Effects of Automation of Customs Systems on Revenue Performance in Kenya

Hanningtone Munyanya Angalwa

A Research Project Submitted in Partial Fulfillment of the Requirements for the Post Graduate Diploma in Customs Administration of the Jomo Kenyatta University of Agriculture and Technology

2022

DECLARATION

I declare that this is my original work and has not been submitted to any other college, institution or university for academic credit.

Signed: …… Date: …….

MUNYANYA ANGALWA HANNINGTONE

HDB-335-C016-2302/2019

This proposal has been submitted for examination with my approval as the University Supervisor.

Signed: …… Date: …….

Samuel Owuor Ominde

JKUAT, Kenya

DEDICATION

This research project is dedicated to all my family members and the Kenya School of Revenue Administration.

ACKNOWLEDGMENT

My sincere thanks goes to God Almighty for His sufficient grace and blessings upon my life. I also appreciate my parents who gave me moral and financial support, my siblings Vicky and Bill for their prayers and Lilian whose encouragement and support have been instrumental to my life.

I sincerely thank Samuel Owuor Ominde for his scholarly assistance, self-sacrifice, patience and guidance. Furthermore, my gratitude's goes to my classmates and my friends who in their own unique ways made contributions.

ABSTRACT

The study aimed at determining the effects of automation of Customs Systems on Revenue performance in Kenya. The research had three specific objectives which were; Scanner technology, Integrated Customs Management system and Electronic Cargo tracking system. The overall objective of the study was to establish the effects of customs revenue performance as a result of system automation in Kenya. The research was anchored on the three theories namely; Mobility intergenerational theory, Technological change theory, Technological acceptance theory and theory of constraints. The research employed a descriptive research design and had a target population of 1132 officers both in the clearing and forwarding firms and Customs administration within Nairobi. This research used two techniques of data collection which included the structured questionnaires as a primary source of data and relevant materials obtained from previous research for a period 2016 to 2020 as the secondary sources. A pilot study was carried out on 20 officers that did not form part of target population to test the reliability and validity of the research instrument. The study used Cronbach's alpha (α) coefficient to test reliability, while face and content validity were used for checking for validity of the research instrument. The primary data collected was analyzed with the use of SSPS version 28. Data analysis was conducted using descriptive statistics and inferential statistics by use of moderated multiple regression analysis. The study revealed that, the Scanner Technology, Integrated customs Management System and Electronic Cargo Tracking System had a major influence on performance of revenues in Kenya. It was also discovered that, Scanner Technology, Integrated customs Management System and Electronic Cargo Tracking System had a variation of 53.8% on performance of revenue implying that since the implementation of the new system, Customs administration has had a significant increase in revenue collection. This resulted to greater border control hence a significance growth in the regional trade. There is need for tight enforcement measures in the implementation of the new system to enhance growth in revenues by customs administration. In conclusion, the automation of the systems requires urge investment in technology, trainings, security enhancement and management of hitches hence implementation of these systems will facilitate revenue growth. Harmonization of systems regionally allows data sharing and competitiveness globally. The research recommends that, it's important for the future researchers to undertake the same or replicate empirical studies in Integrated Customs Management System on the operational performance in East Africa in order to validate the findings and conclusions of this study. The study provides future researchers with a useful conceptual and methodological reference to carry out studies in this area of integrated Customs Management system. The study ended up developing new policies in the area of influence of integrated Customs Management system on performance of revenue in Kenya.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS AND ACRONYMS

ASYCUDA Automated System for Customs Data

COMESA Common Market for Eastern and Southern Africa

CTS Cargo Tracking System

EAC East Africa Community

EAC East African Community

ICT Information Communication Technology

KENTRADE Kenya Trade Network Agency

KRA Kenya Revenue Authority

WCO World Customs Organization

WTO World Trade Organization

DEFINITION OF OPERATIONAL TERMS

Customs: This is an organization in a country responsible for collection of duties and Controls the flow of Resources Goods, People, Animals, Plants, Intellectual Property and Services, Conveyances, into and out of a country (Mukherjee*, et al.,* 2016).

Integrated Customs Management System: This is a scheme that connects Kenya Revenue Authority's internal schemes with the external stakeholders' systems to attain faster cargo clearance; with one repository linking various modules. (TechTarget, 2010).

Regional Electronic Cargo Tracking System: This is a system that uses devices and software to track transit vehicles carrying goods throughout the transit routes. This is done through fitting of an electronic-seal with a 60-day power capacity and is monitored under the Global Positioning System platform. (Koigi, 2017)

Performance: This is defined as a set of financial and nonfinancial pointers which offer information on the degree of accomplishment of objectives and results (Azara, Syed & Muhammad, 2013)

Scanners: These are Integrated devices for examining, reading, or monitoring images through X-Ray for photographic prints, computer editing. Additionally, they display/relay information retrieved from the system (TechTarget, 2010).

Systems Automation: This is the use of software and hardware to implement business processes with slight human support. (ISA, 2020)

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

Revenue administrations have automated their systems to enable them collect taxes to enable them meet their targets as per the Treasury. This has led to the implementation of ICT integrated systems so as to attain customs core business. Customs department is the official unit of government that has the ultimate authority to administer the rules that guide the duty collection, exportation, movement of goods, importation and trade statistics across the borders of the country. Customs department has a mandate in assessment and payment of taxes, cargo clearance, processing of goods declaration for imports among others (UNECE, 2012). This institution's authority is mandated by the laws made by partner states. It can be noted that the role of customs in Kenya has faced numerous challenges. However, the regional efforts between the countries of the East African Community, and other regional blocs, for example, COMESA, IGAD, EU, SADC among others, have in some way helped in reducing these barriers. These regional blocs through integration came up with guidelines on how trade facilitation is made easier amongst the states. For instance, in the EAC, the flow of goods and services is made easier while preventing the movement of contraband across borders (EAC, 2004).

According to (Staff, 2018), The call for customs administration modernization to achieve agility, precision, effectiveness, transparency trade through multiple customs schemes which are being implemented in its administration. The introduction of the automated system in trade facilitation has helped in changing the customs department through faster goods processing, and improving the alignment of its operations hence ensuring ease of doing business transactions across the borders.

Indeed, there are many administrative challenges in trade. These limitations can be burdensome since customs processes and regulations have failed to tie with increasing trade dynamics globally. Africa has trailed behind for a long time. Under World Trade Organization round negotiations, Trade facilitation has significantly become a priority towards increasing regional and global interactions in economic ties (Organization, 2018). In today's WTO round negotiations, Trade facilitation has become an essential drive and has been regularly been quoted in supply chain security (Wilkinson, Hannah, & Scott, 2006). Automation in service delivery is a recommended solution in global trade; it highly increases efficiency. With constant technological advancements in all sectors including the transportation of goods across national and international borders, the administrative challenges that accompany customs management become reduced.

Furthermore, as earlier stated, the dynamics that are globally accepted by international trade unions and regional blocs are meant to regulate how traders of national borders and governmental institutions operate (Bhattachrya and Hossain, 2006). Consequently, the automated customs system seeks to ease the flow of trading activities. Through globalization, regional and world trade has been improved. This is mainly due to technological advancements. The automation of customs is made possible through the application of information and communication technologies. It can be argued that Kenya's introduction of automated customs management has been essential to the country's economic growth.

1.1.1 Global Perspective of Automated Customs Systems

Globally, many countries are undertaking different reforms so as to modernize their customs operations. The nations are working towards getting well organized and competent customs services that without fail balances its multiple responsibilities so as to achieve maximum compliance with the defined regulatory requirements and the purposed customs revenue objectives not forgetting at the same time enabling legal drive for both exports and imports,

including people and animals across the border points (Ranker,2003). However, conditions differ among different countries because each custom administration is called for to tailor its reforms and modernization efforts according to its implementation capabilities, national objectives and availability of resources. There are some core principles which are required for countries globally to achieve the reforms and modernization objectives. They may include: use of information and communications technology, reliable and intelligence risk management programs, ensuring partnership with the private sector and increased working together with other border control agencies.

Trade liberalization need to be complemented with trade facilitation measures also if the nations aim to enhance their external competitiveness and thus become best integrated into the world economy (Kleinbaum *et al.* 2013). The European Community for example introduced a common external tariff in the year 1968 but the union had to streamline its customs processes through reforms and modernization so as to fully get benefits from its common market. The World Trade Organization in the same vein, in 1996, as part of the Singapore Agenda, added the trade facilitation and customs revenue collection as part of its negotiable agenda through customs reforms and modernization. The issue of the cotton export subsidy as granted by the United States and other agricultural European nations resulted to the disappointing results of the World Trade Organization Ministerial Conference in 2003. This was due to the sub-standard trade logistics environment. This led to the realization that customs services needed to be improved which has resulted to many countries devoting substantial resources and energy to modernization. As a result, both bilateral and multilateral development agencies have supported a number of customs reform initiatives (Kleinbaum *et al.* 2013). Other International Development Partners and monetary institutions have all played a vital role in support of reforms and modernization in customs and operations.

Another example, is observed from the Philippines. According to the World Bank (2002), the authorities encountered increased volumes of their imports in the year 1990. There was an increase in trade of over 160% between 1990 and 1996. In the same period, the authorities were working towards reducing the customs administration workforce by 15%. As a result of the above pressures, the country adopted thorough reforms that emphasized efficient use of risk management techniques, pre-arrival and post release instead of at the point of entry, automation of systems and security reform measures. Despite the high volumes of trade in the country, the reform measures led to the cargo clearance time dropping from one week to less than 48 hours for the selected shipments and fifteen minutes for shipments in super green lane. This recorded over 60% increase in revenue collection. Indian Customs rolled out use of Radio Frequency Identification (RFID) closing devices in stages for the factory bloated exports in January 2018 after an assessment conducted realized that several customs scenes in the country lacked requisite infrastructural requirements for the digitization program, (World Bank, 2018). The agency advised the Authorized Economic Operators (AEO) to adopt the use of e sealed containers as a reform strategy and also worked towards equipping the customs locations with scanner readers as well as other equipment so as to ensure a nationwide enforcement of the RFID program in sealing containers. The technology-based program adopted ensured that Cargo Velocity was improved in the supply chain.

Through the electronic sealing system, Indian export trade has been improved as its government puts in more mechanism to ease the process of doing business. The reform has also influenced the revenue collected. Automation of systems is a major reform that has been embraced by different nations across the globe purposing on delivery of better services to the importers and the exporters (Maranga, 2015). In 1991, Germany rolled out a Custom Information System (OECD, 2012). The system successfully reduced trade barriers and in return increasing on their customs revenue collected. Country like China has adopted reforms

and modernization strategies in its Custom Revenue Service and it has since reported efficiency and effectiveness in areas such as transport and distribution, simplification of customs processes as well as ensuring that customs rules are followed (Cajala, 2015).

1.1.2 Regional Perspective of Automated Customs Systems

African countries have managed to rise to the challenge the improved economic growth and better its living standards for her people, reforms and modernization especially geared towards improved resource mobilization are of extreme importance. Therefore, a number of African countries that work together with international bodies such as the World Bank, World Customs Organizations (WCO), United Nations Conference on Trade and Development (UNCTAD), and World Trade Organization (WCO) have currently employed initiatives leading to increased volumes of trade and thus increasing revenue collection. Customs reforms and initiatives in Africa have been greatly relied on as a strategy of improving the revenue collection.

The revenue administration structures for most of the developing countries have failed to meet the set revenue objectives and have also not been as productive as desired. This has called for the need to reform the revenue structures for most of the developing countries. This has been done with the aim of achieving economic efficiency, revenue adequacy, simplification of customs procedures and equity and fairness among the traders. Some policy advice has been directed towards such countries in the process of redesigning their tax policies through various reforms (Blinder, 2008). This has led to introduction of new customs reforms, more efficient administrative tools to block the loopholes that led to tax evasion as well as the call to widen tax bases and cut on exemptions. For instance, in South Africa, through the reform and modernization strategies has recorded a significant benefit in clearing time of the cargo by the customs administration. Also, there has been an increasing transparency within the customs administration staff and also with other trading countries (Wondemagegne, 2014). Locally,

countries have faced a number of challenges that called for enhancement of professionalism in revenue administration.

In regards to this, Kenya Revenue Authority has introduced an ongoing change strategy in running of its activities. This led to the establishment of reforms in Revenue Administration. The program began in 2004 with the intention of changing KRA into a modern, client focused and fully consolidated organization. The revenue administrations of the EAC through the reforms have made consultations with the taxpayer as a crucial measure of its achievement in compliance. There are also annual events on trade held by Kenya, Tanzania and Rwanda referred to as the Taxpayers Day which entails discussing the importance of tax compliance as well as recognizing companies that have been compliant. The meetings are held monthly in Uganda. Another form of reform adopted by the East African countries is the use of Information Technology (IT) in customs operations among the states. For instance, Kenya adopted the Simba 2005 system in its operations. The system differs from ASYCUDA which is the most widely used IT System in Africa. Kenya also phased out the pre-shipment inspection of cargo for purposes of customs in 2005 while Tanzania subcontracted the destination inspection to be done by a pre-shipment company.

1.1.3 Local Perspective of Automated Customs Systems

Reforms have been partly driven by development aid conditions and preferential trade agreements hence complying with the WTO regulations. Tariff rates have reduced gradually on imported inputs. The main objective of these reforms that were implemented together with liberalization of trade was to enhance openness in trade hence moving towards export oriented industrialization (Kamau, 2014). A number of African countries work together with international bodies have applied these reforms hence increased trade volumes and thus increasing revenue collection. Customs reforms and initiatives in Africa have been greatly relied on as a strategy of improving the revenue collection.

The revenue administration structures for most of the developing countries have failed to meet the set revenue objectives and have also not been as productive as desired. This has called for the need to reform the revenue structures for most of the developing countries. This has been done with the aim of achieving economic efficiency, revenue adequacy, simplification of customs procedures and equity and fairness among the traders. Some policy advice has been directed towards such countries in the process of redesigning their tax policies through various reforms (Blinder, 2008). This has led to introduction of new customs reforms, more efficient administrative tools to block the loopholes that lead to tax evasion as well as the call to widen tax bases and cut on exemptions. South Africa for example, through the reform and modernization strategies has recorded a significant benefit in clearing time of the cargo by the customs administration. Also, there has been an increasing transparency within the customs administration staff and also with other trading countries (Wondemagegne, 2014). Locally, countries have faced a number of challenges that called for enhancement of professionalism in revenue administration. In regards to this, Kenya Revenue Authority has introduced an ongoing change strategy in running of its activities.

The Revenue Administration Reform and Modernization Program program began in 2004 with the intention of changing KRA into a modern, client focused and fully consolidated organization. There are annual events on trade held by Kenya, Tanzania and Rwanda referred to as the Taxpayers Day which entails discussing the importance of tax compliance as well as recognizing companies that have been compliant. The meetings are held monthly in Uganda. For instance, Kenya adopted the Simba system 2005 system in its operations. The system differs from ASYCUDA which is the most widely used IT System in Africa. Kenya also phased out the pre-shipment inspection of cargo for purposes of customs in 2005 while Tanzania subcontracted the destination inspection to be done by a pre-shipment company.

1.2 Statement of the Problem

Customs administration has roles that itb plays into the country on revenue performance. These roles include; Revenue collection. Collection of trade statistics, protection of the society, protection of the borders and facilitation of trade (Ayuma, 2018). Customs has also a mandate of risk management on behalf of other government agencies on health, immigration, agriculture and environment (Gathii, 2011). To achieve this, a spectrum of operational awareness and stability are necessary to midwife the application of the agreed regime controls. Customs department has the responsibility to enforce and administer relevant regulatory requirement on imports and exports (Melgar, 2015).

Customs administration have not been performing well in terms of revenue collections as per the treasury. The problem has been that the customs department has many times missed its targets. This has been caused by cargo congestion at the ports and at the ICD hence leading to dumarages leading to high cost of doing business (Gadido, 2015). Due to the recurrent fiscal deficits experienced by the Kenya Customs Administration from the set targets, there has been need to advocate for reforms in areas of customs administration like the intelligence risk management, automation of systems, capacity building, security and integrity among the employees. The failure by the Administration to hit its yearly customs revenue targets has called for the need to adopt reforms that can result to increased customs revenue collection.

The call for the customs reforms and modernization practices by the Kenya Customs Administration has been geared by the fact that the administration has in some years failed to meet its revenue targets set by the agency. For example, during the financial year 2015/2016 the revenue target was 1,212.6 billion but the administration managed to collect 1,200.2 billion recording a shortfall of 12.5 billion. In the financial year 2016/2017 the revenue target was 1,431. 8 billion but the administration collected a total of 1,365. 3 billion Kenya shillings again not meeting the set target (KRA 7th Corporate Plan for the years 2018 to 2021). There has been

a problem by customs administration not meeting the set revenue targets which calls for the agency to come up with measures that will help attain higher customs revenue collection therefore the call for reforms and modernization in the administration.

Kenya has previously adopted different reforms in its customs administration department so as to spur tremendous growth in customs revenue collection (Moyi and Ronge, 2016). However, there are still loop holes that need to be checked in so as to ensure maximum collection of customs revenues with minimal or zero customs revenue loss. As much as there has been improvement in customs revenue collection since the implementation of customs reforms and modernization, the amount collected isn't proportional to the increasing volume of trade. As a result, Kenya Customs Administration finds it impossible hitting the revenue targets by the treasury in the past years. Though the government invested much in tight enforcement measures and technology, the customs administration has failed to meet the set targets. The study is meant to examine whether customs revenue performance has improved since the automation of the new system.

1.3 Research Objectives

1.3.1 General Objective

The overall aim of this study is to examine the effects of Customs System automation on performance of revenue in Kenya.

1.3.2 Specific Objectives

i. To examine effect of Integrated Customs Management System on performance of revenue in Kenya.

ii. To determine the effect of Scanner Technology on performance of revenue in Kenya.

iii. To examine the effect of Cargo Tracking System on performance of revenue in Kenya.

1.4 Research Questions

To attain the above objectives, the study attempted to seek to answer the following questions.

i. What is the effect of Integrated Customs Management System on revenue performance in Kenya?

ii. How do Scanners affect revenue performance in Kenya?

iii. How does cargo Tracking System affect revenue performance in Kenya?

1.5 Significance of the Study

This research work will be of benefit to policy makers, Customs tax administration and scholars on their development.

1.5.1 Policy makers

Both Global and Local policy makers will use this study to base their legislation on customs and tax matters. Collection of Revenue is an important element on administrative and facial policy of the economy of the country. Through the collection of revenues, the government is able to measure its performance. Consequentially, data from external users is also improved as well as that of other government agencies.

1.5.2 Customs Administration

The administrators in customs will use this study in their revenue collection matters. Revenue automation schemes have an affirmative effect on the efficiency of revenue collection. It may also integrate the potential risks faced in the operation if revenue collection automation strategy is achieved. Nevertheless, automation process of these revenue collection points have had a significant effect on clearance time hence reducing the costs of doing businesses.

1.5.3 Researchers

This research work will also increase learners' stock of information in the days to come for their reference and research. The researchers will be equipped with the knowledge in relation to this topic and come up with areas that requires further research.

1.6 Scope of the Study

The research work examined efficiency of revenue collection as a result of system automation hence putting its focus tax payer audits, refunds, compliance monitoring. The study was carried out in Customs Departments and clearing and forwarding firms within Nairobi. The study targeted customs department, clearing and forwarding employees and transporters to determine effects of modernization on revenue collection in Kenya at the customs and border control services department. Three variables focused were: the effects of Integrated Custom Management System, Scanners and Rects on revenue collection by customs department. The targeted group were employees working with Customs and Border Control Services Department.

1.7 Challenges of the Study

The researcher experienced varied challenges in relation to this research. First, the issue of corvid 19 has seriously affected the usual way of interaction. Therefore, physical meeting of the participants towards distribution of questionnaires was definitely affected. However, the researcher had put in place adequate measure and tried to convince the participants of non-disclosure of their identity. Another limitation was obtaining information from other studies similar to the researchers' study, the areas were unique and seemed to have not been vastly researched in the past. Finally, there was the issue of financial constrain as the researcher had to make physical movement to the scene of data collection of which was not sponsored by the academic institution.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This refers to evaluation of the existing literature based on one's subject or the topic being studied, by reviewing literature relevance to the study topic. Literature review is important in the research in that it creates a sense of rapport reader so that they can trust one's study. This section will provide a review of some of the current literature on research on customs system impacts on trade facilitation by critically examining their aims, methodology and results. It also covers main sections such as conceptual framework, theoretical literature and empirical literature, research gaps, study-related criticism of current literature and summary.

2.1 Theoretical Review

This shows an understanding of various theories relevant to the topic under study and help to make a prediction about a given situation (Carnwell & Daly, 2015). It explores thoughts on the impacts of various systems used by customs administration on Trade process. The following theories are therefore used in the study: Mobility intergenerational Theory, Technological Change Theory and International Trade Theory.

2.1.1 Mobility Intergenerational Theory

This is a modern social science paradigm that explores not only people's motion, but also products that are traded. It also examines these movements ' wider social consequences. This theory is very important for Customs Department officers to digitalize cargo monitoring scheme to assist in monitoring and track cargo from on-loading and off-loading locations which help to prevent diversion of cargo on transit (Kominers et al., 2018). In reaction to the growing realization of the historical and modern significance of motion on people and products in society, this theory started in the 1990s (Williams, 2016). Usually higher mobility rates and

fresh types of mobility in which bodies mix with data and distinct mobility patterns motivated this turn.

The mobility paradigm contains fresh methods to theorize how mobility lies at the core of constellations of authority, identity creation, and everyday micro geographies. According to (Kominers et al., 2018), mobility arose as a criticism of contradictory orientations in social science towards both sedentary and deterritorialisation. People have often been seen as unchanging entities linked to particular locations, or in a globalized or frenetic life, mobility looks at forces and movements that drive, constrain and are generated by those movements (Williams, 2016).

2.1.2 Technological Change Theory

Technological change theory mainly focuses on the adoption of Integrated Customs Management System by custom administration. According to (Tidd, Bessant, & Pavitt, 2005), technological change has also been demonstrated in the previous days with the' Linear Model of Innovation,' which has now been mainly discarded to be substituted by a model of technological change involving innovation at all phases of research, production, dissemination, and use. Generally speaking, technological change modeling often implies the innovation process. This continuous improvement process is often modeled as a curve that shows downward expenses over time (Mondragon, Mondragon & Coronado, 2017). Concerning custom systems management, there has been a progressive change in technological that has been adopted to improve custom management and facilitate trade. The custom system has also registered a progressive change in technology over years.

In 2005, Kenya Revenue Authority in the department of customs implemented Simba 2005 with technical assistance from the Government of Senegalese. The system was part of the proposed modernization and reforms programs aimed at streamlining various operations

departments of customs. The department that deals mostly with exporters and importers of goods and services being the highest revenue earner among customs departments (Mbui, 2016). The system was introduced to help promote efficiency in clearing and forwarding imported and exported goods by providing electronic submissions for the required import or export and to allow easy lodging traders information of clearance within the system. After formally introducing the Electronic Single Window System, Kenya made notable progress in 2014 (Djanitey, 2018). This was intended to create it much easier, quicker and easy to document cargo clearance across its boundaries. The Single Window System is a technological change that Kenya has implemented to support international trade in Kenya by decreasing delays and reducing expenses connected with border clearance while retaining the necessary controls and collection of levies, charges, duties and taxes on imports or exports where applicable. In order to encourage trade facilitation, all these customized schemes have been implemented. In this way, international trade processes, in particular import and export processes, transit conditions and processes implemented by customs and other organizations, are simplified, harmonized and automated.

2.1.3 Technological Acceptance Theory

This model was generated by Davis et al in the 1989. The technology acceptance theory measures peoples and organization's willingness to adopt new technology. As presented by Davis (1989), the model attempts to explain the reasons for acceptance or rejection based on the theory of reasoned action. To do so, the theory explains the essential components of technology diffusion and acceptance of information systems. According to Davis (1989) the model focuses on two fundamental factors that influence the use of new technology, first is ease to use the system and secondly, how the system is useful to its function as the system is intended. The two theoretical constructs are said to influence and predict attitudes towards use of technology. According to Davis, Bogozzi, and Warshaw (1989), perceived usefulness of a

system is the extent to which the intended user understands the role of the new technology on their job description and performance. On the other hand, perceived ease of use is the user's expectation of difficulty in the adoption of the new system and the amount of effort need to implement it (Venkatesh and Davis, 2000).

TAM posits that user's technology adoption is dependent on the intended use and the preexisting beliefs and attitudes about the technology. Additionally, the expected ease of use and usefulness of a system can explain the differences between users" intentions. Therefore, the theory also incorporates users" attitude as a third component and determinant of technology acceptance.

Davis et al. (1989) define attitude as a mental and neural state that defines a user's readiness to understand, use, or engage with a concept. The mental state is determined by the experiences associated with the particular issue. In this case, the theory evaluates the role of performance and effort expectancy, facilitating conditions, and social influence, which influence behavior and the use of technology. TAM uses demographic factors, such as age and gender, among other factors, including experience and voluntary of use, to moderate the modeled relationships and determine validity and reliability of the system and the predictability of the dependent variable.

2.1.4 International Trade Theory

This theory focuses on the adoption of technology on customs revenue performance by custom administration. This theory is a microeconomic theory that deals with the structure, causes and volumes of international trade: number of exports and imports from one country to another; incorporating the gains and revenues attributable to these transactions and how both gains and revenues are distributed (Sen, 2010). This theory explains how taxes, quotas and other barriers to trade while also addressing factors of production and consumption. It also takes into account on how relative prices can be determined globally and gaining in-depth knowledge on prospects

for greater competitive advantage. According to (Gandolfo, 2014), a key assumption of this theory is the existence of balance of payments (BOP). The fundamentals of international trade theory are summarized in 3 main models: Classical Theory, Heckscher-Ohlin theory and Neo-classical theory.

The classical theory, also referred to as the Torrens-Ricardo theory, originated from David Ricardo in 1817. It asserts that, a fundamental variable clarifying the existence and outline of international trade is technology. They also explained that the variance in comparative costs of invention reflects differences in production technique. The Heckscher-Ohlin theory emphasizes on the differences in factor endowments between different countries. Sen (2010) in his study, explained this theory as a model exhibiting two countries, two main factors of production and two final goods. The neo-classical theory asserts that the real GDP for every person grows because of the changes in the technology, this induced the level of savings and investments making per capita income to grow (Parkin, 2005). In the neo-classical theory, it asserts that the rate of technological change influences the rate of economic growth, and in the context of this study, customs revenue performance (Toney, 2014). It addresses the key subsets of the dependent variable (customs revenue performance): revenue collection, border control and trade facilitation by factoring in barriers in trade, different tariffs such as import quotas and protective tariffs.

2.3 Conceptual Framework

This shows a connection between the dependent variables performance of customs department in Kenya and independent variables scanner technology, ICMS and cargo tracking system. This is usually displayed in form of a diagram and helps the researcher to have a picture of relationship between theories (Uma Sekaran & Bougie, 2011). The figure below guided the research and show how the factors in this research interrelate. The main factors mentioned in

this conceptual framework are consistent with the theories built for this research to explain, predict, and master phenomena such as interactions, occurrences, actions.

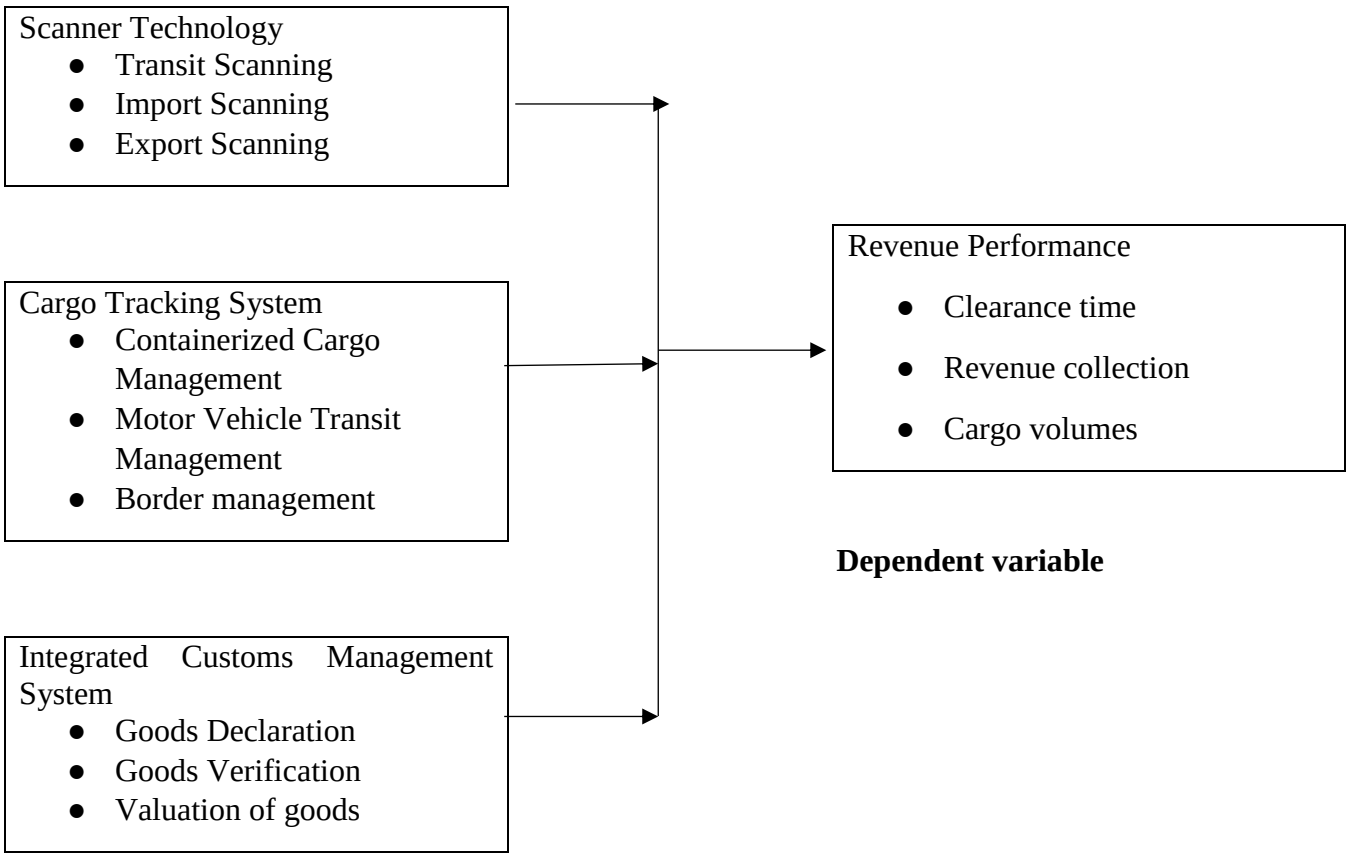

Figure 2.1: Conceptual Framework

2.3.1 Scanner Technology

This is a system that uses X-ray lights to scan goods on transit and commercial use (Dobell, 2017). This system has great effect on collection of taxes since it enables the customs officer to identify the cargo hence enabling him compute correct taxes by correct classification of these goods. This is also important since it ensures that the security at the borders is maintained. This is enhanced by detecting dangerous and prohibited goods. By using this system, the cargo clearance time is reduced significantly hence reducing the cargo congestion that was being witnessed at the border and at the (MRA, 2018). Previously, before the implementation of this

system, if there was incompatibility the physical examination was done hence wasting time hence leading to high cost of doing business (KRA, 2018).

All the information provided on the items that is selected for examination by the customs officer is loaded to the officer's screen. Singapore embraced the new scanning system in 2017; the passport system which involves inspection of projected images to material inspection. The system adopted is efficient in identification of guns and aminations and drugs using high energy X-rays in its scanning process (Freeman, 2017). Gidado (2015) studied the consequences of congestion at the ports, which involved delays, ques of cargos observed at the port and time wastage causing unpleasant consequences on supply chain. This increases the cost of doing businesses within the partner state. According to Wanyama (2017), lack of smooth flow of customs processes interms of document delivery and inefficiencies led to delay in clearing time leading to corruption cases along the borders.

2.3.2 Integrated Customs Management System

This system is bilateral and multilateral trade of goods and services exchanged at a certain monetary value, (Provencal, 2017). Kenya government agency (KRA) in the department of customs, taxes goods flowing in and out of the country for business purposes. This is what is known as import duty or export duty, in similar term tax. The agency which is taxed with this responsibility to collect duties uses these systems to help them collect the required documents for traders in one system to enable them facilitate their transaction process faster. The system is known to customs department as importers and exporters' fraternity as ICMS that allows online submission of documents through the Internet which include; online declarations of cargo or entries(Kaibe, 2012).

This system helps in smoothly shipping and clearing goods out and in country through the application in the system or software, which makes the process to be much easier to clear cargo

at the port without holding up in queue waiting for services, which enable the traders to clear the cargo faster. System being computerized or automated it requires human personnel to run them efficiently in order to improve performance (Naser, et al., 2017). Although this system is good and had been embraced to facilitate trade by enhancing export and import of goods, it requires every personnel operating the system to acquire proper training on how to use the system efficiently without any hitches. This system is web based thus it is limited to both online declaration and payment (Djanitey, 2018). Since not all traded related activities can be applied and payment be payment online, this aspect comes out as a gap which is associated to this system which the current study aimed at bridging.

2.3.3 Cargo Tracking System

ECTs system incorporates a real-time tracking of cargo from the loading point to a place of discharge or offloading (Evans, et al. 2016). It thus provides cargo security by preventing dumping of goods which are in transit or theft. This system for monitoring cargo transiting through Kenya to neighboring countries within East African community to improve trade competitiveness through cargo security along the transit routes by eliminating security escort which was initially being used to escort the goods along the transit, (Irandu, 2016). Cost reduction is achieved through enhanced cargo predictability and enhanced truck turnaround time eventually leading to reduced transport expenses; improving cargo security and assisting traders to predict goods arrival.

Furthermore, RECTS also reduces time wastage because it sends an alert to the officials in command when a truck remains longer than necessary in a specific place. Although electronic cargo tracking system is very vital in tracing the cargos or goods on transit from one point to another, it is determined that sometimes it can lose track of some important goods on transit because it requires intensive monitoring and limit diversion. The current study targeted these areas to bridge the existing research gap.

2.3.4 Revenue Performance

(Sagas, 2015)did an assessment of the impact of electronic tax register on revenue collection by Kenya Revenue Authority western region, Kenya. Findings from their study indicated that 75% of the respondents were of the opinion that ETR machines have helped to curb cases of tax evasion 86% of the respondents were of the opinion that ETRs have helped increase revenue collection due to their efficient nature. (Wang'ombe, 2009) did a study on the revenue productivity and some administrative factors of the Kenyan tax system for the period 2001–2008.

The result of this study came up with buoyancy estimates of the total tax system as 1.26 while elasticity was 1.27. The study thus concluded that the tax system in general was both elastic and buoyant implying that tax reforms had greatly improved productivity. Discretionary tax measures had a very small effect on tax productivity implying improved efficiency.

Computerization of customs systems uses computer applications which consists of broad and incorporated software's that control and monitors all movements of imports, exports and goods on transit and ensures goods are duly cleared before they are released, this also ensures that declaration processes are made, capturing and processing information on collection of taxes. By automation of customs systems, clearance time has significantly reduced hence reducing the cost of doing business in the country. This has mede traders not to incur demurrage which was caused by long ques which was witnessed at the ports before automation.

2.4 Empirical Review

This is a way of gaining knowledge by means of direct and indirect observation. Empiricism values of this kind are more than other kinds also can be measured qualitatively or quantitatively. Quantifying the evidence or making sense of it in qualitative form, a researcher can answer empirical questions, which should be clearly defined and answerable with the evidence collected.

2.4.1 Scanner Technology

The Scanner technology uses a non-intrusive and non-destructive mode of inspection in a bid to identify goods in transportation systems. It uses an x-ray imaging of goods in a container or tanker (Dobell, 2017). Port delays due to clearance procedures at the point of entry are directly related to trade policy as well as customs and port infrastructure (Lewis, Erera, Nowak, & White-III, 2013). Therefore, any shortfall on this affects big and small companies alike, not forgetting the regional blocks goal of intra and inter-regional trade facilitation. In Korea, the Korean Customs Service provides a swift clearance process for ecommerce goods. For instance, according to data extracted from the automated e-clearance system (UNIPASS), on average it takes only 4 hours to complete the Customs clearance of expedited cargo under the list clearance procedure.

Currently, X-ray inspections of expedited cargo and international mail are conducted by the KCS on a 100% basis. Postal operators and couriers are obliged to send information requested for clearance electronically, in order to permit the pre-advice and possible pre-clearance of items. Nevertheless, postal operators use the electronic version of the CN 22 and CN 23 forms developed by the WCO and the Universal Postal Union (UPU). All information on the packages selected for inspection, such as the X-ray image and the data contained in the form used for clearance, is loaded on the computer screen of the Customs officer handling the inspection. Technology is constantly being revolutionized. In 2017, Singapore embraced a new advanced scanning system: Passport System. This system projected image to material identification hence it was able to identify guns, drugs and other contraband goods which was based on their atomic number (Freeman, 2017). Chalfin (2004) also explained the role of border scanning technology on the sovereignty of customs service in Ghana, providing opportunity for surveillance of state agents and authorities in execution of their duties.

In the case study of Nigeria, Durban, the Suez Canal and Mombasa, Gidado (2015) studied the consequences of congestion at the ports which led to delays and long ques at the ports which increased the cost of doing businesses, this impacted unpleasant problems on supply chain. This creates additional costs, loss of trade and disruption of trade and transport agreements. Wanyama (2017), in the study on Kenyan customs, points that lack of smooth flow of documentation process and operational inefficiencies were found to be contributing factors to the delay in the clearance of goods with corruption as the main cause.

Number of officers deployed at the verification section would not match the demand of the work as volume of goods had increased and therefore, the laid down number of containers that every officer is supposed to verify, cannot reduce congestion at the port. Use of scanner technology affects revenue collection from identification and proper classification of goods under correct duty payable. It ensures border security is maintained by detecting contrabands and prohibited goods. It significantly reduces cargo clearance time (MRA, 2018).

2.4.2 Integrated Customs Management System

This is a system where all functions of customs administration, including the entire series of activities carried out by customs officers in the control procedures on the import and export of goods. This system (ICMS) has created an opportunity for expanded tax payment channels hence reducing the costs of doing business. It has spearheaded reengineered customs processes to align and harmonize them through such actions as enhancing AEO programmes and creating documents management systems. Its implementation is in phases (KRA, 2018). The ICMS solution comes with best practice features including auto-upload of cargo import data from shipping manifest to prevent import falsification, auto-exchange of information with Itax to counter non-compliant traders and a virtual electronic auction platform to make Customs cargo auctions accessible to all (Kenya Revenue Authority, 2018). The ICMS Implementation Roadmap shows it has achieved several milestones since its inception. They include

accompanied baggage clearance at baggage hall module, Air Manifest, Single Window, Document Management system and continuous training of internal and external users.

Automation of customs systems has brought about many benefits, for instance, faster clearance of cargos and release, harmonization of procedures and documentations, reduced physical examination of goods, separation of payment of duties and taxes from physical clearance of goods and faster electronic lodgment of customs declarations, using Direct Trader Input or other on-line connections (Ward & Dietmar, 2007). (Holniker, 2005) in his study highlighted other advantages as: reduced customs auditing of documents. This efficiency was not applicable in the previous system; Simba system. Simba system ran from 2005 to 2014, under sub-systems and required multiple points of authentication for users. This took more time for a transaction to take place. ICMS was late envisioned to change this fact by reducing imports and exports clearance by at least 60 per cent (KRA, 2018).

ICMS is regarded as a key constituent of internal control in Kenya as is the Bulgarian Integrated Customs Information System. Its access is authorized on the basis of specific proficiencies of customs officers with respect to its separate modules, and records are kept about which actions have been performed, when they were performed, and by which employee. All EAC member states, except Kenya, have; for a long time; been using the Automated System for Customs Data (Asycuda).

This system (ICMS) has created an opportunity for expanded tax payment channels hence reducing the costs of doing business. It has spearheaded reengineered customs processes to align and harmonize them through such actions as enhancing AEO programmes and creating documents management systems. Its implementation is in phases (KRA, 2018). The ICMS Implementation Roadmap shows it has achieved several milestones since its inception. They

include accompanied baggage clearance at baggage hall module, Air Manifest, Single Window, Document Management system and continuous training of internal and external users.

2.4.3 Electronic Cargo Tracking System

ECTS is a web-based integrated system developed to electronically monitor goods under transit control as it moves along the Northern Corridor supply chain that is Kenya, Uganda and Rwanda. It offers real-time cargo tracking that helps in knowing the exact location of cargo consignments along the supply chain hence enhancing cargo security while facilitating efficiency and effectiveness in trade. It was introduced to curb transit diversions into the local market. Prior to its implementation, KRA used physical human escorts to escort the transit cargo from the port of Mombasa all the way to the Kenya-Uganda border. ECTS technology become available in the early 2004, but it was only in April 2010 that the Kenyan government introduced the mandatory installation requirements and Uganda followed in November 2013. Currently, the system has been upgraded to include three of the Northern states i.e. Kenya, Uganda and Rwanda who operates an integrated cargo monitoring unit commonly referred to as RECTS (Regional Electronic Cargo Tracking System). It enables them to have joint monitoring of the transit goods within the region.

The system helps customs and private transporters monitor movement of transit goods and prevent transit cargo theft and dumping while enhancing fair terms of trade. The system uses Radio-frequency identification (RFID) and GPS/GPRS technology. All trucks, tankers and container carrying transit goods are fitted with a tracking device and an electronic seal which sends the seal status, truck location and any violation to KRA on a real time basis. Its main components include a tracking reader (GRS receiver, RDIF reader & GPRS/GSM modem), mechanicals for hatches and valves (wet cargo), ECTS software platform and an electronic seal (e-seal). An e-seal is an intelligent gadget which signals its presence and communicates with a tracking reader using the Radio Frequency Identification- RFID technology.

2.4.4 Revenue Performance

Automation helps conduct complex processes accurately, efficiently and effectively. Automation of tax administration allows tax data entry, automated processing, computation and analysis as well as automatic production of tax reports and feedback required for control and risk management purposes Furthermore, (Holniker, 2005) explains automation of tax administration includes developing powered computer programmes to carry out tax assessments and computations; and to determine tax dues at high levels of speed and accuracy.

According to Narayanaswami et al., (2019) the adoption of the electronic custom procedure create room for effective reconciliation of payments since all details are provided on demand. In essence, management and activity report can be easily generated and made available through the implementation of data warehousing. In his sentiments, Narayanaswami et al., (2019) argues that collection points associated with integrated custom systems is characterized with collection points of fewer cashiers as long queues are eliminated. As a consequent, the cashiers have to select the entry and collect payment without having to fix in large amount of transaction details.

The potential benefit of electronic custom procedures includes paperless processing of reliable information, reduction of costs and delays among along with the supply chain. This reduces unprecedented chances of insecurity in conducting cross boarder business. Research evidence obtained from Riom (2020) indicates that the adoption and roper use of IT could save the tax man agency billions of money on annual basis.

Modern logistics have increasingly vouched for technological based clearance processes; including use of Radio Frequency Identification Technology. Since the need for a logistics-customs clearance services platform worldwide, Kenya has since embraced this measure to provide efficiencies in the harmonization and simplification of customs processes along with

increasing revenue collection (Deng et al., 2010). According to Parliamentary Budget Office (PBO) Policy paper (Series No. 2/2010) on revenue potential in Kenya, there is need to put more efforts to ensure that there is adequate and sustainable exploitation of the available opportunities to raise resources domestically. Despite the country having a large potential and opportunities to raise resources, the low compliance levels and tax evasion creates a narrow tax base and high enforcement costs. Taxes are collected from easy-to-tax sectors as public wage earners while enforcement of collection among small business enterprises is difficult. Tapping into this group of taxpayers can significantly increase revenue collection (Masese, 2011).

Customs systems automation have led to increased transparency in duties assessment and valuation, reduced clearance time and data sharing amongst regional bodies. Both revenue authorities and the trading community have attained direct and indirect saving from systems automation including synchronization of procedures, faster electronic lodgment of declarations using Direct Trade Input (DTI) and reduced physical examination of shipments. More revenue has been collected from customs duties from the automated calculation of duties and the uniform application of regional and global customs laws. Systems automation has allowed timely data sharing for foreign trade statistics. Cost implications vary from country to country based on the initial reforms programmes, ICT systems and technological applications used in their customs administration units. These vary from hardware, software, training requirements and ICT infrastructure in the country. Countries with efficient goods markets are well positioned to produce the right mix of products and services given their particular supply-and-demand conditions, as well as to ensure that these goods can be most effectively traded in the economy. According to (Maree, 2018) a healthy market competition, both domestic and foreign, is important in driving market efficiency, and thus business productivity, by ensuring that the most efficient firms, producing goods demanded by the market, are those that thrive.

2.5 Critique of the Existing Literature

Automation of customs processes and generally trade procedures comes with criticism and ultimate favor for the conventional approach to tax operations. Systems automation creates a risk of replacing human capital for tools such as TaxBots and other machines. Nationalism along with rigid political and trade policies subjects Kenya to unsynchronized trade activities with its trade partners. Moreover, systems automation requires a large capital allocation by the states and their respective counties to initiate and sustain it (Dobell, 2017). The empirical studies cover Scanner technology, ICMS, Cargo tracking systems individually making the scope to be limited. Policy development requires a wider consideration of factors affecting the very policy area which renders the studies limited in scope. The report on WCO Private Sector Consultative Groups (2018) discusses why technology in excess though good, cannot change many trading environments. It can only boost existing positively steered states. Moreover, though technology helps with data sharing, countries still regulate information for fear of unfair international competition (Maree, 2018).

2.6 Summary of the Literature Review

It is clear from literature reviewed, little research has been conducted examine the effects of the recent automation to improve efficiency at Customs and Border Control Services Department by KRA, and to measure its effect on revenue collection and reduction of contraband goods in the country. The concept of revenue performance as proposed in the new structure of KRA, the use of Scanner Technology, RECTS and ICMS have positive impact and is now bearing fruits. However, modernizing port and administrative operations is not a homogeneous phenomenon; it varies between importers, exporters and the government.

According to the study carried out in Kenya and East Africa on the Integrated Customs Management System, which is the newer system is that this system is a bit faster in carrying out cargo clearance from the port. In the study done on Single Window System, it's essentially

a trade facilitation tool whose main purpose is to harmonize and simplify processes associated with cross border movement of goods. Finally, the current study reviewed literatures which focused on the Electronic Cargo Tracking System which has invariably been associated with tracing, to form the commonly adopted concept of tracking and tracing. Lastly, the study also reviewed literatures conducted on the trade facilitation. These studies confirmed that a better climate for trade facilitation increases import and export quantities as the trade facilitation scheme can assist assess the relationship between time for exports and imports, logistics facilities and international trade, and discovered that time delays result in reduced amounts of trade and decrease the likelihood that companies entering export markets for time sensitive products.

2.7 Research Gaps

A similar study done in Bulgaria; on the role on technologies in the development of customs control in the Republic of Bulgaria explains that European Commission is increasingly and actively working to implement information technology in customs control. A Pan European electronic customs system was launched to build a robust communication system between customs offices in the union and other stakeholders (Antov, 2017). Rehman, Esichaikul, & Kamal (2012) in their case study of Pakistan explained three variables: awareness, trust in the internet and trust in the government caused adoption of e-government in Pakistan, this showing conceptual gaps. The methodological gap is exhibited in Ghana's case study by Gidisu (2012) who used descriptive research design.

According to (Antov, 2017), Bulgaria employed various systems to this effect: New Computerized Transit System, Customs Information Systems for Exports, Bulgarian Integrated Customs Systems and Import Control System. The European Commission have set high standards that Bulgaria have to follow to qualify for preferential treatment as part of its customs union, guided by the Customs Code (Antov, 2017). According to Tetteh (2012) the Ghanan

Revenue Authority automated its system procedures which improved its revenue collections. The contextual gap in these studies were their concentration on Bulgaria, Pakistan and Ghana. Dobell (2017) explains the use of scanner technology as improving border security, depicting a contextual gap in his premise from its non-practicability to Kenya owing to differing variables to customs operations. These formed the basis for this study.

CHAPTER THREE

RESEACH METHODOLOGY

3.1 Introduction

Research methodology is the systematic theoretical analysis process of the various methods applied in the field of study for collecting information and data to help in making decision. It covered the sampling technique and research design. Additionally, the researcher also explained the strategies used to select participants, methods applied in during the data collection process, analysis and presentation.

3.2 Research Design

This is a plan that answers the question to the problem by providing a solution (Cooper & Schindler, 2010). The descriptive research design was adopted in this research. According to Jolley (2012), descriptive survey design comprises observation studies, correlation research, developmental designs, and survey research. Descriptive survey as described by Kothari (2004) is a method which embraces observation and description of the behavior of a subject without influencing how it operates.

3.3 Target Population

A population is defined as a set of objects or people with similar features (Mugenda & Mugenda, 2003). The researchers targeted customs officers and registered clearing and forwarding agents within Nairobi. The total number of people selected in this study was 1132 with 240 customs officers and 892 licensed clearing agencies according to KIFWA. The target population is illustrated on the table below.

Table 3.1 Target Population

Target group	Total population
Customs officers	240
Clearing and forwarding agents	892
Total	1132

3.4 Sampling Frame

A sampling frame comprises of a list of people from which the researcher uses to obtain information about the study (Maxwell, 2012). The sampling frame defines a set of elements from which a researcher can select a sample of the target population. Because a researcher rarely has direct access to the entire population of interest in social science research, a researcher must rely upon a sampling frame to represent all of the elements of the population of interest. Generally, sampling frames can be divided into two types, list and non-list. A sampling frame includes a numerical identifier for each individual, plus other identifying information about characteristics of the individuals, to aid in analysis and allow for division into further frames for more in-depth analysis. The researcher used a list sampling frame. This consisted of segmented respondents from the Customs Departments and Clearing and forwarding firms.

3.5 Sample and Sampling Technique

Sample size refers to the number of participants or observations included in a study (Gentles, 2015). Sample size is usually represented by n' symbol. Sample size within a population ought to be identified because it helps a researcher in identifying the precision of the estimates and give the researcher power of the study to draw conclusions (Tang, 2018). The study used a stratified random sampling in order to determine the sample size. Stratified sampling suited this study because it provided a great precision and guard against unrepresentative sample

(Kim, 2010). The target population of the study was divided into uniform strata where each stratum was evaluated independently.

Table 3.1: Sample Size

Target group	Total population		Sample size
Customs officers	240	15%	36
Clearing and forwarding agents	892	15%	134
Total	**1,132**	**15%**	**170**

3.6 Research Instrument

Research instruments are the specific tools used in collection of data that is used in a research study (Frels, 2013). To achieve the research objectives both primary and secondary data were used to answer the research questions. Primary data are the items initial to the issue being studied. Questionnaires were used to obtain information from the topics. The structured questionnaire is the instrument for collecting the primary data (Cohen, 2013). According to Galton (2012) by questionnaires, we can learn much about opinions and attitudes as well as intentions and expectations**.** The questionnaire serves four fundamental aims: to gather the relevant information, to make information comparable and analytical, to minimize bias in formulating and answering questions, and to make questions engaging and diverse. The structured questionnaire used Likert scale. Likert scale is an interval scale that specifically utilizes five anchors, with strong disagreement, neutrality, strong agreement disagreement and agreement.

A Likert scale measures attitudes and behaviors using Sekaran (2015) response decisions ranging from one extreme to another. Non-probability sampling technique was used and enabled the researcher use subjective decisions in comparison with random sampling

probabilistic techniques (Creswell & Daly, 2015). The primary reason for selecting non-probability sampling is due to restricted access to the target population as system consumers. Furthermore, the selection of a non-probabilistic sampling is optimal in owing to time and funds limitations to fulfill the need to obtain information in the most resource-efficient and time-efficient way. This therefore requires self-selection sampling, so that the researcher does not approach the research participants directly. Rather, the participants were regarded on a voluntary basis once the questionnaire has been made accessible to them to fill them out. Participants were notified of the research's ethical rules and consent to the questionnaire (Zikmund, 2010).

3.7 Data Collection Procedure

The researcher obtained approval of the research from the department of customs studies in the Kenya school of revenue administration, the researcher came up with a data collection schedule and visit the sections of the customs department to get consent to administer the instruments. This enabled the researcher to familiarize with the respondents. The questionnaires were collected immediately once they were duly filled. Respondents who were not able to give immediate responses were given a timeline within which to have the questionnaires filled and follow up made (Mugenda & Mugenda, 2003). Due to a wider spread of population all over the geographical area in the question, the questionnaire provided the most convenient tool of data for both the researcher and the responded.

3.8 Pilot Testing

A pilot test is a survey done before the actual survey is done (Kombo & Tromp, 2009). A pilot study assists in the determination of the reliability of the research questionnaire and ensures its validity (Cooper & Schilder, 2011). Pilot test should entail 10% of the sample population (Kothari, 2004). This equals 10 respondents participated in the pilot study conducted in Nairobi, who did not participate in the final study.

3.8.1 Validity of the Research Instrument

Validity of data collection instruments was done to ensure that the tools are up to the standard level and can collect the data as required. It is mandatory that the data collection instruments be validated before a research is done (Shuttle, 2009). During validation process, the data collection instruments were reviewed for clarity check, suitability and the language as well as the expression that they portray. Content validity was done on the data collection instruments. Content validity helps to insure the quality of the data collection tools and that of the data collected from the study.

3.8.2 Reliability of the Research Instruments

Reliability refers to a measure of the degree to which research instruments yield consistent results (Mugenda & Mugenda, 2005). The data collection instruments must yield consistent results for them to be reliable enough to conduct the study. Internal consistency reliability was done. Internal consistency was used to measure how well the items on a test measure the same construct or idea. High degree of internal consistency is recommended because it helps in ensuring that the same construct has yielded into more and similar scores. 5% of the respondents was conducted using Cronbach's alpha (α) to measure the reliability of the research instrument.

3.9 Data Analysis and Presentation

This study utilized descriptive statistics for data analysis. Standard deviation, mean, frequency and percentage were the descriptive statistical tools employed in analysis. Descriptive statistics is useful for describing data the way it is and presenting data in a summarized way for more meaningful insights and interpretations of the data. Inferential statistical analysis, Pearson Product Moment correlation and multiple regression, was also conducted. The purpose of inferential analysis is to examine associations and relationships between study variables. Regression analysis is used to explain the effect of the independent variables on the dependent

variable. Correlation analysis measures the direction and strength of association between variables (Sreevidya & Sunitha, 2011).

In this study, the researcher used a linear regression model to represent the relationship between the variables and predict the outcome of the study. The linear regression model is shown below:

$$\mathbf{Y= \beta 0+ \beta 1X1 + \beta 2X2 + \beta 3X3 + e}$$

Where;

β1, β2 and β3 = Coefficients of determination of the independent variables

Y = Customs Revenue Performance

β0 = Constant term

X1 = Information Customs Management System

X2 = Scanner Technology

X3 = Electronic Cargo Tracking System

ε = Error term.

3.10 Diagnostic Tests

These are tests carried out to determine the effect of the research design challenges leading to diagnostic accuracy (Lijmer *et al.,* 1999). Two diagnostic tests, normality and multicollinearity tests were carried out before doing the analysis of data so as to validate the findings. The normality used Shapiro-Wilk test to check for normality while VIF was done to test for multicollinearity

3.10.1 Multicollinearity Test

This is a situation where a huge correlation occurs between the autonomous variables. This situation happens in case of a multiple linear regression model hence existence of a high

correlation of predictor variables leads to unrealistic regression coefficients. As a result, strange results occurs when there is an attempt to determine how the individual variables have a significant effect on the dependent variable (Creswell, 2014). There is always decreased reliability hence confusing and misleading results as a result of multicollinearity. In this study, the test was conducted to determine whether there was existence of high correlation.

3.10.2 Normality Test

This test is usually carried out using the Shapiro-Wilk test where it finds the degree of normality by sensing the presence of skewness and kurtosis. For instance, data is assumed to be normally distributed if the P-value is greater than 0.05. normality usually assumes that the normality of the distributed mean is normal.

3.10.3 Linearity Test

This test is of importance in the regression analysis and correlation analysis. Linearity implies the level to which a change in depended variable varies with a change in the independent variable. In this research the linearity was tested using the Pearson correlation of analysis.

3.11 Operationalization of Study Variables

This process involves identity of the operations that can showcase values of the variables under the study. This is of significance to the researchers since it reduces subjectivity and reduces the reliability of the study.

Table 2.3: Operationalization of the Study Variables

Type of Variable	Variable	Indicators
Dependent Variable	Revenue performance	• Clearance time • Revenue collection • Cargo volumes
Independent variable	Integrated Customs Management System	• Sight verification • Declaration of goods • Verification of goods • Valuation of goods
	Scanner Technology	• Transit Scanning • Import Scanning • Export Scanning
	Cargo Tracking System	• Containerized Cargo Management • Motor Vehicle Transit Management • Border management

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSION

4.1 Introduction

This chapter discusses the findings on the study topic, effects of automation of customs systems on Customs Revenue Performance in Kenya. This chapter is divided into various sections as per the research objectives which includes; effects of Integrated Customs Management System on performance of revenue, determination of the effects of Electronic Cargo Tracking System on performance of revenue and establish the effects of Scanner technology on customs revenue performance in Kenya. Additionally, various data were analyzed using descriptive statistics and analysis of variance.

4.2 Response Return rate

A total of 170 questionnaires were distributed to the sampled respondents. Out of this questionnaires, 131 were completely filled and collected from the respondents making a response rate of 77.06% which was sufficient and satisfactory for the analysis. The response rate of 50% is usually adequate for data analysis, but 70% and above is excellent Mugenda & Mugenda (2008).

Table 3.1: Response Rate

Category	Frequency	Percentage
Response	131	77.06%
Non-Response	39	22.94
Total	**170**	**100%**

4.2.1 Reliability and Data Validity

The ability of an instrument to be consistent in producing same results when subjected to same measurement over and over is reliability. Bagozzi (2000) summarizes that reliability

can be the extent of accuracy or inaccuracy. Reliability of the data collection instrument was determined using Cronbach's alpha from the SPSS version 28.

Table 4.2 Reliability Results

Scale	Cronbach's Alpha	Comments
Integrated Customs Management System	0.775	Accepted
Electronic Cargo tracking system	0.718	Accepted
Scanner Technology	0769	Accepted
Customs Revenue Performance	0.754	Accepted

Reliability refers to the consistency that an instrument has by providing same results when measuring the same test consistently. To test and retest is mostly regarded as conservative estimate of the true reliability of the data collection instrument (Bellini and Rumrill 2009: Cronbach, 1990) using the SPSS version 28, Cronbach's alpha was used to view the values on how the questions a related. According to Amin (2005) a Cronbach's alpha, an average index of 0.70 is considered adequate to consider the instrument reliable. The above table 4.2 shows the reliability results of the questionnaire. The findings indicated that Integrated Customs Management System had a Cronbach's alpha value of 0.775, Electronic Cargo tracking system a value of 0.718, scanner technology having Cronbach's alpha value of 0.769, while customs revenue performance had a value of 0.754. Therefore, this indicated that there was high reliability of the data collection instrument. Finding of the study concurred with research conducted by Otieno, (2014.

4.3 Demographic Analysis

Demographic data analysis of the respondents included level of education, years of experience and age of the respondents.

4.3.1 Age of the Respondents

Findings in Table 4.3, indicate that based on distribution with regards to ages, a higher percentage of the respondents (39.70%) were aged between 29 – 38 years, 31.30% between 39 – 48 years, 16.79% were aged between 18 – 28 years and 12.21% were 49 years and above. Based on this information, majority of employees in these departments are young people who are able to adopt and learn to use the new technologies being used easily. Hence, this information helped us to know or to determine how efficient the employees are able to use the new system easily without much constrains to delay trade processes. Finding of the study concurred with research conducted by Andrews & Regula, (1986) which established that most of the responses are able to learn and adopt the new system at a young age.

Table 4.3: Respondents Age

Age in Years	Frequency	Percentage
18 – 28	22	16.79%
29 – 38	52	39.70%
39 – 48	41	31.30%
49 and above	16	12.21%
Total	**131**	**100.00%**

4.3.3 Respondents' Years of Service

Respondents were asked to indicate the number of years they have been working in customs department at Times towers, importers, transporters and clearing and forwarding firms at JKIA, ICD. From the findings as indicated in Table 4.4, majority of the respondents 41 (31.30%) indicated that they had been in service at the customs department between 8 – 11 years, followed by 35 (26.72%) who had been in service for 4 – 7 years, 30 (22.90%) had been in

service for 12 years and above while only 25 (19.08%) respondents had been in service for 0 – 3 years. This indicated that the information on effects of automation of customs systems on Customs Revenue Performance was collected from respondents who had been in customs department, Importation, Transport and clearing and forwarding sector for a longer period of time and had experience on the Automation of customs systems on revenue performance. Finding of the study concurred with research conducted by Ondiek, (2008) which established that most of the responses from Kenya revenue authority on the challenges in the implementation of the customs' reforms and modernization were given by the senior staffs.

Table 4.4: Respondents' Years of Service

Years	Frequency	Percentages
0-3	25	19.08%
4-7	35	26.75%
8-11	41	31.30%
12 and above	30	22.90%
Total	**131**	**100 .00%**

4.3.4 Academic Qualifications

The study also sought to determine the respondents' academic qualifications. From the findings in Table 4.5, indicates that majority of the respondents, 49 (37.40%) had bachelor's degree, 13 (9.92%) had diploma, 38 (29.01%) had postgraduate diplomas, 21 (16.04%) had masters' degrees and the remaining 10 (7.63%) had Doctorate. This can be analyzed that majority of the respondent had Bachelor's degree qualifications in the department of customs and clearing and forwarding signifying that they had knowledge based on the training to use various technologies used in that department thus enable them to boost the process of clearance of cargo for traders and improve revenue performance. The findings concurred with Babbie

(2013) who indicated that educated respondents were in a position of understanding what they were required to answer in a given area of study.

Table 4.5: Table of Academic Qualification

Academic qualification	Frequency	Percentage
Diploma	13	9.92%
Degree	49	37.40%
Post graduate Diploma	38	29.01%
Masters	21	16.04%
Doctorate	10	7.63%
Total	**131**	**100 .00%**

4.4 Descriptive Analysis

4.4.1 Scanner Technology

Table 4.6 shows how the use of scanner technology has resulted to revenue performance. The scanner technology adoption hastens the cargo clearance process at the Kenya border point with a (mean=3.82, std=1.765). scanner technology reduced cost of doing business and facilitate trade it in Kenya (mean=3.62, std=1.854). the collection of duties or taxes have become easier or faster as a result of scanner technology adopted by Kenya revenue authority (mean=3.96, std=1.689). There is reduction of dangerous cargo that is being diverted to the local market in Kenya (mean=3.83, std=1.706) while scanner technology adoption reduces the cost of doing business to the traders had a (mean=3.86, std=1.778).

Table 4.6: Scanner Technology

Statement	N	Min	Max	Mean	Std. Dev
Does the scanner technology adoption hasten the cargo clearance process at the Kenya border point?	131	1	5	3.82	1.765
Does the scanner technology reduced cost of doing business and facilitate trade it in Kenya.	131	1	5	3.62	1.854
Does the collection of duties or taxes have become easier or faster as a result of scanner technology adopted by Kenya revenue authority in Kenya?	131	1	5	3.96	1.689
There is reduction of dangerous cargo that is being diverted to the local market in Kenya.	131	1	5	3.83	1.706
Does the scanner technology adoption reduce the cost of doing business to the traders (import and export).	131	1	5	3.86	1.778
Mean & std				**3.818**	**1.7584**

4.4.2 Integrated Customs Management System

Using a likert scale questionnaire with ordinal for the respondents to answer the statements with either strongly agreeing to strongly disagreeing. Table 4.7 illustrates how the Integrated Customs Management System has helped in performance of revenue collection in Kenya. ICMS adoption has hastened the cargo clearance process at the Kenya border point with a (mean=4.03). Integrated Customs Management System reduced cost of doing business and facilitate trade it in Kenya with (mean=4.00). Collection of duties or taxes have become easier or faster as a result of Integrated Customs Management System adopted by Kenya revenue authority with a (mean=3.71). Adoption of ICMS has reduced dangerous cargos from being diverted to the local market in Kenya (mean=4.05). Lastly, Integrated Customs Management System adoption reduce the cost of doing business to the traders (import and export) had a (mean=3.69).

Table 4.7: Integrated customs management system

Statement	N	Mean	Std. Dev
Does the Integrated Customs Management System adoption hasten the cargo clearance process at the Kenya border point?	131	4.03	1.645
Does the Integrated Customs Management System reduced cost of doing business and facilitate trade it in Kenya.	131	3.71	1.821
Does the collection of duties or taxes have become easier or faster as a result of Integrated Customs Management System adopted by Kenya revenue authority in Kenya?	131	4.00	1.678
Adoption of ICMS has reduced dangerous cargos from being diverted to the local market in Kenya.	131	4.05	1.602
Does the Integrated Customs Management System adoption reduce the cost of doing business to the traders (import and export).	131	3.69	1.782
Mean & Std		**3.896**	**1.7056**

4.4.3 Cargo tracking system

Table 4.8 gives an illustration on how the adoption of the cargo tracking system has increased performance of revenue in Kenya. adoption of the Electronic Cargo Tracking System by customs department enable the data to be captured on the system to be shared on the real time basis resulting to reduce dumping, tax evasion, cargo theft and diversion with a (mean=3.63, std=1.858). The adoption of Electronic Cargo Tracking System in customs department has eliminate the paper work involved in the old ways of doing business at the border post and this makes clearance to be much faster for traders (mean=3.44, std=1.906). The quality of service to traders due to increase of service delivery as a result of adoption of the Electronic Cargo

Tracking System (mean=3.95, std=1.686). Traders are now more willing to do the business with customs due to the efficiency created by the Electronic Cargo Tracking System which makes the trade to become easier without delaying their clients (mean=3.51, std=1.824) while There is reduction of dangerous cargo that are being diverted to the local market in Kenya (mean=3.68, std=1.931).

Table 4.8: Cargo tracking system

Statement	N	Min	Max	Mean	Std. Dev
The adoption of the Electronic Cargo Tracking System by customs department enable the data to be captured on the system to be shared on the real time basis resulting to reduce dumping, tax evasion, cargo theft and diversion.	131	1	5	3.63	1.858
The adoption of Electronic Cargo Tracking System in customs department has eliminate the paper work involved in the old ways of doing business at the border post and this makes clearance to be much faster for traders (import and export).	131	1	5	3.44	1.906
The quality of service to traders due to increase of service delivery as a result of adoption of the Electronic Cargo Tracking System.	131	1	5	3.95	1.686
Traders are now more willing to do the business with customs due to the efficiency created by the Electronic Cargo Tracking System which makes the trade to become easier without delaying their clients.	131	1	5	3.51	1.824
There is reduction of dangerous cargo that are being diverted to the local market in Kenya	131	1	5	3.68	1.931
Mean & Std				**3.642**	**1.841**

Table 4.9: Effects of Systems Automation on Customs Revenue Performance.

System Automation	Measure	No. of Interventions	Revenue generated (Ksh. Millions)
Financial Year 2018/19	Financial Year 2018/19	Financial Year 2017/18	
Scanning	No. of scanned Containers	339,359	
Without Inconsistencies	329,226		
With Inconsistencies	10,133	2176	1,630
No. of scanners installed	5		
Regional Cargo Tracking System	No. of transit trucks under electronic monitoring system	17,592	
BIF Saved	1,193	1,843	568
CIF value for non-containerized cargo	0.184	0.151	
Recoveries	1,427	67	65

According to the KRA financial reports for the years 2017/2018, 2018/2019, and 2019/2020 there has been growth in revenues as a result of implementation of ICMS, scanners and the ECTS. For the financial year 2019/2020, customs administration performed well in terms of revenue collection signifying a 7.7% growth. This was as a result of non-oil pools which accounted to 70% leading to increase in revenues. The customs revenue performance is as a result of enforcement strategies being employed on cargos in order to discourse the undervaluation through benchmarking of the values. By application of these processes, it has led to average daily collection of customs revenue improved from Ksh 1.126 Billion in the H1

of financial year 2016/2017 to Ksh 1.257 Billion in H1 of the financial year 2017/2018. This led ro revenue increase by Ksh 131 Billion per day (KRA, 2018).

During the financial years 2018/2019, the revenue collected by customs administration was Ksh 525.3 Billion which was an improvement from the target of Ksh 522.8 Billion. There was a significance growth in revenues at the border control which surpassed the three financial years, 2015/2016, 2016/2017 and 2017/2018 with a revenue growth of 9.5% signifying an average daily collection of 7.9%. this is evident as shown in the financial year 2017/2018 which had a daily collection of Ksh 1313 million as compared to the financial year 2018/2019 which a daily collection of Ksh 1418 million. Revenues collected by KRA in the financial year 2018/2019 had a significance growth by 11.8% which was Ksh 525.3 Billion from the previous financial year. The revenues collected as per the scanner technology was 2.2Billion, while that from RECTS was 0.67million for the financial years 2018/2019 after 1.84Billion saver from the implementation of the E-seals. The revenue collection for the financial year 2019/2020 had dropped by 2.8%. this is due to Covid-19 pandemic on the global trade (KRA, 2020).

4.5 Correlation Analysis

The researcher sought to determine the relationship between dependent and independent variables, through correlation analysis. Using Karl Pearson's coefficient of correlation (r) to ascertain the relationship between variables, there was a positive correlation with linear relationship between the independent variables and dependent variable with coefficient of correlation (r) given by values 0.462, 0.659 and 0.635 for resource Integrated Customs Management System, Electronic Cargo Tracking system and Scanner Technology and are statistically significant with ($p < .005$) for variables.

Table 4.10: Correlation Matrix

Customs Revenue Performance	**Integrated Customs Management System**	**Electronic Cargo Tracking System**	**Scanner technology**	
Customs Revenue Performance	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	131		
Integrated Customs Management System	Pearson Correlation	.462**	1	
	Sig. (2-tailed)	.000		
	N	131	131	
Electronic Cargo Tracking System	Pearson Correlation	.659**	.397**	1
	Sig. (2-tailed)	.000	.000	
	N	131	131	131
Scanner technology	Pearson Correlation	.635**	.354**	.666**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	131	131	131	131

** Correlation is significant at the 0.01 level (2-tailed).

4.6 Regression Analysis

4.6.1 Coefficient determination

In the model, the value of (R) is 0.733, which shows presence of shared variance between the dependent and independent variables. The value R Square is a goodness-of-fit of the model. As indicated in the table 4.11 below, the value is 0.538; inferring 53.8% of the relationship is explained by the variables under study. This means that, the other factors not considered in the

study contribute 46.2% of variance in the dependent variable. This factors include; Use of Canines, Authorized Economic Operators, Oil Stock Management among others.

Table 4.11: Coefficient of determination

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.733	.538	.527	2.092

a Forecasters: (Constant), ICMS, ECTS, Scanner technology

4.6.2 Analysis of Variance

The analysis of variance was used to determine the significance of the model. It describes the overall variance accounted for in the model. During testing of significance, P-value of equal or less than 0.05 is considered to be statistically significant. From the table 4.12 below the model has a p-value of 0.00 which was less than 0.05. This shows that the regression model was statistically significant in predicting strategic factors affecting customs revenue performance in Customs Department. Basing on confidence level at 95%, the analysis indicated a relatively high reliability of the results obtained. The ANOVA results therefore indicates that the regression model was significant at F (representing a test of the null hypothesis) = 49.245, p = 0.000 as shown below.

Table 4.12 Analysis of Variance ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	646.670	3	215.557	49.245	.000b
	Residual	555.910	127	4.377		
	Total	1202.580	130			

a. Dependent Variable: Customs Revenue Performance

b. Predictors: (Constant), Integrated Customs Management System, Electronic Cargo Tracking System, Scanner technology

4.6.3 Multiple Regression Analysis

A multiple regression analysis was conducted to determine the relationship between customs revenue performance and the three independent variables of the study (Integrated Customs Management System, Electronic Cargo Tracking System, Scanner technology)

Table 4.13 Multiple Regression Analysis

		Unstandardized Coefficients	**Standardized Coefficients**			
Model	**B**	**Std. Error**	**Std. Error**	**Beta**	**t**	**Sig.**
1	(Constant)	5.004	1.052		4.755	.000
	Integrated Customs Management System	.198	.064	.204	3.081	.000
	Electronic Cargo Tracking System	.324	.074	.366	4.397	.000
	Scanner Technology	.217	.056	.219	3.904	.000

a. Dependent Variable: Customs Revenue Performance

b. Forecasters: (Constant), ICMS, ECTS, Scanner technology

As per the table above, the established regression equation was;

The general regression Model arrived at was $Y = 5.004 + 0.198X1 + 0.324X2 + 0.217X3$

Where,

Y= Customs Revenue Performance,

X1= Integrated Customs Management System,

X2 = Electronic Cargo Tracking System,

X3= Scanner technology

The findings as indicated in Table 4.13 implies that a unit change of Integrated Customs Management System = 0.198, will results in performance of customs revenue by 0.198 change in customs revenue performance; Electronic Cargo Tracking System = 0.324, will results in to 0.324 change in customs revenue performance and lastly Scanner technology = 0.217; will results in to 0.217 change in the customs revenue performance. The Y- Intercept ($\beta 0 = 5.004$), predict the performance customs revenue raised by Customs department, when all other variables are zero, implying that without the independent variables; Integrated Customs Management System, Electronic Cargo Tracking System, Scanner technology, customs revenue performance in customs department in KRA would be 5.004. From the analysis, management decision X2 ($\beta = 0.324$, $p<0.005$) has the strongest relationship with customs revenue performance. This is in line with Butler (2001) argument that if management decisions are undertaken properly, it will guarantee sustainability on returns. The Beta Coefficients in the regression model shows that all of the tested variables had positive relationship, and are all statistically significant with p-values less than 0.005.

4.7 Discussions of the findings

4.7.1 Scanner technology and customs revenue performance.

The research established that, the scanner technology has an effect on revenue performance in Kenya which was positive and a statistically significant value of B=0.219 and a Sig=000 which is less than the minimum threshold value of 0.05. with the interpretation, a unit increase in scanner usage results to an increase in performance of revenue in Kenya. These findings concur with that found by Chalfin (2004) in which he found that, the use of scanner technology increases revenue collected by ensuring that goods are classified and identified correctly and

that the correct duties are paid. Scanner technology also ensures that the borders are secure from contraband and prohibited goods.

4.7.2 Integrated Customs Management System and Customs Revenue Performance

The research found that, ICMS has an effect on revenue performance in Kenya which was positive and a statistically significant value of B=0.204 and a Sig=0.000 which is less than the minimum threshold value of 0.05. with the interpretation, a unit increase in ICMS usage results to an increase in performance of revenue in Kenya. These findings concur with that found by Moyi & Ronge (2006) in which he found out that ICMS is a key element to Kenyan Customs administration. Its authorization is usually accessed on customs officer's ability regarding different modules hence keeping records on actions performed by respective officers.

4.7.3 Cargo tracking System and Customs Revenue Performance.

The research found that, Cargo Tracking system has an effect on revenue performance in Kenya which was positive and a statistically significant value of B=0.366 and a Sig=0.000 which is less than the minimum level of confident interval value of 0.05. with the interpretation, a unit increase in ECT usage results to an increase in performance of revenue in Kenya. These findings concur with that found by Freeman (2017) such that enabling the tracking of cargos on real time basis on transit from the ports of entry to its final destination through a synchronized online platform that is digital.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1. Introduction

This chapter gives a brief overview of the findings based on the objectives of the study. It also gives the conclusion of the study, recommendations and the suggestion of areas of further research studies.

5.2 Summary of the findings

The study found out that, Integrated Customs Management System, Electronic Cargo Tracking System and Scanner Technology have great effect on revenue performance. In this study, it was also discovered that the reforms were embraced by customs especially in the wake of the authority not meeting its revenue targets.

5.2.1 Scanner Technology

The study established that the use of scanners by customs department contributes to revenue performance in Kenya. The study revealed that scanner technology had quite a bit been adopted well, and its adoption had brought significant gains in the process of customs clearance. Similarly, the study revealed that integrated customs management system adoption reduced the cost of doing business and facilitated trade in Kenya because through the scanner technology, goods flowing in and out of the country for business purposes can easily be facilitated hence low cost incurred by traders. Furthermore, study showed that there was a reduction of dangerous cargo that were being diverted to the local market in Kenya. Lastly, findings indicated scanner technology adoption reduced the cost of doing business to the traders (import and export).

5.2.2 Integrated Customs Management System

The study established that the use of ICMS by customs department contributes to revenue performance in Kenya. The study revealed that ICMS had quite a bit been adopted well, and

its adoption had brought significant gains in the process of customs clearance. Similarly, the study revealed that integrated customs management system adoption reduced the cost of doing business and facilitated trade in Kenya because through the ICMS, goods flowing in and out of the country for business purposes can easily be facilitated hence low cost incurred by traders. Furthermore, study showed that there was a reduction of dangerous cargo that were being diverted to the local market in Kenya. Lastly, findings indicated integrated customs management system adoption reduced the cost of doing business to the traders (import and export).

5.2.3 Electronic Cargo Tracking System

Findings show that in regards to Customs Systems on Trade Facilitation, the adoption of Electronic Cargo Tracking System by customs department to a great extent enable the data to be captured on the system to be shared on the real time basis resulting to reduce tax evasion, dumping, diversion and cargo theft. And this to a great extent has in customs department eliminated the paper work involved in the old ways of doing business at the border post and this makes clearance to be much faster for traders (import and export). Findings also showed that there were more benefits of using customs systems on trade facilitation and determined that there is significant reduction with regards to average lodgment time. In addition, the study established that Electronic Cargo Tracking System brings a significant reduction with regards to average cost for lodgment and for clearance as well as a significant reduction with regards to average cost of clearance.

5.3 Conclusions

The following conclusions were drawn based on the results of this research; the adoption of various systems on customs departments had a major effect on traders and clearing and forwarding companies. All companies were compelled to have an IT system with internet connectivity to allow the electronic Customs system to be used. The average lodging time and

clearance time have been significantly decreased by the electronic Customs systems. Due to the implementation of customs electronic processes, lodging costs and clearance costs have also been drastically decreased. From these findings, we can conclude that the quicker movement of products is now taking place with the implementation of various customs systems. Thus, the implementation of various customs systems has a major impact on facilitating trade in Kenya

5.2.1 Scanner technology

The study found out that Scanner technology had a significant positive influence on customs revenue performance. The overall mean score of response regarding Scanner technology and customs revenue performance indicated that majority of the respondents agreed that Scanner technology affects the customs revenue performance in Kenya. Correlation results indicated that there was a positive and significant relationship between Scanner technology and customs revenue performance. It was therefore concluded that scanner Technology has significant positive effect on customs revenue performance.

5.2.2 Integrated Customs Management System

The study found out that Integrated Customs Management System had a significant positive influence on customs revenue performance. The overall mean score of responses regarding Integrated Customs Management System indicated that majority of the respondents agreed that Integrated Customs Management System affects the customs revenue performance in Kenya. The reliability analysis results showed that all the coefficients of the constructs were positive and significant.

5.2.3 Electronic Cargo Tracking System

With regard to cargo tracking system, study concluded that Electronic Cargo Tracking System to a great extent enable the data to be captured on the system to be shared on the real time basis

resulting to reduce tax evasion, dumping, diversion and cargo theft. And this to a great extent has in customs department eliminated the paper work involved in the old ways of doing business at the border post and this makes clearance to be much faster for traders (import and export). In addition, Electronic Cargo Tracking System brings a significant reduction with regards to average cost for lodgment.

5.4 Recommendations

The study revealed a statistically substantial link between integrated customs management system, scanner technology, and Cargo Tracking systems on customs revenue performance in Kenya. From the findings,

5.4.1 Scanner Technology

I recommend that the scanner technology should be adopted by customs department since it greatly affects the accountability and efficiencies of customs officers and the cargo owners. KRA should also invest more in this system since it has reduced clearance time at the border post hence reducing the cost of doing business. The cargo congestion experienced at the border posts has greatly reduced, hence full implementation of these system will reduce the demurrage cost to bare minimum. KRA should also introduce scanner usage at the “panya” roots to curb those traders that evade payment of duties.

5.4.2 Integrated Customs Management System

I recommend that KRA should emphasize more on stakeholder training on the new system implemented and any automations done on them. This will help the stockholders involved in trade such as traders, clearing agents, customs officers to gain more knowledge to the new system since technology is changing rapidly. KRA has a mandate to enhance self-declarations of goods which affects compliance. This will make customs department raise more revenue through the awareness of the new systems implemented.

5.4.3 Electronic cargo tracking System

I recommend that Cargo Tracking Systems should be adopted by customs department since it great effect on cargo accountability at the ports and on the transit routes and that E-seals ought to be subsidized to allow greater inclusion of all stakeholders and that more emphasis should be put on the use of IT in encouraging trade by all stakeholders and that customs department should prepare adequately for the introduction of fresh IT technologies.

5.5 Areas for Future Research

A research on the effect of customs electronic processes on revenue performance needs to be conducted. This research identified the advantages of implementing Vis a Vis customs electronic process as the manual lodging scheme in place prior to implementing the ICMS in Kenya. Nevertheless, as the research focused only on three specific objectives Integrated Customs Management System, Cargo Tracking systems and the Scanner Technology, other research can be carried out on the factors affecting the ICMS implementation.

REFERENCES

Antov, M. (2017). The role of information technologies in the development of customs control in the Republic of Bulgaria. *World Customs Journal, Vol. 11*.

Ayuma, I. (2018). *The Impact Of Emerging Technology On International Trade: A Case Study Of The Three-Dimensional (3D) Printing And Customs Authorities In The East African Community*. http://hdl.handle.net/11295/105778

Bertalanffy, L. Von. (1972). The History and Status of General Systems Theory. *The Academy of Management Journal*, *15*, 407–426.

Bhattacherjee, A. (2001). *Understanding Information Systems Continuance: An Expectation-Confirmation Model*. *Vol. 25*, 351–370. https://www.jstor.org/stable/3250921

Bimber, B. (1990). Karl Marx and the Three Faces of Technological Determinism. *Social Studies of Science*, *Vol. 20*, 333–351. https://www.jstor.org/stable/285094

Booze, R., Allen, J., & Hamilton, E. (2007). *Customs Automation in Sub Saharan Africa*.

Boru, T. (2018). *Chapter Five Research Design and Methodology: Introduction*. https://doi.org/10.13140/RG.2.2.21467.62242

Burmeister, S. (2007). *Innovation as a Possibility. Technological and Social Determinism in Their Dialectical Resolution*. pag 21–42. https://www.edition-topoi.org/articles/details/1211

Chandler, D. (2013). *Technological or Media Determinism*.

Cooper, D. R., & Schindler, P. S. (2010). *Business Research Methods 8th Edition*.

Deng, H.-F., Deng, W., Li, H., & Yang, H.-J. (2010). Authentication and access control in RFID based logistics-customs clearance service platform. *International Journal of Automation and Computing*, pg 180-189. https://doi.org/10.1007/s11633-010-0180-x

Djanitey, R. (2018). *Assessing the impact of national single window on the competitiveness of Ghana's maritme sector*. https://commons.wmu.se/all_dissertations

Dobell, J. (2017). The Future of Tax Technology is Now. *International Tax Review*.

Fjeldstad, O.-H., & Moore, M. (2008). *Revenue Authorities and State Capacity in Anglophone Africa*.

Freeman, M. (2017). *This company's scanning technology is a smugglers' nightmare*.

FREMONT E, K., & ROSENZWEIG, J. E. (1981). General Systems Theory: Applications for Organization and Management. *Academy of Management Journal*.

Gathii, J. T. (2011). African Regional Trade Agreements as Legal Regimes. *International Trade Journal*, *Vol.4*, 34–37. https://doi.org/10.1017/CBO9780511994821

Gidado, U. (2015). Consequences of Port Congestion on Logistics and Supply Chain in African Ports. *Developing Country Studies*, *5*.

Goodhue, D. L., & Thompson, R. L. (1995). *Task-Technology Fit and Individual Performance*. *Vol. 19*, 213–236. https://www.jstor.org/stable/249689

Grbich, C. (2013). *Content analysis of texts. C. Grbich, Qualitative data analysis*. Pag 189-

199.

Greenwood, L., Thapan, A., Ahmed, J., Kertzman, D., & Balbosa, J. (2008). *Republic of the Philippines: Enhancing Revenue Collection and Strengthening the Criminal Prosecution of Tax Evasion Cases*.

Holloway, S. (2008). The transition from eCustoms to eBorder management. UNCTAD. *World Customs Journal*.

Holniker, D. (2005). *Computerization of commercial tax system. A Review of Some Efficiency and Macroeconomic Aspects*. pg 231-263.

Kamau, S. K. (2014). the adoption of technology as strategic tool in enhancing tax compliance in kenya: a case study of large taxpayers of kenya revenue authority. *Unpublished MBA Project Report Submitted to the Chandaria School of Business, United States International University. Nairobi, Kenya*.

Katsuya-Takii. (2003). *Prediction Ability of Customs Automation. vol 6,* pgs 80-98.

Kothari, C. . (2014). *Research Methodology: Methods and Techniques. 2nd Edition, New Age International Publishers, New Delhi.*

KRA. (2018). *Integrated Customs System, a Game Changer in Clearance of Goods*.

Kripanont, N. (2007). *Examining a technology acceptance model of internet usage by academics within Thai business schools*.

LaMorte, W. W. (2019). Diffusion of Innovation Theory. *Behavioral Change Models*.

Louho, R., Kallioja, M., & Oittinen, P. (2006). *Factors affecting the use of hybrid media applications*.

MacKenzie, D., & Wajcman, J. (1999). *Introductory essay: the social shaping of technology*. http://eprints.lse.ac.uk/28638/

Maree, J. (2018). *Report on WCO Private Sector Consultative Groups. Brussels: WCO*.

Masese, W. (2011). *Daily Nation. Retrieved January 28, 2017, from KRA Automation:* http://www.nation.co.ke/business/Automation-has-boostedKRA-%0A/996-1090288-gf3uwfz/index.html

Maxwell, J. (2012). *Qualitative Research Design: An Interactive Approach.*

Mbui, C. (2016). *Effect of Strategic Management Practices on Export Value Addition in the Tea Subsector in Kenya*.

Melgar, B. H. (2015). The Transit of Goods in Public International Law. *International Law Journal, Vol.70*.

Mesarovic, M. D., & Takahara, Y. (1975). *General Systems Theory: Mathematical Foundations*.

Mugenda, O. M., & Mugenda, A. G. (2003). *Research Methods: Quantitative and Qualitative Approaches*.

Okoth, E. (2017). *Kenya joins Uganda, Rwanda in e-cargo tracking system*.

Segal, H. P. (2006). *Technology and Utopia: SHOT Historical Perspectives on Technology*.

Sekaran, U. (2015). *Research Methods for business: A skill Building Approach (5th Edition)*.

Sekaran, Uma, & Bougie, R. (2011). *Research Methods for Business: A Skill-Building Approach, 6th Edition*.

Skyttner, L. (2001). *General Systems Theory: Ideas and Applications*. Pages: 472. https://doi.org/10.1142/4307

Surry, D. (1997). Diffusion Theory and Instructional Technology. *Journal of Instructional Science and Technology*.

Swindley, G. (2007). *Computerization of Tax Administration.* 199–233.

TechTarget. (2010). *scanners*.

Tetteh, E. G. (2012). *Automation System Procedure of the Ghana Revenue Authority on the Effectiveness of Revenue Collection: A Case Study of Customs Division*. http://hdl.handle.net/123456789/4459

TradeMarkEastAfrica. (2018). *Support to Kenya Revenue Authority (iCMS)*.

Wanyama, T. (2017). causes of delay in clearance of goods at the port of mombasa. *International Journal of Supply Chain and Logistics*, *1*, 22–43.

Ward, N., & Dietmar, J. (2007). CAREC Customs Automation. *In Technical Paper Presented at a Conference Held at Beijing*, pp 23-25.

APPENDICES

Appendix I: Letter of Introduction

Munyanya Hanningtone,
P.O. Box 48240-0100,
Nairobi.

To whom it may concern,

RE: INTRODUCTION LETTER

I am Munyanya Hanningtone, a student at the Kenya School of revenue Authority. I am studying for a Post Graduate Diploma in customs Administration. I am carrying out a Research on the effects of automation of Customs Systems on trade facilitation in Kenya. Your feedback is very key as your inputs will be used for academic purposes only. I greatly appreciate if you could take a few minutes to provide me with information. Your response will be kept confidential and it will not be divulged to any person or institution outside this corporation.
Thank you in advance.

Sincerely,
Munyanya Hanningtone
0796313298

Appendix II: Questionnaire

Instructions

Please tick in the appropriate box and fill in the blank spaces provided for those questions where elaborate answers are required. You are requested to complete this questionnaire as honestly and objectively as possible. Use the space at the back of this questionnaire if you need more space for your responses.

PART A: BACKGROUND INFORMATION:

The following information asks about your work environment. Tick the box that most closely represents your current employment status. For the following section, respond by ticking in the box appropriately

Highest level of education attained

Primary and below ☐ College ☐

High school level ☐ Postgraduate ☐

Degree ☐

Length of Service in the field 0-3 years ☐ 5-10 years ☐

3-5 years ☐ 10 years & above ☐

PART A: Icms and Customs

Using the Likert scale of 1-5 where 1= strongly disagree, 2= disagree, 3= neutral, 4=agree and 5=strongly agree.) please tick where applicable.

Question	**1 Strongly Disagree**	**2 Disagree**	**3 Neutral**	**4 Agree**	**5 Strongly Agree**
Does the Integrated Customs Management System adoption hasten the cargo clearance process at the Kenya border point?					
Does the Integrated Customs Management System reduced cost of doing business and facilitate trade it in Kenya.					
Does the collection of duties or taxes have become easier or faster					

as a result of Integrated Customs Management System adopted by Kenya revenue authority in Kenya?					
There is reduction of dangerous cargo that is being diverted to the local market in Kenya.					
Does the Integrated Customs Management System adoption reduce the cost of doing business to thetraders (import and export).					

PART B: Scanner technology and customs:

Using the Likert scale of 1-5 where 1= strongly disagree, 2= disagree, 3= neutral, 4=agree and 5=strongly agree.) please tick where applicable.

Question	**1 Strongly Disagree**	**2 Disagree**	**3 Neutral**	**4 Agree**	**5 Strongly Agree**
Does the scanner technology adoption hasten the cargo clearance process at the Kenya border point?					
Does the scanner technology reduced cost of doing business and facilitate trade it in Kenya.					
Does the collection of duties or taxes have become easier or faster as a result of scanner technology adopted by Kenya revenue authority in Kenya?					
There is reduction of dangerous cargo that is being diverted to the local market in Kenya.					
Does the scanner technology adoption reduce the cost of doing business to the traders (import and export).					

PART C: Cargo tracking system and customs

Using the Likert scale of 1-5 where 1= strongly disagree, 2= disagree, 3= neutral, 4=agree and 5=strongly agree.) please tick where applicable.

Question	**1 Strongly Disagree**	**2 Disagree**	**3 Neutral**	**4 Agree**	**5 Strongly Agree**
The adoption of the Electronic Cargo Tracking System by customs department enable the data to be captured on the system to be shared on the real time basis resulting to reduce dumping, tax evasion, cargo theft and diversion.					
The adoption of Electronic Cargo Tracking System in customs department has eliminate the paper work involved in the old ways of doing business at the border post and this makes clearance to be much faster for traders (import and export).					
The quality of service to traders due to increase of service delivery as a result of adoption of the Electronic Cargo Tracking System.					
Traders are now more willing to do the business with customs due to the efficiency created by the Electronic Cargo Tracking System which makes the trade to become easier without delaying their clients.					
There is reduction of dangerous cargo that are being diverted to the local market in Kenya					

PART D. Customs revenue performance

Using the Likert scale of 1-5 where 1= strongly disagree, 2= disagree, 3= neutral, 4=agree and 5=strongly agree.) please tick where applicable.

Question	**1 Strongly Disagree**	**2 Disagree**	**3 Neutral**	**4 Agree**	**5 Strongly Agree**
Technological advancements affects customs compliance and revenue collection.					
Customs valuation has grown in accuracy since ICMS, Scanners inception and Cargo Tracking systems.					
Demographical gaps affect border control customs operations.					
Access controls affects the quality of service at the border posts.					
Customs operations methods affect regional trading activities.					

PART E: Effect of technology on customs revenue performance.

Using the Likert scale of 1-5 where 1= strongly disagree, 2= disagree, 3= neutral, 4=agree and 5=strongly agree.) please tick where applicable.

Question	**1 Strongly Disagree**	**2 Disagree**	**3 Neutral**	**4 Agree**	**5 Strongly Agree**
Scanners provide faster accessibility for goods.					
Conventional approach to customs operations still works best.					
ICMS is critical in streamlining customs procedures.					
Trade information sharing affects confidentiality of country's trade affairs.					
Technology is critical to customs revenue performance					

THANK YOU FOR YOUR TIME