

**INFLUENCE OF AUTOMATED SYSTEMS ON CUSTOMS PERFORMANCE IN
KENYA**

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DECLARATION

This project is my original work and has not been presented for a post graduate diploma in any other academic or non-institution

Signed

Date

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HDB335-C016-7291/2016

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

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DEDICATION

I dedicate this work to my family and parents.

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I wish to thank Jomo Kenyatta University of Technology in its entirety for offering me the chance to sharpen my scholarship and skills. In the same vein I wish to extend my sincere thanks to my lecturers who have taken me through the course diligently, professionally and with a lot of sacrifice. I wish to reserve special thanks for my supervisor Mr.Owuor Ominde for guidance and diligence in the course of the project development. I must salute all my colleagues and friends at Kenya Revenue Authority for their insightful comments, ideas and inspiration. Above all I wish to thank God for helping me manage all these.

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LIST OF ABBREVIATIONS AND ACRONYMS

C&BC	Customs & Border Control Department
CU	Customs Union
DPC	Document Processing Center
EAC	East African Community
ECTS	Electronic Cargo Tracking System
EDI	Electronic Data Interchange
EOU	Ease of Use
FTA	Free Trade Areas
GATT	General Agreement on Trade and Tariffs
iCMS	Integrated Customs Management System
ICS	Internal Control System
ICT	Information and Communication Technology
IDT	Innovation Diffusion Theory
II	Individual Impact
IQ	Information Quality
KNESWS	Kenya National Electronic Single Window System
KRA	Kenya Revenue Authority
NTBs	Non-Tariff Barriers
NTMs	Non-Tariff Measures
NII	Non-Intrusive Inspection
OECD	Organisation for Economic Co-operation and Development
OI	Organisation Impact
POOGI	Process of Ongoing Improvement
P.V.O.C	Pre-Export Verification Certificate
RECTS	Scanning Systems
SCT	Singe Customs Territory
SSA	South Sahara Africa

STP	Simba Transformation Project
SQ	System Quality
TAM	Technology Acceptance Model
TOC	Theory of Constraints
TMEA	Trade Mark East Africa
ULDs	Unit Load Devices
UTAUT	Unified Theory of Acceptance and Use of Technology
WCO	World Customs Organization
WTO	World Trade Organization

OPERATIONAL DEFINITION OF TERMS

- Automation** The technological upgrade undertaken by Kenya Revenue Authority as part of its strive to increase tax collection and reduce tax loopholes especially caused by tax evasion (Ndonga, 2013)
- Cargo** Goods or produce being conveyed – generally for commercial gain – by water, air or land (Akinyi and Mupelwa, 2017)
- Customs** The government service that is responsible for the administration of Customs law and the collection of duties and taxes (Cheruiyot & Rotich, 2018).
- Scanner System** It is a system for inspecting cargo that uses X-rays in displaying the images of the contents being transported (Mugambi, 2017).
- Simba System** System for goods clearance at border post involving TRADE-X is the Customs clearance management module (Gitaru, 2017)
- Single Window** A facility that allows parties involved in trade and transport to lodge standardized information and documents with a single entry point to fulfil all import, export, and transit-related regulatory requirements (Akinyi and Mupelwa, 2017).

ABSTRACT

The study sought to establish the influence of Automated Systems on Customs Performance in Kenya. The study was guided by the following objectives; to establish the influence of Simba System 2005, Single Window System and Scanning Systems on Customs Performance in Kenya. The theories that anchored the study include the computable general equilibrium theory, innovation diffusion theory, the information systems theory and Romer's growth model. Literature of past studies was reviewed from written documents and materials in books, journals and reports to enhance conceptualization of the study variables and establishment of gaps. The study used the descriptive design and considered the population of 57 Customs Officers at the Customs and Border Control Department, Kenya Revenue Authority. From the findings, strong positive correlation was established between Simba Systems 2005, Single Window Systems, Scanner Systems and Customs Performance. The study concluded that automation of processes enhances improved customs performance mainly as a result of improved transparency and accountability at the Customs and Border Control Department. The study recommended Training of staff on the operations of the system should be continuous so as to provide them with up to date applications so as to improve the system's efficiency further. The study also suggested that similar study should be undertaken in other border Customs offices like Busia, Malaba, Namanga, Lunga Lunga among others that are involved in import and exports of other products since this study focused on the Headquarters in Nairobi, Kenya.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Customs administrations perform broad, important functions that facilitate the flow of goods and services across international borders. Traditionally, customs has played a somewhat narrow role, focused primarily on the collection of duties and taxes on imported goods. Today, they have a bigger role of promoting international trade as well as ensuring security for goods, people and services at exchange points (Peterson, 2017). Kiragu (2016) contended that in many developing countries, however, customs agencies are still seen principally as tax-collecting entities, even as trade promotion is acknowledged as increasingly vital to these countries' economic growth. The cost of trade activity in developing countries is estimated to be 1.8 times higher, on average, than in developed countries.

Chimilila, Sabuni and Benjamin (2014) advocated that in an increasingly globalized world, where goods (and people) cross borders with more frequency, and where speed to market is of utmost importance for both supply chain participants and end consumers, customs administrations are now asked to both facilitate legitimate trade and protect borders. However, it is often difficult for customs administrations to strike a balance between these two functions, which can often undercut one another. This is especially true when changes in political or economic circumstances require customs administrations to give immediate priority to either import security or Customs Performance.

Peterson (2017) contended that the globalization of supply chains, the expansion of just-in-time (JIT) manufacturing, and the growth of e-commerce have stimulated efforts toward customs

reform. At present, more than half of all goods that cross international borders are intermediate goods, reflecting the geographic fragmentation of production networks and an increase in vertical specialization. Intermediate inputs account for a large share (more than 50 percent) of participation in global value chains by the United States, as well as by many other countries, whether members of the Organisation for Economic Co-operation and Development (OECD) or not.

1.1.1 Global Perspective of Automated Systems

More than 85 countries worldwide have implemented customs management systems to enable customs to discharge its fiscal and control responsibilities more effectively. However, an automated system alone does not guarantee the elimination of procedural bottlenecks, lack of transparency and inconsistent clearing processes. Today there is extensive need for integrated global logistics as evidenced by emergence of considerable market for logistics services not only in industrialized nations but also, in developing economically booming countries in Asia and elsewhere. Traditional Companies in the People's Republic of China like COSCO, China Shipping and Sino-trans, have adjusted their structures and operations to fit the modern changes, (China State Council, 2013).

Global Alliance for Customs Performance and World Economic Forum report (2016) indicated that developing countries, by contrast, have pursued broad-based customs reform efforts that, in some cases, include both infrastructure and institutional (soft infrastructure) reform. In South Sahara Africa (SSA), for example, customs reform is often associated with so-called “hard infrastructure reform,” including the building or improvement of roads, railways, airports, and seaports, Information And Communications Technology (ICT) systems, and reliable sources of power. “Soft infrastructure reform” encompasses the streamlining and harmonization of customs

and border procedures, the incorporation of ICT enabled processes, and the elimination of corruption at border checkpoints.

Customs agencies, globally, are facing the emerging dilemma of balancing demands to improve Customs Performance while at the same time meeting increasing needs for compliance. They are under pressure to deliver customer-focused services, collect accurate revenues and prevent illegal trade within the constraints of limited resources. This call for modernisation of customs administration to deliver agility, accuracy, security, and transparency using systems that are empowering rather than restrictive.

1.1.2 Regional Perspective of Automated Systems

While African continent has experienced rapid growth in trade over decade, trade within African countries has been slow due to low level of Customs Performance and industrialization. Factor mobility across the borders and the coordination of policies would facilitate economic growth and greater welfare for participating countries thereby reducing poverty and solving unemployment. Member states are to initiate measures for Customs Performance programmes such as promoting, developing and adopting common solutions to problems in Customs Performance and establishing joint programmes among member states for easier movement of goods and people (WTO, 2015).

Njinkeau, Dominique and Hartmann (2015) posited that the use of manual processes for customs documentation in Africa, or the deployment of automated systems without adequate electricity or capacity for repair, contributes to customs delays in the region. These delays, in turn, increase the likelihood of traders making “facilitative payments” (i.e., bribes) to customs officials to speed the clearance of their goods through border checkpoints. According to Shinyekwa and

Othieno (2013), an efficient and secured border management is vital for conducting cross-border trade in a smooth and cost-effective way. This is particularly true for the landlocked developing countries which are far away from seaports.

Recently-measured cross-border delays indicate that the average delay figures for those border posts that carry the most traffic, typically those along the north-south corridor, including Beitbridge (South Africa to Zimbabwe), Chirundu (Zimbabwe to Zambia), and Kasumbalesa (Zambia to the Democratic Republic of the Congo)-are between 24 and 46 hours. This has affected the regional trade negatively. One of the biggest causes of delays is customs inspections at these border posts (WCO, 2016).

Bhero, Hoffman, Lusanga and de Corning (2015) assert that the experience of the Democratic Republic of Congo highlights the importance of electronic systems in cross-border trade. Through training and communication, the country reduced document preparation time by 122 hours for exports and 42 hours for imports; border compliance time was also cut, by 219 hours for exports and 252 hours for imports. Cheruiyot and Rotich (2018) noted that in the second half of 2017, Morocco's Port of Tangier improved the flow of outgoing and incoming cargo after separate areas for the handling of exports and imports were established. A new scanner was also installed in the export area. As a result, border compliance time both exports and imports decreased.

In the East African Community (EAC), progress has been made in establishing integrated systems between Kenya and Uganda at Malaba. Uganda has been Kenyans' major trading partner for the last two decades with the trade volume increasing from Ksh 6.8 Billion in 1997 to Ksh 52.2 Billion in 2016 (KNBS, 2017). The main objective of the current EAC is to promote cooperation in "political, economic and social fields" by encouraging economic development

(including trade liberalization, monetary and financial integration, the free movement of persons, capital, goods and services); science and technology (including infrastructure, health and education); as well as political and legal matters. It envisages deepening regional integration by establishing a customs union (CU), common market, a monetary union and ultimately a political federation among the partner countries.

1.1.3 Local Perspective of Automated Systems

Customs clearance procedures, regulated by recipient country governments, may change over time and can be quite complex. Failure by importers to master local customs clearance procedures, or customs procedures that are themselves prone to breakdowns, may cause long delivery delays, stock shortages, and even stock-outs, (Louis, 2011). The customs authority concentrates on physical inspection and paperwork, in the second, the customs authority works to reduce fraud and maximize revenues, and in the third, the customs authority works to facilitate trade through internal checks, process management and the development of electronic data exchange. Custom procedures in Kenya are regulated through the East Africa Community Customs Management Act 2014 (EACCMA).

According to Akinyi and Mupelwa (2017), a ‘Single Window’ is a paradigm of governance, introduced by the customs department in Kenya, in which traditional structures of government are transformed into new arrangements that best serve the needs of citizens and businesses. The Single Window is understood as an ideal system, the highest standard of excellence in the area of delivery of public services. As part of the ‘Single Window’ approach, citizens and businesses receive government services through a single interface. The complex organizational arrangements that go into service delivery are made transparent to the consumers of those services, resulting in increased efficiencies and a reduction in transaction costs.

Gitaru (2017) indicates that the Revised Kyoto Convention is the generally accepted reference point for the key principles of customs modernization. Due to lack of reliable customs system which was also cited by IMF besides other bodies, Kenya Revenue Authority (KRA) sought to go forth and implement the Simba System in 2005, which was a web based system. The Simba System came together with many other transformations and reforms from within the institution and this engulfed a whole philosophy of customs reform modernisation. The current customs system, Simba 2005/2014, runs on a multiplicity of sub-systems and requires multiple points of authentication for users hence sometimes takes more time.

1.1.4 Customs and Border Control Department

Customs is the government service that is responsible for the administration of Customs law and the collection of duties and taxes, and which also has responsibility for the application of other laws and regulations relating to the importation, exportation, movement or storage of goods. The Customs & Border Control Department (previously known as Customs and Excise Department) of the Kenya Revenue Authority was established by an Act of Parliament in 1978. It is the largest of the four revenue departments in terms of manpower, revenue collection and countrywide operational network. The department's vision is to be globally recognized as a modern Customs Administration that is responsive to the needs of the 21st century customer (Shinyekwa & Othieno, 2013).

The primary function of the Department is to collect and account for import duty and VAT on imports. Other taxes collected by the Department on an agency basis include: Petroleum Development Levy; Sugar Levy; Road Maintenance Levy; Import Declaration Fee (IDF); Road Transit Toll; Directorate of Civil Aviation Fees; Air Passenger Service Charge; KAA Concession Fees; and Fees on Motor Vehicle permits. Apart from its fiscal responsibilities, the Customs

Services Department is responsible for facilitation of legitimate trade; and protection of society from illegal entry and exit of prohibited goods. The Department is headed by the Commissioner of Customs & Border Control Department deputized by the Deputy Commissioner.

1.2 Statement of the problem

The clearance of imports and exports by Customs and other agencies are among the most problematic links in global supply chains. They are frequently blamed for undermining the capacity of developing countries to compete on global markets. According to the World Bank (2016), in Africa 25% of border delays are caused by infrastructure while 75% are caused by poor Customs Performance. These delays and bureaucracy make African transport costs to be on average, three times more expensive than those of South America and five times more expensive than Asian ones: these impacts negatively on the competitiveness of African goods on the international markets

The Kenya Revenue Authority's decision to automate Customs Systems was a response to the government's interest in improving cross-border trade, tax collection, enhancing enforcement of cargo handling regulations, and maintaining Kenya as the preferred trade route for cargo in East Africa (Kiragu, 2016). However, Tibbs (2015) noted that Kenya Revenue Authority faced a number of formidable challenges, including finding ways to: cope with the loss of tax revenue due to illegal cargo dumping; better secure all transit goods crossing Kenya; increase cargo throughput by eliminating physical escorts for transit goods; optimise Kenya Revenue Authority processes and to reduce human intervention by automating the collection of essential data; develop more advanced reporting to facilitate operational decision making; maintain Kenya's competitiveness as the preferred port for East and Central Africa.

Ochieng, Wawire, Manyasa, and Thuku (2014) posited that there is strong evidence that Customs reform is motivated by a desire to lower significant costs to trade. Some of these costs, often referred to as Non-Tariff Barriers or nontariff measures affecting trade, are financial in nature, as they involve direct payment. Others, such as time delays, ultimately lower corporate profitability but may not necessarily take the form of direct payments. It has been shown that Non TaMs can add 70 percent to the restrictiveness of tariffs alone and that countries that have lessened customs barriers tend to enjoy both more diverse exports and more re export intensity (UNECA, 2013).

However, despite considerable investment, service delivery is unsatisfactory and degenerating the East African region. For the enhancement of the attainment of the mission and goals of the Customs and Border Control Department in Kenya, it is therefore necessary that these hindrances be removed. Notably, there is limited literature available in Kenya as regards the effectiveness of automated customs systems for Customs Performance, with delays reported by transporters, especially at Mombasa port. In this backdrop, this research sort to investigate the influence of automated Customs Systems on Customs Performance in Kenya.

1.3 Research Objectives

1.3.1 General Objective

The main objective of the study is to establish the influence of Automated Systems on Customs performance in Kenya.

1.3.2 Specific objectives

- i. i. To establish the influence of Simba System 2005 on Customs Performance in Kenya
- ii. ii. To evaluate the influence of Single Window System on Customs Performance in Kenya

- iii. iii. To evaluate the influence of Scanning Systems on Customs Performance in Kenya

1.4 Research Questions

- i. i. What is the influence of Simba System 2005 on Customs Performance in Kenya?
- ii. ii. What is the influence of Single Window System on Customs Performance in Kenya?
- iii. iii. What is the influence of Scanning Systems on Customs Performance in Kenya?

1.5 Significance of the study

The study on the influence of Automated Customs Systems on Customs Performance in Kenya is important in the government functions globally. The study evaluated the system effect on Customs Performance. Further, the study establishes the relationship between Single Window System, Simba System 2005 and the Scanner Systems on Customs Performance in Kenya.

National Government, as they formulate systems upgrade programmes in enhancing cross border trade.

Kenya Revenue Authority, Customs and Border Control Department being key stakeholders in cross border trade will find the study crucial as they undertake Customs management reforms with the aim of fastening its performance.

Traders may find the study beneficial as they get information on customs systems performance and challenges inherent. The study may give them more information for objective suggestions to Kenya Revenue Authority.

Clearing and forwarding agents who are important in clearance may establish the contribution of Customs Management systems on their operations.

Future researchers and scholars in public administration and finance may use the study finding as references.

1.6 Scope of the study

The study sought to establish the influence of Automated Systems on Customs Performance in Kenya. It was limited to the three specific objectives and undertaken at Customs and Border Control Department, Times Tower in Nairobi. The respondents targeted 57 Customs Officers from Customs and Border Control Department Headquarters, Times Tower Nairobi. The study was confined to the three specific objectives.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a synthesis of available literature on Automated Systems on Customs Performance. The study reviews existing theories in the theoretical framework and proceeds to highlight findings and conclusions of similar studies in the empirical review. The researcher summarizes the findings and conclusions of these studies and identifies gaps to be filled by this study. A conceptual framework is also presented.

2.2 Theoretical Framework

Theoretical framework is a structure that can hold or support a theory of a research study. Theories are formulated to explain, predict, and understand phenomena and, in many cases, to challenge and extend existing knowledge within the limits of critical bounding assumptions. To this effect, four key theories were adopted, Romer's growth model, the computable general equilibrium theory, innovation diffusion theory and the information systems theory.

2.2.1 The Computable General Equilibrium Theory

This theory is popularly used by governmental organizations and academic institutions to analyse the economy-wide effects of events such as customs regulations, tax policies, and immigration. Zaki *et al* , (2010) used the model theoretically and empirically to explicitly investigate in a dynamic manner Tariff equivalent, of red tape and related procedures through modification to take into account the cost and tariff equivalents in the process of Trade facilitation. The model is dynamic enough to study the theoretical and empirical aspects of trade facilitation. Using the

model, Zaki grouped the Trade facilitation issues in four sections namely, administrative barriers, rent seeking, lengthy clearance times, bureaucracy and poor infrastructure.

Zaki's motivation to use the GCE model in an Egyptian case he studied in 2008 was economic interest and empirical reasons. He was able to establish that reduction in administrative barriers was likely to impact more on trade than the classical impediments we know of such as transaction length, bureaucracy, Customs fraud etc. With increased supply chain dependency, Zaki argues that imported products delivery delays have turned into a severe constraint on production and that the cost of non-facilitation has risen to a high of 2-15% of the value of goods traded in. Egypt, which was his study location was ranked 26th in Trading across borders (World bank "Doing Business 2008") a head of economies like Turkey, Lebanon, Jordan and Syria. Applied general equilibrium models had achieved a degree of acceptance and prestige which is in many respects unique due to the inherent potential of the approach to responding to many needs in a superior way compared to previous methods. However, as new applications and extensions are proposed, it becomes clear that the results obtained are not always in line with the expectations, and that the approach has some limitations which must not be overlooked (Borges, 2010) weakness is the lack of empirical validation of the models, in the sense that usually there is no measure of the degree to which the model fits the data or tracks the historical fact.

General equilibrium models are usually very large, including a substantial number of parameters and often embody rather complex structures. Because of the assumption of general economic equilibrium, this is seldom observed results of the model indicate long-term tendencies around which the economy will fluctuate. The models cannot be used to replicate the evolution of the economy in the past as a means of checking their validity. CGE models not only assume that all markets find their equilibrium but also that nothing happens until equilibrium is reached. In other

words, no transactions take place in disequilibrium. The general equilibrium approach is directed toward long-term questions. Its results should be interpreted in that context. Therefore, it has not been applied to issues other than long term consequences of policy decisions or exogenous shocks. Equilibrium, as if all economic agents were to wait until equilibrium is found before they made any decisions. The CGE models do takes into account the role of technological progress and its role in performance. The theory corroborates with the study which seeks to show the correlation between automated systems on customs performance at the customs and border control department.

2.2.2 Innovation Diffusion Theory (IDT)

Everett Rogers's 1962 work, *The Diffusion of Innovations* (and subsequently, the numerous later editions), has become arguably the most influential book in the area of understanding how an innovation infiltrates a population (or not). Drawing on a wide range of research crossing fields of sociology, education, psychology, geography, and others (Rogers, 1995), Rogers provided a comprehensive structure for understanding individual adoption and, collectively, diffusion. The strength of Rogers's theory is in the broad foundation it provides to understand the factors that influence the choices an individual makes about an innovation. It is the basis for understanding adoption. Ismail (2006) defines diffusion as the process by which a technology spreads across a population of organizations. The concept of diffusion of innovations usually refers to the spread of ideas from one society to another or from a focus or institution within a society to other parts of that society.

The four main elements of the diffusion theory that have been identified by Rogers (1995) are innovation, communication channels, time and the social system. Rogers posits that innovation must be perceived by the user as new and it is influenced by the following five factors:

Complexity, Compatibility, Trial-ability, Observability and Relative Advantage. These factors affect the adoption of innovation of a system and will be studied on the customs electronic systems. However, certain of the factors have been expanded further with the introduction of perceived ease of information management systems usage as noted by Vogel and Cheung (2013), which will also be explored in the study.

Rogers (2003) observed that every innovation involves time in three aspects: the innovation decision process (process of forming an attitude towards an innovation), innovativeness of an individual (innovators, early adopters, early majority, late majority and laggards) and the rate of adoption (the speed at which members of a system adopt an innovation). According to O'Connor (2007), the organizations can be perceived to involve a lot of units, but all of them are working together in the solution of problems to reach the common goal.

This study explored the various decision channels, the change agents, the training of skills and the communication structures that have been used in the implementation and adoption of automated Customs Systems and their influence on the performance of Customs and Border Control Department in Kenya. The theory enhanced conceptualization of the adoption of Simba System, Single Window and Scanner systems applied in customs processes in evaluating their effect on Customs performance.

2.2.3 Information Systems Theory

Gable, Sedera and Chan (2008) introduced this theory as a measure for Information Systems. The development to this includes 27 measurements distributed across four distinct dimensions, namely: system quality (SQ), information quality (IQ), individual impact (II) and organisation impact (OI). According to Petter, DeLone and McLean (2008), 'this theory has started to develop standardised measures that can be used to evaluate the various dimensions of success as

specified by DeLone and McLean's IS success model', rather than examining one or more relationships using the qualitative technique of meta-analysis. As a result, it can lead to a better understanding of how to measure success.

DeLone and McLean (1992) reviewed 180 conceptual and empirical studies and from them extracted 100 measures used to evaluate success. These were used to create the IS-success model which is most widely cited today (Heo & Han 2003). This theory is the most popular theory for researchers evaluating or measuring the success of automation (Myers *et al.* 1998; Sedera & Gable 2004). It consists of six interrelated and interdependent dimensions of success: 'system quality', 'information quality', 'use', 'user satisfaction', 'individual impact' and 'organisational impact'. It has contributed to the success of Information System research by summarising common factors in prior studies of IS-success (Gable, Sedera & Chan 2008).

In this study, this theory is a most comprehensive and up-to-date metric for Customs Performance based on electronic systems installed for goods clearance, as it contains the most recognised indicators for measuring the impact of automation.

2.2.4 Romer's Growth Model

Romer, (1993) demonstrates in this model the benefits of an open trade orientation. This could be potentially higher than the static gains. In his growth model, Romer shows that a greater variety of inputs does more for production than higher quantities from a limited range. Results confirm that gains are realised in trade liberalization when trade facilitation improvements are incorporated. In the study in the Middle East and North Africa (MENA) region, trade with the European union(2007) increased welfare gains from \$913 million to \$3 billion (0.1% increase to base GDP) The study highlights the improvement in welfare and Gross Domestic Product. Krugman (1979) argues that tremendous growth in trade among countries in the 20th century is

difficult to explain by the theory of comparative advantage. Krugman's explanation of trade between similar countries was proposed in the *Journal of International Economics*, (1979) and involves two key assumptions: that consumers prefer a diverse choice of brands, and that production goes with economies of scale, therefore he models a 'preference for diversity' for production and assumes a utility function for the consumers commonly referred to as the "new trade theory".

Krugman's theory takes into account transportation costs, a key feature in production, and demonstrates that these costs have an impact on the movement of goods and on trade in general. The country with the larger demand for a good shall, at equilibrium, produce a more than proportionate share of that good and becomes a net exporter. He argued that trade between similar countries remains beneficial in general, because it permits firms to save on costs by producing at a larger, more efficient scale, and because it increases the performance of any entity and to effect customs performance.

2.3.1 Simba System 2005 and Customs Performance

In the year 2005, Kenya Revenue Authority Customs Services Department currently Customs and Border Control Department deployed the Simba System as a turnaround strategy in management of customs operations- clearing of cargo at Kenya's entry points. Unlike the boffin IT system the Simba System supports Direct Trader Input, allows for Cross-departmental information sharing and has an intelligence and risk-based selectivity. The application is a web-based system with a centralized relational database. Kenya Revenue Authority applied organic change management model in the implementation of automation of Customs procedures (Muthama, 2013).

According to Khaguli (2013), the Simba system has basic modules and another 14 sub-systems interfaced with the core system. This kind of system architecture means there are multiple points of authentication for users and multiple points of system failure. This level of improvement for Kenya's customs processes and procedures will allow for less paperwork and thus faster clearance, to save not only money but also time in business transactions. It is also expected to unlock significant benefits through the elimination of bureaucratic processes at the ports and borders. Ultimately this will increase voluntary compliance by the taxpayers and traders and boost their competitiveness in addition to faster trade flow.

According to Gitaru (2017), Simba 2005 system has yielded considerable gains in Customs Clearance Process. It has revolutionized the conduct of Customs business by introducing online lodgement of manifests and entries, electronic processing, automated reports and reconciliations, electronic presentation of Customs entries, automated calculation of duties and taxes and internal

accounting. The system also provides audit trails and eliminates many human interventions, thus reducing the possibility of error or inappropriate practices.

While the business community, including Clearing and Forwarding Agents remained supportive of the automation and modernization, they were concerned that the implementations of systems like Simba 2005 led to unprecedented delays in clearance of both imports and exports. Since the introduction, there had been several problems experienced by those accessing it causing much frustrations, while in the press, it had appeared that the problems were only those by Clearing and Forwarding Agents (Khaguli, 2013). The current Customs system, Simba 2005/2014, system runs on a multiplicity of sub-systems and requires multiple points of authentication for users hence sometimes takes more time. But with the new state-of-the-art system, it is envisioned that clearance time for imports and exports will reduce by at least 60 per cent.

Ndonga (2013) however advocates that, the system which performs several customs clearing functions is not without teething and technical problems. These are mostly due to service outages of the main network link. The introduction of online tax payment through the Simba System, they said was meant to reduce human contact and corruption. They suggest that the Simba System should be connected with other platforms in East and Central Africa to monitor transit cargo and share information and that the system should be used to cancel bonds online or share information with other systems of the landlocked countries. The system currently experiences downtime of 11 hours a week due to outdated hardware and software (Gitaru, 2017).

2.3.2 Single Window System and Customs Performance

The WTO Customs Performance Agreement commits countries to the development and implementation of Single Windows. In the last three decades, Customs and Border Control Department has been developing automated systems with a view to improving Customs

Performance and to pursuing effectively their objectives of revenue collection, social protection, and the provision of data and intelligence to government in support of management and policy decisions. These initiatives have gone hand in hand with programmes to modernize Customs and border management, leading to simplification of trade processes and more effective Customs administration overall (Cleary, 2017).

Trade hubs, trade portals and port community systems are examples of facilities that allow business-to-business interaction as part of the Single Window concept. Some of these systems are sometimes available to a closed group of users, while others are accessible on open platforms (Rukanova, Huiden & Tan, 2017). Developments in cloud computing and e-commerce technologies have resulted in the concept of “data pipelines” which help transport supply chain data of the right quality to the right party at the right time, and include regulatory agencies like Customs (Cowen, 2014). The idea of a ‘Single Window’ for international trade challenges the conventional models of regulatory control of the movement of goods and means of transport because clearance of goods across borders involves several regulatory agencies (Okazaki, 2017).

Bakiyem and Rusu (2014) applied Capability Approach (CA) framework by Amartya Sen’s in investigating the influence of e-government scheme that planned to modernise Customs procedures and facilitate trade within and among their neighbours. They found out that electronic trade adoption by Customs provide businesses and individuals chance to upload and download export and import declarations by electronic means using a single document. This resulted to saving of time and costs as those declarations could be made from any place one is at any time. This improved Customs operations and capability which is significant in creating jobs and ability of people to make a living and thereafter human development.

Akinyi and Mupelwa (2017) indicated that in Kenya, Customs Performance is carried out by a number of institutions whose roles include revenue collection, provision of services for cargo movement and ensuring that goods conform to the set standards and health regulations as well as efficiency. The overall objective of the Single Window System is to facilitate international trade in Kenya by reducing delays and lowering costs associated with clearance of goods at Kenyan entry points, while maintaining requisite controls. Its target is to reduce the time of import to a maximum of three days at the port of Mombasa, one day at airports, and one hour at land borders.

Kiragu (2016) established the system has been implemented and it has a positive impact on operational performance both at Kenya Revenue Authority and also at transport organizations that have implemented the system. The research findings further revealed that the major challenge in implementing the system is a slight disconnect between what the revenue collect expects and what the vendors have set-up, similarly the research reveals that IT infrastructure is key for the successful implementation of the system. The study recommends both the transporter and Kenya Revenue Authority should be in constant communication for the system to work.

Serete (2015) assessed factors affecting containerized cargo clearance in the Kenya port. This research embraced a descriptive research design. The target population involved 200 respondents. Stratified random sampling method was used to select 25% of the target population to act as the sample size. The study found out that a strong positive relationship existed between independent variables; documentation process, handling equipment, transport infrastructure and space capacity and the dependent variable containerized cargo clearance at Kenya Ports Authority. Single window system on containerized cargo clearance has been seen as a solution to curb congestion problems.

The WCO Survey (WCO, 2011 and 2016) has revealed that Single Window projects are being implemented in phases that sometimes extend beyond five years. Each phase and sub phase builds upon the previous one, leading to progressive simplification for trade, and more processing elements within the environment. It should also be kept in mind that the targeted environment may not be the result of a single project, but could be the outcome of a series of projects. However, the most important stage for implementation is seemingly the most difficult to implement. Without some agreed standards in relation to technology and data sets, there will be ‘gaps’ and ‘delays’ in the knowledge about suspect movements and their reconciliation.

2.3.3 Scanner Systems and Customs Performance

International Trade Centre (2018) indicates that the World Trade Organisation (WTO) forecasts that global trade will rise by 3.6 per cent by the end of the year. Sea transport will continue to play a key role in this growth, given that nearly 90 per cent of all goods in the world are transported by sea. However, this rapid growth in international trade and cargo volumes, travellers and conveyances presents increasingly new challenges. They include security threats of terrorism, illegal trade in natural resources, trade in substances that pose a threat to public health and safety, illicit financial flows (money laundering) as well as piracy.

Cargo scanning or Non-Intrusive Inspection (NII) refers to non-destructive methods of inspecting and identifying goods in transportation systems (Peterson, 2017). Cargo inspection is a critical aspect in safeguarding the supply chain, security and protection of society against the organised transnational crimes of terrorism, hazardous substances and environmental crimes, and facilitation of legitimate trade (World Bank, 2016). The growing cargo traffic requires efficient inspection procedures. Hence, shipments passing checkpoints are risk profiled by the Customs

Administrations to identify inconsistencies between declared and transported goods, illegal material, and threats to society.

According to Peterson (2017), most borders and ports now use X-ray screening for Unit Load Devices (ULDs) and containers to identify smuggled items and security threats. This technology is particularly useful as it provides an image of the shipped content without the need for physical interference. For the last 15 years, the Kenya Revenue Authority (KRA) has employed modern cargo inspection tools through use of x-ray cargo scanning systems at the Mombasa seaport and airports. The use of non-intrusive inspection equipment is consistent with the World Customs Organisation's Safe Framework of Standards. Apart from the interception of contraband goods, the scanners have also helped prevent perpetrators of the criminal activities from dumping cheap, substandard and harmful products in the local market to the detriment of the citizens.

In Kenya, for the past 15 years, the Kenya Revenue Authority has used modern cargo inspection tools such as X-ray cargo scanning at the Mombasa seaport and airport. The use of non-intrusive inspection equipment is consistent with the World Customs Organisation's Safe Framework of Standards, which states "that non-intrusive inspection equipment and radiation detection equipment should be available and used for conducting inspections, and in accordance with risk assessment. This equipment is necessary to inspect high-risk cargo and/or transport conveyances quickly, without disrupting the flow of legitimate trade" (WCO, 2016).

Cheruiyot and Rotich (2018) indicate that the launch and deployment of the scanners will increase the Mombasa port's throughput capacity to scan up to 1,000 containers per day, while increasing considerably the Kenya Revenue Authority assets under the National Scanner Solution framework. The scanners have also helped to prevent dumping of cheap, substandard and harmful products in the local market. The Kenya Revenue Authority is installing Smart Gate

Technology at the points of entry to automate the capture of container and vehicle registration marks and numbers prior to the release of cargo from the ports and container freight stations, phasing out manual processes and enhancing the integrity of cargo release records.

2.3.4 Customs Performance

Implementation of New Computerized Transit System is step into new way of doing customs procedure which represents continuation of common work of customs officers, international forwarders and entrepreneurs in order to create condition for better, faster and more efficient flow of goods. The NCTS has several advantages for customs office, entrepreneurs and especially for forwarders, authorized importers and exporters, transporters and all other members of transportation (Babić, 2012).

Djankov (2010) estimates that for a single country, a one-day delay in goods reaching their destination is equivalent to reducing the country's overall trade by 1 percent or to adding 70 kilometres of transport distance. Delays in time-sensitive goods result in a more striking outcome: a reduction in trade by as much as 6 percent. Large firms that are able to absorb the costs of time delays are more likely to trade nonetheless, while these costs may keep small firms from engaging in cross-border transactions altogether. The desire to avoid these costs can stimulate firms to reconfigure their supply chains, to lessen the amount that they trade, or to alter the composition of traded goods. Therefore, to the extent that they understand that trade is often an important driver of economic growth, countries have worked toward eliminating inefficient Customs procedures through technology.

In Croatia, Erceg (2016) argued that adoption of e-customs significantly altering the role of international forwarders and customs authorities. The New Customs Transit System (NCTS) was one of e-customs tools being implemented by Croatians when the country was making

preparation to join European Union. Erceg found out that utilisation of the NCTS assisted business people to reduce transit time from the Croatian border to products destination. The NCTS also shortened waiting time at the border and this created saving in transit time. It also saved money for preparing customs documentation processes at the border, it facilitated enhanced, quicker and professional work related procedure of transportation of cargo, thus enhancing the performance of customs union in the country.

In Ghana, Ameke (2016) explored the effect of operational efficiency on customer satisfaction. The case study involved the use of a customer survey based on a scale called SERVQUAL which was used as a measure of service quality. The research pointed out that quality service induced by operational efficiency does have a positive influence on customer satisfaction. Thus, operational efficiency at port has high level influence on customer satisfaction.

Several other researchers (Gordhan, 2007; Granqvist, Hintsa, & Mannisto, 2012; Babić 2012) stated that the implementation of NCTS and e-Customs have many advantages for all stakeholders in customs procedure (transporters, forwarders, authorized importers, authorized exporters and other entrepreneurs) as well as for the government. The main advantages are: faster flow of goods, more efficient transit procedure, paperless customs clearance and shorter queues of trucks at border crossings, lower costs of a customs procedure.

In Kenya, Serete (2015) assessed factors affecting containerized cargo clearance in the Kenya port. This research embraced a descriptive research design. The target population involved 200 respondents. Stratified random sampling method was used to select 25% of the target population to act as the sample size. The study found out that a strong positive relationship existed between independent variables; documentation process, handling equipment, transport infrastructure and

space capacity and the dependent variable containerized cargo clearance. Single window system on containerized cargo clearance has been seen as a solution to curb congestion problem.

2.4 Empirical Review

Empirical research is based on observed and measured phenomena and derives knowledge from actual experience rather than from theory or belief. It entails the review of data collected appertaining to a particular research.

2.4.1 Simba System 2005

Gidisu (2012) conducted a study to examine the effectiveness of automation systems in tax collection in Ghana revenue authority. The study targeted officials in the custom division within the authority. The findings of the study established that automation systems in the authority had contributed to increased tax collection and security of goods in the country. Additionally, the automation system had positively influenced the level of tax administration and collection in the authority.

A study by Asiweh and Abiola (2012) sought to determine how automation impacts collection of revenue in Nigeria. The study targeted employees in cargo division within the Nigerian Revenue Authority. The study established that automation of tax collection systems positively influenced the amount of tax collected but the automation of the processes was hindered by inefficient enforcement machineries, inadequacy in the number of competent employees and lack of sufficient computers.

As study by Kirimi (2015) focused on how automation of revenue collection influences performance of organizations with a focus on county governments in Kenya. The study focused on assessing the influence of automation of revenue collection, online processes, online

receipting process and online payment processes on the performance. The findings of the study revealed that there was a high relationship between automation of revenue collection processes and performance of the county governments.

2.4.2 Single Window System

Lilian and Isaac (2010) sought to establish how customs tax administration and automation of tax systems affect effectiveness and efficiencies in administration and collection of tax in Uganda Revenue Authority. The study targeted respondents from the cargo monitoring sector and data was collected through questionnaires. The results of the analysis revealed that automation and revenue cost administration negatively but significantly correlated with the administration and collection of revenue in the authority.

Henry, Bigonko and Ong'iyu (2018) conducted a study to assess the influence of automation on revenue collections by county governments with a focus on Nakuru County. The study adopted a survey research design and targeted 132 employees working in the county's revenue collection departments. The study revealed a significant relationship between automation and amount of tax collected by the county government. The findings further established that the county had increased its level of tax collection through automation of their tax collection systems.

Luwugge and Nkote (2010) analysed the effects of automating revenue collection platforms on tax administration in Uganda. The findings of the study established that there was a challenge in automating tax collection and administration platforms in the country due to lack of trained work force to handle the automation process. The study recommended that there was a need to equip the authority with trained employees to increase the efficiencies of tax collection and administration in the country for good Customs Performance.

2.4.3 Scanner Systems

Scanner systems effect on the performance of customs function has been undertaken. Bhero *et al* . (2015) investigated the impact of a radio-frequency identification system and information interchange on clearance processes for cargo at border posts of South Africa. The findings was that the average transit time across all cargo types decreased from 17.40 hours to a minimum of 12.53 hours at 80% of pre-declared cargo and then increased slightly to 13.60 hours at 100% pre-declared cargo with the adoption of scanner systems.

Nsiah (2014) sought to examine the procedures used by port of Tema in electronically clearing cargo in Ghana. The study adopted a mixed sampling procedure in acquiring a sample of 142 respondents. The study findings revealed that the port of Tema uses scanner systems in electronically verifying of cargo to ease the clearing procedures. The electronic cargo clearing procedures significantly increased the efficiencies in the clearing operations of cargo.

Moyi and Muriithi (2003) assessed the differences in tax revenue collection under non-automated systems and automated systems in Kenya Revenue Authority. The study compared the level of tax collection and administration in both the automated and non-automated systems. The results of the study established that the level of tax collection in the in the non-automated systems was extremely low compared with the automated platforms.

Odoyo *et al* (2013) sought to determine the effects of automation of revenue collection systems in local authorities found in Homa Bay County. The study specifically sought to assess whether there was significant effect of revenue collection systems on the amounts of revenue collected. The findings of the study revealed that there existed a positive and significant effect between tax collection effectiveness and automation of revenue collection systems. The study further

revealed that the automation system was faced with oppositions from some of the administrative staffs in the county.

2.4.4 Customs Performance

Erceg (2016) assessed the significance of adopting e-custom system in making clearing and forwarding activities effective in Croatia. The study specifically assessed the significance of adopting New Computerized Transit System (NCTS) in the clearing of goods in the country's borders. The findings of the study established that NCTS had played a significant role in reducing transit times from the country's borders to set destinations. The system had also shortened the waiting periods on document processing at the borders.

A study by Cajala and Alcedo (2015) sought to assess the implications of computerization program in Philippines' Bureau Of Customs on export and imports transactions. The study adopted a descriptive research design and used validated questionnaires in collecting both primary and secondary data. The analysis results revealed that the computerized programs benefited the Bureau of Customs in the country as it enabled fast clearance of goods in the border.

Rusu and Bakiyen (2014) investigated the influence of e-government schemes in modernizing customs procedures and facilitating trade in Nigeria and its neighbours. The study adopted a capability approach framework formulated. The findings of the study established that the e-government scheme adopted by the government played a significant role in clearing of goods as it allowed uploading declaration documents that eased the entire process of verification.

Simiyu (2017) study in Kenya established that the introduction of e-customs had improved service delivery. However, the respondents seemed to be undecided on the contribution of e-

customs revenue and clearance systems on service delivery. They seemed to agree that e-customs risk analysis and monitoring systems had higher influence on service delivery at Kenya Revenue Authority. A 2016 survey by the Kenya Tax payers association reported an unstable operation of services in Kenya Revenue Authority Customs Stations using automated systems across the country. The report findings showed operations efficiency was below average despite higher expectations of the Customs Automated System working on service delivery.

2.5 Critique of Existing Literature

Though the World Trade Organization Customs Performance Agreement commits countries to the development and implementation of Single Windows, it has not been without challenges. Actually, delays still prevail at goods clearance points in Kenya's Customs and Border Control border posts. Okazaki (2017) and Cleary (2017) cite the importance of technology adoption in Customs management reforms. However, most of the challenges are not associated with technology but rather getting individual agencies to collaborate to achieve a collective goal.

Despite recent reforms, trade procedures still remain lengthy, cumbersome and costly. This has negatively impacted on the competitiveness of Kenyan goods in the region. The rationale for implementing the Single Window clearance was based on weaknesses inherent in the current system. Ndonga (2013) indicated that the Simba system currently experiences downtime of 11 hours a week due to outdated hardware and software. However, they overlooked the aspect of whether the technology adopted is outdated or whether systems upgrade is not connected to effective research and development.

Besides having almost 27 agencies, duplication of roles has become the order of the day among State agencies including Kenya Bureau of Standards, National Transport Safety Authority, Pharmacy and Poisons Board and Nursing Council of Kenya, National Biosafety Authority and

Radiation Protection Board. Again the motivation does seem to be elsewhere-revenue generation. There was limited information on the effect of technology innovations on goods clearance, and how such impact on customer satisfaction and overall performance of the Customs and Border Control Department in Kenya. Cheruiyot and Rotich (2018) indicate that the launch and deployment of the scanners will increase the Mombasa port's throughput capacity to scan up to 1,000 containers per day. However, their results were not conclusive on the impact on goods clearance at the border posts. Though modernization of Customs Automated Systems was heralded to enhance cargo clearances, challenges still abound on clearance times and trade in the East African region.

2.6 Summary of the Literature Review

Literature reviewed provided a deeper insight on Automated Systems and Customs Performance. In effecting imports as well as exports, documentation plays a very important role. Especially in case of imports, the availability of right documents, the correctness of the information available in the documents as well as the timeliness in submitting the documents and filing the necessary applications for the Customs Clearance determines the efficiency of the Customs Clearance process.

Any delay in filing or non-availability of documents can delay the process and thereby importer stands not only to incur demurrage on the imported cargo but also stand to lose business opportunities. It was established that overall, the Single Window System is also expected to reduce the cargo dwell time at the port of Mombasa from 8days to 3days. The simba system was also expected to integrate clearance procedures and reduces clearance times at border points. Scanners on the other hand were expected to reduce physical goods inspection, thus reducing

time and fasten goods clearance hence increased Customs Performance. Empirical studies reveal challenges in implementation of the systems.

2.7 Research Gaps

The rise in maritime traffic will continue generating the demand for advanced technology for handling cargo through sea and land borders and, to this end, the scanning technology will remain a critical tool now and in the future. The automated systems have not been very effective in Kenya as revealed by the studies and a further review of challenges inherent is critical. Establishing whether the technology, infrastructure, human resource, country integration of systems and/or inter-agency collaboration contribute to lack of effectiveness of the systems in reducing goods clearance times. Thus gives the onus of this study.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research methodologies employed in carrying out the study. These include research design, target population, sampling procedures, and data collection techniques and data analysis. Research Methodology refers to techniques that the researcher used in obtaining, organizing and analysing data (Cooper & Schindler, 2008).

3.2 Research Design

The researcher adopted a survey research design. The central features of survey are that it allows the collection of a small amount of data in a standardized form from relatively large number of individuals from a known population (Franklin, 2012). The survey research was used to establish the influence of Automated Systems on Customs Performance in Kenya. The Survey involved statistical data analysis and is a popular and common strategy in business and management research (Mugenda & Mugenda, 2003).

3.3 Target Population

A Population refers to an entire group of individuals which are the concern for the study within the area of the study (Mugenda and Mugenda, 1999). The target population of this study involved Kenya Revenue Authority Officers at the Customs and Border Control Department. A total population of 57 Customs Officers were interviewed.

3.4: Sampling Technique and Size

Stratified random sampling was used since it works more effectively where the sampling frame is heterogeneous. The population was divided into small groups called strata then a systematic technique was used to select members who will participate in the study from each stratum. The rate used for sampling is 30% based on studies Mugenda and Mugenda, (2012) given that this is the accessible population that would be enough for descriptive studies. The sample size of the study was thus 57 officers in Customs and Border Control Department.

3.5 Sampling Frame

A sample frame is a collection of information used to classify a population for statistical treatment (Mugenda & Mugenda, 2008). The sampling frame for this study was all the officers at Customs and border Control Department, Kenya Revenue Authority.

3.6 Data Collection Instruments

The study utilized primary data. Data was collected using a questionnaire. A questionnaire is a set of printed or written questions with a choice of answers, devised for the purposes of a survey or statistical study (Franklin, 2012). The questionnaires were simply structured with closed questions for ease of administration and also to obtain the necessary information for the study.

3.7 Data Collection Procedure

The researcher sought authority from the Customs and Border Control Department in order to access the respondents and seek their voluntary contribution to the study. The questionnaires were administered through drop and pick method to individual respondents who were given time to respond, and later collected for analysis.

3.8 Pilot Testing

A pilot test is a small preliminary study used to test a proposed research study before a full-scale performance (Creswell, 2014). Additionally, the test acts as preliminary for examining whether the selected aspects and procedures of research perform as intended. Mugenda and Mugenda (2013) add that the primary purpose of a pilot study is to evaluate the feasibility of the proposed major study.

To measure validity, piloting was done in Nairobi, which will not be included in the main study. Pilot questionnaires was administered to 10 Customs officers at the Jomo Kenyatta International Airport Customs Office and later analyzed through test retest method to ensure that they were suitable for eliciting required data. This allowed for making any adjustment to ensure that the instrument was valid for this study.

3.8.1 Validity Test

Validity is the degree to which a test measures what it is supposed to measure. Pre-testing assists in determining the accuracy, clarity and suitability of the research instrument (Gay, 2002). The research instrument was validated in terms of content and face validity. The content related technique measures the degree to which the questions items reflected the specific areas covered while face validity is the extent to which a test is viewed as covering what it purports to measure, this done by consulting research professionals like managers, supervisors and corporate consultants. In the study, the researcher will use ten percent of the respondents to do a pre-testing. Test–re-test method shall be applied in ascertaining validity of the questionnaire.

3.8.2 Reliability Test

Reliability refers to the consistency of a measure. A test is considered reliable if the researcher can get the same result repeatedly and an accurate representation of the total population. If the results of the study can be reproduced under a similar methodology and will not fail to perform within specified limits in a given time while working in a stated environment, the research instrument is considered to be reliable (Franklin, 2012). This was achieved using Cronbach Alpha, and a resultant score of 0.7 and above was deemed the instrument reliable for the study.

3.9 Data Analysis and Presentation

Sekaran and Bougie (2010) define data analysis as the process of systematically searching and arranging completed research instruments after field work, with the aim of increasing understanding and hence enabling one to present them to others. It is the process of looking at data and summarizing it with intent to extracting useful information. The data collected was transformed with the aim of obtaining useful information to facilitate conclusions (Mugenda, 2003). The researcher edited, coded, classified and sorted the data upon collection. The researcher used Statistical Packages for Social Sciences (SPSS) and Microsoft Excel as tools of the study. The collected data was carefully analyzed through statistical methods of mean, frequencies and percentages, and presented in form of tables, charts and graphs for ease of interpretation and discussion according to the objectives and research questions of the study. These made it easier for the researcher to compare and interpret data findings appropriately. Multiple regression coefficients analysis was adopted to find out the relationship between the independent and the dependent variables to answer the questions in the study.

The aim of the study was to establish the influence of Automated Customs Systems on Customs Performance at Customs and Border Control in Kenya. The representation of the multiple regression model for the study is as the below equation;

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

Where;

Y = Customs Performance

B = Constant

X = Independent Variable

X₁ = Simba System

X₂ = Single Window System

X₃ = Scanner System

ε = error term

β₁, β₂, β₃ = Regression Coefficients

Regression analysis was carried out as the significant effects of independent variables (X₁X₁, X₂X₂, X₃X₃) on dependent variable (Customs Performance). Tests of significance at 95% confidence level applied on quantitative findings. Analysis variance (ANOVA) was used to determine the relationship of the variables.

CHAPTER FOUR

DATA ANALYSIS, INTERPRETATIONS AND PRESENTATIONS

4.1 Introduction

This chapter looked at the research findings, analysis and discussion of findings. The study targeted the staff at the Customs and Border Control Department. Data was then analysed using descriptive statistics to summarize and explain the data. Correlation analysis was conducted to portray the linearity of the data as a regression assumption. Linear regression analysis was run to illustrate the relationship between independent and dependent variables.

4.2 Response Rate

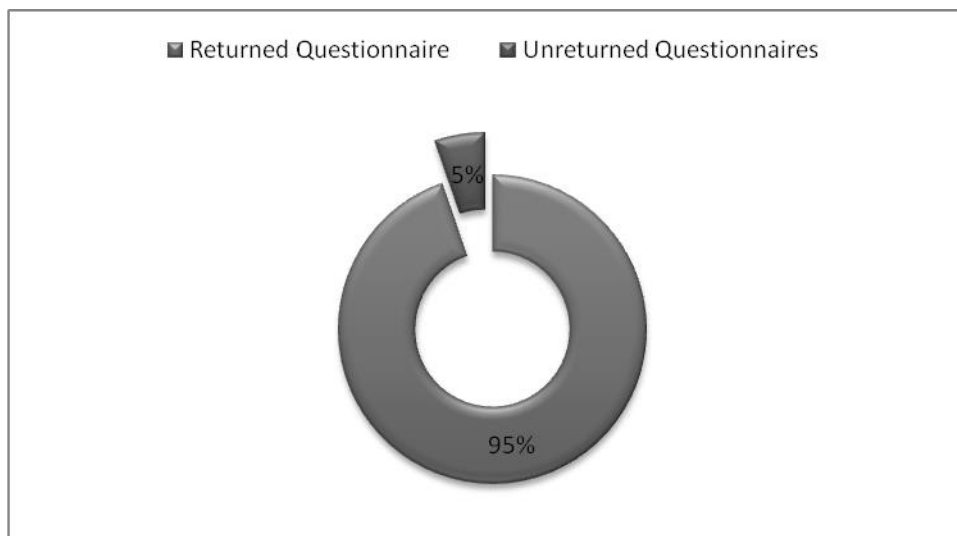


Figure 4.2: Response Rate

The study targeted a sample size of 57 Customs Officers at the Customs and Border Control Department from which 54 filled in and returned the questionnaires making a response rate of 95%. This response rate was satisfactory to make conclusions for the study. According to

Mugenda & Mugenda (2013), a response rate of 50 percent is adequate for analysis and reporting; a rate of 60 percent is good and a response rate of 70 percent and over is excellent. Based on this assertion, the response rate was considered excellent.

4.3: Validity and Reliability Analysis

Reliability of the questionnaire was evaluated through Cronbach's Alpha which measures the internal consistency. Cronbach's alpha was calculated by application of SPSS version 23 for reliability analysis. A higher value shows a more reliable generated scale. Cooper & Schindler (2008) have indicated 0.7 to be an acceptable reliability coefficient. Table 4.1 shows that scanner systems had the highest reliability ($\alpha=0.814$) followed by single window system ($\alpha=0.799$), and Simba Systems ($\alpha=0.756$). This illustrates that all the three scales were reliable as their reliability values exceeded the prescribed threshold of 0.7 (Mugenda & Mugenda, 2013).

Table 4.1: Reliability Coefficients

Scale	Cronbach's Alpha	Number of items
Simba System 2005	0.756	3
Single Window System	0.799	3
Scanner Systems	0.855	3

4.4: Demographic information

4.4.1: Gender of the respondents

The study sought to establish gender of the respondents. The results from the analysis of findings are illustrated in the figure 4.3 below as shown.

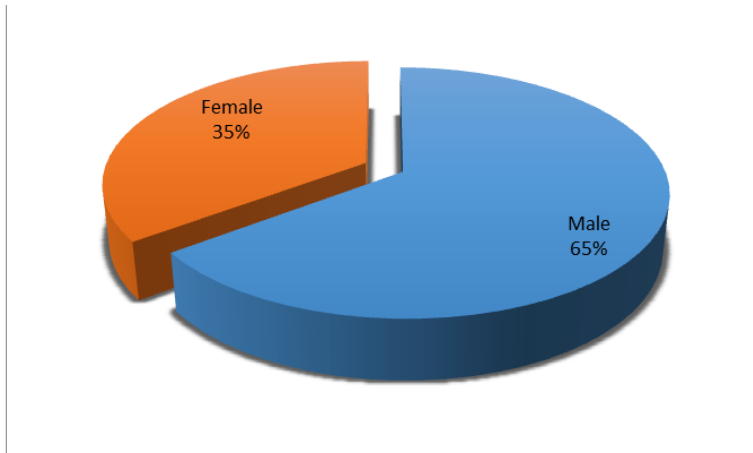


Figure 4.3: Gender of the respondents

From the analysis of findings, it was noted that majority of the respondents (65%) indicated that they were male while 35% of the respondents indicated to be female. The 30% differential was however noted to be inadequate in producing any gender bias for the study on the influence of automated systems on the Customs performance in Kenya.

4.4.2: Age of the Respondents

The study also sought to establish the age of the respondents. The results from the analysis are illustrated in the figure below as shown.

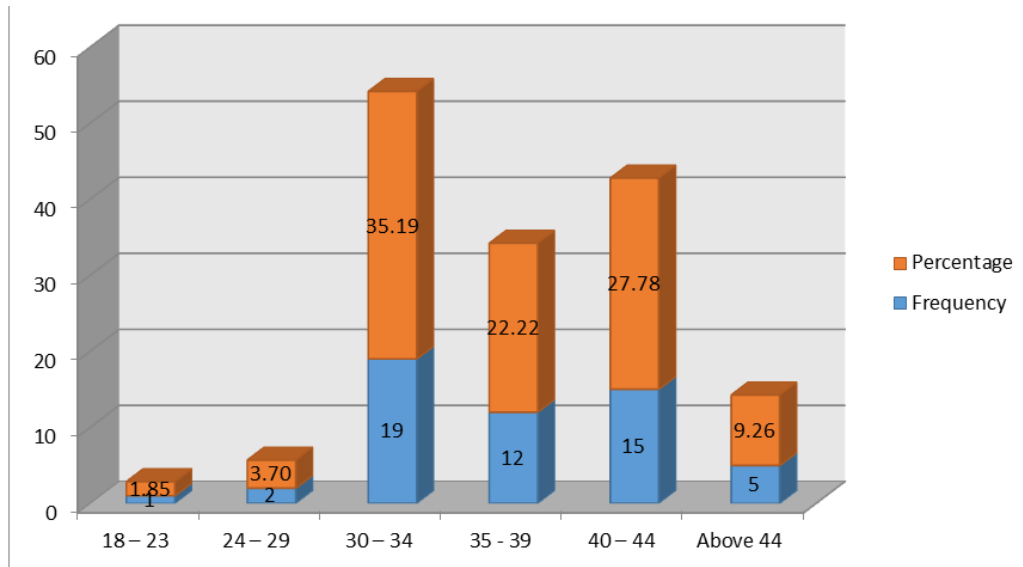


Figure 4.4: Age of the Respondents

From the analysis of findings, majority of the respondents (19, 35.19%) indicated that they were aged between the ages of 30 and 34. Closely after, were respondents (15, 27.78%) who indicated that they were aged between 40-44 years old. 22.22% of the respondents indicated that they were aged between 35 and 39 years while 9.26% of the respondents indicated that they were aged above 44 years. 3.70% of the respondents indicated that they were aged 24 and 29 years while the least response was of respondents who indicated that they were aged between 18 to 23 years. The study thus established that majority of the respondents were old enough to provide information on the influence of Automated Systems on Customs Performance in Kenya.

4.4.3: Number of years worked

The study also sought to establish from the respondents the number of years worked at the Customs and Border Control Department. The results from the analysis of findings are illustrated in the figure below as shown.

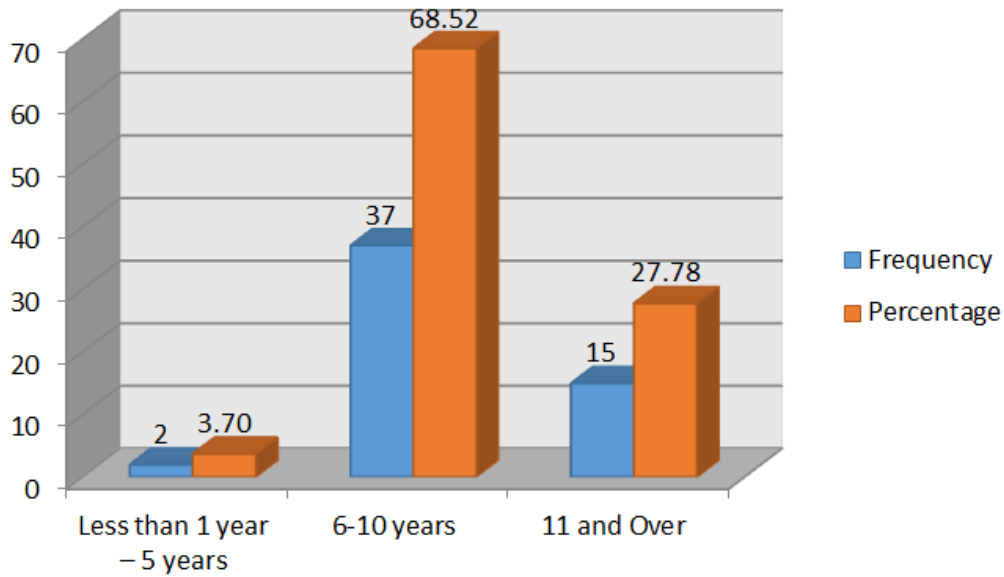


Figure 4.5: Number of years worked

From the analysis of findings, majority of the respondents (37, 68.52%) indicated that they had worked for a period of 6 to 10 years. Closely after were respondents (15, 27.78%) who indicated that they had worked for a period of 11 years and over. The least frequency (2) was of respondents who indicated that they had worked for a period of less than 1 year to 5 years. The study thus concluded that the respondents had worked long enough at the Customs and Border Control Department to provide information on the influence of Automated Systems on Customs Performance.

4.4.4: Level of Education

The study sought to establish the education level of the officers. The results from the analysis of the findings is illustrated in the in the figure 4.5 below.

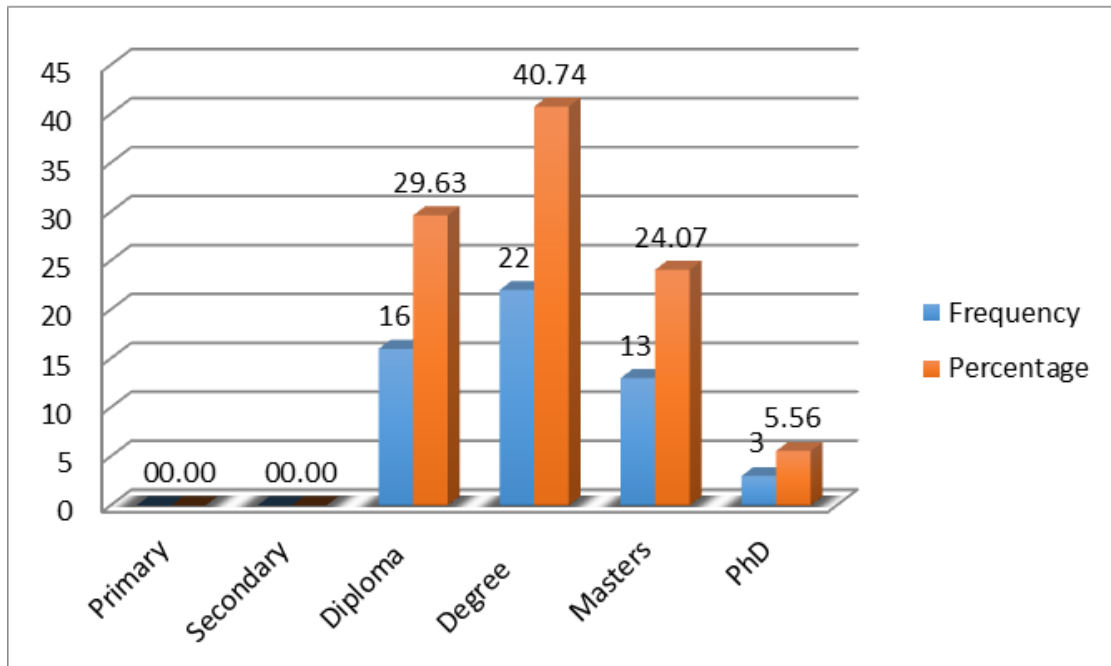


Figure 4.6: Respondents' Level of Education

From the findings it was established that 40.74% of the respondent indicated their highest level as a university degree, 29.63% of the respondent indicated their highest education level as a college Diploma while 24.07% of the respondents indicated that their highest level of education was a Master's degree. 5.56% of the respondents stated that the highest education level of education was a doctorate while none of the respondents indicated their highest level of education as primary education or secondary education.

4.5 Descriptive Statistic

The study sought to establish the influence of Automated Systems on Customs Performance in Kenya. The respondents were asked to rate how they felt about different variables related to automated systems and customs performance in a five point Likert scale. The range was from strongly agree (5) to 'strongly disagree' (1). The score of 1 represented "strongly disagree" 2 represented "disagree", 3 represented "neutral", 4 represented "agree" and five represented "strongly agree"

4.5.1: Simba System 2005 on Customs Performance

The study sought to determine whether Simba System 2005 had any influence on Customs Performance at the Customs and Border Control in Kenya. The table 4.5 below shows the findings of from the respondents.

Table 4.2: Simba Systems and Customs Performance

	Mean	Standard deviation
Simba system is easy to implement	4.401	0.932
Cross border information sharing through Simba System has reduced goods clearance times	4.592	0.402
Online lodgements efficiency has reduced goods clearance times	4.111	0.993
Clearing and forwarding agents are able to apply the system for faster clearance of goods	3.301	1.025
Goods payments simplicity through reduced goods clearance times in Kenya	3.508	0.393
Collection of Trade Data through Simba system has enhanced clearance times at border posts	3.503	0.441

From the findings in the SPSS analysis, the study asserted that Simba Systems had a significant influence on Customs Performance at the Customs and Border Control Department. For instance, a great number of the respondents agreed that cross border information sharing through Simba System has reduced goods clearance times. This was supported by the mean value calculated of 4.592. A significant number of the respondents also agreed Simba system is easy to implement; this was inferred from the mean value calculated in the analysis of 4.401. The standard deviation of 0.932 calculated in the SPSS indicated little variation in the responses of the respondents. The study also established that online lodgements efficiency has reduced goods clearance times. This was noted from the mean calculated of 4.111, which indicated that most respondents agreed to the statement and the standard deviation calculated of less than 1.5 indicates that there was little variance from the mean value. A significant number of the respondents also agreed to the statement; Goods payments simplicity through reduced goods clearance times in Kenya, this was inferred from the mean value calculated in the analysis of 3.508. The standard deviation of 0.393 calculated in the SPSS indicated little variation in the responses of the respondents. Generally, it was evident that Simba Systems 2005 had an overarching effect on Customs Performance at the Customs and Border Control department.

4.5.2: Single Window System on Customs Performance

The study sought to establish the influence of the Single Window Systems on the Customs Performance at the Customs and Border Control Department. The findings are illustrated in the table 4.3

Table 4.3: Single Window System on Customs Performance

	Mean	Standard deviation
There is a high degree of inter-agency collaboration that enhance goods clearance	4.089	0.836
The system has enhanced efficiency of customs communication at post	4.307	0.394
The system ensures more transparent, efficient and faster cargo clearance	3.631	1.098
Duplication of agency roles has affected the effective implementation of the system	4.292	0.912
The system has enhanced quick access to transit cargo data and timely goods clearance	4.115	0.752
KRA staff capacity building has developed broad-based commitment during the system's project design	4.033	0.599

Based on the responses from the respondents, it was clear that most respondents saw that single window systems had an influence on customs performance at the Customs and Border Control Department. This inference was realized by responses of statements relating to the two variables. It was established from the analysis that most respondents strongly agreed on the statement; the system has enhanced efficiency of customs communication at post. This was established by the high mean value calculated of 4.307. The standard deviation calculated of .394 indicates that there was very little fluctuation from the mean mark. It was also established that duplication of agency roles has affected the effective implementation of the system. This was seen true by the high mean value calculated in the spss analysis of 4.292. The standard deviation calculated in the analysis of 0.912 indicated little variance from the mean mark in the responses. Also noted from

the analysis of the findings was that there is a high degree of inter-agency collaboration that enhance goods clearance. This was noted true by the mean calculated of 4.089. Its standard deviation indicated that there was little variance for the mean and that most respondents generally strongly agreed with the statement. The study also established that the system ensures more transparent, efficient and faster cargo clearance. This was seen true by the mean calculated of 3.631. The standard deviation calculated of 1.098 indicated uniformity in the responses from the respondents.

4.5.3: Scanner Systems on Customs Performance

The study sought to establish the influence of Scanner Systems on Customs Performance at the Customs and Border Control Department. The findings are illustrated in the table 4.4 below.

Table 4.4: Scanner Systems on Customs Performance

	Mean	Standard deviation
There are sufficient scanning gadgets in the customs and border posts	4.894	.902
The scanning gadgets have modern applications/software	4.246	.893
The scanners are well integrated to ease documentation	4.034	.382
The scanners have enhanced goods inspection by Customs and Border Control Department	4.096	.909
The scanners have enhanced velocity of transit goods through faster clearance at ports and borders.	3.989	0.887

From the analysis of the descriptive statistics, it was clear that most respondents asserted that the Scanner Systems had a significant influence on Customs Performance at the Customs and Border Control Department. This was noted from the response from the analysis of findings.

For instance, it was noted that majority of the respondents indicated that there are sufficient scanning gadgets in the Customs and Border posts. This was noted true by the mean calculated from the findings of 4.894. The standard deviation calculated of 0.902 indicated that majority of the respondents were of a similar opinion. Also noted was that most respondents agreed that the scanning gadgets have modern applications/software. This was noted true by the mean calculated on the statement of 4.246. The standard deviation calculated in the study of 0.893 indicated uniformity in the responses from the respondents. Also noted from the findings was that the scanners are well integrated to ease documentation. This was seen true by the mean calculated of 4.034 and the standard deviation of .382 which suggested that majority of the respondents were of the same opinion. Also noted from the findings was that majority of the respondents conceded that the scanners have enhanced goods inspection by Customs and Border Control Department. This was seen true by the mean calculated of 4.096. The standard deviation calculated of 0.909 indicated little deviation from the mean mark. The study thus established from the findings that scanner systems play a significant influence on Customs Performance.

4.6 Correlation Analysis

Table 4.5: Correlation Matrix

			Simba Systems 2005	Single Window Systems	Scanning Systems	Customs Performance
Simba 2005	Systems	Pearson Correlation	1			
		Sig. (2- tailed)	.			
Single Systems	Window	Pearson Correlation	0.358	1		
		Sig. (2- tailed)	0.032	.		
Scanning Systems		Pearson Correlation	0.673	0.147	1	
		Sig. (2- tailed)	0.143	0.781	.	
Customs Performance		Pearson Correlation	0.523	0.672	0.336	1
		Sig. (2- tailed)	0.001	0.008	0.005	.
		N	54	54	54	54

The study used correlation analysis to establish the association between Simba systems 2005, Single Window Systems, Scanning Systems & Customs Performance of staff at the Customs and Border Control Department of Kenya Revenue Authority. Two-tailed Pearson correlation (R) was used to establish the same at 95% confidence level. From the results, the R-value between Simba Systems 2005 and Customs Performance was 0.523. This signifies strong and positive

linear association between Simba System 2005 and Customs Performance. Single Window Systems had correlation value of 0.672 with Customs Performance at the Customs and Border Control Department. This depicts a strong and linear relationship between Single Window Systems and Customs performance. Also noted was that Scanning Systems had a correlation value of .336 which indicated a low but significant, positive and linear relationship between Scanning Systems and Customs Performance at the Customs and Border Control Department.

4.8 Regression Analysis

The study conducted multiple regression analysis of:

$$Y = \beta_0 + \beta_1\chi_1 + \beta_2\chi_2 + \beta_3\chi_3 + \varepsilon$$

β_0 is the regression model constant; $\beta_1 - \beta_3$ are the regression coefficients. Y is customs performance at the Customs and Border Control Department. χ_1 is the Simba Systems 2005, χ_2 is Single window Systems while χ_3 is Scanning Systems; ε is the error term obtained from the F-significance from ANOVA.

Table 4.6: Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
0.853	0.727	0.701	0.00455456

a. Predictors: (Constant), Simba Systems, Single Window Systems, Scanning Systems

b. Dependent Variable: Customs Performance at the Customs and Border Control Department

Table 4.7 above presents the regression model summary of fit to establish if regression analysis is suited for the data. Pearson Correlation value of 0.853 was established depicting that the independent variables (Simba Systems, Single Window Systems, and Scanning Systems) had a

very good linear relationship with the dependent variable (Customs Performance). An R-square value of 0.727 was established depicting that this relationship was very strong and Simba Systems, Single Window Systems, and Scanning Systems account for 72.7% of Customs performance at the Customs and Border Control Department of KRA.

Table 4.7: Analysis of Variance (ANOVA)

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	1.776	3	0.592	2.655	0.001
Residual	11.150	50	0.223		
Total	11.926	53			

ANOVA analysis was conducted to determine the significance of the regression model. A significance value of 0.001 was established depicting that the regression model had low significance (confidence level) ($p < 0.05$).

Table 4.8: Model of Coefficient

	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	4.946	1.355		3.651	0.574
Simba Systems 2005	0.842	0.062	0.927	13.581	0.000
Single Window Systems	0.873	0.149	1.388	5.859	0.005
Scanning Systems	0.345	0.058	0.992	5.948	0.012

a. Dependent Variable: Customs Performance

The study established the following regression model:

Customs Performance = 4.946 + 0.842 * Simba Systems 2005 + 0.873 * Single Window Systems + 0.345 * Scanning Systems

The study established that when Simba Systems 2005, Single Window Systems, Scanning Systems are zero, Customs Performance would be 4.946. The study also established that holding other factors constant, a unit increase in Simba Systems 2005 would lead to a 0.842 unit increase in Customs Performance; a unit increase in single window would yield a 0.873 unit increase in Customs performance while a unit increase in the scanning systems would result in a 0.345 increase in the Customs performance at the Customs and Border Control Department of Kenya Revenue Authority.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This section of the study summarizes the findings, draws conclusions and also gives recommendations based on the findings of the study.

5.2 Summary of the Findings

The purpose of the study was to establish the Influence of Automated Systems on Customs Performance. The study was guided by the following specific research objectives: To establish the influence of the Simba System 2005 on Customs Performance in Kenya, to identify the influence of Single Window Systems on Customs Performance in Kenya and to examine the influence of Scanning Systems on Customs Performance in Kenya. The target population consisted of 57 officers at the Customs and Border Control Department of Kenya Revenue Authority.

5.2.1 Simba System 2005

From the findings in the SPSS analysis, 87% of the respondents indicated that the Simba System was used for imports and exports. Only a mere 13% indicated that the system was not used for imports and exports. Majority of the respondents (45%) were highly satisfied with the existing level of automation of the Simba system. 42% of the respondents were moderately satisfied with the existing level of automation while only 13% of the respondents indicated they were less satisfied with the existing level of automation. From the regression analysis, the study

established that holding other factors constant, a unit increase in the Simba systems would lead to a 0.842 increase in Customs Performance.

5.2.2 Single Window Systems

From the descriptive statistics, the system has enhanced efficiency of customs communication at post. This was established by the high mean value calculated of 4.307. It was also established that duplication of agency roles has affected the effective implementation of the system based on the mean calculated of 4.292. Also noted from the analysis of the findings was that there is a high degree of inter-agency collaboration that enhance goods clearance. This was noted true by the mean calculated of 4.089. From the regression coefficients, when other factors are held constant, a unit increase in the Single Window Systems would yield a 0.842 increase in Customs Performance.

5.2.3 Scanning Systems

It was established from the descriptive statistics that majority of the respondents indicated that there are sufficient scanning gadgets in the customs and border posts. This was noted true by the mean calculated from the findings of 4.894. Also noted was that most respondents agreed that the scanning gadgets have modern applications/software. This was noted true by the mean calculated on the statement of 4.246. From the inferential statistics, it was noted that when other factors are held constant, a unit increase in Scanning Systems would result in a 0.374 increase in Customs Performance at the Customs and Border Control Department.

It was evident from the model's goodness of fit measure that an R value of 0.853 was established depicting that the independent variables (Simba Systems, Single Window Systems, and Scanning

Systems) had a very good linear relationship with the dependent variable (Customs Performance).

5.3 Conclusion

The purpose of the study was to determine the Influence of Automated Systems on Customs Performance. The following are the major conclusions based on the findings and discussions. That automation of processes improves Customs Performance in an organization. This could be through processing of entries, release of goods, online banking and clearance of goods. Further, automation of processes enhances skill development of the staff through training and use of the system. Automation of processes improves the effectiveness of the process in terms of accessibility and reliability. It also improves decision making, planning, effective performance management, monitoring and control. In addition, automation of processes leads to reduction in costs through reduced amount of time and money spent on following up customs clearance and man hours. Finally the researcher concludes that automation of processes enhances improved governance mainly as a result of improved transparency and accountability.

5.4 Recommendations

The following recommendations were made based on the findings and conclusions of the study. Kenya Revenue Authority should ensure that the system is at least 90% secure for it to achieve its intended purposes and thus increase customs performance. Training of staff on the operations of the system should be continuous so as to provide them with up to date applications. This will help improve the system's efficiency further.

5.5 Recommendations for further Studies

The study makes the following suggestions for further studies, a similar study can be undertaken in other border customs offices of Busia, Malaba, Namanga, Lunga Lunga among others that are involved in import and exports of other products since this study focused on petroleum products. A comparative research need to be undertaken to determine the effectiveness of Automated Systems on service delivery standards. A study on the influence of Custom Systems management on revenue collection by Kenya Revenue Authority in Kenya

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APPENDICES

APPENDIX I: LETTER TO RESPONDENTS

Serah Wanjiku Kuira

Jomo Kenyatta University of Technology

School of Business

Dear Respondents,

REF: DATA COLLECTION.

I am a student of the Jomo Kenyatta University of Technology pursuing post graduate diploma in Customs Administration. Currently I am carrying out a research on the influence of Automated Systems on Customs Performance in Kenya.

After the completion of this research, I will give recommendations on the findings of this research to enable improved Customs management practice.

I therefore request for your assistance and cooperation in attaining the above objective by filling in the attached questionnaire as an individual and be as sincere as possible.

I assure you that the information provided shall be treated as confidential and will be used for academic purposes only. Please do not write your name on the questionnaire.

Yours Sincerely,

Serah Wanjiku Kuira

APPENDIX II: QUESTIONNAIRES

Please fill in the following questionnaire by answering all the questions that are given as instructed. Kindly note that all the information provided shall be treated with high level of confidence and shall only be used for the purposes of this research. Please do not write your name anywhere on the questionnaire. Thank you as you take your time to fill up this questionnaire. **(Tick Appropriately)**

Section A: Personal Data

1. What is your gender?

a) Male

b) Female

2. What age bracket are you within?

a) 18-25 years

b) 26-30 years

c) 31-35 years

d) 36-40 years

e) 40-45 years

3. What is your level of education?

a) Primary

b) Secondary

c) College []

d) University []

4. How long have you worked at the customs department?

a) 1-5 years []

b) 6-10 years []

c) 11-15 years []

d) Over 15 years []

Section B: The influence of Simba System 2005 on Customs Performance at the Customs and Border Control in Kenya

Scale provided. Scale: 1. Strongly Disagree 2. Disagree 3. Neutral 4:Agree 5. Strongly Disagree

Factor for Simba 2005	1	2	3	4	5
Simba system is easy to implement					
Cross border information sharing through Simba System has reduced goods clearance times					
Online lodgements efficiency has reduced goods clearance times					
Clearing and forwarding agents are able to apply the system for faster clearance of goods					
Goods payments simplicity through reduced goods clearance times in Kenya					
Collection of Trade Data through Simba system has enhanced clearance times at border posts					

Section C: Influence of Single Window System on Customs Performance at the Customs and Border Control in Kenya

Scale provided. Scale: 1. Strongly Disagree 2. Disagree 3. Neutral 4:Agree 5. Strongly Disagree

Factor for Single Window System	1	2	3	4	5
There is a high degree of inter-agency collaboration that enhance goods clearance					
The system has enhanced efficiency of customs communication at post					
The system ensures more transparent, efficient and faster cargo clearance					
Duplication of agency roles has affected the effective implementation of the system					
The system has enhanced quick access to transit cargo data and timely goods clearance					
KRA staff capacity building has developed broad-based commitment during the system's project design					

Section D: The influence of Scanner Systems on Customs Performance at the Customs and Border Control in Kenya

Scale provided. Scale: 1. Strongly Disagree 2. Disagree 3. Neutral 4:Agree 5. Strongly Disagree

Factor for Scanner Systems	1	2	3	4	5
There are sufficient scanning gadgets in the customs and border posts					
The scanning gadgets have modern applications/software					
The scanners are well integrated to ease documentation					
The scanners have enhanced goods inspection by Customs and Border Control Department					

The scanners have enhanced velocity of transit goods through faster clearance at ports and borders.

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