

**EFFECT OF ELECTRONIC-CUSTOMS ON CUSTOMS BORDER MANAGEMENT
IN KENYA, A CASE STUDY OF NAMANGA BORDER**

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2019

DECLARATION

I hereby declare that this is my original work, submitted after a thorough field and book research on this topic and that it has been submitted in its original form without any erasure whatsoever.

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DEDICATION

I dedicate this research to my son Troy, all my family members, and all my friends and colleagues at the Kenya School of Revenue Administration.

ACKNOWLEDGMENT

First and foremost I would like to acknowledge the almighty God for His tender care and guidance to me through the entire period of this research. Secondly, a research of this magnitude would not have been successful without the assistance, guidance and inspiration of many individuals. I would like to extend my sincere thanks to my project supervisor John Khamila, my fellow students, and family members, for their great support through the program. I would also like to acknowledge the management at the Kenya School of Revenue Administration for facilitating our study at the institution.

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LIST OF ABBREVIATIONS AND ACRONYMS

AEO	Authorized Economic Operator
ANOVA	Analysis of Variance
CSD	Customs Services Department
DPC	Document Processing Centre
EAC	East African Community
EACCMA	East African Community Customs Union Management Act
ICD	Inland Container Depot
KEBS	Kenya Bureau of Standards
KEPHIS	Kenya Plant Health Inspectorate Service
SADC	Southern African Development Community
WCO	World Customs Organization
WTO	World Trade Organization
ZIMRA	Zimbabwe Revenue Authority
ASYCUDA	Automated System for Customs Data

DEFINITION OF TERMS

Customs Border Management- The use on new process and modern technology to facilitate trade and promote security at the border (Rogers et al., 2017).

Customs – Customs is the customs Department of a partner state (EACCMA, 2011).

Customs Administration - customs administrations is the individuals in the customs department performing significant and broad functions to facilitate the flow of goods and services across borders (Peterson, 2017).

Electronic-Customs- The use of technology to facilitate custom's administrative activities

Electronic data Exchange- EDI is the communication between computers to exchange information relevant for carrying out business activities. Therefore it is the electronical communication of businesses (Ward, Hildebrandt, & Patel, 2017).

Integrated Electric System—it is the process of assembling the components and sub-systems of the electric system by making them function as a single unit (Rogers et al., 2017)..

Cargo Security- refers to the act of protecting bulk cargo from threats by identifying and minimizing the threats such as cyber-attacks (Wolff, 2008).

Verification of Goods—this is the checking of goods for compliance of the goods into the state's regulations, standards and declaration by customs authorities (Gahigi, 2017)

ABSTRACT

Border management is one of the great challenges of our times. In an increasingly globalized world, how do governments maintain the security they need, while encouraging the trade they want? The Kenyan government successfully launched and implemented KNESWS in 2014 with the intention of automating its systems to promote trade and enhance the security thereby improving the management of its borders. However, despite the implementation of KNESWS, The Kenyan Customs is still currently experiencing difficulties with managing its borders which are commonly characterized by smuggling, dumping of contraband and sub-standard goods, diversion and terrorists passing through the borders. Therefore this study determines if there has been any value of the investment seen in the stabilizing e-customs at the Kenyan borders, by answering the question “has e-customs helped improve the management of the Kenyan borders?” The study was guided by a primary objective of establishing the effect of e-customs on border management in Kenya while focusing on the case of the Namanga Border. The study was further guided by three specific objectives, which are to examine the effects of the exchange of electronic data on border management in Kenya, to evaluate the effects of integrated electronic system on border management in Kenya, and to determine the effects of the impact of cargo security on border management in Kenya. This study was based on the Diffusion of Innovation (DOI) theory, Unified Theory of Acceptance and Use of Technology (UTAUT), and the theory of planned behavior. The study had a target population of about 120 people consisting of customs officers responsible for inspection, customs officers responsible for monitoring scanners, declarations, and ECTS, and customs officers who monitor the Red, Yellow, and green channel. The study obtained its primary data using Likert scale questionnaires and secondary data from the relevant empirical literature. The study used a descriptive survey design. Stratified sampling was employed in obtaining a sample of 72 respondents. Inferential and descriptive statistics (such as mean, coefficient of variation, percentages, and standard deviation) were used to analyze the study’s quantitative data. Moreover, correlation analysis was used to establish the relationship between the independent and the dependent variables. The survey found that 86.7% of the respondents believed that effective exchange of electronic data promoted border security, 83.3% of the respondents agreed the level of cargo security determined if the borders were managed effectively or not and 88.7% of the respondents integrated electronic systems highly promoted border security. The study concluded that the Namanaga border should invest more on the Wireless Sensor Network (WSN), which is a form of integrated electronic system. The WSN would be effective in connecting the physical and the digital worlds. Moreover, the WSN has the potential of promoting border security hence enhancing the management of the Kenyan borders as it is known to be widely applicable in not only monitoring and controlling borders, but also in the increasing of the alertness of the border security officials. The study also recommends that the criteria used to determine high risk containers that require thorough expansion should be widened and increased and the monitoring of ECTS should be done by both machines and human beings. The study further recommended that for better facilitation of trade it is of utmost importance for the Kenyan government to continually upgrade its electronic system (KNESWS).

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Customs Border management refers to the process of managing border processes and procedures efficiently to promote borders that are secure and open to an unimpeded flow of people and goods. Therefore, border management not only involves the promotion of security around borders, but it also comprises of the act of facilitating legitimate trade and travel (Scott & McGuire, 2017). The Kenyan government recognizes that trade is an essential element that contributes to its development socially and economically. Therefore, it strives to introduce and promote a sound border management system, which strikes a fine balance between facilitating a smooth flow of persons and goods across the border while maintaining uncompromised security (Rogers et al., 2017). The Customs Immigration and Quarantine (CIQ) environment is responsible for maintaining border management. While undertaking its responsibilities, CIQ works with several other governmental bodies such as the agencies involved with the decision making process that is related to border management. Though the agencies may have different responsibilities that are in line with their mission, they all work to safeguard the national security and the promotion of the well-being of the entire community.

Because of the need to publicize its customs rules and regulations, do away with opaque procedures and move to paperless operations, the Kenyan govern government has empowered its Customs administration to embrace Electronic Customs (e-Customs). E-customs is more powerful and effective than customs automation because it supports a greater level of integration and response times. E-customs enables the customs administration to save on time and cost by allowing a greater accuracy of processing of information and data (Scott &

McGuire, 2017). Moreover, e-customs is efficient in the provision of timely data, assessment risk in consignments even before their arrival at the airport, improves the supply chain's efficiency, and generally lowers the cost of conducting international business as it enhances business regulatory efficiencies (Raus et al., 2016).

In as much as e-customs has been successful in facilitating trade, its real test will be regarding the determination of its effectiveness in border management where it will be required to synthesis the areas' information and communications technology (ICT) activities. For effective facilitation of border management, e-customs is required to synthesis ICT activities and border responsibilities nationally, across government agencies and cross borders (Raus et al., 2016). In Kenya, e-customs through the "Single Window" is expected to provide solutions to cross border issues for it to be regarded as effective in managing the border.

1.1.1 The Concept of e-customs

Most governments and administrations across the world have adopted e-customs because they perceive it as a platform that facilitates trade while promoting regulatory compliance. Administrations favor the use of e-customs as it ensures a cost-efficient usage of government resources while promoting a smooth flow of persons and goods across borders (Owens et al., 2013). It is evident that Single Window System for foreign trade (SWS) is critical in the facilitation of effective border management as it enables efficient compliance with export and import requirements among traders and the connection and coordination of different border government agencies to promote security and seamless flow of trade (Owens et al., 2013). Therefore, single window is beneficial to both the government and traders as it facilitates a smooth flow of information between all stakeholders. The Single window that has a facility to allow the payment of duties and levies is often managed centrally by a lead agency but

allows relevant government authorities and agencies to access all the information that is relevant for their functions (Tan et al., 2016). E-customs, which is mostly implemented, may vary in the level of its high-tech depending on the level the ICT system's advancement that it uses. E-customs is especially important in the management of organizations that trade through virtual networks cross borders that are required to comply with several compliance frameworks.

E-customs is helpful as it removes the burden of traders having to deal with different cultures, geopolitical issues, various ICT systems and technologies, and different business standards and logics (Nejad & Sabzikaran, 2017). E-customs also enhances the visibility of supply chains' visibility risks through its ability to sensor technologies and the sharing of information and data. Notably, e-customs also decreases the translation and adaptation costs incurred by traders as it acts as a bridge between different national systems that may use different information interfaces and data format (Nejad & Sabzikaran, 2017). In the future, customs is expected to help facilitate the filling of customs' declarations while provide an easy access to trade related documents at the international level.

1.1.2 The Global Perspective of effects of e-customs on Customs Border management

Notably, several governments across the world have adopted and embraced the use of e-customs in the management of their borders especially in the facilitation of trade and promotion of border security (Moraczewska, 2016). For instance, the EU member states, in their Lisbon Agenda, strived to increase their companies' competitiveness by strengthening their single market and establishing that pan-European e-Government Services through e-customs. The EU member states mainly intended to use e-customs to have a seamless flow of data that would increase the efficiency of their customs clearance procedures, increase their security of their international trade and decrease their administrative costs (Moraczewska,

2016). Moreover, by doing away with customs procedures characterized by the paper format, the EU states had the objective of collecting the correct amount of taxes, facilitate trade and enhance their security.

According to the OECD report, Germany adopted the Germany Customs Information system that succeeded in the elimination of most trade barriers especially those related to quotas and barriers. Germany currently cooperates with its neighbors who belong to the EU to dissolve trade barriers and enhance border security using e-customs (McLinden et al., 2013). In Asia, China's customs Revenue service system is regarded as the best in Asia, especially because of its electronically facilitated procedures regarding transport and distribution are quite efficient. Owing to the efficiency (well simplified and harmonized) associated with the China's e-customs system; its efficiency was ranked at 78% by the consumer research agencies.

Mexico on the other hand adopted a customs administration that facilitates trade with its neighbors while maintaining the security of its borders (McLinden et al., 2013). The Mexican Customs electronic system is renowned for its efficiency in tariff collection, protection of intellectual property rights, and prevention of the entry of illicit drugs and hazardous substances into its borders. Unfortunately, the Mexican e-customs system was not effective for long as it failed.

1.1.3 The Regional Perspective of the Effects of E-Customs on Customs Border Management

In the EAC, Rwanda is known for its Rwanda Electronic Single Window (RESW), which is efficient in managing its borders especially managing the cross-border trade that the country engages in. Before embracing RESW, Rwanda, which is a landlocked country, suffered from high transport and freight costs, delays caused by poor infrastructure that made Rwanda not

to be competitive, and time consuming manual clearance procedures (McLinden et al., 2013). However, when the country installed the RESW, its clearance costs were dramatically reduced and the quality of its services was improved.

1.1.4 The Kenyan Perspective of the Effect of e-Customs on Customs Border

Management

During the 2000s especially the years before 2008, Kenya's customs procedures were characterized by inefficient trade practices that were not only slow, but also costly. Moreover, because of the opaque nature of the customs systems, non-compliance and corruption were quite rampant causing the amount of the collected tax revenues to be far less than they ought to have been (Lewis, 2009). The problems facing customs forced the Kenyan government to seek for a solution from Singapore and several other countries that are the mastermind of e-customs. As a means of finding solutions to the Kenyan customs procedures, Kenya's customs looked to eliminate unnecessary procedures and reengineer others.

Therefore, Kenya implemented and launched a single window system that is close to being fully automated in 2014. The single window system (SWS) allows the submission of all official documents through the electronic portal (Lewis, 2009). Moreover, The SWS facilitates the undertaking of procedures that are simpler and faster thus, enabling more compliance and reduced costs. Before the implementation of the SWS in 2014, shipments at the Kenyan borders used to take between 8-10 days but after the implementation of the system, clearance only takes up to a maximum of 3 days. Notably, the SWS facilitate border management by facilitating trade that is wholly transparent where traders have the luxury of tracking their goods (Lewis, 2009). Since its implementation, the system has not only reduced corruption tremendously but it has also attracted foreign direct investment and increased Kenya's competitiveness in the global market.

1.2 Statement of the Problem

Kenya has taken proactive approaches to modernize its Customs electronic systems with the aim of increasing the efficiency and effectiveness of its operations. One of Kenya's modernization projects involved the implementation and upgrading of customs' electronic systems and platforms through the adoption of the Kenya National Electronic Single Window System (Kenya TradeNet System/KNESWS). By enhancing Customs electronic platforms through KNESWS, Kenya hoped to streamline its customs operations and manage the issues associated with slow clearances, poor monitoring units, delayed payments, and inefficient border procedures. The launch and implementation of the KNESWS in 2014 was quite successful (Lamprey, 2013). Currently KNESWS serves about 11500 registered users in the board system's 36 Partner Government Agencies, and has over 80,000 direct beneficiaries. Since the KNESWS went live, it has processed over 1,707, 642-trade permits and saved the business community about US\$25.36 million (KShs. 2.5 billion) through the elimination of compliance costs associated with transport, time, and administration. With the streamlining of approximately 84 procedures and processes and a satisfied client base, an independent assessment of the KNESWS in November 2016 indicated that the system had been implemented successfully (Lamprey, 2013).

According to the World Bank's estimations, e-customs has the potential of saving about \$115 for each container, reducing trade costs by 2.4% for low-income economies when implemented properly and by 1.7% when it is implemented in a limited manner. Notably, in Kenya, e-customs through The KNESWS has enhanced the management of borders by reducing the application steps in processing by 50%, the average number of documents needed for processing of applications by 30-50%, and it has increased transparency and information sharing (Lamprey, 2013). Moreover, the implementation of TradeNet is deemed successful in the management of customs borders as it has removed the potential risk

associated with falsified documents, it has improved the borders' general security, and its regulatory single window meets the UN/CEFACT's criteria specified in No.33 and 35 for a single window.

However, in as much as there has been a record of the general success in the management of borders through e-customs in the form of KNESWS, a research conducted by Mutunga (2017) on the impact of e-customs on border security indicates that there is still a problem with the management of Kenyan borders as they are not managed as efficiently as they should. Notably, customs has invested about \$549,000 for the successful implementation of KNESWS, however, it has not yet received the expected return on investment. Moreover, several studies supplement Mutunga (2017)'s findings, for instance, studies by Kosgei (2015), Aliet (2016), and Awitta (2017) on the effectiveness of modernization of customs reforms at the Kenyan borders all indicate that the management at the border has not yet reached its potential. According to the aforementioned studies, the Kenyan border management is still struggling with cases of smuggling, diversions, dumping of contraband, counterfeits, and sub-standard goods, there are several cases of delays, and terrorists are still passing into the country through its borders. Therefore, the study seeks to determine if there has been any value of the investment seen in the stabilizing e-customs at the Kenyan borders, by answering the question "has e-customs helped improve the management of the Kenyan borders?"

1.3 Research Objectives

1.3.1 General Objective

The study aims at investigating the effects of e-customs on border management in Kenya, a case study of the Namanga Border.

1.3.2 Specific Objectives

1. To examine the effects of the exchange of electronic data on border management in Kenya, a case study of the Namanga Border.
2. To evaluate the effects of integrated electronic system on border management in Kenya, a case study of the Namanga Border.
3. To determine the effects of the impact of cargo security on border management in Kenya, a case study of Namanga border.

1.4 Research Questions

1. What are the effects of the exchange of electronic data on border management in Kenya, a case study of the Namanga Border?
2. How does the integrated electronic system affect border management in Kenya, a case study of the Namanga Border?
3. How does the cargo security affect border management in Kenya, a case study of Namanga border?

1.5 Justification of the study

The research, “The effects of E-customs on Border Management, a case of Namanga Border” Seeks to find information that will be used to give customs and the Kenyan government insight as to what can be done to increase the level of effectiveness of e-customs in border management. The Kenyan Customs department accompanied with the relevant government agencies and stakeholders such as the revenue collection body Kenya, KRA, will use the information to design suitable customs regulation policies for customs officers and stakeholders operating the Customs’ electronic facilities such as the KNESWS (Watanuki, 2015). The study will help provide answers as to why customs has not yet used the KNESWS

to manage its borders effectively to attain the targeted efficiency at the borders. Moreover, the study will provide insight into different difficult questions that have been raised in the past concerning the influence of customs regulations, policies, and incentives on customs officers' behaviors (Watanuki, 2015).

Finally, the research has the potential of attracting the interest of scholars and researchers who may require to develop and advance their knowledge in the field of e-customs and border management.

1.6 Scope of the Study

This paper focused on collecting information regarding the effects of e-customs on border management from the customs officers and stakeholders based in the Namanga Border. The study chose to focus its research on respondents located at the Namanga border because Namanga is an international border; it is conveniently located and has many customs officers and relevant customs stakeholders operating from there. Most of the customs officers and stakeholders operating at the Namanga serve several traders and undertake critical security responsibilities.

1.7 Limitations of the Study

Time was a significant limiting factor for the study, as it needed to be conducted within a short time (Watanuki, 2015). The funds available for conducting the study were not sufficient as the researcher was self-sponsored. The study experienced difficulties in finding customs officers and stakeholders who were cooperative and willing to participate in the research's interview due to the sensitivity of the subject of discussion (Watanuki, 2015). Therefore, there was no assurance that the interviewees would respond to all the questions in the questionnaire and return the duly completed questionnaires, because of the fear of the exposure of their negative attitudes and activities that could be termed as 'feet dragging.'

To counter the limitations, the researcher had to create time to research by taking time off work (Watanuki, 2015). The researcher sought extra funds needed for the study from friends and relatives. The researcher assured the customs officers and stakeholders of confidentiality and requested them not to give any of their personal details as they participated in the interview. The researcher also explained to the interviewed customs officers and stakeholders the intent of the study and issued them with a transmittal letter and the researcher's supervisor's contacts for verification purposes

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter gives a review of the relevant and available literature on the effect of e-customs on border management. The chapter seeks to highlight and explain issues and factors that affect the efficacy of the implementation of e-customs for the purpose of managing borders. Therefore, the chapter delves into various theories that have been put forward by various scholars to explain the Customs officers and stakeholders' behaviors and attitude concerning the implementation of e-customs at the border in a bid to facilitate trade and enhance security at the borders (Komarov, 2016).

2.2 Theoretical Review

A theoretical framework consists of concepts together with their definitions and reference to relevant scholarly literature, existing theory that is used for a particular study. A theory is a formulation used to explain, predict, and understand phenomena and, in many cases, to challenge and extend existing knowledge within the limits of critical bounding assumptions (Labaree, 2013). Theoretical review is therefore a review of the theories identified, and the illustration of how the theories relate to the subject variables. It is significant because it can act as the lens through which you evaluate your research problem and research questions.

2.2.1 The Diffusion of Innovations (DOI) Theory

DOI is one of the social science theories that seek to illustrate the rate at which new ideas spread over time while providing answers as to how and why the new ideas spread at that particular rate. The theory originates from varied origins and multiple disciplines but Everett Rogers is the one behind the popularization of the theory, which he did through his book "Diffusion of Innovations," that was published in 1962. According to Rogers, the spread of a

new idea primarily depends on the innovation behind the new idea, the communication channels that are used, the social system that is applied, and the duration within which the idea spreads (Granqvist, Hintsa, & Männistö, 2011). However, Rogers notes that the spread of a new idea heavily depends on the efficacy of the available human capital.

Moreover, Diffusion of Innovation is highly subject to the types of adopters employed and the process on innovation-decision. For a new idea (an innovation) to be self-sustaining, it must be widely adopted. Adoption occurs when one does something differently as compared to how they did it previously. A new idea's adoption does not occur simultaneously, but rather it involves a process where some people adopt it earlier and faster as compared to others. DOI has five established adopter categories and the people's level of adoption depends on the people's characteristics (Granqvist, Hintsa, & Männistö, 2011). Notably, most of the people's level of adoption falls at the middle category and different strategies should be used to appeal to people of different categories. The categories range from innovators, which is a group that consists of the venturesome people who want to try out innovation fast and nothing much can be done to appeal to the innovators. Early adopters belong to the second stage and it consists of opinion leaders who are aware of the need for change and are therefore comfortable with adopting the change. Early majority are rarely leaders and they need to see the evidence of how an innovation works before adopting it, the people in this category tend to be appealed by success stories. The fourth category of adopters is referred to as the late majorities who are skeptical of change and therefore only adopt an innovation that has been tried by most people (Komarov, 2016). The laggards fall under the fifth category and they are a group of people who are extremely conservative because of being bound by their traditions. The laggards can only accept innovations when pressured by other people. The theory is however limited by the fact that it fails to take into account the people's resources or the social support that they may have when in a quest to adopt technology.

2.2.2 Unified Theory of Acceptance and Use of Technology (UTAUT)

The UTAUT theory intends to determine the behavior behind the usage and the subsequent usage of IS. According to the theory, the usage, intention, and behavior of people who use IS is determined by factors such as the expected performance, the expected efforts, influence by social groups, and the conditions that facilitate its usage. The factors that determine how IS is used are moderated by ones age, gender, and one's level of voluntariness (Komarov, 2016). During the development of the theory, contracts of eight models and theories were reviewed and consolidated to explain how IS has been used in the past. The eight models were the reasons action theory, the model of technology acceptance, model of motivation, planned behavior theory, a theory that integrates planned behavior and technology acceptance, PC utilization model, the theory of social cognitive, and the diffusion of innovation theory (Komarov, 2016). From the review of the theories and UTAUT's subsequent validations, it was apparent that the theory is accountable for 70% of the intentions of the user

2.2.3 The Theory of Planned Behavior (TPB)

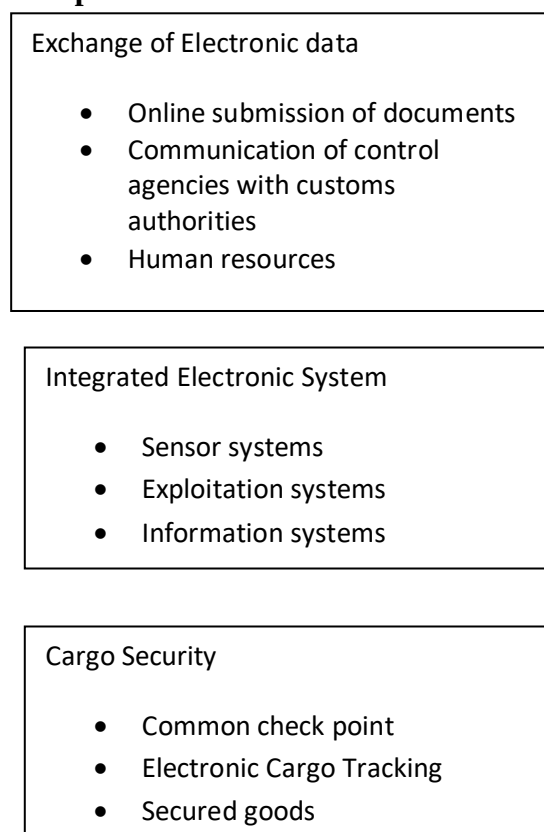
The theory was developed from that of reasons action of the 1980s by Icek Ajzen. The theory predicts the behaviors of people regarding actions which they can fully control, and therefore it focus on the intentions of people's actions. According to the theory, the intentions of people's actions are determined by their attitude towards what they expect to the outcome of their actions and the risks and benefits associated with engaging in a particular action. A people's behavior depends upon their motivation and the control that they have. The theory differentiates the behavioral, normative, and control beliefs. According to the theory, a [person's control over his/her behavior depends on his attitude, his intention, his subjective and social norms, his perceived power, and his perceived control of behavior. The theory is limited because it fails to address the time frame between intent and actual action, it assumes that a person has unlimited resources and opportunities to perform a desired action regardless

of his intention, and it does not account for other factors such as threats, moods, fear, and past experience.

2.3 Conceptual Framework

Maxwell (2005) defines conceptual framework as the system of concepts, assumptions, expectations, beliefs, and theories that supports and informs one's research. According to Maxwell (2005) it can as well be defined as the visual or written product, that explain, either graphically or in narrative form, the main things to be studied—the key factors, concepts, or variables—and the presumed relationships among them. It is a researcher's understanding of how the particular variables in his study connect with each other. It is significant in helping the readers understand the relationship between variables from the researcher's perspective.

Independent Variables



Dependent Variables

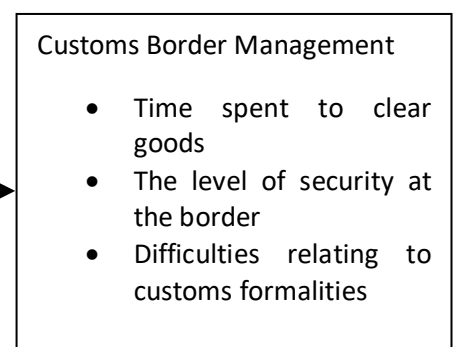


Fig 2.1: Conceptual Framework

2.4 Empirical Review

Penn state University libraries define empirical research as the research based on observed and measured phenomena and derives knowledge from actual experience rather than from theory or belief. These studies are recognized by going through headings and subheadings within articles, books, reports, and recognizing the relationship between them and the researcher's topic. Enogo academy as well defines it as a way of gaining knowledge by both direct or indirect experience and observation. Empirical evidence can then be analyzed either quantitatively or qualitatively. An empirical review is significant in giving insight on what other scholars and researches experienced and had to report about the variables.

2.4.1 Exchange of Electronic data

The exchange of electronic data refers to the action of two or more systems sharing data and information and using the shared data meaningfully to facilitate border management by meeting all the regulatory requirement for efficient and effective movement of goods across borders. The data can be exchanged between systems that are within the borders of the same region or across international borders. Exchange of electronic data is of utmost significance as it enables the processing and re-use of data with minimum efforts to ensure speedy international trade and transactions regarding transport, administration, and other regulations in the supply chain.

Studies indicate that the single window interoperability (SWI) that is described in UN/CEFACT Recommendation 36 has been established in several developed and developing countries and has in turn improved their trade and border management. According to the studies, SWI requires several information and documents for the smooth processing of data and information in electronic form. The requirements of several documents for electronic processing is constrained by the fact that most of the documents are in paper form and not in

soft copy. The requirement of documents in soft copy has pushed many government to strive to work towards reducing the number of paper-based documents with the aim of facilitating the sharing of information across borders. The SWI has proved reliable since it allows safe sharing of electronic information across borders facilitation collaboration among traders, improving communication between transport operators, and improving the operations of governments and the international supply chains.

2.4.2 Integrated Electronic System

It is common knowledge that borders tend to be extremely vulnerable to attacks from terrorists as well as prone to illegal activities such as smuggling and illegal immigration. Because of the sensitive nature of the borders, it is necessary to fuse sensors and data information to achieve automated fusion and raw sensor data aggregation (Karpova & Mayburov, 2019). In the recent past, the Surveillance of Borders, Coastlines and Harbors (SOBCAH) has been effective in the sharing of data obtained from sources that are heterogeneous. Currently, with the advanced technology, video data techniques of data fusion have taken the sharing of information a notch higher, increasing the provision on crucial security data to system operators at the borders. Moreover, border's immigration enforcement relies on the efficacy of integrated border management system to combat cross-border crime, illegal immigration, and terrorism (Karpova & Mayburov, 2019). There is an urgent need for open and fully secured and controlled data since the number of travelers are growing steadily and so is the traffic of cargo that needs to be transited between borders.

Wireless Sensor Network (WSN) is a form of integrated electronic system that is effective in connecting the physical and the digital worlds. WSN is widely applicable in not only monitoring and controlling borders, but also in the increasing of the alertness of the border security officials in a bid to improve border protection. Unlike in the past where border patrol

system were highly labor intensive, currently, aerial vehicles that are unmanned, grouped sensors, surveillance towers. Unfortunately, studies indicate that the new systems that have taken over the work of man are limited by problems such as false alarms and limitations of sight (Karpova & Mayburov, 2019). Therefore, despite the presence of WSN and digital means of monitoring the borders, border officers are required to be consistently present at the borders to deter criminal activities and increase the awareness of terrorist attacks in an area that is exposed to the risk of terrorist attacks.

Notably, the integrated electronic systems that require training, practice, and robust infrastructure are not the best in ensuring border security. Therefore, an effective border management requires border guards to fulfill their surveillance duties using stationary and mobile units. The guards should be legally empowered to discourage criminal activities from taking place at the borders. Moreover, effective border management requires the surveillance of both border guards and the Integrated Electronic systems to adapt to the estimated risks and transnational threats that are existing or have been identified.

2.4.3 Cargo Security

Customs is responsible for knowing everything that is inside maritime containers and trucks to determine whether it poses risk to its people and to ensure that it collects all due revenue. Often, customs works with community trade programs such as the Container Security Initiative and the Customs Trade Partnership against Terrorism. The programs foster security while safeguarding the international trade industry. E-customs enables the reporting of imports, export, and transit goods, which is necessary for safe clearance and release. Usually, customs selectively control goods depending on the risk that is associated with them since it is not possible for all consignments to be thoroughly checked by the regulatory authorities (Grainger, 2010). Notably, e-customs, through the single window system selects

and targets containers that may be risky by applying risk-based selectivity. Moreover, customs enables its participating agents to utilize resources judiciously when applying regulations by adhering to risk-based principles that are consistent with the customs lead agencies. Therefore, customs has the responsibility of ensuring its single window system has features that facilitate interdictions that foster risk minimization as it enforces the laws custom related laws, regulations, and taxes.

The cargo that customs deals with is associated with several threats that are diverse in nature and they depend on their function which is both their probability of occurring and the threat's potential consequence. It is quite challenge to estimate potential risks and their consequences because of the complex and diverse nature of border threats (Grainger, 2010). Moreover, the strategic nature of terrorists, criminals, and migrants makes it difficult to assess border threats. Customs divides border threats into 'actors' and 'goods' where actors are terrorist, unauthorized migrants, and transnational criminals among others whose entry into Kenya's boundaries has a high probability of causing harmful consequences to the nation. Goods, on the other hand, include weapons of mass destruction, illegal drugs, counterfeit and contraband products, and any other products that are potentially harmful.

2.5 Critique of Existing Literature

Evidently, border management is a significant field. Authors in various disciplines, have reviewed information regarding the effective management of borders. There are several studies both individual and group studies on how advancement of technology has promoted the effective management of borders. For instance, Zubair, (2017) is one of the individual researchers who studied the changing the role of Customs Officers and possible mistakes in the management of borders. Gellert, (2011) as well studied the electronic data exchange system and how its effective use and application can positively impact the manner in which

borders are managed. However, all these scholars have given the study a general view, unspecific to the Kenyan borders, especially the Namanga border. Electronic customs is also a significant field since it has had numerous researchers interested in studying how electronic customs in terms of how advanced technology promotes and enhances border security and flow of trade. It has been studied in terms of the manner in which it promotes the security of cargo and its means of promoting effective trade across the borders. For instance Koley, Datta, & Mukherjee, (2016) studied the e-customs in terms of reducing time used in declaring goods in relation to promoting trade and enhancing border management. Mosyoki (2017) as well focused his study on the technology behind scanners used at the ports and how it expedites and streamlines the clearance of cargo. Cost of doing business has as well been studied in terms of risk management. However, there is little information and resources available to give more insight. Evidently, border security and trade facilitation, which are the key components of border management are wide topics and areas of research.

Turner (2015) focused his study on barriers to entry at the customs borders during times of disasters in the developing countries. Mitigating life-saving materials' delays was noted to have a significant role in facilitating the movement across borders (Holloway, 2009). However, there is little to no information regarding the due procedures followed to ensure security of cargo and prevention of immigration. Moreover, scholars have failed to cover the several procedures that happen after the online declaration of goods when illustrating how e-customs has facilitated border management. In Kenya, it is alarming as the most researchers focus their studies on the Mombasa port as a key border. Though Mombasa serves many traders and is a significant Kenyan border, other borders in Kenya are also significant, for instance, the Namanga border is a major border which has been neglected by most researchers.

2.6 Summary of Literature Review

Researchers and scholars have studied electronic customs and its relationship to border management and covered different forms on how e-customs may affect the management of borders. Some have studied electronic-customs (in the form of KNESWS) independently such as Zubair, (2017) and Gellert, (2011), while Koley, Datta, & Mukherjee, (2016), some have studied electronic-customs in relation to border management. Mosyoki, (2017), and some have studied regions or areas not equal to Kenya, especially not the Namanga border. However, the literature review shows that little information exist in relation to the direct effect or impact that e- customs has on facilitating or influencing the management of borders (Erceg, 2013). Moreover, most of the information available on border management dates back to the years before 2010, hence unreliable due to acute changes in the manner in which borders are managed. The literature review revealed that there is minimal information regarding the variables for this study. The available studies have neglected studying the Namanga border as most studies are focused on J.K.I.A and the Mombasa borders. Also, most scholar and researcher resources available date back to the years before 2010, and therefore, do not take account of the significant changes in customs border management that have been implemented in recent years.

2.7 Research Gaps

However, most of the studies on the effectiveness of e-customs have been general and have not focused on how e-customs affects the management of borders. Also in the relationship between e-customs and border management, there is little information and resources available to give more insight on the different aspects of e-customs and their impacts on border management (Elmane-Helmane & Ketners, 2012). Additionally, In Kenya, it is unfortunate as most researchers' emphasis is given to the Mombasa port, the J.K.IA, and Inland container depot while neglecting borders like Namanga

CHAPTER THREE

RESEARCH METHODS

3.1 Introduction

This chapter outlines the research methodology that will be used to achieve the study's purpose. It covers the research design, the target population, and the sampling and sampling techniques of the study, instruments, and methods of data collection, and the procedures of data collection (Durham, Manly, & Ritsema, 2014). After that, the study examines the reliability and validity of the research instruments, and then it proceeds to analyze and present the collected data through qualitative and quantitative analysis.

3.2 Research Design

The primary method of data collection was used to gather information during the study. Scientific analytical tools were used to develop variables that were used to collect secondary data (Dwivedi et al., 2019). The proposed research is non-experimental and correlative, which is a quantitative method of study. The research design was a questionnaire-based survey of customs agents and some customs officers and agents to collect firsthand information. The questionnaire was efficient in collecting data about the dependent and the independent variables. Gay (1996) explains that descriptive data are usually obtained using questionnaires. Others like Cohen and Manion (1998) have also identified questionnaires, as important instruments of data collection in descriptive research (Durham, Manly, & Ritsema, 2014). The study used the Likert scale of five questionnaires, which will use ordinal scales and will result in numeric scores that were summarized to the extent to which the dependent variables affected trade facilitation (Durham, Manly, & Ritsema, 2014). The correlative study ensured the research determined the strength and direction of the survey hence found out the relationship that exists between the independent and dependent variables (Hayes, 2013). The

other reason why descriptive design was the most appropriate for the study was that it had the ability to allow the collection of large quantities of data, and hence it was suitable to collect data from the various customs officers at various departments at the Namanga border.

3.3 Target Population

The study targeted customs officers operating the e-customs facilities especially the SWS at the Namanga border in Kenya as its participants. The study conducted its research on a heterogeneous population, and therefore the study used a stratified sampling method (Alm, Bloomquist, & McKee, 2017). The study selected approximately 90 customs officers both male and female from the Namanga border, Kenya. The participants were requested to participate voluntarily in the survey. The study hoped that at least 15% of the invited participants would honor the invitation.

Table 3.1: Target Population

Target population	Number of respondents
Customs officers responsible for inspection	40
Customs Officers responsible for monitoring scanners, declarations, and ECTS	30
Customs Officers who monitor the Red, Yellow, and green channels	50
Total	120

3.4 Sample and Sampling Techniques

To provide a high degree of correspondence between the sampling frame and the sample population, the researcher ensured high accuracy of the sample which depends upon the

sampling frame. The researchers aimed to have a sample size that makes inferences from its population (Doyle, 2010). Usually, the sample size is determined by the expense of the data collected and the needs for sufficient statistical power. Statistical power is a very significant feature of a sample size as it indicates the probability of showing a notable difference in the case there is one.

The study used the Krejcer and Morgan table to determine the ideal sample size for the study.

The researcher used the following formula to determine her sample size.

N/k ith:

Where;

N = Total number of custom officers

k ith item = every second customs agents selected in succession from N to form the sample

E.g. If the sample size were 120 participants, the number of customs agents firms would be divided by 2 = 60 customs agents.

The research while conducting the study will use a systematic sampling technique where the participants in the first sample will be randomly selected, and the remaining customs officers will be selected in an automatic sequence resulting into 60 respondents (Alm, Bloomquist, & McKee, 2017).

Table 3.2: Sample size

Target population	Number of respondents	Sample Size (50% of respondents)
Customs officers responsible for inspection	40	20
Customs Officers responsible for monitoring scanners, declarations, and ECTS	30	15
Customs Officers who monitor the Red, Yellow, and green channels	50	25
Total	120	60

3.5 Research Instrument

The study collected primary data by administering questionnaires. The questionnaires contained both open-ended and closed-ended questions (Côté-Boucher, 2015). The responses from the questionnaires provided the researcher with an in-depth understanding of the factors that affect the level of remittance of duties among customs agents. Questionnaires are the main instruments that were used to collect data for this study (Alabede, Ariffin, & Idris, 2011). The questionnaire gathered statistically meaningful data on the views of the participants on the tax compliance issue and the factors that affect their level of remittance of duties. The questionnaire collected the respondents' biographic data; it will then collect information on factors that affect tax the level, of tax compliances among the customs agents and then the questionnaire tried to find out the strategies to improve the remittance of duties

among customs agents from the respondents (Alabede, Ariffin, & Idris, 2011). The researcher used the help of two other researchers to train the participants after which they administered the questionnaires and supervised the process. To gain the respondents' trust, the researcher intends to allow the participants to tell their stories freely as they disclose information on the sensitive topic that is affecting the Kenyan Customs. The researcher developed some questionnaire questions using the Likert scale; others had fixed choices while some other questions followed the open-ended format.

3.6 Data Collection Procedures

Data collection started after the research proposal had been approved. Sampled entities were given letters to request for their consent to allow the researcher collection of data from their entities' respondents (Alabede, Ariffin, & Idris, 2011). The researcher administered the research questionnaires directly to the respondents. For easy facilitation and to save on time, the researcher used the help of two other researchers. The respondents not be in a position to fill the questionnaire at the time of the research had the questionnaires sent to them via the email (Alabede, Ariffin, & Idris, 2011). The research was conducted in a venue and time that was the most convenient to the respondents as it was at the convenience of the respondents which would allow their free participation.

3.7 Pilot Testing

It is important that all surveys are tested before the actual survey is conducted (Davies & Hughes, 2014). This is done to ensure that the questionnaire is clear to respondents and can be completed in the way the researcher wishes (Hair et al, 2015). Pilot testing is an activity that will help this study in determining whether there are errors, limitations, or other weaknesses within the design and will allow the researcher to make necessary adjustments and corrections before embarking on the survey (Creswell & Creswell, 2017). A pilot study

was undertaken on five percent of the target population. The five percent pilot testing sample did not involve the sample size, though the members are directly involved with operations of the port to test the reliability and validity of the questionnaire.

3.7.1 Reliability of the Research Instruments

A reliable instrument is one that yields results that are consistent after repeated trials (Alabede, Ariffin, & Idris, 2018). The researcher tested the reliability of a questionnaire as the research's instrument by employing a test-retest technique where the researcher administered the questionnaires to a group of customs agents with similar characteristics, and they acted as the actual sample size, but their results were not included in the study's final findings (Carrera, 2007). The test was repeated after a two-week duration to test the consistency of the test. Since the findings elicited some consistency, the questionnaire was approved as a reliable research instrument for the data collection.

3.7.2 Validity of Research Instrument

Validity is the extent to which a research instrument can measure what it is intended to measure, that is the degree of the accuracy of the instrument's questions (Carrera, 2007). For this study, the validity of the questionnaire as its primary research instrument was determined through piloting where the researchers checked the respondents' responses against the research objectives. For the instrument to be regarded as valid for the study, its findings and selected content need to be relevant and agreeable with the variables under investigation (Bartlett, Ghoshal, & Birkinshaw, 1995)). The researcher performed the pilot study by testing randomly selected responses of 15 freight forwarders and compare the responses with the study's objectives. The validity of the instrument was also be tested using a research expert's

opinion (the research supervisor). The research supervisor independently judged the validity of the research instrument against the study's set objectives.

3.8 Data Analysis and Presentation

This is a thorough and careful analysis of the completed questionnaires with the aim of ensuring that data is collected accurately and consistently, and align the data with the secondary information available on the research topic (Agyei, 2014). The researcher pre-processed the collected data through editing to detect errors and omissions and made the necessary corrections and rectifications. The researcher analyzed the data by coding the information according to the study's variables for efficiency purposes and to classify the respondents' responses. After that, the researcher classified the coded information regarding common characteristics and attributes (Balarin et al., 2003). The researcher then assembled and tabulate the raw data in statistical tables for further analysis. The researcher used the Statistical Package for Social Sciences (SPSS) as an aid in the data's analysis.

The statistical significance of the various independent variables (tax rate, tax information, and tax compliance cost) on the dependent variable (tax compliance) of this study were tested using the multiple regression model analysis. The study chose to use multiple regression analysis because first, according to Balarin et al. (2002) multiple regression analysis is to be used in studies that have more than one independent variable. Second, multiple regression is useful in quantifying the impact of several simultaneous influences on a dependent variable.

For (Zhang, 2015), Multiples regression is the most appropriates as it combines several predictor variables' effect on a dependent variable. The following regression model was be used for data analysis of the study

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

Where

Y = e-customs

β_0 = Constant

$\beta_1 - \beta_3$ = Regression Coefficients

x_1 = Exchange electronic data

x_2 = Integrated electronic system

x_3 = Cargo security

e = error term

The study used the Pearson Bivariate correlation coefficient to test the strength of the relationship between the independent and the dependent variables. The Pearson Bivariate determines strength (r) of relationships between -1 and 1. Where a 0 value indicates no relationship, 1 indicates a perfect positive relationship while -1 implies a negative relationship. When r is between 0.5 and 1, the variables have a very strong relationship (Zhang, 2002). When r is greater than 0.3 but less than 0.5, the variables have a moderate relationship whereas when r is less than 0.3, the relationship between the variables is termed as weak.

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSIONS

4.1 Introduction

The chapter presents findings and discussions on effects of electronic-customs on customs border management in Kenya. The study uses statistical packages to analyze the data and the interpretation of the study's data is guided by frequencies, percentages, and standard deviation. The chapter presents data on response rates, respondents' background information and the presentation of the findings against the study's objective. Gender, age, education level, work specification, and work experience are some of the parameters that the study used to determine its respondents' background information. The study analyzed its findings with the help of descriptive statistics and ANOVA.

4.1.1 Response Rate

Table 4.1: Response Rate

Questionnaire	Frequency	Percentage
Filled	72	70.6
Not Filled	30	29.4
Total	102	100

The study targeted 120 customs officers working at the Namanga Border. Out of the 120 targeted respondents, only 72 filled and returned their questionnaires, which represents a response rate of 70.6%. Bailey (2014) and Mugenda and Mugenda (2003) indicates that any response rate that is higher than 50% is adequate, 60% is good while 70% is very good when

used for an analysis of a study. This infers that the study's response rate of 70.6% is a very good representation of the targeted population.

4.1.2 Pilot Study Results

The reliability of the study and the validity of the study instrument that was used was tested using a pilot study. For the pilot study, the study used 10 percent of the sampled population. Consequently, 10 percent of 120 translates into 12 respondents. With the help of random sampling technique, the study identified the 12 respondents from the population sample. The 12 respondents were excluded from the main survey. According to the results of the study, the Cronbach's alpha for border management is 0.827 of a total of 9 items. The Cronbach's alpha indicates that the items included in measuring border management constructs show the same underlying disposition. The Cronbach's alpha for exchange of electronic data, integrated electronic system, and cargo security are 0.872, 0.886, and 0.787 respectively, thus the items in the construct show the same underlying disposition. According to Nunnally (2015), a research's instruments ought to have a reliability of 0.70 and more.

Table 4.2: Reliability Test Results

Variable	Number of Items	Cronbach's
Alpha		
Border management	9	0.872
Exchange electronic system	9	0.886
Integrated Electronic System	9	0.787
Cargo Security	9	0.827

Notably, the study established the construct's validity by using interviewing key informants (retired customs officers) on in-depth and critical matters before constructing the

questionnaires. The interviews conducted on the retired customs officers were essential in identifying concepts of the questionnaire that needed modification to ensure that the resulting constructs were valid.

4.2 Demographics Characteristics of Respondents

4.2.1 Gender Distribution

Table 4.3: Gender of the Respondents

Gender	Frequency	Percentage
Male	53	73.6
Female	19	26.4
Total	72	100

According to the study's descriptive statistics, 53 (73.6%) of the respondents were male, while the rest 19(26.4%) were female as shown in table 4.3. the statistics show that the male participants were the majority of the respondents

4.2.2 Age of the Respondents

Table 4.4: Age of the Respondents

Age	Frequency	Percentage
Less than 24 years	07	9.7
25 – 35 years	13	18.1
36 – 45 years	32	44.4
46 – 55 years	13	18.1
Above 55 years	07	9.7
Total	72	100

The finding shows that 9.7% of the respondents are aged less than 24 years and between and above 55 years, 18.1% of the respondents are aged between 25 – 35 years and 46 – 55 years. The highest percentage was 44.4% represented the respondents aged between 36-45 years, this implies that majority of the respondents were aged between 36 – 45 years.

4.2.3 Level of Education

Table 4.5: Level of Education

Level of Education	Frequency	Percentage
Post Graduate degree	05	6.9
First degree	11	15.3
Diploma	19	26.4
Certificate	18	25.0
O Level	12	16.7
CPA	07	9.7
Total	72	100

Table 4.5 shows that 19 (26.4%) of the respondents were diploma holders, 11 (15.3%) of the respondents were first degree holders, 05 (6.9%) of them were Post Graduate degree holders, 18 (25%) of the respondents were certificate holders, 12 (16.7%) were O-level holders, while the remaining 7 (9.7%) respondent had CPA certificate.

4.2.4 Work Specification

Table 4.6: Type of Organization

Type of work	Frequency	Percentage
Inspection	15	20.8
Monitoring of declarations	17	23.6
Monitoring of scanners and ECTS	30	41.7
Red, yellow, and green channels	10	13.9
Total	72	100

The finding reveals that 15 (20.8%) of the respondents were customs officers responsible for inspection, 17 (23.6%) of the respondents were customs officers in charge of monitoring declarations, while 30 (41.7%) were the customs officers monitoring scanners and ECTS and finally 10 (13.9) were the Customs officer in charge of cargo security who monitored the red, yellow, and green channels. This implies that majority of the respondents were responsible for monitoring scanners and ECTS.

4.2.5 Current Position in the Organization

Table 4.7: Respondent Position

Position	Frequency	Percentage
Senior Managers	08	11.1
Middle Managers	24	33.3
Junior Managers	40	55.6
Total	72	100

Table 4.7 shows that 11.1% of the respondents were Senior Managers, 33.3% of the respondents were Middle Manager and 55.6% of the respondents were Junior Managers.

4.2.6 Work Experience

Table 4.8: Number of Years of undertaking the specified responsibilities

Year	Frequency	Percentage
Over 15 years	22	30.6
11 – 15 years	20	27.8
6 – 10 years	16	22.2
Less than 5 years	14	19.4
Total	72	100

Table 4.8 shows that 30.6% have a work experience of more than 15 years, 27.8%% of the respondents had a work experience of 11 – 15 years. While 22.2% of the respondents had

worked for worked 6 – 10 years, and 19.4% have worked for less the 5 years. This shows that majority of the respondents have a work experience of more than 15 years.

4.3 Descriptive Statistic

The study sought to establish the factors influencing trade facilitation in East Africa at the Namanga border. The respondents were asked to rate how they felt about different variables related to factors influencing trade facilitation 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"

4.3.1: Exchange of Electronic data and Customs Border Management

The study sought to the relationship between Exchange of Electronic data and border management. The table 4.9 below shows the findings from the respondents.

Table 4.9: Exchange of Electronic Data and Customs Border Management

Observation	Mean	Std. Deviation
Online submission of documents has reduced the time taken to clear goods	4.32	0.845
Real time communication between control agencies with customs authorities has Adequate experience among the ports'	3.98	0.716
relevant human resources, like clearance officers has increased the level of security at Communication between control agencies with customs authorities has reduced	4.52	0.458
	4.15	0.325

From the findings in the SPSS analysis, the statement, border management is a directly affected by exchange of electronic data the highest level of mean (4.52) meaning that majority of the respondents concurred with the statement. The standard deviation calculated from the analysis of 0.458 indicated uniformity in the responses from the respondents. The study also noted that a great number of the respondents strongly agreed that electronic exchange of data results in reduced time taken to clear goods at the border. This was supported by the mean value calculated of 4.32. The statement also calculated a standard deviation of .845 which also indicated that there was little variance from the mean mark. A significant number of the respondents strongly agreed that communication between control agencies with customs authorities has reduced incidental costs has increased the level of security at the border. This was inferred from the mean value calculated in the analysis of 4.15. The standard deviation of 0.325 calculated in the SPSS indicated that majority of the respondents were of a similar opinion. The study also established from the descriptive statistics that real time communication between control agencies with customs authorities has increased the security at the border. This was noted from the mean calculated of 3.98. The standard deviation calculated of .716 indicated uniformity in the responses from the respondents. Generally, it was clear that the exchange of electronic data plays a significant role on border management.

4.3.2: Integrated Electronic System and Customs Border Management

The study sought to establish the influence of Integrated Electronic System on border management. The findings are illustrated in the table 4.10 below.

Table 4.10: Integrated Electronic System and Customs Border Management

Observation	Mean	Std. Deviation
The sensor system is used and applied effectively at the border to reduce the time	4.26	0.212
The exploitation system is used and applied effectively at the border to security	4.33	0.483
The information system is used and applied effectively at the border to increase security	3.98	0.791
The Exploitation system is used and applied effectively at the border to reduce difficulties	4.79	.109

Based on the responses from the respondents, it was clear that most respondents strongly agreed that integration of electronic systems influence border management. This inference was realized due to the high mean value calculated in the analysis of 4.79. The standard deviation .109 was in support of the study as it indicated little variation from the mean mark. It was established from the analysis that most respondents strongly agreed that proper valuation of goods and sensor system has a significant influence on border management. This was established by the high mean value calculated of 4.26. The small standard deviation calculated indicates uniformity in the responses from the respondents. It was also established that the exploitation system is used and applied effectively at the border are essential in enhancing border management. This was seen true by the high mean value calculated in the descriptive analysis of 4.33. The standard deviation calculated in the analysis of 0.483 indicated little variance from the mean mark in the responses. Also noted from the analysis of findings was that the information system used and applied effectively at the border to enhance security at the border. This was inferred from the mean calculated of 3.98. The standard deviation calculated of .791 indicated little deviation from the mean. From this

analysis, it was clear that the independent variable integrated electronic system has a significant influence on border management.

4.3.3: Cargo Security and Customs Border Management

The study sought to establish the relationship between cargo security and border management. The findings are illustrated in the table 4.11 below.

Table 4.11: Cargo Security and Customs Border Management

Observation	Mean	Std. Deviation
Customs administrations are faced with ever-rising cases of secured goods	4.35	0.94
Adoption of electronic cargo tracking systems enhances border management.	4.25	0.58
Common check points aid in expediting trade flow by simplifying border management	4.10	0.87
Secured goods at the border station have improved border management.	2.17	.79

From the analysis of the descriptive statistics, it was clear that most respondents believed that cargo security has a significant influence on border management. This was noted by the responses made from the respondents of statements related to cargo security. For instance, it was noted that respondents agreed that customs administrations are faced with ever-rising cases of secured goods. This inference was established by the mean of 4.35. The small standard deviation indicated that there was little variance in the responses from the respondents. Also noted was that most respondents agreed that adoption of electronic cargo tracking systems enhances border management. This was noted true by the mean calculated

on the statement of 4.25. The standard deviation calculated in the study of 0.58 indicated little variation from the mean mark. Also noted from the analysis of findings was that majority of the respondents conceded that common check points aid in expediting trade flow by simplifying border management. This was seen true by the mean calculated of 4.10. The standard deviation calculated of .87 indicated little deviation from the mean mark. Conversely, it was noted that majority of the respondents disagreed that secured goods at the border station has improved border management. This was seen by the low mean value calculated of 2.17. The standard deviation calculated of 0.79 indicated that majority of the respondents were of a similar opinion.

4.4 Correlation Analysis

After the descriptive analysis, the study conducted Pearson correlation analysis to indicate a linear association between the predicted and explanatory variables or among the latter. It, thus, help in determining the strengths of association in the model, that is, which variable influenced border management the most. It also helped in deciding which variable(s) to drop from the equation given low linear relationship or multicollinearity.

Table 4.12: Correlation Analysis

			Exchange of Data	Electronic	Electronic	Integrated	Cargo Security	Management	Border
Electronic Exchange of Data	Pearson Correlation		1						
	Sig. (2-tailed)		.						
Integrated Electronic Systems	Pearson Correlation		0.632	1					
	Sig. (2-tailed)		0.002	.					
Cargo Security	Pearson Correlation		0.699	0.558	1				
	Sig. (2-tailed)		0.019	0.032	.				
Border Management	Pearson Correlation		0.092	0.673	0.147	1			
	Sig. (2-tailed)		0.871	0.843	0.781	.			
	N		61	61	61	61			

The study used correlation analysis to establish the association between electronic data exchange, integrated electronic systems and cargo security on border management. Two-tailed Pearson correlation (R) was used to establish the same at 95% confidence level. From the results, the R-value between the electronic exchanges of data was 0.871. This signifies strong and positive linear association between electronic data exchange and border management. Integrated electronic systems had a correlation value of 0.843 with border management. This depicts a strong and linear relationship between predictor and dependent

variable. Also noted was that cargo security had a correlation value of .781 which also indicated a significant, positive and linear relationship between the predictor variable and border management.

4.5: Multicollinearity

Multicollinearity test was conducted to establish if the independent variables were correlated. Multicollinearity affect regression model and its lack, thereof, is a key assumption for regression. The study conducted formal detection-tolerance or the variance inflation factor (VIF) for multicollinearity. For tolerance, value less than 0.1 suggest multicollinearity while values of VIF that exceed 10 are often regarded as indicating multicollinearity. The values of tolerance were greater than 0.1 and those of VIF were less than 10. This shows lack of multicollinearity among independent variables.

Table 4.13: Collinearity Statistics

		Tolerance	VIF
Electronic Data Exchange		0.890	1.124
Integrated Electronic systems		0.409	2.445
Cargo Security		0.433	2.309

4.6 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 Border Management in Namanga border, East Africa, χ_1 is the electronic data exchange, χ_2 is integrated electronic systems; χ_3 is the cargo security, and ε is the error term obtained from the F-significance from ANOVA.

Table 4.14: Model Goodness of Fit

R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
0.889	0.790	0.767	0.00455456	2.189

a. Predictors: (Constant), electronic data exchange, integrated electronic systems, cargo security

b. Dependent Variable: border management

Table 4.13 above presents the regression model goodness of fit to establish if regression analysis is suited for the data. Pearson Correlation value of 0.889 was established depicting that the independent variables (electronic data exchange, integrated electronic systems and cargo security) had a very good linear relationship with the dependent variable (border management). An R-square value of 0.790 was established depicting that this relationship was very strong and electronic data exchange, integrated electronic systems and cargo security account for 79% of the border management in East Africa. A Durbin Watson test for autocorrelation value of 2.189 was established depicting no (serial) autocorrelation within the

regression model residuals. Thus, the random (non-stationary) data was used in the regression analysis.

Table 4.16: Regression Coefficient

		Unstandardized		Standardized	t	Sig.
		Coefficients		Coefficients		
		B	Std. Error	Beta		
(Constant)		4.946	1.355		1.500	0.574
Electronic data exchange		0.421	0.209	1.634	8.901	0.002
Integrated electronic systems		0.842	0.062	0.927	33.335	0.000
Cargo security		0.873	0.149	1.388	3.566	0.005

a. Dependent Variable: Trade Facilitation

The study established the following regression model:

Trade Facilitation = 4.946 + 0.421 * electronic data exchange + 0.842* integrated electronic systems + 0.873* cargo security

The study established that when, electronic data exchange, integrated electronic systems, and cargo security are zero, and customs border management would be 4.946.

The study also established that holding other factors constant, a unit increase in the electronic data exchange would lead to a 0.421 unit increase in border management; a unit increase in integrated electronic systems would yield a 0.842 unit increase in border management; a unit increase in cargo security would result in a 0.873 increase in border management. From the coefficients, it was established that each of the independent variables; data exchange,

integrated electronic systems, and cargo security significant in explaining the changes in border management with specific reference of the Namanga Border Station.

Table 4.15: Analysis of Variance (ANOVA)

	Sum of Df	Mean	F	Sig.
	Squares	Square		
Regression	21.312	3	7.104	7.0197
Residual	1.020	85	1.012	
Total	22.332	88		

ANOVA analysis was conducted to determine the significance of the regression model. An F-significance value of 0.000 was established depicting that the regression model had high significance (confidence level) ($p < 0.05$).

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter provides the summary and conclusion of the study's findings, and afterwards, it provides recommendations and gives suggestions for further study.

5.2 Summary of the Study

The findings in chapter four enabled the study to determine the effect of electronic-customs on customs border management in Kenya a case study of the Namanga border, with the help of the three independent variables electronic data exchange, integrated electronic systems, cargo security. In the three variables directly influence how the management of the Namanga border (Williams, Rana, & Dwivedi, 2015). According to the findings, the results of the correlation analysis show that the coefficient of correlation r is 0.421 for the electronic data exchange, 0.842 for the integrated electronic systems, and 0.873 for cargo security. The results show that there is a strong positive relationship between the study's independent variables and dependent variable, thus, electronic data exchange, integrated electronic systems, and cargo security have a significant effect on customs border management.

5.2.1 Electronic Data Exchange

The study established that electronic data exchange directly affects customs border management. According to the study, aspects of electronic data exchange such as submitting documents online and real time communication between security agencies significantly impacted border management (Yang et al., 2014). The study recommends for maximum, amount of security to be maintained at the border, customs needs to ensure that the personnel working at the border have adequate experience. Moreover, the study suggests that more funds should be channeled towards making the communication between control agencies and

customs authorities smooth and efficient as fast communication between the two bodies significantly reduces incidental costs.

5.2.2 Integrated Electronic Systems

The study found that the Integrated Electronic Systems has a significant and noteworthy influence on customs border management. According to the findings of the study, effective use and application of the sensor system dramatically reduces the amount of time spent clearing goods hence promoting border management (Yang et al., 2014). Moreover, when the exploitation system is employed as specified, it promotes border security in a noticeable manner. The study recommends that the customs personnel at the border should be trained to take advantage the border's information's systems to take the security at the border a notch higher (Williams, Rana, & Dwivedi, 2015).

5.2.3 Cargo Security

The study found that customs administration is continually facing cases related with the security of goods. According to the study, the use of ECTS has been quite effective in promoting cargo security but it has not yet reached its expected potential. Moreover, the study found that securing cargo at the border has promoted their security hence enhancing customs border management (Yang et al., 2014). The study recommends that more common check points be set up as they are effective in aiding the expedition of the flow of trade and making the process of managing the borders easier.

5.3 Conclusion of the Study

The findings of the research led to the conclusion that all the study's independent variables of the study significantly influence customs border management as shown by both the string coefficient of correlation and the p-value that was less than 0.05. According to the findings of the study, the independent factors' overall influence on border management was high pointed

out by the coefficient of determination. The relevance of the studied variables is further confirmed by the p-value of 0.00 (which is less than 0.05 or 5%), which, in turn, shows that the independent variables had a 95% significance. The results, therefore, indicate that the study's independent variables namely the electronic data exchange, integrated electronic systems and cargo security have a significant influence on border management, especially at the Namanga border. According to the study's findings, integrated electronic systems had the most influence on customs border management while cargo security had the least influence. The findings of the study and the its conclusions are in line with the findings and the conclusions made by Kosgei (2015), Aliet (2016), and Awitta (2017) when they studies the how e-customs affects the management of borders.

5.4 Recommendations

The three factors influencing border management are electronic data exchange, integrated electronic systems and cargo security. The study recommends improvement in the systems that are supported by ICT to improve border management. The study identifies the cumbersome nature of border management to ensure high level of security and smooth flow of trade, therefore it recommends the setting up of more check points make the process if managing borders easier (Yang et al., 2014). Moreover, the study recommends that experienced personnel should be motivated to work at the border to promote cargo security as they can deal better with several criminal activities taking place at the border. According to the study, it would be beneficial for the government to invest in ensuring smooth and efficient communication between customs' control agencies and its authorities to reduce incidental costs significantly.

5.5 Areas for Further Research

The research indicates that electronic data exchange, integrated electronic system, and cargo security have a significant effect on border management. Since the study focused on the Namanga borders, it could be extended to other borders such as the Isebania and the Busia Borders. Moreover, other studies could be conducted to determine the effect of implementation of e-customs on border management and in the process determine how the attitude of custom's employees have affected the implementation of e-customs at the customs borders.

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APPENDIX I

INTRODUCTORY LETTER TO THE RESPONDENT

Date:

To: Whom It May Concern

RE: REQUEST FOR DATA COLLECTION FOR AN ACADEMIC RESEARCH PROJECT

The bearer of this questionnaire is a student of post graduate diploma in customs administration in the department of economics, accounts and finance, of the University of Jomo Kenyatta University Agriculture and technology. The subject research project is on the effects of customs clearance procedures on the cost of doing business in Kenya. My interest in the study of this topic is to add up to the existing knowledge, as activities in international trade are continually being realized broadly. As the research, I will be grateful if you could take some time to respond to my questionnaire for this study. The information you will give will be treated confidentially and used solely for the purpose of this study.

Thank you for your assistance

Yours sincerely,

Deborah Nyaboke Moses

Student (KESRA/JKUAT)

Mobile Number: +354 (0) 716662974

Email Address: debbienyaboke@gmail.com

APPENDIX II

QUESTIONNAIRE

EFFECTS OF E-CUSTOMS ON BORDER MANAGEMENT AT THE NAMANGA BORDER, KENYA

I am Deborah Nyaboke Moses, a Post Graduate student in Customs Administration, at the Kenya School Revenue Administration, doing a research project. This questionnaire is designed to help with data collection of the effect customs clearance procedures have on the cost of doing business in Kenya. I, therefore, request that you respond to the following questions, honestly, by ticking on the most appropriate responses.

NOTE: All information provided in this questionnaire will be used with all confidence, and will only be used for academic purposes.

Please tick where most appropriate:

SECTION A: BACKGROUND INFORMATION OF RESPONDENTS

1. Sex of Respondent: (A) Male { } (B) Female { }
2. Age of Respondent: (A) Less than 24 years { }
(B) 25- 35 years { }
(C) 36-45 years { }
(D) 46- 55 years { }
(E) Above 55 years { }
3. Level of education attained
(A) Certificate { } (B) Diploma { }
(C) First Degree { } (D) Post Graduate Degree { }
(E) Other (specify).....
4. Name Section/Department/Unit.....
5. What is your position/status in the organization?

- (A) Senior Manager { }
- (B) Middle Manager { }
- (C) Junior Manager { }
- (D) Other (Specify).....

6. How many years have you worked with this organization?

- (A) Over 15 years { }
- (B) 11 – 15 years { }
- (C) 6 – 10 years { }
- (D) Less than 5 years { }

SECTION B: Exchange of Electronic data

a) Online submission of Documents

Indicate your level of satisfaction on the statements below by ticking in the most appropriate box, where; 1= Strongly Agree, 2= Agree, 3= Indifferent, 4= Disagree, 5= Strongly Disagree

Statement	1	2	3	4	5
Online submission of documents has reduced the time taken to clear goods					
Online submission of documents has increased the level of security at the border					
Online submission of documents has reduced the difficulties relating to customs formalities					

+

b) Communication between control agencies with customs authorities

Indicate your level of satisfaction on the statements below by ticking in the most appropriate box, where; 1= Strongly Agree, 2= Agree, 3= Indifferent, 4= Disagree, 5= Strongly Disagree

Statement	1	2	3	4	5
Easy communication between control agencies with customs authorities has reduced the time spent in clearing of goods					
Real time communication between control agencies with customs authorities has increased the security at the border					
Communication between control agencies with customs authorities has reduced incidental costs					

c). Human Resources

Indicate your level of satisfaction on the statements below by ticking in the most appropriate box, where; 1= Strongly Agree, 2= Agree, 3= Indifferent, 4= Disagree, 5= Strongly Disagree

Statement	1	2	3	4	5
Adequate number of relevant human at the borders, like customs officers has reduced the time spent in clearance of goods					
Adequate experience among the ports' relevant human resources, like clearance					

officers has increased the level of security at the border					
Competence among the border's relevant human resources has reduced difficulties relating to customs formalities					

SECTION C: Integrated Electronic Systems

a. Sensor Systems

Indicate your level of satisfaction on the statements below by ticking in the most appropriate box, where; 1= Strongly Agree, 2= Agree, 3= Indifferent, 4= Disagree, 5= Strongly Disagree

Statement	1	2	3	4	5
The sensor system is used and applied effectively at the border to reduce the time spent in clearing of goods					
The sensor system is used and applied effectively to increase security at the border					
The sensor system is used and applied effectively to reduce Difficulties relating to customs formalities					

b) Exploitation systems

Indicate your level of satisfaction on the statements below by ticking in the most appropriate box, where; 1= Strongly Agree, 2= Agree, 3= Indifferent, 4= Disagree, 5= Strongly Disagree

Statement	1	2	3	4	5
The exploitation system is used and applied effectively at the border to reduce the time spent in clearing of goods					
The exploitation system is used and applied effectively at the border to security					
The Exploitation system is used and applied effectively at the border to reduce difficulties related to clearance of goods					

c) Information systems

Indicate your level of satisfaction on the statements below by ticking in the most appropriate box, where; 1= Strongly Agree, 2= Agree, 3= Indifferent, 4= Disagree, 5= Strongly Disagree

Statement	1	2	3	4	5
The information system is used and applied effectively at the border to reduce the time spent in clearing of goods					

The information system is used and applied effectively at the border to increase security at the border					
The information system is used and applied effectively at the border to reduce difficulties related to clearance of goods					

SECTION D: Cargo Security

a) Common check point

Indicate your level of satisfaction on the statements below by ticking in the most appropriate box, where; 1= Strongly Agree, 2= Agree, 3= Indifferent, 4= Disagree, 5= Strongly Disagree

Statement	1	2	3	4	5
Customs administrations are faced with ever-rising cases of secured goods					

b. Electronic Cargo Tracking Systems

Indicate your level of satisfaction on the statements below by ticking in the most appropriate box, where; 1= Strongly Agree, 2= Agree, 3= Indifferent, 4= Disagree, 5= Strongly Disagree

Statement	1	2	3	4	5
Adoption of electronic cargo tracking systems enhances border management.					

C. Secured Goods

Indicate your level of satisfaction on the statements below by ticking in the most appropriate box, where; 1= Strongly Agree, 2= Agree, 3= Indifferent, 4= Disagree, 5= Strongly Disagree

Statement	1	2	3	4	5
Common check points aid in expediting trade flow by simplifying border management					
Secured goods at the border station have improved border management.					

END OF QUESTIONARE
Thank you very much for your cooperation

APPENDIX III: WORK PLAN

	FEBRUARY- JULY 2019	AUGUST 2019	SEPTEMBER 2019	OCTOBER 2019	NOV 2019
Research proposal topic presentation					
Proposal development					
Proposal submission					
Proposal presentation					
Data collection and analysis					
Submission of final project					
Presentation of final project					
Final project approval correction and supervisor approval					
Submission of golden copies					

APPENDIX IV: BUDGET PLAN

ITEM	ACTIVITY	AMOUNT (Khs.)
1	TYPE SETTING	5, 000.00
2	PHOTOCOPYING	3, 000.00
3	BINDING	3, 000.00
4	PRINTING	5, 000.00
5	TRANSPORT	45,000.00
5	MISCELLENOUS	25, 000.00
	TOTAL	86, 000.00