolt, 2008).

Government controls and regulations are also weak in most third world countries and thus diversion of transit goods is possible (Chaplowe, 2008). Further, economic superpowers use third world countries for their economic benefit by ensuring that their goods get into niche markets or

raw materials which are not intended for export get out of the country without passing through the normal clearance procedures (GRA, 2013).

### **2.5.3 Effect of Cargo Monitoring on Revenue**

The monitoring function of a project heavily depends on the context in which it is operating, the capacity of the agency under which the project is running and the conditions set by the financiers of the project. To make monitoring meaningful to the context, capacity and financiers' needs, it is primary that the ones conducting the monitoring have the necessary equipment to enable them track the requisite performance indicators of the project. Tools needed to track the performance of a project include risk management tools; project initiation tools; planning tools; executing tools; and monitoring and controlling tools. The tools must match the skills and the needs on the ground (Chaplowe, 2008).

A study conducted by Hunting, de Jong, & Vijver (2017) aimed at assessing which This study assessed which monitoring tools and techniques had the potential to serve surface water quality assessment under the European Union's Water Framework Directive (WFD) initiated in 2010. The study was to determine whether new monitoring tools could provide cost effective means to replace or complement existing monitoring tools. The study showed that several new monitoring tools had the potential and support to improve the current tools used. This study indicated that monitoring was highly determined by the tools used in the monitoring process.

In another study, Lukersmith, et al. (2013), aimed at identifying and analyzing tools and methods reported in a variety of literature for monitoring and evaluating community-based rehabilitation (CBR) programs. The study was conducted by use of literature review and descriptive analysis. The study used secondary data from PubMed and Google Scholar databases, hand searches and reference lists. The study established that there were standardized tools for monitoring projects. However, the tool used determined the quality and effectiveness of the monitoring. This suggests that the tools used can determine how well monitoring is conducted.

The diversion of goods in the local market denies the government of their revenue and thus leading to low economic development. The desire to avoid the long process of transit goods clearance and controls imposed which increases the cost of doing business changes the

operations of transit goods. In order to leverage optimal gains from transit goods, it means that the owners have to be very careful and in many cases they even escape taxes to remain competitive in the market (Krugman & Obstfeld, 1992).

Neat, (1997) in his research argues that when there is transparency of goods from one destination to the other, there is increased integrity and thus reduced corruption cases. This not only has a positive impact to the government in terms of revenue collected but also protects other traders from price wars. The price wars arise as a result of individuals who sneak funds into the market that have not been given due clearance and consequently can be sold at a lower price.

According to a study done by Belissent, (2009), the set-up of ECTs came at a significant cost, especially given that the system is still at the introductory stage of being rolled out. Both the transporters and the authority are required to use resources to be able to implement the system across the country. Manji, (2015) in his World Bank report noted that that infrastructure contributed to just 0.5% to the annual per capita GDP growth between 2001 and 2011. The report points out that infrastructure improvement such as ECTS can improve the infrastructure of the country by 3%. The report points out that for the country to fully develop, it would need massive capital to eradicate issues of congestion, delays at Customs and upgrades required for networks. Implementation of ECTs increased the government view of cargo in real time and consequently boosted KRA in collecting revenue through sealing of loopholes for tax leakage. This include dumping and diversion of cargo which not only have impact on custom levies but also domestic taxes through price erosion and killing of local industries. ECTs therefore is significant to government agency in charge of revenue since about 93% of all freight and passenger traffic travels by road (Road Policy, 2012).

## **2.6 Critique of Existing Literature**

The effectiveness of electronic cargo tracking system in enhancing revenue collection was the main subject of study. The available literature in this section mainly focus on the challenges that were faced by the emergence of technology in cargo tracking system. The available literature indeed focuses on numerous aspects of trade facilitation and fails to provide a direct linkage to revenue.

The theories provide an insight of the reasoning that support implementation of such measures. The literature explores the emergence of technology in monitoring of cargo and how it has reduced the cost and efficiency of management and monitoring of transit cargo. The available literature further analyzes a comparison of various methods of monitoring of transit cargo. There is variation in the population and focus where the studies focus on, they mainly study developed countries who do not majorly rely on custom duty as the main source of government revenue.

## **2.7 Research Gap**

From the literature review, it is evident that there are several studies which have been done on various aspects of diversion of goods and the factors that stimulate diversion of goods. Further, the available literary material covers diversion of goods as a general concept not attributed to particular reasons. Despite the fact that electronic cargo tracking system has been implemented in a number of countries, particularly to curb diversion of goods, little research has been done effectiveness of ECTS in curbing diversion of transit goods along the northern corridor.

In lieu to these, it is important to understand how Electronic Cargo tracking system (ECTS) as one of the factors that was introduced to deal with diversion of goods and transform warehousing and transit activities forms the basis for this study. The available literature looks at the causal factors of diversion of goods little research has been done on how the measures of curbing diversion has impacted on the causal factors in this case diversion of goods, warehousing and transit activities. The lack of a wholesome research on diversion of transit goods implies that the literature on this area research necessitated this research.

The theories reviewed in the literature review show a connection between business systems and its intended purpose. The theory of constraint shows how bottlenecks arising from system implementation can affect the success of a project and therefore a pointer of the required interventions.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter discusses the methodology that was used to achieve the objectives of the study. The chapter begins with describing the research design. It also describes the target population and the sampling techniques. The chapter also describes the location of the study. Further, it discusses piloting, data collection instruments, methods and analysis techniques.

#### **3.2 Research Design**

This study adopted descriptive research design using a survey methodology. A descriptive research focuses on describe, explain and interpret conditions as they are currently. A descriptive research examines a phenomenon occurring at a specific place and time. It is concerned with conditions, practices, structures, differences or relationships that exist, opinions held and processes that are evident (Creswell, 2003). A survey research is a field study that involves the collection of data from a sample of elements that drawn from a clearly defined population. The data is collected through the use of a questionnaire or a brief interview with regard to specified existing phenomena of interest (Kothari, 2004).

This study requires an accurate description of the effect of electronic cargo tracking system on the monitoring of transit goods along the northern corridor as it currently is. This required obtaining views and opinions of those directly involved in the execution of the electronic real-time transit cargo tracking and how this affects monitoring of movement of goods on the northern corridor. Such an approach was used by Carrel, Sengupta, & Walker (2015) when investigating the link between travel behavior, transit service quality, and the satisfaction and subjective well-being of transit riders in San Francisco, USA. This justifies the use of descriptive research design and application of survey methods.

#### **3.3 Population and Sampling**

The target population for this study comprised of workers of KRA at the Northern Corridor Transport Observatory in Mombasa. This include staff who are located along the Kenyan

Northern corridor, with their coordinator headquartered at central monitoring center. The staff are mainly middle level managers ranging from manager to officer level as well as support and the clerical staff. The population is distributed along the Northern corridor working in conjunction with other government agencies. The target population comprises of 58 members of staff in total as shown in table 3.1 below. According to Kothari, (2004), the sample space from a given population is calculated using the formula shown below:

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

Where N is the population

n is the sample size which was

$\epsilon$  is level of precision (which for this case was 95% hence  $\epsilon$  is 0.05)

This resulted into a sample of

$$n = \frac{58}{1 + 58(0.05 \times 0.05)} = 50.655$$

Which translates to 51

**Table 3.1: Sample Size**

SECTION	NUMBER	SAMPLE	PERCENTAGE
Number of Staff	58	51	87.9%
<b>TOTAL</b>	<b>58</b>	<b>51</b>	<b>87.9%</b>

(Source: Northern Corridor Transport Observatory)

### 3.4 Data Collection

This study used a self-administered questionnaire to collect data. The questionnaire is structured in two sections. Section A focused on the demographic information about the respondents. Demographic data involved data about age, gender, department and training and section B

focused on the factors that resulted from implementation of ECTS on revenue collection. The respondent provided the required data by filling blank spaces or by ticking an option that best describes their position about a statement.

The study used primary data collected from the staff at Northern Corridor Transport Observatory. The primary data required is the data about the staff, the processes, the equipment and the electronic monitoring of transit cargo in the Northern Corridor. The researcher first introduced herself to the management at Northern Corridor Transport Observatory before identifying the specific respondents. The researcher then introduced herself to the respondents and explain to them the intentions of the research. The researcher explained to the respondents on how to complete the questionnaire that has been designed by the researcher to provide specified information. The researcher also impressed upon the respondents that the decision to participate or not is at their discretion. The researcher then handed the questionnaire to the respondents who provided the required information by completing the questionnaire and handing it back to the researcher immediately after.

The study had four variables: three independent variables and one dependent variable. The first independent variable is Staff. Staff is a variable that was measured by the mean of a set of variables about staff in an organization. The Likert scale ranging from 1 to 5 in which 1 will mean "strongly disagree" while 5 meant "strongly agree". The measure of the variable will be an interval scale which range from 1 to 5.

### **3.5 Data Analysis and Presentation**

The data obtained from the staff at Northern Corridor Transport Observatory was sorted and coded into the SPSS analysis software in preparation for analysis. Demographic data was analyzed with the intention of describing the characteristics of those who have participated in the research with the objective of demonstrating validity and objectivity in sampling. The data was analyzed using graphical presentations such as frequency tables, bar graphs and pie charts.

Data on the four variables in the study was analyzed using mean and standard deviation. This was done by calculating the mean response on every item per variable in the questionnaire. This enabled identification of outstanding issues regarding items per variable. The means were

displayed in a table. For every respondent, the mean observation per variable will be calculated. For all the respondents, a regression model was used to establish the relationship. The regression model took the form below:

$$Y = f(X_1, X_2, X_3) \dots \dots \dots 3.1$$

Where  $Y$  is Revenue Collection,  $X_1$ = Trade facilitation,  $X_2$ = Revenue leakage and  $X_3$ = Monitoring of Cargo movement. The conceptual model suggests that monitoring in the Northern Corridor is a function of the government revenue, diversion of goods and the Transit operation and procedures. The analytical model took the linear form below:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \dots \dots \dots 3.2$$

Where  $\beta_0$  is the constant of regression while  $\beta_1$ ,  $\beta_2$  and  $\beta_3$  are the coefficients of  $X_1, X_2$  and  $X_3$  and respectively. The significance of  $\beta_1$ ,  $\beta_2$ ,  $\beta_3$  and  $\beta_4$  was done using the  $t$ -statistic at 95% confidence interval. The strength of the analytical model was done using the  $F$ -test.

## **CHAPTER FOUR**

### **RESULTS AND DISCUSSION**

#### **4.1 Introduction**

This chapter gives the results of the analysis of the data that were ascertained from the questionnaire as outlined in the research methodology in the previous chapter. The first part will give a general description of the respondents in terms of age, gender, level of education and years of experience. The second section will give relational analysis of the variables under study and their relationship.

#### **4.2 Response Rate**

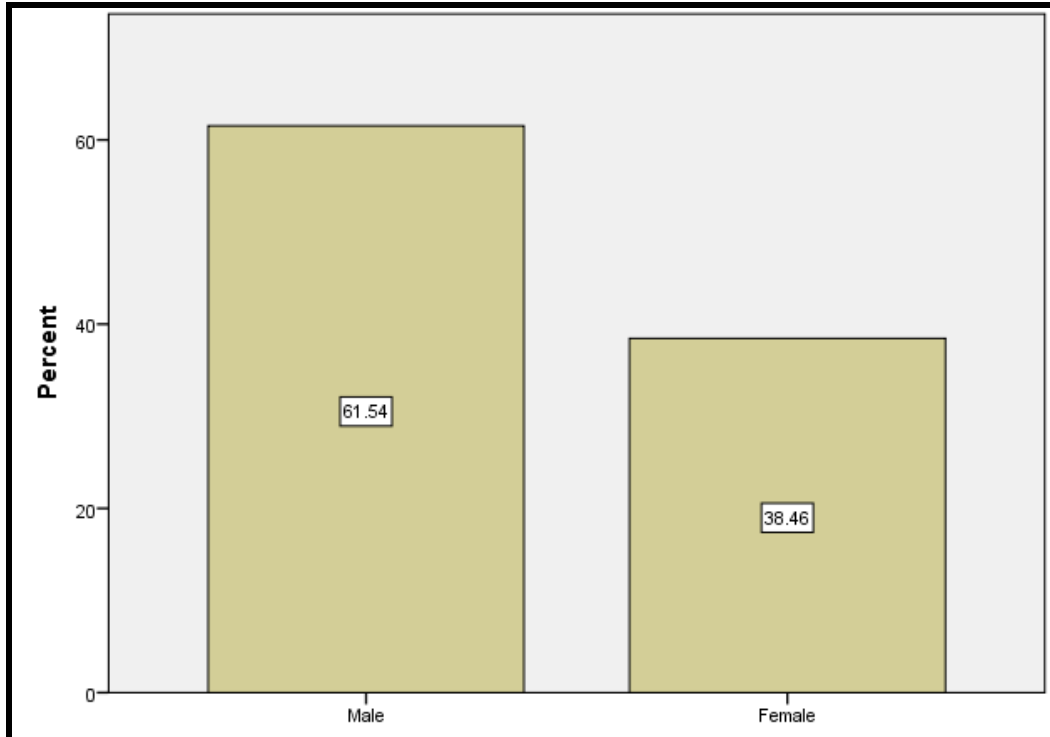
From the results, there were 39 respondents out of a total sample of 58 translating to 76.47% response rate. This, according to Cooper and Schindler (2003) is a good response rate for the data collection tool used. Constant calls and follow up to the respondents was one of the reasons for the high response rate.

#### **4.3 Demographics**

Demographics gives a description of the respondents, giving features such as age, gender, experience, education level and the type of goods.

##### **4.3.1 Gender of the Respondents**

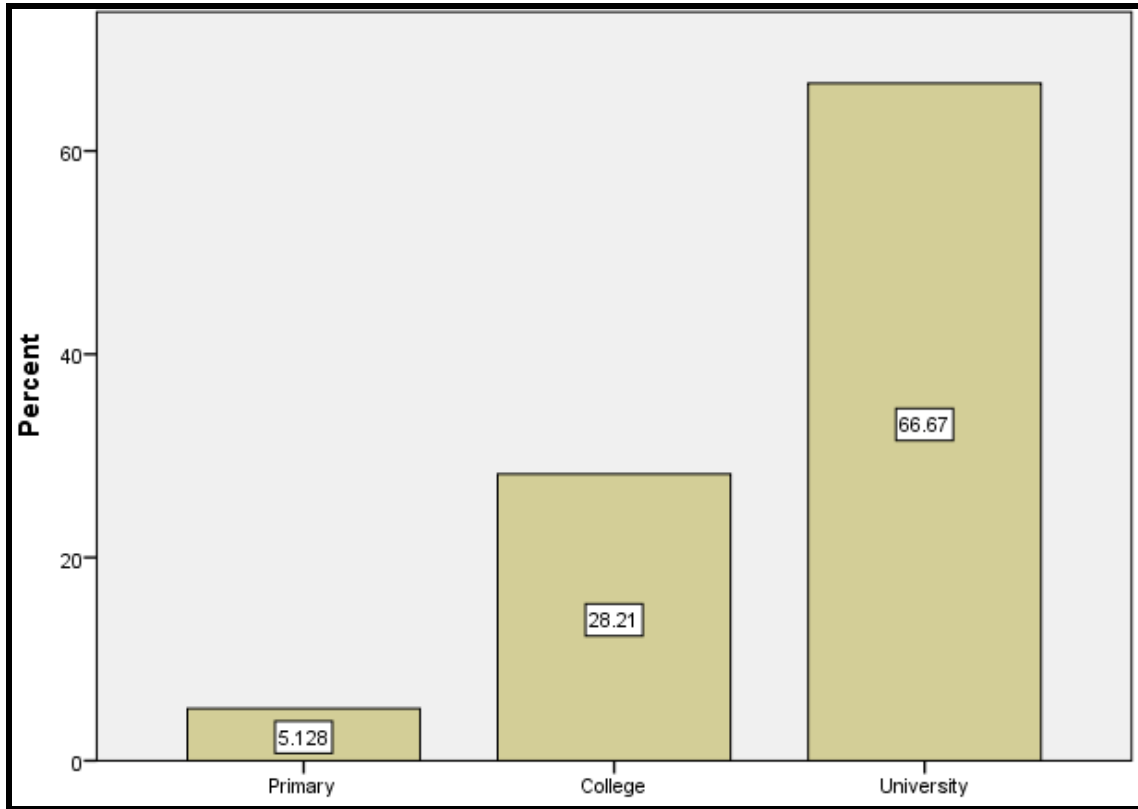
The gender of the respondents was distributed as shown in the graph shown graph in figure 4.1. From the graph, it can be observed that 61.54% of the respondents were male while 38.46% were female. This is representative of the staff establishment in that institution, where men are slightly more than female. This affirms a representative gender distribution of the population hence the results were a picture of the entire population.



**Figure 4.2: Graph of Gender Distribution**

#### **4.3.2 Level of Education introduce the figures**

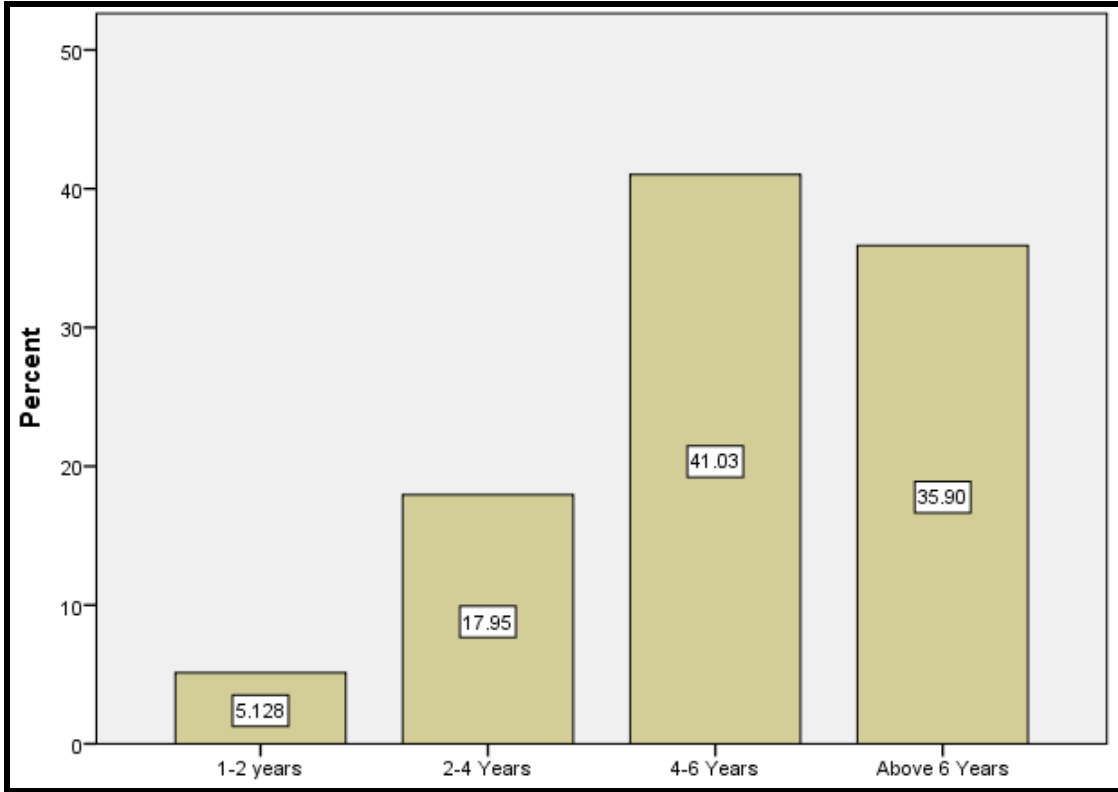
The level of education was divided into three main categories; primary, college and university. The graph shows that majority of the respondents have attained university level of education with 66.67%. 28.21% of the respondents attained college level of education, which is an indication of certificate and diploma holders while minority 5.128% of the respondents attained primary level of education. This are mainly the office Assistants who have been working with the organization for a very long time and were employed when illiteracy levels was much lower than today.



**Figure 4.3: Graph of Level of Education**

#### **4.3.3 Work Experience of the Respondents**

From the graph shown in figure 4.3, it can be seen that majority of the respondents have worked in the organization between 4-6 years at 41.03% followed by 35.90% who have worked above 6 years. It was found that only 5.128% of the respondents have worked between 1-2 years in the Authority.



**Figure 4.4: Graph of Experience of Respondents**

#### **4.4 Impact of ECTS on Revenue Collection**

The measurement of the various aspects of ECTS implementation on a scale of 1 to 5, where 5 is the highest is as shown in figure 4.1 below. It can be seen from the table that all the factors measure positively with ratings above 3, which is the 60% mark. It can be observed from the results that the greatest impact of ECTS was in enhancing collaboration within stakeholders and information sharing, sealing tax leakage and reducing cases of counterfeit, illicit and non-standard goods with a rating of above 4 which translates to 80% rating.

From the results, it is evident that ECTS has brought about transformation in management of cargo along the northern corridor. The factors indicate that majority of the respondents have felt the positive impacts of the system in their operations. These impacts influence revenue collection in different ways as given by the regression analysis.

**Table 4.2: Rating of Impacts of ECTS**

	N	Min.	Ma.	Mean	Std. Dev
Revenue collection along the Northern corridor has improved as a result of implementation of ECTS	39	2	5	3.51	.823
ECTS is effective in curbing tax evasion and avoidance	39	1	5	3.31	1.151
ECTS has led to increased competitiveness in the local market	39	1	5	3.87	1.005
ECTS has opened other trading opportunities that give revenue to the government	39	2	5	3.79	.978
ECTS has increased transparency and real time status of transit cargo	39	2	5	3.69	.977
ECTS has reduced congestion at the port of Mombasa	39	2	5	3.92	.900
ECTS has led to transformation of Custom clearance procedures at the port and border points	39	2	5	3.74	.938
ECTS has led to collaboration between different stakeholders and information sharing	39	2	5	4.00	.858
ECTS has reduced cases of diversion of Transit goods	39	2	5	3.97	.743
ECTS has helped in sealing tax leakages on goods diverted into the local market	39	1	5	4.00	.827
ECTS has reduced cases of illicit, counterfeit and non-standard goods	39	2	5	4.03	.843
Valid N (listwise)	39				

#### 4.5 Relationship between ECTS and Revenue Collection

The results of regression analysis that depicts the relationship between the independent and dependent variables are as shown below. The aggregate of the factors that contribute to tax leakage, monitoring of transits cargo and trade facilitation was computed in SPSS and regression analysis done with revenue collection as the dependent variable.

**Table 4.3: Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics			Durbin Watson
					R Square Change	F Change	Sig. F Change	
1	.271 <sup>a</sup>	.073	-.006	.72653	.073	.923	.040	1.678

a. Predictors: (Constant), Tax\_Leakage, Monitoring, Trade\_Facilitation

b. Dependent Variable: Revenue\_Collections

The table above gives the summary of the model that was used in establishing the relationship between the attributes of revenue collection and ECTS implementation. The value R gives the correlation between the observed and predicted values of dependent variable. R-Square is a measure of the variance of the dependent variable which can be explained by the predictor variable. In this case, the value of R-square is .073, which implies that 7.3% of the variation in revenue collection can be explained by tax leakage, trade facilitation and monitoring of cargo. Adjusted R-square is a normalized R-square value that has removed extraneous predictors of the model. The p-value indicated by sig value is 0.04, which is less than 0.05 test significance level and thus the findings from this model are statistically significant.

**Table 4.4: Coefficients Regression Analysis**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.853	1.677		1.105	.027
1 Tax_Leakage	-.146	.347	-.082	-.421	.026
Monitoring	.222	.293	.145	.758	.043
Trade_Facilitaion	.314	.260	.207	1.208	.050

a. Dependent Variable: Revenue Collections

The regression model for this analysis is given by:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \dots\dots\dots 4.1$$

Where;

Y=Revenue Collection

$\beta_0$ =Constant

$\beta_1, \beta_2, \beta_3$ . =The coefficients of independent variables

$X_1$ =Tax Leakage

$X_2$ =Monitoring of Cargo

$X_3$ =Trade Facilitation

e=Error Term

From table 4.2 above the regression model becomes:

$$Y=1.853 -0.146X_1 + 0.222X_2 + 0.314X_3 \dots\dots\dots 4.2$$

The findings show that monitoring and trade facilitation positively affects revenue collection as evidenced by the positive coefficient of 0.222 and 0.314 respectively. Tax leakage was found to negatively impact on revenue collection as seen by negative coefficient of -0.146. The sig. Value denotes the measure the significance level of the coefficient of that variable. If the sig. Value is greater than 0.05 then the coefficient for that variable is not statistically significant. In this case, all the variables are statistically significant since none of them is greater than 0.05. This implies that the results can be used to make statistically significant inference. The results show that a unit increase in tax leakage will lead to decrease in revenue by 0.146 units while a unit increase in monitoring of cargo and trade facilitation will lead to increase in revenues by 0.222 and 0.314 units in that order.

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSION AND RECOMENDATIONS**

#### **5.1 Introduction**

Chapter five covers the summary of the results achieved from the previous chapter. The discussion first looks at the tax leakage, monitoring of cargo and tax facilitation and its effect on revenue collection along the Northern corridor. This chapter further gives the recommendations that can be made from the findings to the various stakeholders involved in this research. The conclusion gives way to recommendations from the findings of this research and the experience involved throughout the process from proposal to data collection and finally data analysis and presentation

#### **5.2 Factors Influencing Revenue Collection**

From the study it was found out that there is a lot of investment by the government and donor organizations to implement technology based initiatives to improve collection of revenue along the Northern corridor. The main aim of ECTS is to improve revenue collection through creation of a competitive economic environment for trade, curbing tax leakage and providing real time status of cargo. Despite the fact that implementation of ECTS and policy formulation to operationalize the same along the Northern corridor, little is known about the gains that it has brought to the Nations along the corridor.

##### **5.2.1 Trade Facilitation**

The implementation of ECTS and involvement of East African countries ensured that there is increased collaboration and thus improved the partnership and trade between the countries along the corridor. The increase in the volumes of cargo along the corridor means that there is growth of economy along the Northern Corridor. This has led to increase in government revenue both in levies and those that are derived from the vibrant economy. The competitive environment for trade also increase the revenue of the government since there is high volumes of stock being moved across the borders. This explains there is a positive correlation between trade facilitation and revenue collection.

The aim of this is to facilitate the traders and investors. This influences attractiveness of the corridor based on reduced costs. This further helps investor to increase their production of open new production plants to take advantage of the common tariff. Removal of tariff protection measures ensures that some production entities who produce at high cost are exposed to those that have production advantages and consequently export trade is inevitable.

### **5.2.2 Monitoring of Cargo Movement**

Monitoring of cargo as it moves along the northern corridor has introduced transparency and easier clearance at the border points. This not only gives assurance to the investors of the safety of their goods as it moves along the Northern corridor but also creates business friendly route for moving Cargo to majority of East African destinations. When the route become a route of the choice it ensures that there is increased business, consequently increasing revenue. Further, transparency of movement of cargo ensures that there is no diversion of goods. This protects the local market for unfavorable prices as a result of tax evasion. This kills the local industries and thus with effective monitoring this economic vice is averted.

The fact that there is no competition among tax administrations, they play a major role in trade facilitation in the region. The cross border inefficiencies impose an extra cost for goods and services in a given country. From the results, it can be concluded that faster clearance of cargo and transparency has a great impact on revenue collection. This can be explained by the fact that the process of clearing is more efficient leading to reduced cost of doing business along the corridor.

### **5.2.3 Tax Leakage**

Tax leakage occurs where goods that are destined for transit get into the market without the due taxes. This is one of the greatest sources of tax leakage experienced when moving cargo. Tax leakage occurs in the cases of diversion of goods which is abated by movement of goods along the northern corridor. Tax leakage is found to have a negative impact on the revenue collection. This is because it not only introduces products that have not been taxed into the local market but also destroys the performance of the local market and factories. This negatively affects economic growth in the transit nation, resulting into lower revenue to the government.

Performance of import and export trade are greatly affected by both a number of factors such as infrastructure and the cross border bureaucracies that introduces inefficiencies. This could be because of the fact that the verification and clearance process is the longest and at times very cumbersome process that has to be done independently within each of the countries. In this case goods would be verified in Kenya and at the same time at Tanzania. This increases the transportation and storage charge delaying delivery times. This encourages the use of illegal mechanisms to reduce the cost of business

### **5.3 Conclusion**

This study has been eventful and exciting from the development of proposal to data collection and finally data analysis. The study whose main aim was to establish the impact of implementation of ECTS on Revenue Collection along the Northern Corridor has not only been eventful but also exciting and fulfilling. The study started with problem statement which led to the choice of the title from a number of possible titles with reference to available literature on the subject area. Once the title was selected, proper research questions and objectives were formulated leading to creation of a conceptual framework. This was followed by the rigorous exercise of literature review, where numerous literatures related to this study was reviewed leading to formulation of research methodology. At this stage a data collection tool, a questionnaire was designed and data collection was conducted.

The data collection was conducted, where structured questionnaires were used to collect data from the respondents. Once the data collection process was completed, the data analyzed both qualitatively and quantitatively. The quantitative data was coded then exported into scientific package for social scientist software (SPSS) for analysis purposes. It was at this point that data analysis was carried out and presented in graphs and tables.

The research found out that joint verification plays a major role in performance of trade at the border post. Further, coordinated border agencies promote trade at the border and the East African Community. It was found out however, that joint verification is a stronger predictor variable for export trade as compared to import trade.

It can be concluded from the results that ECTS plays a role in promoting revenue collection along the northern corridor. It is clear from the study that economic factors influence growth of import and export trade in the region. These economic factors include factors directly impacts on the amount of revenue collected along the corridor. It is important to note from the study that the economic competitiveness of countries that participate in the treaty also play a role in trade. Some countries will be disadvantaged if the factors of production are high. This is because the market will be exposed to cheaper products from other countries which have cheaper production costs.

Revenue growth along the northern corridor has improved as a result of improvement implementation of ECTS. Specifically, trade facilitation and monitoring of cargo movement are two factors which resulted in ECTS implementation and have a positive impact on Revenue. Tax leakage have a negative influence on revenue, this should however be viewed from the perspective that it negatively impacts on revenue but has been drastically reduced by ECTS. It can be concluded therefore that, introduction of ECTS has led to reduction of tax leakage which negatively impacts on revenue collection along the northern corridor.

The findings from this study are largely reflecting the findings that have been done by other researchers. Trade facilitation is found to be enhance revenue collection in this study which agrees to the argument and findings of Ayoki, Obwana and Ogwapus, (2005), that ECTS improves the time spent for clearance of cargo hence increased turnaround times. Manji, (2015) in his report found out that infrastructure increases per capita of a country by 0.5%, this agrees with the findings from the study that monitoring of cargo which form part of infrastructure increases revenue. On the other hand, tax leakage negatively influences revenue which reflects the finding of Baumol, (2007) that argues that diversion of goods caused by congestion and high cost of business leads to decrease in trade activities and lower revenues.

#### **5.4 Recommendations**

In this study, there were numerous lessons learnt as well as crucial information gathered which would go a long way in improving the state of affairs in this field of research. The implementation of ECTS along the Northern Corridor affects a number of stakeholders; however, the greatest beneficiaries of this report are the intergovernmental agencies who make

decisions that influence ECTS. Further the investors should be informed of the effects of the system on the economy and trade in general. The study can also benefit other regional entities that are yet to actualize and enjoy the benefits of ECTS.

Inter-governmental, being the decision making organ in the region can find the results from this study useful in a number of ways. First, the study points out that monitoring of movement of cargo and trade facilitation have a positive impact on revenue collection. This is an important aspect since it helps them in making decision on sensitization and education on the principles provided by ECTS which has a significant impact on performance of the economy. Secondly, the research has indicated that tax leakage which negatively influences revenue collection has been drastically reduced by implementation of ECTS along the Northern corridor. It is clear also that the policy and decision makers have a role to ensure that there is competitiveness while seeking to expand the participating nations for greater economic gains.

Investors play a major role in exporting and importing goods across the borders. They also invest in new manufacturing plans where the cost of production is favorable. These are some of the fundamental stakeholders who benefit from this study in the sense that they can clearly see the state of affairs of performance of trade. This helps them to understand the role played by ECTS and that they need to input their suggestions and make proposals for overall improvement its performance along the corridor. The investors can also help policy and decision makers to ensure that they perform their best in ensuring that there is improvement of the effectiveness of cross border measures and strategies. This will be of their interest since improved revenue collection implies that investors are making more money.

### **5.5 Areas for Further Research**

This research topic was examining one fundamental aspects of ECTS that have influence on revenue collection. This research in trade at the border post provides much needed literature and methodology in this area of research. The world of academia can apply similar models in other regional collaborations.

From the literature review it was found that there are various other perspectives which have been used by researchers to explore the factors that influence revenue collection. Factors such as

government policies and infrastructure are significant in economic growth and revenue collection especially in areas where a number of countries are involved. In this study it was found out that trade facilitation and monitoring of cargo movement positively influence revenue collection. However, this are just a few factors that influence revenue collection. There is need therefore to conduct further studies to be conclusive as possible on all the stimulants of trade along the Northern corridor and other factors that encourage investors leading to increased revenue.

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## APPENDICES

### APPENDIX I: COVER LETTER

LYNNE KEBUT

KENYA SCHOOL OF REVENUE ADMINISTRATION (KESRA)

P.O. BOX 48240-00100

NAIROBI.

Dear Respondent,

I am carrying out a research on **The Effectiveness of Electronic Cargo Tracking System (ECTS) In Enhancing Revenue Collection Along the Kenyan Northern Corridor**. This is in partial fulfillment of the requirement of the post graduate diploma in customs administration, a diploma program at KESRA. This research is significant as it will highlight the impact of ECTS which is one of technological investments to monitor transit cargo along the Northern corridor. The objective of this survey is to establish effect effectiveness of ECTS on diversion of cargo from the port of Mombasa to their transit points. It is envisaged that this survey will provide information useful to regulatory agencies and investors along the Northern corridor. This is an academic research and confidentiality will be strictly observed and your name will not appear anywhere in the report. Kindly spare some time to complete the questionnaire attached.

Thank you in advance,

Yours sincerely,

**Lynne Kebut**

## APPENDIX II: QUESTIONNAIRE

Kindly complete the following questions by ticking or completing the questions.

### Part A: General Information:

1. What is your Gender

a) Male

b) Female

3. What is the highest level of education obtained?

Primary

Secondary

College

University

4). Work Experience

a) 1-2 Years

b) 2-4 Years

c) 4-6 Years

d) Above 6 Years

5). Which category of employee cadre do you belong?

a) Top Management

b) Middle management

c) Officers and Clerical

### Part B: Factors that influence revenue collection as a result of ECTS implementation

RATING	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
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<b>ECTS and Revenue</b>						
i.	Revenue collection along the Northern corridor has improved as a result of implementation of ECTS					
ii.	ECTS is effective in curbing tax evasion and avoidance					
<b>Trade Facilitation</b>						
i.	ECTS has led to increased competitiveness in the local market					
ii.	ECTS has opened other trading opportunities that give revenue to the government					
<b>Monitoring of transit cargo</b>						
i.	ECTS has increased transparency and real time status of transit cargo					
ii.	ECTS has reduced congestion at the port of Mombasa					
iii.	ECTS has led to transformation of Custom clearance procedures at the port and border points					
iv.	ECTS has led to collaboration between different stakeholders and information sharing					
<b>Revenue Leakage</b>						

i.	ECTS has reduced cases of diversion of Transit goods					
ii.	ECTS has helped in sealing tax leakages on goods diverted into the local market					
iii.	ECTS has reduced cases of illicit, counterfeit and non-standard goods					

### APPENDIX III: TIME SCHEDULE FOR RESEARCH ACTIVITIES

**Activity**

<b>Jan 2017</b>	<b>September 2017</b>	<b>October 2017</b>	<b>November 2017</b>	<b>December 2017</b>	<b>January 2017</b>	<b>February</b>
Presentation of thesis topic						
Preparation of thesis proposal						
Hand over proposal to the supervisor						
Make correction to the proposal						
Proposal defense						
Data collection						
Presentation of findings						
Thesis defense						
Final compilation						

#### APPENDIX IV: THESIS BUDGET

ITEM	COST
Production of proposal=====	Kshs 7,000
Data collection costs=====	Kshs 4,000
Logistical costs=====	Kshs 10,000
Data analysis=====	Kshs 6,000
Thesis =====	Kshs 12,000
Contingency/Miscellaneous =====	Kshs 5,000
<b>Grand Total Costs=====</b>	<b>Kshs 44, 000</b>