EFFECTS OF TECHNOLOGY ON CUSTOMS PERFORMANCE AT THE PORT OF MOMBASA

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A RESEARCH PROJECT SUBMITTED TO THE DEPARTMENT OF ECONOMICS, ACCOUNTING AND FINANCE, SCHOOL OF BUSINESS IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF POSTGRADUATE DIPLOMA IN CUSTOMS ADMINISTRATION AT JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY.

OCTOBER, 2018

DECLARATION

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

……..…..... ……..…….

Signature Date

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

……..……. ……..…….

Signature Date

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DEDICATION

This study is dedicated to my wife Fridah, son Kingsley. My parents Paul and Lucy, you have successfully made me the person I am becoming. My sister, Martha, brother, Samuel .You are very special.

ACKNOWLEDGEMENT

I first and foremost thank God for giving me the strength and commitment to complete this project. I also wish to thank my supervisor Mr. Benn Mumia for his invaluable guidance and advice on all academic and project related issues.

I also wish to extent my gratitude to the management of Kenya School of Revenue Authority for granting me the opportunity to carry out this research study.

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LIST OF ABBREVIATIONS AND ACRONYMS

AEOs	Authorized Economic Operators
CAMIS	Customs Management Information System
COSIS	Customs Oil Stock Information System
CBP	Customs and Border Protection
CSD	Customs Services Department
CFS	Container Freight Station
DPC	Document Processing Centers
ECTS	Electronic Cargo Tracking System
FDI	Foreign Direct Investment
GPRS	General Packet Radio Service
GPS	Global Positioning System
ICMS	Integrated Customs Management System
ICT	Information Communication Technology
ITAX	Integrated Tax Management System
ITMS	Integrated Tax Management System
KEBS	Kenya Bureau of Standards
KEPHIS	Kenya Plant health inspectorate Service
KPA	Kenya Ports Authority
KRA	Kenya Revenue Authority
KWS	Kenya Wildlife Service
MIS	Management information system
MMS	Manifest management system
MSS	Management Support System
NEMA	Natural Environmental Management Authority
RADDEX	Revenue Authority Digital Data Exchange
RFID	Radio Frequency Identity
RKC	Revised Kyoto Conventions
SPSS	Statistical Package for Social Sciences
TARS	Tethered Aerostat Radar Systems
UAV	Unmanned Aerial Vehicles
URA	Uganda Revenue Authority

VMS	Vehicle Management System
WCO	World Custom Organization

DEFINITION OF TERMS

Custom Performance It is the holistic realization of organizational objectives of the revenue organization or customs department in terms of collecting revenue, enforcement of tax laws, facilitating trade, protecting society, managing risks and securing borders (WCO study, 2010).

Non-intrusive technology Is technical equipment and machines such as X-ray or gamma-ray imaging type equipment that allow the inspection of cargo without the need to open the means of transport and unload the cargo (Richards,2017).

Integrated Systems This involves integration of systems of various organizations to increase knowledge sharing and increase efficiency. The use of integrated systems in the operations of customs administration is to increase productivity and greater economic growth (Simataa, 2016).

Smart gates Is an automated self-service border control system operated by customs department and located at immigration checkpoints in arrival halls at international ports and airports. Smart Gates allow clearing at the ports more rapidly, and to enhance travel security by performing passport control checks electronically (Harrison, 2017).

ABSTRACT

Technological advances in the past two decades have been central in organizational processes across different economic sectors. Numerous technologies have been introduced in the shipping sector as a strategy to enhance the levels of efficiencies in ports operations. This study sought to examine the effect of technological integration on the customs performance at the port of Mombasa. The study focused on the outcomes in operational change influenced by the integration and execution of tasks using new tools and methods. These tools include the utilization of new technologies and new operational processes that are backed by high-tech gadgets in the execution of port operations. The study focused on three specific areas, namely; integrated systems, smart gates, non-intrusive technology and their impact on customs performance. A descriptive research design was adopted as the research methodology, which defined the procedure followed in collection of the field data. The target population included the Mombasa port officials, notably the customs officers and the KRA staff stationed at the primary terminal berths. Furthermore, the study also included clearing agents who facilitate the movement of cargo from the port to the destination. A sample size of 200 respondents was calculated and stratified random sampling process was used to organize the respondents in groups. A structured close-ended questionnaire was used as the primary tool for data collection process. The questionnaire contained a 5-point Likert scale, which was used to measure the respondent's opinions for each question. The study established that, integrated systems positively impacted customs performance, registering a mean of 4.244. In addition, the study found that smart gates influenced customs performance to a large extent, recording a mean of 4.401. The study also established that non-intrusive technology positively impacted on the customs performance with a mean of 4.295. The study concludes that, technology integrations contributes to enhanced levels of operational efficiency, increased levels of accountability, effective transmission of data and critical information, speed and efficiency in decision making and reduced operational costs. The study recommends the enhancement of existing integrated systems in conjunction with upgrading and effective adoption of better systems to boost customs performance. Furthermore, the study proposes increased investment smart gates system to increase efficiency and reduce costs, while proactively managing risk, thereby boosting customs performance. Finally, the study recommended increased automation of the port process and use of non-intrusive technology with a bid to increase technical capacity and boosting compliance and widening the tax net. Recommendations for further studies be done on other technological factors influencing the performance of the customs department. Furthermore, future research should focus on widening the scope of evaluating customs performance to include aspects like public trust and customer satisfaction. Other studies should also be conducted, focusing on the factors influencing customs performance, other that technological factors. Recommendation for further studies be done on other technological factors influencing the performance of the customs department. Furthermore, future research should focus on widening the scope of evaluating customs performance to include aspects like public trust and customer satisfaction. Other studies should also be conducted, focusing on the factors influencing customs performance, other that technological factors

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CHAPTER ONE
INTRODUCTION

1.1 Background of the study.

Technology forms part of key Revised Kyoto Conventions (RKC) principles, RKC advances exchange assistance and viable controls through its lawful arrangements that detail the utilization of straightforward yet productive methodology. It likewise contains new and compulsory standards for its application. Implementation RKC principles WCO member country will benefit from fewer Customs formalities, faster release and lower trade costs, reduced data requirements, increased revenue, higher transparency and predictability, More FDI and economic competitiveness enhanced security and sound base for other international instrument (WCO study,2010).

Technology has a significant role in simplifying and harmonizing border and administrative procedures that facilitates trade. It has given birth to Customs electronic procedures including lodgment of entries, data validation, cargo inventory control, and goods declaration processing, electronic notification of release, revenue accounting, and Customs enforcement. From the viewpoint of businesses, electronic lodgment reduces the costs of doing business by raising the efficiency of Customs administration while ensuring the uniform application of legislation, transparency in the assessment of duties and taxes and predictability of clearance times (Kwalia ,2012).

Since 19th century, digitization has occurred and there has been a consistent increment in the utilization of Digital innovations. Items, for example, TVs, phones, music, watches and cameras have changed to computerized designs (Ellis-Chadwick, 2012).Various enterprises from small to large, non-profit organizations to government agencies are undergoing digital transformation that has turned digitization into new processes, transactions and activities (Anna van, 2015).Digitization has revolutionized the way we work, govern, educate, manage our health, travel, enjoy life and shop. The technologies of digitization have enabled the change of traditional forms for example; information storage such as paper and photographs into binary code of computer storage which has also resulted to the digital transformation of human interaction and economic transactions (Gil, 2015).

Data and Communication Technology Department in KRA works in a situation that requests critical dependence on robotization because of advances in IT and media transmission that is

encouraged by an empowering lawful and administrative structure in the nation. The command of ICT in KRA is to help KRA business goals and assume the part of a 'change empowering agent' in the modernization of business activities and emotionally supportive networks.

1.1.1 Technology in the international perspective

The part of Customs has changed essentially because of both transformative components, including the expanding globalization of exchange, and progressive elements, for example, the fear based oppressor assaults of 9/11. The resultant move in government strategies and the manner by which those arrangements are regulated have conveyed us to a point where it is not any more conceivable to unmistakably characterize the part of 'Traditions'. While the duties of outskirt administration keep on being completed, the nature and blend of significant government organizations is evolving. Therefore, what may speak to center business for one organization may fall outside the circle of duty of another. To be sure, while the tusk, trunk and tail of traditions direction remain, the living being known as 'Traditions' seems bound for annihilation. The World Trade Organization, World Customs Organization and other universal bodies are reacting through the advancement of worldwide models that perceive the changing idea of fringe administration (Widdowson, 2007).

But today, the flow of technology has reversed. Many of the technologies being deployed by the U.S. Customs and Border Protection include detection sensors and cameras uses infrared, Unmanned Aerial Vehicles (UAVs), often referred to as drones, are pilot-less planes designed to survey a given area, larger detection devices are used at ports of entry and for checking cargo containers, The NOFI Buster technology has unique capabilities of collecting and concentrating oil at higher towing speeds or in current exposed waters. Tethered aerostat radar systems (TARS) provide data about everything from weather monitoring to incursions into U.S. airspace. In the Dubai Cargo Inspection System; the Oracle Siebel platform is used to help the department to offer its services on digital devices and achieve better governance across departments. Benefits of the adopted digital platform include; smooth supply chain, efficient value chain, faster service delivery on digital platform, digital e-Governance model, agile processes, promoting legitimate trade and cost reductions.

1.1.2 Technology in the Local Scenario

KRA has invested heavily in technology the authority has also implemented its ICT Strategy through the introduction various tax reforms and modernization programs. Some of such

programs include Modernization of CSD, KRA also rolled out the Simba 2005 System in order to automate the process of import and export. The agency also put in place a web-based computer system (COSIS) was also introduced so as to be able to manage the stock of all oil refined or imported into the country. The system has also helped largely to monitor stocks held and by individual oil marketers Additionally a Cargo Management Information System (CAMIS) which is considered to Be as the data tracking system was put in place so as to help improve service delivery While at the same time help reduce compliance costs given that it provides a One Stop Centre for taxpayers.

An integrated system was also brought on board to aid track movement of cargo from ports to borders so as to reduce diversion of transit cargo transported into the domestic market. The Authority also introduced the development as well as the implementation of the Integrated Tax Management System (ITMS). At the moment the E-registration is fully operational and cumulatively new taxpayers had registered online and acquire their identification pin (KRA, 2009). Additionally the Vehicle Management System (VMS) and Simb2005 System were linked so as to allow for payment of motor vehicle registration fees with import duty. The integration process helps in a large way to enable vehicle importers to seamlessly pay for the registration along with other relevant customs duties online through the Simba System. The VMS was also integrated with the PIN database so as to allow for PIN Verification for RTD transactions.

Through the Revenue Authority Digital Data Exchange (RADDEX), KRA has the ability to initiate real-time data exchange with Uganda Revenue Authority (URA). Additionally an avenue has been created to enable exchange of live data on exports, ex-warehouse as well as transit goods via the Simba 2005 System (KRA) and Ascyuda++ System (URA). This has gone a long way to allow cancellation of bonds and also confirmation of exports online.

ICMS -The Integrated Customs Management System: This is a system which Kenya Revenue Authority (KRA) has been implementing since 2014-2017 with the intention to improve Kenyans Customs processes and procedures to allow less manual transactions and thus fast cargo clearance at all its border control. Simba system Cargo clearance from the port of Mombasa was being slow, to minimize frequent system breakdowns as a result of so many systems being dependent on the same platform hence being slow, the old system uses only one browser (Windows Explorer) which also made it slow. The dependence on one browser made

Simba not to be able to accommodate the new technological advancements. The manual processes which the Simba system could not undertake, the ICMS has minimized it by almost 90%. ICMS system will have minimal physical interaction between customs officers and agents to save time during documentation and clearance processes. Also, there will be virtual verification and approval of cargo especially (AEOs) consignments Therefore the ICMS has lot of features which can enable the agent to amend and get the approval on the same platform and also can generate an E-slip for payment of the amendment, unlike the old system which required freight forwarders physically seek F147 form from the officers at the port. (Morris ,2017).

1.1.3 Customs Performance at the port of Mombasa

Customs administration is replete with extensive units of operations which are obligated to undertake various operations in related to port operations. A huge corporate agency, such as the port administration authorities are faced with momentous chain of red tapes in overseeing the implementation of customs activities (Wu &Goh, 2010). Therefore the scope of examining performance of customs operation, invites assessment on the levels of efficiencies with which the giant bureaucratic juggernaut of customs activities in a shipping port are executed (Apte et al, 2000). Customs efficiencies which reflect operational performance can be assessed on examining elements such as speed in executing customs task, levels of smart gates, and effectiveness in quality control processes and efficiencies in performing port inspection duties (Kamble et al, 2010).

All freight imported into the nation or sent out of the nation via ocean, air, land or rail courses are represented by the arrangements of the Customs Act and different laws of the nation identified with section/exit from the nation. The division is accused of the duty of encouraging worldwide exchange which it does by giving sped up freedom of products through streamlined and fit Customs methods as imagined under the Revised Kyoto Convention. Traditions organizations everywhere throughout the world apply nearly similar methods and procedures, speed of freedom depending to a great extent on what controls are required by neighborhood enactment and how much data and correspondence innovation is connected i.e. hold fast to imports and fares control, installment of pertinent assessments, physical examination of freight and ultimately arrival of load. (Joseph, 2010).

Customs officers at the port of Mombasa are tasked to compilation of Trade Statistics, where they collects and collates trade data on all imports and exports that the government uses for planning and decision purposes. Also take full control of imports and exports, according to Enforcement of prohibitions and restrictions laws. Secures open wellbeing, wellbeing and profound quality by excepting universal exchange illicit substances and materials e.g. opiate substances, arms and ammo, imperiled creature species, risky squanders, obscene materials, and lapsed, fake or sub-standard merchandise. Contact with other law requirement offices for example KEPHIS,KEBS,Kenya Police ,Health Officers ,NEMA,KWS,INTERPOL and other Customs agencies) to prevent trans-border crimes like movement of drugs, stolen motor vehicles, smuggled goods (Oloo, 2004).

1.2 Statement of the problem

Technology has tremendously changed the manner of conducting business due to its revolutionary and dynamic nature. The world has been be caught up lagging behind has it seek to implement existing system another system tends to emerge with different challenges and cost factors. Customs Electronic procedures represent a major trend in management. The emergence of global networks has profoundly influenced the way individuals interact with each other, businesses conduct their affairs, and governments provide services to their citizens. (Jennifer, 2013).

Customs performance in Kenya especially in the Port of Mombasa has suffered from manual operations, arbitrary decisions, corruption and delays in clearance. Despite simplification of Customs procedures in recent times, Customs formalities in Kenya were lengthy and inefficient, leading to delays in the release of goods, poor revenue collection and bureaucracy leading to poor business environment. Corruption is on the rise in many revenue administrations, especially in Kenya. This vice led to stagnation or decline in revenue collection, despite continued economic growth, reforms of important tax legislation in line with “best practices” as prescribed by the IMF and accumulated operational experience in the new revenue administrations. Bureaucracy occurs in the form of red tape in processing of documents and other customs processes making the customs department uneconomical. Though technology was intended to reduce inefficiencies, systems failures like the breakdown of the Simba system; leads to frustrated clients, inefficiency, thereby creating room for red tape and corruption due to the use of manual processes (KRA corporate plan, 2017)

Despite the fact that KRA has sufficiently been empowered to utilize IT in revenue collection and improving customs performance; the government has not been able to develop new revenue mobilization strategies or even intensify its existing ones. Despite the apparent benefits of using information technology in customs and revenue collection, the adoption of information technology has not completely removed the bottlenecks faced by customs departments. There are various components that influence the success of information technology in improving Customs performance, (Gachugi, 2017).

To develop a better understanding on why the use of information technology has not yielded the expected results, research is required to examine the various components of information technology like integrated systems, smart gates and non-intrusive technology in endeavors to improve the efficiency and effectiveness of customs authorities in Kenya. This thus prompted the need to conduct research that identifies the impact of information technology on Customs performance, thereby providing possible solutions and measures that can be adopted to improve Customs performance. This study thus sought to examine the impact of information technology on the Customs performance in the Port of Mombasa to provide understanding and possible recommendations on optimal utilization of information in improving customs performance in the port.

1.3 Objectives

The general objective of this study was to establish the effect of technology on customs performance at the port of Mombasa.

The study was guided by specific objectives which include:

i. To determine the effect of integrated systems on customs performance at the port of Mombasa.
ii. To assess the effect of smart gates on customs performance at the port of Mombasa.
iii. To examine the effect of non-intrusive technology on customs performance at the port of Mombasa.

1.4 Research questions

i. What is the effect of integrated systems on the customs performance at the port of Mombasa.?

ii. What is the influence of smart gates on customs performance at the port of Mombasa.?
iii. In what ways does non-intrusive technology affect customs performance at the port of Mombasa?

1.5 Significance

The findings deduced in this study will significantly influence the Kenya Revenue Authority (KRA), Kenya Ports Authority (KPA) and the national government. The management of KRA will benefit as the information will assist the managers to improve ICT and its management thus improving performance and Revenue collections. These findings will help KPA establish a situational analysis report in areas of improvement, challenges experienced and ways to mitigate the future occurrences. The government as regulator will benefit in creating the relevant enabling environment for these facilities to operate successfully and thus enhance revenue collection. The research findings will provide customers with technology and customs related information that will be useful to retrieve.

1.6 Scope

This paper embarked on use and effectiveness of technology on management of Kenya Revenue Authority with much emphasis of the customs operations at the port of Mombasa. The study sampled 200 staff, Kenya Revenue Authority customs officers and Kenya Ports Authority officers who daily operate the controls including Port Security officers and customs agents. These groups were chosen because they directly relate to the study and they are the custodians and operators of the controls at the port side.

1.7 Limitations

The study was based on assumptions that respondents would find time to accurately and honestly answer questionnaires thus providing a reliable data for this research project. The reliability of this data was based on the respondents' honest opinions with clear understanding that some respondents could have lacked the will or time to provide honest feedback.

Funding for the research activities such as printing of the questionnaires, dropping and picking of the dully filled questionnaires and adequate time to conduct this study provided another challenge. This challenge was overcome, by creating electronic copies of questionnaires that were sent to the respondents via email. In addition the researcher maintained constant communication with all the respondents to encourage them to fill in the questionnaires. Time

constraints outlined to collect, analyze and presentations of data presents another challenge to conduct the study. The researcher overcame these challenges, through creating a comprehensive schedule with a strict timelines.

Despite of these limitations, the researcher focused in gathering reliable data and accurate feedback through committing maximum effort. The researcher used a well-structured questionnaire and guaranteed the confidentiality of the information obtained from respondents. Finally, the researcher treated all the respondents with utmost respect, and the collected data was handled with the highest degree of confidentiality.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This section of the study presents chapter two which explores on the past studies as covered by different academicians and scholars in the field of organization management. Chapter two reviews the literature on the integration of technology on customs performance. Literature review will be split into different sections which include; theoretical review, empirical review conceptual framework, critique of the literature, summary and evaluation of the research gaps.

2.2 Theoretical Review

Theoretical review examines existing set of accepted facts touching on a particular field of academia. Theoretical review involves a study on a set of accepted academic principles that help in expounding the perspective on the effect of technology integration on customs performance. The theories that were examined in this study include; systems based theory, decision making theory and transaction cost theory.

2.2.1 Systems Based Theory

The foundation of systems theory centers on the caveat of organizational scope where a corporate organization is viewed as a system. In this perspective, the system be looked into two approaches, open and closed. Traditionally, most systems embrace the open system, which ascribes to the particular approach where an organization retains interactions with external agents in different ways. On the other hand, when an organization adopts a closed system, it doesn't interact with the external environment. According to Bertalanffy (1968) the open system has three phases, which commences with organization receiving input resources, then conversion of this inputs into products, then finally distributing the products to the outside world, the external environment. Systems theory elaborates the effects of integrated systems on customs performance at the port of Mombasa i.e. user of systems (ICMS, COSIS, MMS, CAMIS), data processed and final the output of the process to yield revenue collection and faster clearance of cargo at the port.

2.2.2 Theory of Technology

Advancements have particular highlights all things considered while additionally displaying predispositions got from their place in the public eye. The specialized code is the govern under

which advances are acknowledged in a social setting with inclinations mirroring the un square with dispersion of social power. Subordinate gatherings may challenge the specialized code with impacts on outline as innovations advance. Innovation is a two-sided marvel: from one viewpoint the administrator, on the other the question. Where both administrator and protest are people, specialized activity is an activity of intensity. Power, et al (2015),

Where, further, society is sorted out around innovation, mechanical power is the guideline type of intensity in the general public. It is acknowledged through outlines which slender the scope of interests and worries that can be spoken to by the ordinary working of the innovation and the establishments which rely upon it. This narrowing contorts the structure of involvement and makes human enduring and harm the common habitat. The activity of specialized power brings out protections of another sort inborn to the one-dimensional specialized framework. Those rejected from the outline procedure in the long run endure the unwanted outcomes of advancements and challenge. Opening up innovation to a more extensive scope of interests and concerns could prompt its overhaul for more prominent similarity with the human and normal points of confinement on specialized activity. A popularity based change from underneath can abbreviate the criticism circles from harmed human lives and nature and guide a radical change of the specialized circle. Much reasoning of innovation offers extremely unique and unhistorical records of the embodiment of innovation. These records show up horrendously thin contrasted with the rich multifaceted nature uncovered in social investigations of innovation Tilvytiene, R. (2014).

However innovation has the recognizing highlights portrayed above and these have standardizing suggestions. The decision of a specialized instead of a political or good answer for a social issue is politically and ethically huge. The predicament partitions innovation examines into two restricted branches. Most essentialist rationality of innovation is disparaging of advancement, even hostile to present day, while most experimental research on advances overlooks the bigger issue of innovation and in this manner seems uncritical, even conventionalist, to social pundits (Feenberg, 2003).

The technology theory is important to the subject matter of this study, where synopsis is made on the impact of technology in the customs performance at the port of Mombasa. Technological systems, like smart gates, ensure consistent exchange across different borders which contribute

to seemless flow of goods thus trade facilitation and enhanced efficiencies in operational decisions.

2.2.3 Technology Integration Theory

The innovation mix hypothesis approach sees vertical reconciliation as a method for evading the potential burglary issues. Specifically, it predicts that vertical reconciliation ought to be more typical when there is more noteworthy specificity and burglary is all the more expensive, and that vertical mix should improve speculations by all contracting parties (Williamson, 1981).

Before any new innovation is actualized, it is reasonable to decide if a relative preferred standpoint exists or whether there is a need that a given innovation device can address. Once a need has been recognized and a given innovation's relative favorable position assessed, the following stage is deciding goals and suitable appraisals. The following stage is to plan instructional systems that will help the client to comprehend and acknowledge the new innovation. An imperative perspective to outlining another innovation is guaranteeing that the earth is prepared for new innovation to be presented (Nelson, 2016).

The hypothesis predicts that the significance of the innovation power of the maker and provider ought to affect the probability of vertical joining. Specifically, while a higher significance of the maker's innovation force should expand the likelihood of in reverse joining, a higher significance of the provider's innovation power ought to diminish that likelihood. Moreover, it predicts that vertical coordination ought to be more receptive to the innovation powers of both the provider and the maker when the provider represents a bigger part of the info expenses of the maker. At long last, the hypothesis says that if the pertinent edge of decision is between in reverse vertical combination and non-joining, at that point innovation force of the provider ought to debilitate mix, the innovation power of the maker ought to support mix, and the significance of the provider to the maker estimated regarding offer of expenses ought to empower mix, (Qureshi, 2006).

By integrating non-intrusive technology in critical process within port operations, it aids in faster information exchange between numerous operational centers. Port managers and KRA

custom officials make decisions that influence the effectiveness of port and overall customs operations.

2.3Conceptual Frame Work

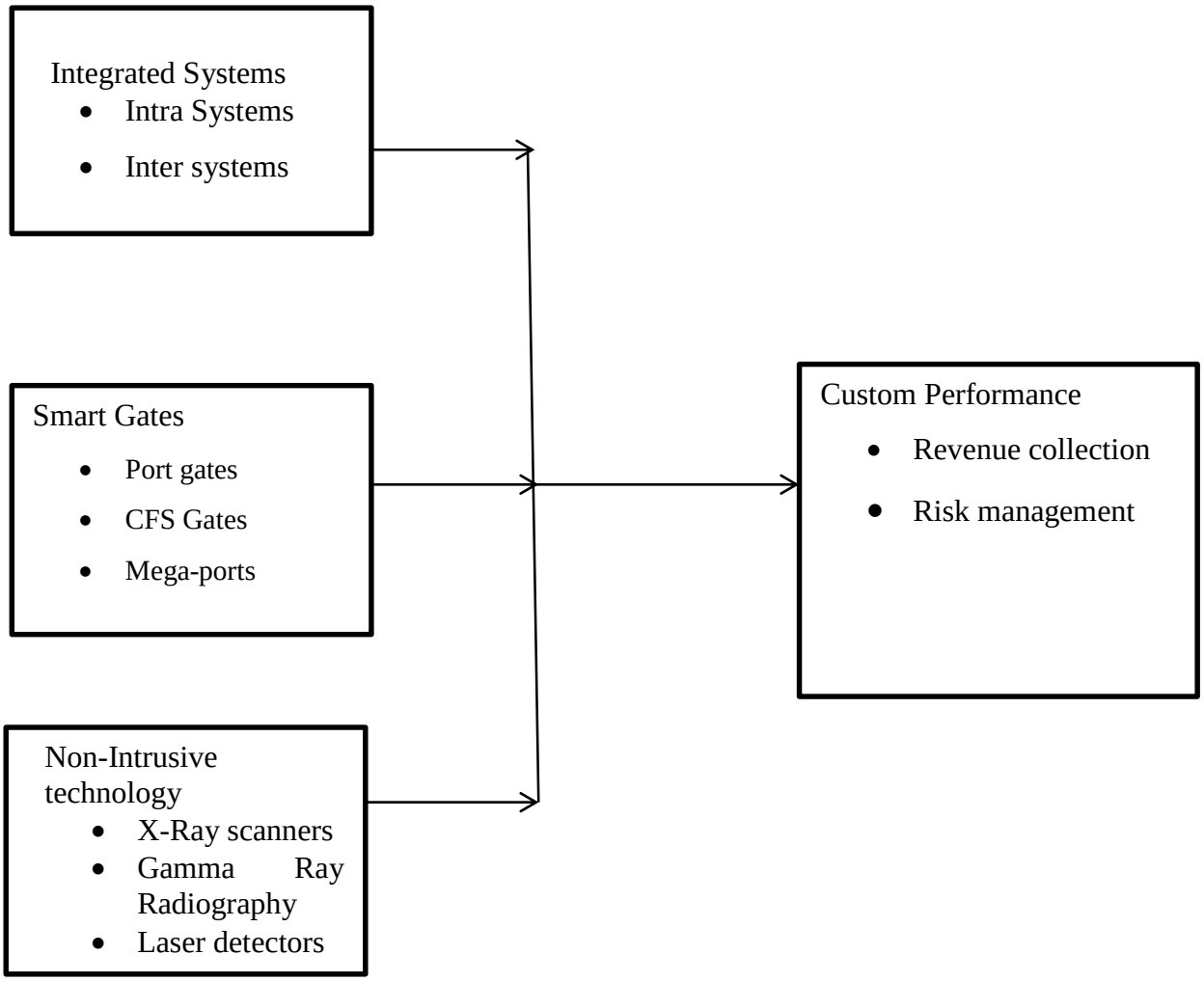


Figure 2.1 Conceptual Framework

2.3.1 Intra Systems

Intra systems are systems within the organization which do not interact with systems outside the organization. However these systems are integrated with all systems in the firm to increase efficiency and information sharing. They do not interact with systems outside the organization to ensure data integrity and for competitive advantage. An example is the HR system and an

accounting system. In KRA an example of an intra-system is CAMIS. CAMIS is used to maintain records of corrective and preventive customs work tasks associated to customs management and accounting. It is a useful tool to optimize the operations of customs management (Kwalia, 2012).

2.3.2 Inter Systems

Inter systems are systems of various partners integrated together, or having an option of information sharing to increase cooperation, knowledge sharing, learning, increasing efficiency and reducing hurdles. To thrive, entities are required to incorporate applications into a great framework, with the goal that the elements in the exchange. An incorporated framework is a blend of business administration rehearses with data innovation, whereby the business procedures of an element are coordinated into the PC framework, so as to accomplish particular business destinations (Gachugi, 2017). Endeavor frameworks are a basic part of the procedure perspective of associations. They encourage correspondence and coordination among various associations, and they permit simple trade of, and access to, information over the procedure.

The various inter-systems in use at the Port of Mombasa include KPA's KWATOS system, DTD, CFS and the modern integrated Customs Management System (ICMS) adopted by KRA in June, 2017, to replace the obsolete Simba system in a move to curb tax evasion. The system was aimed at improve transparency and communication, reduce delays in clearing goods, and maximize the collection of customs revenue. The new system was fitted with features to conduct automatic benchmarking of cargo value to help address the perennial challenge of cargo under-valuation. Other benefits of the new system include its ability to be integrated to the Regional Electronic Cargo Tracking Platform (Gachugi, 2017).

2.3.3 Port Gates

Use of the Management Support System (MSS) assists importers to keep more accurate administrative records and pay the correct amount of duty. In addition, the use of MMS, a subset of management information system (MIS), in customs management; extends the information retrieval capabilities of the end-users with 'query and analysis functions' for searching a database, generating 'what if' scenarios, and other such purposes (Kwalia, 2012).

2.3.4 Single window

The single-window framework is an exchange help idea. The usage of a solitary window framework empowers global dealers to submit administrative and charge records at a solitary area or single element. Such archives incorporate traditions announcements, applications for import/send out grants, and other supporting records, for example, testaments of root and exchanging solicitations. The fundamental favorable position for having a solitary window for a nation or economy is to build the productivity through time and cost investment funds for brokers in their dealings with government experts for acquiring the applicable leeway and grants for moving cargoes crosswise over national or monetary outskirts (Kwalia, 2012).

2.3.5 CFS Gates

The present exchange condition is testing and complex, and there is expanding requirement for traditions office and undertakings to monitor their merchandise on travel. Utilizing shrewd entryways at CFS' will expand the honesty of products which is a vital part of coordination in light of the fact that these merchandise are pulled through various domains, crosswise over nations and between traditions controlled territories. A CFS is where cargo shipments are combined or de-united and organized between transport legs. A CFS is normally situated in vicinity to the port or air terminal, where freight compartments are transported to and from. It is the area assigned via transporters for the getting of freight to be stacked into compartments by the bearer. Utilization of shrewd entryways at the CFS' will build proficiency, while expanding the procedure of payload preparing and taking care of, (Harrison, 2010).

2.3.6 Mega ports

Mega ports are because of computerization of access doors in the ports joining Megaports radiation location gadgets and paperless traditions discharge framework. Via mechanizing activities at the port utilizing a rapid ethernet interface that associates with the port's data transfer capacity choices makes a typical control point through which all holder and mass load trucks pass when entering and leaving the diverse port terminals. This will help in guaranteeing that all leave forms are controlled via mechanized means. This includes building up a modified entryway process, offering data and teaming up to different offices and associations to incorporate the Megaports frameworks with the port framework and empower a completely mechanized traditions task. The port must guarantee sufficient dealing with the majority of the frameworks reconciliation for the entrance framework, related data administration and exchange sub-frameworks.

At the point when the framework is actualized, all vehicle and payload stack that is affirmed through the mechanized Customs framework is conceded access to the port without the requirement for any further authoritative preparing at the passageway itself. Mechanization of the port specialist truck leave doors takes into account proficient, protected and fast arrival of import loads. Incorporation of mechanized door framework with Megaports radiation recognition program and traditions frameworks makes an ongoing paperless discharge process for import movement. The leave paths are intended to work both in computerized unmanned and manual mode, with the robotized alternative permitting active vehicles be prepared in less than 1 minute. Moreover, the framework takes into account outline and execution all things considered, electrical and interchanges frameworks, in addition to frameworks mix.

2.3.7 X-Ray Scanners

X-Ray scanners through using x-beam frameworks are utilized for load screening of cargo and vast approaching bundles. The X beam frameworks utilize double view and high entrance frameworks. The framework configuration diminishes the general operational zone while guaranteeing the entire location payload clearing and preparing is of superior, financially savvy and solid while keeping up a smooth activity stream and limiting the aggregate cost of review. One illustration is the drive-through location framework which have high-vitality scanners which are intended for non-meddling investigation of vehicles, freight, compartments and products and can be utilized as a part of different assessment locales like airplane terminals, strategic focuses, distribution centers, traditions offices, movement control focuses, brief stockpiling and seaports for add up to load review is required. To get ideal answers for investigation of freight, trucks and traveler vehicles at seaports, traditions and fringe intersections, the drive through high-vitality frameworks utilizing X-Ray scanners are utilized and are intended to distinguish different kinds of concealed dangers and booty, including weapons, explosives, drugs and undeclared merchandise.

2.3.8 Laser detectors

Laser detectors use an optical sensor or detector that converts incident light into an electrical signal for measurement and analysis. To adequately scan and check cargo in containers and trucks, the laser scanners use retro-reflective and through-beam models to provide images of the type of cargo, thereby reducing the need to open cargo physically. This hereby increases efficiency and effectiveness of cargo processing and clearing at the port (Morris, 2017).

2.3.10 Gamma Ray Radiography

Gamma-beam radiography frameworks are equipped for filtering trucks. They ordinarily utilize a radioactive source and a vertical pinnacle of gamma finders. The gamma cameras can deliver one section of a picture, whereby, the even measurement of the picture is created by moving either the truck or the examining equipment. The beams can enter up to 15– 18 cm of steel. The framework additionally distinguishes high-thickness districts too thick to enter, which would be the well on the way to stow away atomic dangers. The utilization of the frameworks gives great quality pictures which can be utilized for recognizing load and contrasting it and the show, trying to identify peculiarities (Kabiru, 2016).

2.3.11 Revenue collection

This is the main responsibility of customs departments. The performance of Customs authorities is based on their ability and effectiveness in revenue collection. Revenue collection can be improved by the use of information technology, to reduce the costs associated with payment of taxes (Morris, 2017). Using technology reduces the hassle of paying taxes, while widening the tax net to increase revenue collected by customs department. By automating revenue collection processes, increased taxpayers identification, collaboration between government agencies and all private firms, tax revenues can be increased considerably.

2.3.12 Risk management

Risk management is defined as the systematic application of management procedures and practices which provide Customs with the necessary information to address movements or consignments that present a risk. Risk-based selectivity operates more effectively in an automated environment, as computer-based risk-based selectivity can be applied consistently to all imports and exports and is significantly faster and more accurate in comparing a given set of data against all currently active risk profiles (WCO, study 2010).Risk is minimized through the use of smart gates and Non-intrusive technology ,where contraband and concealed consignments are able to be scanned and raise alarm to respective customs officers there by curbing tax evasion by unscrupulous traders.

2.4 Review of variables.

2.4.1 Integrated Systems.

The scope of technological innovations is continuously shaping the way numerous business activities are undertaken in the world, especially in regard to the levels of sophistication on the area of information management. This has been central in the implementation of technological platforms in the execution of various customs operations. The use of integrated systems in the operations of customs administration is to increase productivity and greater economic growth (Simataa, 2016).

The utilization of advanced ICT systems such as ICMS COSIS CAMIS MMS, within the port operations, has contributed to enhanced levels of tasks execution, operational tracking and the overall aspect of accountability. The advanced technological, systems have integrated, diverse components assisted tasks such as, automated voice programs, that give instructions on operations executions have led to considerable improvement in the way services are delivered within an organizational framework. The enhanced levels of accountability, has been central to the improved levels of service delivery.

2.4.2 Smart Gates

Smart Gate is a mechanized self-benefit fringe control framework worked by traditions office and situated at migration checkpoints in landing corridors at worldwide airplane terminals. Shrewd Gates permit e-Passport holders of various different nations to clear migration controls all the more quickly, and to improve travel security by performing international ID control checks electronically. Shrewd Gate utilizes facial acknowledgment innovation to confirm the explorer's personality against the information put away in the chip in their biometric travel permit, and in addition checking against movement databases. Explorers require a biometric travel permit to utilize Smart Gate as it utilizes data from the international ID, (for example, photo, name and date of birth) and in the separate nations' databases to choose whether to allow passage or takeoff from the nation or to produce a referral to a traditions specialist. These checks would somehow or another require manual handling by a human, which is tedious, exorbitant and conceivably mistake inclined, (Harrison 2007).

2.4.3 Non-intrusive technology

Non-intrusive technology is specialized gear and machines, for example, X-beam or gamma-beam imaging write hardware that permit the investigation of payload without the need to open the methods for transport and empty the load. With developing exchange volumes, stale and declining staff levels at fringes, the choice to physically assess a shipment can be exceptionally tedious and can influence the general throughput of a Customs office. Choices are regularly in light of hazard appraisal and not in all cases fruitful. Non-nosy examination innovation, for example, X-beam or gamma-beam imaging compose gear can give a snappy knowledge into the payload heap of a compartment or methods for transport without the need to open and empty it, along these lines either affirming or settling the hazard appraisal. In blend with an organized intercession approach, this can help to fundamentally lessen the quantity of superfluous physical reviews and to decrease the time required for these. Standard 3 of Pillar I of the WCO SAFE Framework of Standards perceives the convenience of NII innovation for exchange help and prescribes to Customs organizations that non-nosy investigation gear ought to be accessible and utilized for directing examinations, where accessible and as per hazard appraisal (Harrison, 2007).

Major incorporated frameworks establishments are settled in structures, have a high entrance rate and enable the methods for transport to drive through, in this manner quickening the procedure and lessening the general review time. Coordinated frameworks establishment rules along these lines help Customs organizations to improve the utilization of this innovation for the advantage of both control and assistance.

2.4.4 Customs performance

Customs performance is examined on the quantifiable metrics on quality and efficiency in the execution of the port duties (Bichou, Bell & Evans, 2013). Performance indicators in the scope of customs administration include factors such as; quality of service delivery, speeds in task executions, perceived levels of efficiency, levels of technology integration etc Richards, (2017). Efficient customs department is able to undertake momentous activities within the scope of port operations without experiencing any operational redundancies and mishaps (Kamble*et al*., 2010). Equally, the level of accountability in the customs operational framework demonstrates the performance yardstick in the execution of port operations. This indicates that, accountability factor is critical in determining customs activities operational standards (Wu &Goh, 2010).

The customs operations workforce is responsible for overseeing all the extensive activities within the scope of customs administration. Richards (2017) observed that, the competency levels in customs tasks execution offered an important indicator which can be used to evaluate the quality service in port operations. The customs labor force is expected to demonstrate skillfulness in performing their duties, through demonstrating high levels of agility and prowess in the use of tools and equipment in performing their duties as it affects the overall customs operational productivity and performance (Rastogi & Arvis, 2014).

2.5 Empirical Review

A study by Onyango and Ngugi (2014) used exploratory approach to assess the effects of integration of Information Communication and Technology on the organizational performance at the Kenya Revenue Authority. The findings of this study revealed that, heavy capital investment, that was incurred at the initial stages of technology integration were repaid in the long run. The study showed that, ICT contributed to enhanced levels of organizational productivity, especially driven by the employees who had acquired the ICT skills. The study also revealed increased overall organizational performance that contributed to realization of corporate objectives. The implication to the current study is positive in that technology in operating systems such ICMS, COSIS, CAMIS, MMS etc fosters seamless international trade and efficiently revenue collections. Wilson (2007) postulated that, when customs operations that are streamlined through the use of technological systems contribute to enhance port operations that are highly efficient and boost a countries economy.

Trang Nguyen (2007) conducted a study which reviewed the implementation of a legal framework that required a complete 100 percent container scanning at the port of entry. The study made findings that, comprehensive legal framework at the port, would accrue benefits in continuing global trade and also improving the overall customs security. The study concluded that, presently only 5% of the cargo is scanned. However, upon implementation of the 100% cargo inspection policy, more financial and human resources will be committed towards the physical cargo inspection process. Cirincione et al. (2007) argues that, even though the 100% inspection policy consumes significant resources, it eventually helps in effective customs tariffs implementation.

Wilson (2007) postulated that, when customs operations that are streamlined through the use of technological systems contribute to enhance port operations that are highly efficient and

boost a countries economy. The Smart Gate Systems are usually integrated with the Port Community System and the Terminal Gate Systems to improve the operational efficiency within a port. It is also integrated with security and operational processes, creating a more efficient interface between port gate operations and other government bodies such as customs control and border control.

2.6 Critique of existing literature relevant to the study

There are various studies conducted by various researchers locally and international levels, with some journals providing researches which are relevant to this study and Port operations in general. Although these studies are not similar, they provide a great pool of literature.

Harrison, (2007), indicates that non-intrusive inspection technology such as X-ray or gamma-ray imaging type equipment can give a fast understanding into the freight heap of a holder or methods for transport without the need to open and empty it, subsequently either affirming or settling the hazard evaluation. In blend with an organized intercession approach, this can help to altogether lessen the quantity of pointless physical examinations and to diminish the time required for these. Coordinated frameworks are critical for exchange help. The creator prescribes to traditions organizations that non-meddlesome examination hardware ought to be accessible and utilized for leading investigations, where accessible and as per hazard appraisal (Harrison, 2007).

Gachugi (2017) studied on Influence of digital communication platforms on competitive advantage. The study adopted a descriptive correlation research method design to measure the influence of digital communication platforms on competitive advantage with a focus on Kenya Revenue Authority. Data collection method used questionnaires to get data from respondents. Census approach was used on the targeted population. Inferential and descriptive statistics adopted in analysis of data and presentation. Statistical Package for Social Sciences (SPSS) was used to analyze the data for this research. In addition, Trang (2007) did a study on 100% container scanning law and concluded that at streamlined Customs-to-Customs exchange of advanced information for smart gates would meet both the priority objectives and the roles of Customs, that is, to enhance security and at the same time, facilitate global trade.

2.7 Research gaps

A lot of research has been done about customs performance, specifically at the port of Mombasa. Joseph (2010) studied on the challenges faced by customs authorities at the port and its bid to enhance productivity of the customs department.

Simataa, (2016) contends that the scope of technological innovations has been continuously shaping the way numerous business activities are undertaken in the world, especially in regard to the levels of sophistication on the area of information management. The use of integrated systems is central in the implementation of technological platforms in the execution of various customs operations. Though the various authors have explained the benefits of using integrated systems in a bid to expand customs productivity and increase efficiency, no author has demonstrated the exact improvements currently being enjoyed as a result of using integrated systems in enhancing customs performance. This study therefore sought to fill the knowledge gap of how the use of integrated systems can improve customs performance, specifically in the Port of Mombasa.

Wilson, (2007), posits that the Smart Gate Systems are usually integrated with the Port Community System and the Terminal Gate Systems to improve the operational efficiency within a port. It is also integrated with security and operational processes, creating a more efficient interface between port gate operations and other government bodies such as customs control and border control. He also says that the smart gate system automates security functions, authenticating the identity of the driver, vehicle and cargo. This automation of operational functions reduces or eliminates the need for human intervention. However; there exists a knowledge gap on how the use of smart gates can improve the performance of customs authorities. This study therefore sought to provide the benefits of using smart gates to improve efficiency at the port therein customs performance.

Harrison (2007) indicates that non-intrusive inspection technology such as X-ray or gamma-ray imaging type equipment can give a quick insight into the cargo load of a container without the need to open and unload it, thus either confirming or resolving the risk assessment. In combination with a coordinated intervention approach, this can help to significantly reduce the number of unnecessary physical inspections and to reduce the time required for these. However, the authors have not demonstrated the return on investment of the non-intrusive technologies. In addition, the authors have not elaborated how the use of integrated system scan be used to increase revenue collection and improve customs performance at the port. This

study therefore sought to provide the benefits of using integrated systems to improve efficiency at the port therein customs performance.

Customs performance is examined on the quantifiable metrics on quality and efficiency in the execution of the port duties (Bichou, et al, 2013). Performance indicators in the scope of customs administration include factors such as; quality of service delivery and speeds in task executions, together with perceived levels of efficiency, levels of technology integration. The literature already analyzed concentrates on the elements of customs performance like facilitating trade and revenue collection. However there exists a gap in the explicit impact of information technology on customs performance. There still lacks the effect information technology systems on the various metric of customs performance. This study thus sought to fill this knowledge gap by exploring how various elements in systems management affect customs performance.

2.8 Summary

Literature review has taken an in-depth study of related empirical studies done in the past and relevant theories in relation to the effects of technology on customs operation in other jurisdictions other than Kenya. The review of literature in this chapter has been keenly guided by the three research questions and the study objective. First, the chapter has reviewed literature relating to how the use of integrated systems influences customs performance. Secondly, the review of the literature has dealt with the emergence and use smart gates and how they can be adopted to enhance operational efficiency in customs performance. Thirdly, the review has looked at the use of non-intrusive technologies in enhancing customs performance in Kenya. The chapter has critically reviewed the literature with the aim of establishing gaps in knowledge with the sole purpose of justifying the current study. Once the gaps in knowledge have been identified, then a conceptual framework is developed to act as the model for the study in answering the research questions. The next chapter will handle the methodology that the researcher will use to answer the research question and the study objectives.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the research methodology that was used to carry out the study. Research methodology describes the research design to be utilized, the target population, sampling techniques, instruments of data collection and data analysis.

3.2 Research Design

A descriptive research design was employed in this study. This was valuable as it allowed the researcher to observe the study subject as it is without any particular manipulation of the variables (Kombo& Tromp, 2006). Descriptive study describes the behavior or characteristics of a group to determine the relationships that exist between different factors and establish statistical relationships based on quantitative measures of two or more parameters (Ngulube, 2012). The significance of the descriptive research design is the ability to ensure minimization of bias and maximization of reliability of evidence collected.

3.3 Population

Population in a research study refers to the combined number of persons or individuals that share common characteristics (Kothari, 2005). Population is defined as an abstract idea of a given group which has observable characteristics from which a sample is drawn (Neuman, 2014). The target population for this study was the customs operations officials within Mombasa region. The population of this study included the KPA staff, the KRA Customs officers, plus the clearing and forwarding agents.

Table 3.1Target Population

CATEGORIES	**NUMBER**	**PERCENTAGGE**
Customs Officers	1457	82.9%
KPA staff	150	8.54%
Clearing Agents	150	8.54%
TOTALS	**1757**	**100%**

Source (Researcher, 2018)

3.4 Sampling frame

Sampling frame is a list of all the items in a population. It can be a list of things that a sample is drawn from (Andale, 2014). Sampling frame must be representative of the population and people not in the frame have no prospect of being sampled. The sample frame for this study was 146 customs officers out of a population of 1,457, as detailed in the KRA HR records. 15 Clearing agents and port officials each as illustrated in Table 3.1 below.

3.5 Sample and sampling technique

A 'sample' in research study refers to a group from which information is gathered from (Mugenda & Mugenda, 2008). Sampling involves the actual selection of a number of people from the target population or the larger group of interest and gathering data from it in order to draw conclusions about the population. This study will adopt a stratified random sampling technique. Since the study targets KRA staff, KPA staff as well as the Clearing agents stratified random sampling will be effective to stratify the population into three strata.

A stratified random sampling creates and divides the population into sub-populations (strata) on the basis of supplementary information, a sampling frame for all strata and then select cases using a purely random process (Neuman, 2014).The rate used for sampling was between 10%-30% based on studies Mugenda and Mugenda (2003) given that this was an accessible population that was sufficient for this study. The sample size formula shall be; Sample= **population × rate**

Where rate = **10-30 %**

Table 3.2 Sample Size

CATEGORIES	NUMBER	RATE (10-30%)	SAMPLE SIZE
Customs Officers	1457	0.11	155.7
KPA staff	150	0.2	30
Clearing Agents	150	0.1	15
TOTALS	**1757**	**0.1**	**200**

Source (Researcher, 2018)

3.6 Data collection instruments

Data collection methods are defined as ways of gathering facts that include behaviors, attitudes and perceptions from the respondents (Cooper & Schindler, 2008). The study used a set of structured questionnaire as the primary tool for data collection. The data was sampled from respondents at Kilindini port. The questionnaire was organized in a particular way that facilitated data collection procedure that was in tandem with the objectives guiding the study. The researcher also conducted interviews during the process of data collection. The interviews were valuable as they aided the researcher in getting a better understanding with regard to the port operations and the effect of technology utilization. They were used because: there was low cost in administering them, free from bias of the interviewer; answers were in respondents' own words, respondents had adequate time to give well thought answers and large samples could be made use of and thus the results could be made more dependable and reliable (Kothari, 2004).

Secondary data was collected through extensive examination of existing literature from annual/monthly reports, media reports, evaluation reports, project files, compliance and audit reports, appraisal documents and corporate plans that centered on the use of technology in port operations.

3.7 Data Collection Procedures

These structured questionnaires were administered using drop and pick method. The researcher extended sufficient time, for the respondents to fill in the questionnaires at their own convenience. Follow up with short interviews was conducted to ensure and facilitate proper response rate. Secondary data was collected through acquisition of annual or monthly reports, media reports, evaluation reports, project files, compliance and audit reports, appraisal documents, corporate plans and process documents such as minutes of meetings. These were used to compliment the information derived from primary sources.

3.8 Pilot Testing

Basically, pilot testing means finding out if a survey, the key informant interview guide or observation form will work in the "real world" by trying it out first on a few people. The purpose this exercise was to make sure that everyone in the sample not only understands the questions, but understands them in the same way. This procedure was useful as it made it possible for the evaluation of the questions and assess whether any questions made the

respondents feel uncomfortable and also evaluate how long it takes to complete the survey in real time.

Validity is defined as the accuracy and meaningfulness of inferences which are based on the research result (Mugenda and Mugenda, 1999). It is also the qualitative procedure of pre-testing or a prior attempt to ascertain that research instruments are accurate, correct, true, meaningful and right in eliciting the intended data for the study (Kasomo, 2006). To validate the research instruments the researcher checked whether there were any ambiguous or confusing terms so as to improve the content validity of the instruments.

Mugenda (2003) says that reliability is concerned with estimates of the degree to which a research instrument yields consistent results after repeated trials. In this study, reliability was determined by pre-testing the questionnaires on ten employees of the KRA who did not take part in the main study. This exercise was vital in guaranteeing the validity and reliability of the questionnaire. Based on the pre-test, minor amendments were done on the questionnaires before the final questionnaires were administered to the questionnaires.

3.9 Data Analysis and Presentation.

Both quantitative and qualitative approaches were used for data analysis. The data collected from the study was fed into as computer and analyzed. The data collected from the questionnaire items was coded and arranged in an orderly manner by use of tables. The data was analyzed quantitatively and qualitatively. In analyzing the data, the study adopted descriptive statistics by using the Statistical Package for Social Sciences (SPSS) package and Microsoft excel. The software package enables a researcher to analyze the data into percentages, means and standard deviations, (George et al, 2013). It also consisted of scrutinizing the acquired information and making inferences, coupled with uncovering underlying structures, extracting important variables and testing any underlying assumptions.

The researcher used both qualitative and quantitative methods of data analysis. Descriptive statistics is used to meaningfully describe the distribution of results depending on the variables of the study and the measurements used. The qualitative data generated from open-ended questions was categorized in themes in accordance with research objectives and reported in narrative form along with quantitative presentation. Qualitative methods provide in-depth

information while quantitative methods enable the user the use of numerical values to give better understanding of the data collected, (Mugenda et al, 2008). The researcher's findings were presented using frequency distribution tables, graphs and charts.

To quantify the strength of the relationship between the variables, the study used Karl Pearson's coefficient of variation. The Pearson coefficient is used to indicate one on one association between each of the independent variables to the dependent variable. Multiple will also be used to analyze the relationship a single dependent variable and several independent variables. According to Dunn, (2010), the linear regression assumptions must be met by the data analyzed. The assumptions state that the coefficients must be linear in nature, the response errors follow the Gaussian distribution and that the errors should have a common distribution. The coefficient of determination ®, resulting from the linear regression will be used to determine the goodness of fit. An error term is a variable in a statistical or mathematical model, which is created when a model does not fully represent the actual relationship between the independent variables and the dependent variables. In this study the error term will be variance by which the equation may differ during empirical analysis.

The study used multiple regression model to test the relationship between technology and customs operations at port of Kilindini. The multiple equation model was stated as;

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

Where; Y = customs performance,

β_0= Constant, also known as the intercept which indicates Custom performance without other variables under the study.

X1 = integrated systems, X2 = smart gates, X3 = non-intrusive technology.

β_1, β_2, β_3= Coefficients explaining the effects of independent variables X1,X2,X3 Respectively to dependent variable Y customs performance

ε = Error term, others factors that might influence Technology in customs performance but was excluded in the study.

CHAPTER FOUR
RESEARCH FINDINGS AND ANALYSIS

4.1 Introduction

This chapter illustrates the analysis of the data collected and also discusses the impact of integrating technological systems and high-tech tools on customs performance at the port of Mombasa. The study focused on three pillars of technological integration which include; the integrated systems, smart gates and non- intrusive technology on customs performance. Data was collected from respondents at the Port of Mombasa. The target population included the KRA staff, KPA staff and the clearing agents operating at the port of Mombasa. A sample size of 200 respondents was selected to take part in the study. A structured questionnaire, with close-ended questions was used as the primary tool for data collection. A 5-point level Likert scale was used to seek respondent's opinions on the listed questions. Thereupon the analysis was done based on the research questions.

4.2 Response rate

The data in table 4.2 highlights the study response rate in form of the questionnaires that were successfully returned computed in frequencies and percentages.

Table 4.1 Response rate

Response	**Frequency**	**Percentage**
Responded	145	72.5 %
Not-responded	55	27.5 %
Total	**200**	**100.0%**

Source (Researcher, 2018)

The findings in table 4.2 indicate that, about 145 questionnaires out of the 200 questionnaires that were issued out were successfully returned in time for data collection, which represents a 72.5 % response rate. About 55 questionnaires representing about 27.5% of the respondents failed to return the questionnaires. According to Mugenda and Mugenda (2008), a response rate of 70% and above is sufficient for carrying out comprehensive data analysis, and will offer a good representative outcome. From the response rate, the number (N) of questionnaires that will be used to make conclusions for the study is 145 (N = 145).

4.3 Reliability Results

Pilot study examined the reliability of the research instrument. Reliability test, examines the consistence, stability and dependability of the collected field data (Mugenda, 2008). When a researcher measures a variable, will want to be sure that the measurement provides dependable and consistent results (Cooper & Schindler, 2003). For a measurement to be considered reliable, it needs to register similar results whenever the measurement is repeated (Mugenda, 2008).

Table 4.2 Reliability Test results

Variable	**Cronbach Alpha value**	**Comments**	**items**
Integrated systems	0.801	Accepted	4
Smart Gates	0.848	Accepted	4
Non-intrusive technology	0.805	Accepted	4
Customs Performance	0.782	Accepted	4

The researcher performed a reliability test for all the study variables, namely; integrated systems, smart gates and non-intrusive technology. The test produced Cronbach's alpha values, 0.801 for the integrated systems, 0.848 for the smart gates and 0.805 for nonintrusive technology and 0.782 for Customs Performance. All the computed Cronbach values were above 0.75. According to Mugenda (2008) a variable that registers a Cronbach alpha value of 0.75, will offer satisfactorily consistent results. Therefore all the questionnaire items listed in this study were retained for the field work.

4.4 Demographic Analysis

The demographic data highlights the respondent's background information. The demographic details covered in this study include; age distribution, education level, role at the port and work experience.

4.4.1 Respondents Age Distributions

The data in table 4.1 highlights the tabulation in age distribution among the respondents computed in frequencies and percentages.

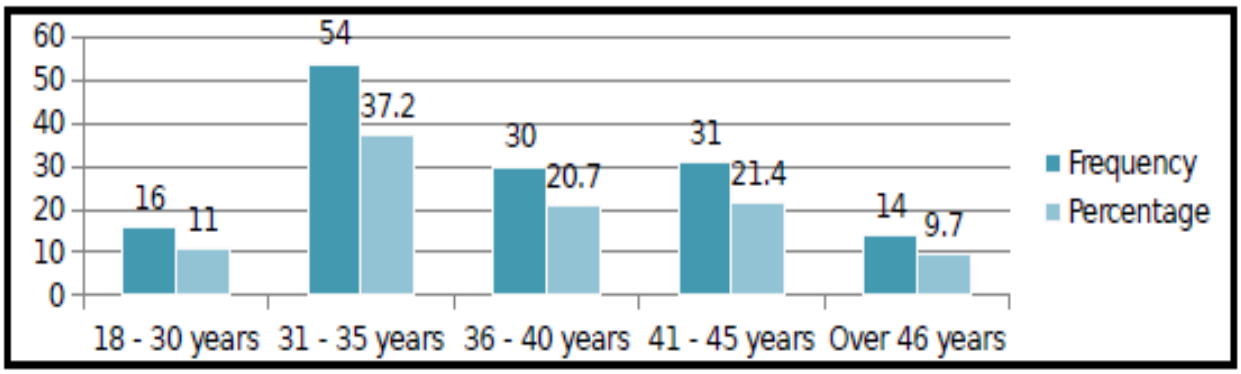


Figure 4.1 Distributions of respondents by age

The findings in figure 4.1 highlight the distribution of the respondents by age. The findings show that majority of the respondents, about 54(37.2%) indicated to be in the age group, 31 – 35 years. The computed findings also indicate that, about 31 (21.4%) indicated to be 41 – 45 years, about 30 (20.7%) indicated to be in the age group, 36 – 40 years, about 16 (11%) indicated to be 18 – 30 years. In addition, the findings show that a marginal 14 (9.7%) of the respondents indicated to be in the over 46 years of age. The findings imply that, there exists a broad consistency in age diversity for the people working within different departments at the port of Mombasa.

4.4.2 Respondents Education Level

The data presented in figure 4.2 highlights the distributions of respondents in terms of education level, with computations derived from frequency distributions.

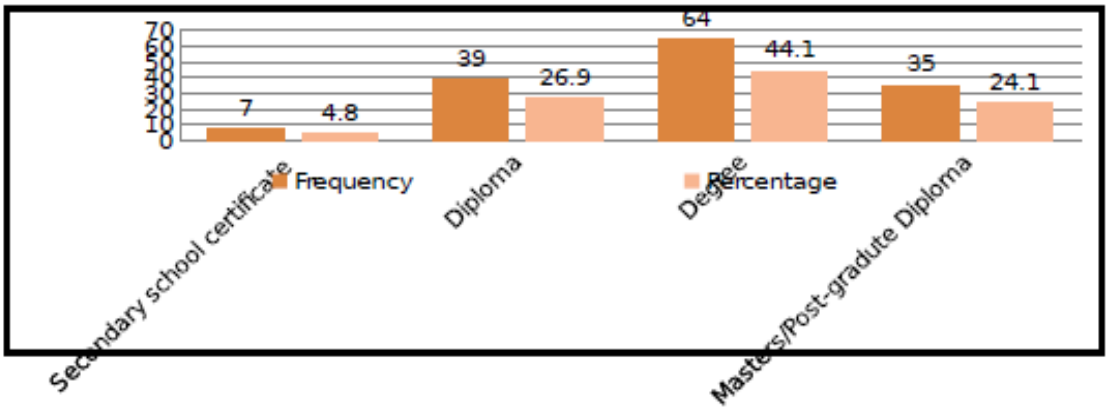


Figure 4.2 Distribution of respondents by education level

The findings in figure 4.2, indicate that majority of the respondents, about 64 (44.1%) had attained a university degree. The findings also show that, about 39 (26.9%) of the respondents attained a Diploma, about 35 (24.1%) have attained a Masters or Post-Graduate Diploma. In addition, the findings indicate that, about 7(4.8%) of the respondents indicated to have attained

basic education to the secondary school level. The findings in this study indicate that an overwhelming majority of the respondents have attained higher education notably; diplomas, degrees and post-graduates. The findings imply that, education is an important component for employees working at the port of Mombasa.

4.4.3 Respondents Role at the Port of Mombasa

The data presented in figure 4.3 highlights the distribution of respondents by job description computed in frequencies and percentages.

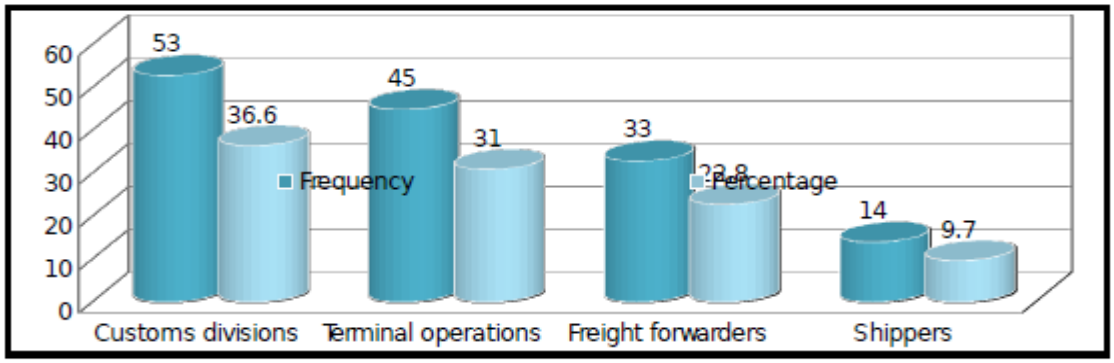
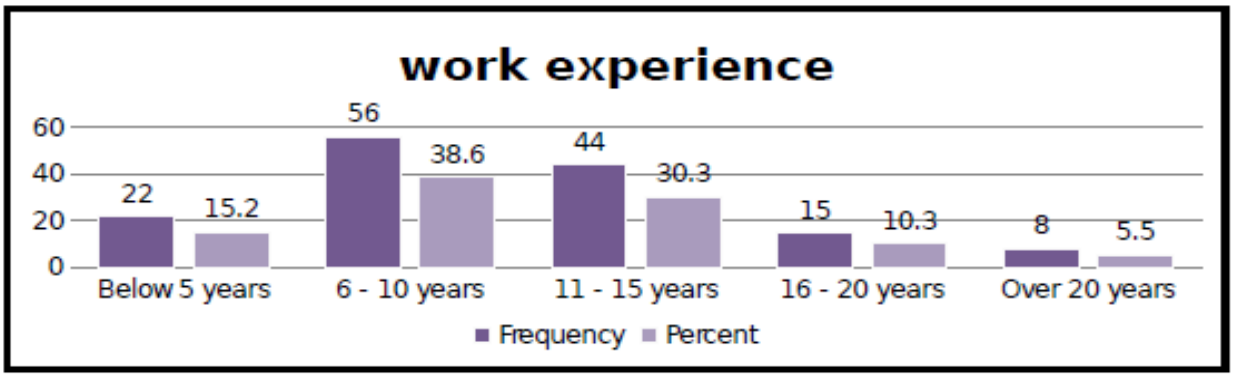


Figure 4.3 Distribution of respondents by job description

The findings in figure 4.3 indicate that, majority of the respondents, about 53 (36.6%) indicated to be attached to the customs department. The findings also show that, about 45 (31%) of the respondents indicated to be attached to the terminal operations department, about 33 (22.8%) indicated that they were attached to the freight forwarders division, and finally about 14 (9.7%) indicated to be attached to the shippers department. The findings imply that a bigger portion of responsibilities at the port of Mombasa centers on the customs operations, which signifies the overwhelming importance of enhancing the operational infrastructure like, technology systems for the customs operations.

4.4.4 Work Experience

The data in table 4.4 highlights the distribution of respondents in terms of work experience computed in frequencies and percentages.



The computed findings in figure 4.4, indicate that majority of the respondents indicated that they had a working experience of between 6 – 10 years. Furthermore the findings also show that, about 44 (30%) of the respondents indicated to have work experience of 11 – 15 years, about 22 (15.2%) of the respondents indicated to have a work experience of below 5 years. The findings also show that, about 8(5.5%) of the respondents indicated to have a working experience of over 20 years. The findings indicate that majority of the respondents have working experience of above 6 years. This implies that, possessing work experience is an important part of effective service delivery amongst the staff at the port of Mombasa.

4.5 Descriptive Analysis

4.5.1 Integrated systems on the customs performance

The first objective of the study was to evaluate the effects of integrated systems on the customs performance at the port of Mombasa. The data highlighted in table 4.2, highlights the respondents views on the impact of integrated systems on customs performance computed in means and standard deviations.

Table 4.3Integrated systems factors Mean and Standard Deviation

Statements	N	Mean	STD dev
Use of integrated systems plays a crucial role in improving customs performance	145	4.34	.603
The advanced technological, systems have integrated, diverse components assisted tasks such as, automated voice programs, that give instructions on operations executions have led to considerable improvement in operations.	145	4.21	.580
Evidence of inter systems portrays the effect of IT on customs performance	145	4.17	.656
The utilization of advanced ICT systems such as ICMS COSIS CAMIS MMS, has contributed to enhanced levels of tasks execution at the port.	145	4.37	.599

Source (Researcher, 2018)

The findings in table 4.3, presents the respondents views on the influence of integrated systems on customs performance. A scale of 1 – 5 was used where; 1 = strongly disagree, 2 = disagree, 3= neutral, 4 = agree and 5 = strongly agree. The respondents were in agreement that the Use of integrated systems plays a crucial role in improving customs performance evidenced with a

mean of 4.34 (standard deviation = 0.603).The advanced technological, systems have integrated, diverse components assisted tasks such as, automated voice programs, that give instructions on operations executions have led to considerable improvement in operations with a mean of 4.21 (standard deviation = 0.580).Evidence of inter systems portrays the effect of IT on customs performance with a mean of 4.17(Standard Deviation = 0.656).The utilization of advanced ICT systems such as ICMS COSIS CAMIS MMS, has contributed to enhanced levels of tasks execution at the port recording a mean of 4.37 (SD = 0.599).

The findings highlight an overwhelming effect of technological integration on the overall performance of the customs duties within the port of Mombasa. This implies that, technology enhances the consolidation and integration of integrated systems which contributes to improved ways of implementing customs operations. The findings in this study are in agreement with findings by Wilson (2007), who established that, technological platforms instilled seamless flow in port operational processes. Further, the findings of this study were in line with Simataa (2016) who established that integrated systems wield significant effect on the overall operational productivity.

4.5.2 Smart gates on the Customs performance

The second objective of this study was the examination of the impact of smart gates on the customs performance at the port of Mombasa. The data in table 4.4 highlights the respondent's views on the effects of technological integration on the smart gates processes, computed in means and standard deviation.

Table 4.4 Smart gates Mean and Standard Deviation

Statements	N	Mean	STD dev
The use of smart gates plays a significant role in customs performance	145	4.36	.562
The use of port gates significantly influences customs performance	145	4.32	.564
The use of CFS gates plays a significant role in customs performance	145	4.42	.495
The use of mega ports has improved customs performance	145	4.47	.501

Source (Researcher, 2018)

The findings in table 4.4, presents the respondent's feedback on the impact of influence of smart gates on customs performance. A scale of 1 – 5 was used where; 1 = strongly disagree,

2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree. The findings show that, respondents agree that the use of smart gates plays a significant role in customs performance with a mean of 4.36 (standard deviation = 0.562).The use of port gates significantly influences customs performance recording a mean of 4.32 (Standard Deviation = 0.564. The use of CFS gates plays a significant role in customs performance, with a mean of 4.42 (SD = 0.495). The findings indicate that, the respondents were in agreement that The use of mega ports has improved customs performance, smart gates has enabled automation of critical procedures reducing operational costs (mean = 4.47, standard deviation = 0.501).

The findings indicate that the use of smart gates has improved the execution of port enterprise processes. This implies that, smart gates supported processes, positively influences the execution of critical tasks in customs operations. The findings in this study agree with, Harrison (2007) who indicated that, utilization of modern technologies like smart gates processes has resulted in the enhanced modes of increasing efficiency and reducing operational costs.

4.5.3 Non-intrusive technology on customs performance

The third objective of the study was to evaluate the influence of non-intrusive technology on the customs performance at the port of Mombasa. The data presented in table 4.5, highlight the respondents views on the influence of integrated systems on customs performance computed in Means and Standard deviation.

Table 4.5 Non-intrusive technology Mean & Std. Deviation

Statements	N	Mean	STD dev
The use of non-intrusive technology greatly boosts the performance of the customs department	145	4.34	.475
The use of X-Ray scanners, laser detectors and gamma ray technology influences customs performance	145	4.01	.871
The organization has invested adequately in non-intrusive technology to improve customs performance	145	3.90	1.095
The non-intrusive technology greatly influences customs performance in speed and efficiency.	145	4.35	.547

Source (Researcher, 2018)

The findings in table 4.5, presents the respondents feedback on the influence of non-intrusive technology in customs performance. A scale of 1 – 5 was used where; 1 = strongly disagree, 2

= disagree, 3 = neutral, 4 = agree and 5 = strongly agree. The respondents agreed that, The use of non-intrusive technology greatly boosts the performance of the customs department with a mean of 4.34 (standard deviation =0.475).The use of X-Ray scanners, laser detectors and gamma ray technology influences customs performance with a mean of 4.01 (standard deviation =0.871).The findings show that the respondents agree that The organization has invested adequately in non-intrusive technology to improve customs performance with a mean of 3.90 and standard deviation of 1.095.The findings show that, respondents agree that The non-intrusive technology greatly influences customs performance in speed and efficiency with a mean of 4.35 and (Standard Deviation = 0.547). Therefore, striving to increase the competence and technical capacity on non-intrusive technology and raising awareness on the use of non-intrusive technology enhances the levels of compliance with customs regulations, while increasing efficiency of service delivery and generally improving customs performance.

4.5.4 Customs Performance

The main objective of the study was to evaluate the effect of technology on customs performance at the port of Mombasa. The data presented in table 4.7, highlight the respondents views customs performance computed in Means and Standard deviation

Statements	**N**	**Mean**	**STD dev**
The adoption of integrated information technology has led to the improvement in the customs performance.	145	4.55	.762
Embracing risk management has led to improve customs performance in terms detecting contrabands and minimizing Revenue loss	145	4.51	.921
The use of integrated systems in the operations of customs administration is to increase productivity and greater economic growth	145	4.06	.951
The quality of service improvement in the customs is attributable to the adoption of integrated technology.	145	4.25	.641

Source (Researcher, 2018)

The findings in table 4.5, presents the respondents feedback on the influence of non-intrusive technology in customs performance. A scale of 1 – 5 was used where; 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree. The respondents agreed that The adoption of integrated information technology has led to the improvement in the customs

performance having a mean of 4.55 and a Standard Deviation of 0.762. Embracing risk management has led to improve customs performance in terms detecting contrabands and minimizing Revenue loss having a mean of 4.51 with a Standard Deviation of 0.921. The findings also show that the respondents agree with the statement that the use of integrated systems in the operations of customs administration is to increase productivity and greater economic growth, with a mean of 4.06 and (Standard Deviation = 0.951). the findings reveal that respondents are in agreement with the statement that The quality of service improvement in the customs is attributable to the adoption of integrated technology with a mean of 4.25 and (Standard Deviation = 0.641).

4.6 Correlation Analysis

4.6.1 Coefficient of correlation

Table 4:1Correlations

Pearson Correlation Correlations					
Model		**Integrated_ Systems**	**Smart_ Gates**	**Non_Intrusive_ factors**	**Customs_ performance**
Integrated_Systems	Pearson Correlation	1	.429	.538	.607
	Sig. (2-tailed)		.000	.000	.000
	N	145	145	145	145
Smart_Gates	Pearson Correlation	.429	1	.382	.307
	Sig. (2-tailed)	.000		.000	.000
	N	145	145	145	145
Non_I_Technology	Pearson Correlation	.538	.382	1	.773
	Sig. (2-tailed)	.000	.000		.000
	N	145	145	145	145
Custom_Performance	Pearson Correlation	.607	.307	.773	1
	Sig. (2-tailed)	.000	.000	.000	
	N	145	145	145	145

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

The study adopted Pearson Correlation coefficient tests to determine the relationship between the independent and the dependent variables, Integrated Systems, Smart Gates, and Non-Intrusive Technology to the Customs Performance. From the above table,

There is a strong positive correlation between integrated systems to the customs performance, given by coefficient r =0.603, this therefore indicates a strong relation between the integrated system and customs performance. The coefficient r for Smart gates to customs performance is 0.307, indicating a weak correlation between smart gates technology to the customs performance.

Non-intrusive Technology has a very strong correlation coefficient of 0.773 to the customs performance, therefore a very strong relationship to the customs performance. All the variables had a significance levels of 0.00 and were all significant to explain the relationship between the independent and dependent variables.

4.7 Regression Analysis

4.7.1ANOVA

Using the Analysis of variance to estimate the significance of the study, the p value in the ANOVA analysis has a p-value of 0.000

Table 4:1 ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	691.348	3	230.449	126.591	.000
	Residual	256.680	141	1.820		
	Total	**948.028**	**144**			

Dependent Variable: Custom Performances
Predictors: (Constant), Non-Intrusive Technology, Smart Gates, Integrated Systems

The findings in table 4.5, presents the Analysis and Variance (ANOVA) for the regression test. The test deduces a Fischer statistical value, F (3, 141) = 126.591. This implies that there exists moderate variance between the means of study variables. The test recorded a p-value of 0.000 (p= 0.000, p< 0.05), at significance level 0.05. This implies that, there exists significant statistical association between technology integration and customs performance.

4.7.2 Coefficient of determination (R^2)

Table 4:2 Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.854	.729	.723	1.34923

A Predictors: (Constant), Integrated Systems, Smart Gates, Non-Intrusive Technology

The coefficient of determination describes the degree to which variations in the dependent variable can be explained by the changes in the independent variable. The findings in table 4.6, indicate that the computed, r –value to be 0.854 (simple correlation). This implies that there exists positive correlation between the technology integration and customs performance. The model summary indicates that, the r-square value for the test is 0.729. This implies that, technology factors, notably; integrated systems, smart gates and non-intrusive technology,

account for 72.9% in variability for the customs performance. This also means that, 27.1% of variability in customs performance can be attributed to factors external to technology factors.

4.7.3 Coefficients

Table 4:3 Multiple Regressions

Coefficients[a]

Model		Unstandardized B	Coefficients STD. Error	Standardized coefficients BETA	t	Sig.
1	**(Constant)**	1.889		.792	2.383	.000
	Integrated Systems	.318	.050	.168	6.479	.002
	Smart Gates	.154	.049	.321	3.096	.000
Non-Intrusive Technology		.503	.048	.560	10.557	.000

Dependent Variable: Custom Performance

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

Where; Y = customs performance,

β_0= Constant , also known as the intercept which indicates Custom performance without other variables under the study.

X1 = integrated systems, X2 = smart gates, X3 = non-intrusive technology.

β_1, β_2, β_3= Coefficients explaining the effects of independent variables X1,X2,X3 Respectively to dependent variable Y customs performance

ε = Error term, others factors that might influence Technology in customs performance but was excluded in the study.

The study adopting the below regression model to explain the relationship between variables: Therefore the regression model obtained from the study will be as follows;

$$Y= 1.889 + 0.318 X_I + 0.154 X_2 + 503 X_3 + \varepsilon$$

Regression test, seeks to examine the existing associations and correlations between the dependent and the independent variables. The study performed the linear regression test, to examine the level of correlation that exists between the technology integration factors, notably; integrated systems, smart gates and non-intrusive technology on the dependent variable of customs performance.

The findings in table 4.6 highlight the model summary for the regression test between the technology integration factors and customs performance, computed in r and r-square values.

Customs performance = 1.889 + 0.318 (Integrated Systems) + 0.154 (Smart gates) + 0.503 (Non-intrusive technology) + ε

The findings imply that, Customs performance at port of Kilindini is at 1.889 even without the influence of Technology. Y intercept is of the result when other variables are zero. Therefore, when the other variables under study are zero, there is performance of Customs at 1.889.

The equation also implies that for every unit change in integrated systems, results in 0.318 units change in customs performance, this implies that integrated systems affects the customs performance by 31.8%. an improvement in customs integrated systems will result to an improvement of the customs performance at Kilindini by 31.8%.

Smart gates were also found to have a mild effect on the customs performance, from the model above, by 0.154, this implies that a unit change in smart gates results to a corresponding improvement in customs by 15.4%.

The study found out that Non-Intrusive Technology significantly affected the customs performance, given by 0.503, indicating that a unit change in Non-Intrusive Technology would result to improvement in the customs performance by 50.3%.

ε The error term implying that other factors that was excluded in the study but might influence technology in customs performance.

The findings in table 4.8 presents the coefficient output for the regression test. The findings indicate that, the p-values for the all the test variables, namely; integrated systems, $p = 0.002$ ($p<0.01$), smart gates $p = 0.000$ ($p < 0.01$) and non-intrusive technology p-value = 0.000($p < 0.01$). This implies that all the variables are statistically significant at significance level 0.01.

CHAPTER FIVE
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter discusses the summary of findings, conclusions and recommendations of the research study. The summary of findings given, are an in-depth explanation of the main factors raised by the respondents on the impact of information technological factors influencing customs performance. The conclusions, covers the final summary of the deduced facts in the study. Recommendations, explores on the strategies the researcher presents that can solve the problem which was understudy.

5.2 Summary of the findings

5.2.1 What is the effect of integrated systems on customs performance at the Port of Mombasa?

The study established that integrated systems wield significant effect on the customs performance at the port of Mombasa, these findings were supported by the Karl Pearson's Coefficient of Correlation conducted, whereby it was established that there was a strong positive correlation between integrated systems to the customs performance, given by coefficient r =0.603, this therefore indicates a strong relation between the integrated system and customs performance.

The equation also implies that for every unit change in integrated systems, results in 0.318 units change in customs performance, this implies that integrated systems affects the customs performance by 31.8%. An improvement in customs integrated systems will result to an improvement of the customs performance at Kilindini by 31.8%. The study makes a finding that all the integrated systems factors wield significant influence on the customs performance at the port of Mombasa. The findings show that, integrated systems have contributed to a number of positive outcomes in customs operations, notably; computerization on operational efficiencies, faster information exchange, simplified data management, computerization on accountability, computers on security and tracking, increased volume of tasks accomplished, faster decision making, elimination of operational lags, data and information security, and finally the elimination of fraud loopholes.

5.2.2 What is the effect of smart gates on customs performance at the Port of Mombasa?

The study established that the use smart gates have boosted customs performance at the port of Mombasa. The study makes a finding that smart gates wielded a positive statistical effect on customs performance with a unit change in smart gates contributing to 0.154 units change in customs performance.

These were similar findings from the Pearson's Correlation Coefficient, The coefficient r for Smart gates to customs performance is 0.307, indicating a weak correlation between smart gates technology to the customs performance.

Smart gates were also found to have a mild effect on the customs performance, from the model above, by 0.154, this implies that a unit change in smart gates results to a corresponding improvement in customs by 15.4%. The study makes a finding that smart gates factors wield surmountable effect on the performance of customs operations at the port of Mombasa. The study makes a finding that, integrating technology in smart gates processes resulted to numerous positives, including; increased levels of efficiency, enhanced quality service delivery, the simplification of tasks, increased accountability, elimination of anticipated future operational errors, efficiency in operational planning and finally reduced operational costs due to automation of tasks.

5.2.3 What is the effect of non-intrusive technology on customs performance at the Port of Mombasa?

The study establishes a very strong positive association between increasing awareness and technical capacity of non-intrusive technology on the customs performance at the port of Mombasa. The study established that, non-intrusive technology wields a significant statistical association with customs performance, significant at 0.01, significance level. Further, the findings show that non-intrusive technology wields a measurable statistical effect on the customs performance, with a unit change in non-intrusive technology factors, resulting in a 0.658 units change in customs performance.

Non-Intrusive Technology has a very strong correlation coefficient of 0.773 to the customs performance, therefore a very strong relationship to the customs performance. All the variables had significance levels of 0.00 and were all significant to explain the relationship between the independent and dependent variables.

The study found out that Non-Intrusive Technology significantly affected the customs performance, given by 0.503, indicating that a unit change in Non-Intrusive Technology would result to improvement in the customs performance by 50.3%. The study found that engagement, increasing compliance and raising awareness of non-intrusive technology has resulted in numerous positive outcomes, notably; enhanced levels of operational efficiency, increased revenues, increased speed of cargo processing, real time operations monitoring, enhanced levels of adherence and compliance to regulations, reduction in operational lags and enhanced high volumes of cargo processing.

5.3 Conclusions

The study concluded that technology integration in the port operations has improved the execution of a variety of duties at the port of Mombasa. The study concludes that integrated systems have resulted to the computerization of varied tasks which is necessary for; enhanced overall efficiencies, faster information exchange, simplified data management, enhanced level of enhanced accountability, advanced levels of security and operations tracking, huge volumes of tasks accomplished, increased speeds in decision making, elimination of operational lags, data and information security and finally the elimination of fraud loopholes.

The study found that usage of smart gates is critical in guiding the execution of smart gates tasks within the scope of the port operations to impart seamless customs processes. The study concludes that, by integration of technologies in smart gates initiatives, it has contributed to; enhanced efficiency, enhanced levels of quality service delivery, simplification of smart gates tasks, imparting high levels of accountability, elimination of anticipated future operational errors, efficiency in operational planning, and the automation of tasks resulting in lean operational costs.

The study found that, the engagement, raising awareness and enhancing capacity on non-intrusive technology has been central to the enhanced levels of operational efficiencies in the customs operations at the port of Mombasa. The study concludes, that with increased awareness and compliance and utilization of non-intrusive technology leads to increased revenue collection, faster service delivery, reduced tax evasion; thereby intimating an increased level of performance of the customs department.

5.4 Recommendations

The study recommends that the organization should introduce innovative systems and upgrade existing ones and enhance existing technological capacities. Furthermore the study recommends that the organization should adopt organizational transition management models to ensure seamless operational transition and contribute to consistency in tasks execution. To increase efficiency and technological and system transition, the study recommends, amendment and review of existing organizational policies related to IT and systems management. Furthermore, the study recommends regular training of staff to increase their technical skills, to facilitate smooth running of operations. Training is central to ensuring effective utilization of the new technologies.

To obtain optimal customs performance, while reducing the detrimental effects of inefficiency, the study recommends adoption of newest models of smart gates in a bid to improve the capacity of the port. This will be crucial in enabling the port to being a mega port in future. Increased systems integration, automation will be crucial in making the utilization of smart gates, thereby increasing efficiency at the port and the customs department. Furthermore the study recommends that the organization should give priority to the usage of smart gates to increase efficiency. In addition, the study recommends that the organization should increase investment on smart gates, to increase the impact of proper smart gates on customs performance.

The study finally recommends that the organization should increase its investments in non-intrusive technology to increase efficiency and ensure optimal automation of port processes. Increased efficiency and automation will lead to reduced costs, competitiveness of the port. This will attract more customers to use the port facilities, thereby increasing revenue collection by the customs department. The study also proposes that the organization should seek collaborative relationships with all organizations and government institutions, to increase capturing of taxpayers data. This will widen the tax net, thereby boosting revenue collection. Finally, the study proposes full automation of all engagements with taxpayers to increase compliance, reduce tax evasion and increase customs performance.

5.5 Suggestions for further studies

The study was based on the assumption that the descriptions of the respondents on the effects of the various elements were actually the effects of the variables in the research study. This is obviously a narrow description of the effects. An ideal study should determine the effects using a cause-effect approach. To this end thus, the researcher recommends studies be done on other technological factors influencing the performance of the customs department. Furthermore, future research should focus on widening the scope of evaluating customs performance to include aspects like public trust and customer satisfaction. Other studies should also be conducted, focusing on the factors influencing customs performance, other that technological factors. From the model obtained in the Coefficient of determination, the variables studied by the researcher only explained the changes in the dependent variable by 72.9% in variability for the customs performance. This also means that, 27.1% of variability in customs performance can be attributed to factors not studied; therefore the researcher recommends further research in the 27.1%.

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APPENDIX I: LETTER OF INTRODUCTION

Kenya School of Revenue Administration

KENYA REVENUE AUTHORITY

ISO 9001:2015 CERTIFIED

KRA/KESRA/MSA/002 **30TH OCTOBER, 2017**

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

RE: REQUEST TO COLLECT RESEARCH PROJECT DATA

This is to certify that Mr. Njijigua K. William of admission number HDB335-C016-2513/2016 is a bona fide student of the Kenya School of Revenue Administration (KESRA), Mombasa Campus. He is in his final year of study and is currently conducting a research project in partial fulfilment of the requirements leading to the award of a Postgraduate diploma in Customs Administration. Mr. William is in the process of gathering data that will strictly be used for academic purposes only. Regarding this issue, the School would like to seek your permission to allow him to collect information that relates to his research from your organization.

Thank you for your support and cooperation.

Yours sincerely,

Winfred Jillani
Ag. Principal – KESRA, Mombasa Campus.

ISO 9001 BUREAU VERITAS Certification UKAS

Tulipe Ushuru Tujitegemee !

KENYA VISION 2030

APPENDIX II: QUESTIONNAIRE

This questionnaire has been set in relation to the objectives of the study. All the questions relate to ***THE EFFECTS OF TECHNOLOGY ON CUSTOMS PERFORMANCE AT THE PORT OF MOMBASA****. Kindly read the questions carefully and answer them honestly by ticking (√), rating and specifying or writing the current the correct answers precisely on the spaces provided.*

SECTION 1: RESPONDENTS INFORMATION

1. Department of the person filling the questionnaire

   ……..

2. Gender

   Male ( ) Female ( )

3. What is your age?

   18-30 ( ) 31-40 ( ) 41-50 ( ) 50 and above ( )

4. What is you level of education?

   Certificate level ( ) Diploma level ( )

   Degree level ( ) Masters/Post-Graduate Diploma ( )

5. The number of years served in your current position

   0-2 ( ) 3-5 ( )

   6-8 ( ) 9 and above ( )

SECTION 2: INTEGRATED SYTEMS

Please indicate the extent to which you agree or disagree with the following statements. (Please tick 1 for Strongly disagree, 2 for Disagree, 3 for Neutral, 4 for Agree and 5 for strongly agree).

		1	**2**	**3**	**4**	**5**
a)	Use of integrated systems plays a crucial role in improving customs performance					
b)	The advanced technological, systems have integrated, diverse components assisted tasks such as, automated voice programs, that give instructions on operations executions have led to considerable improvement in operations.					
c)	Evidence of inter systems portrays the effect of IT on customs performance					

d)	The utilization of advanced ICT systems such as ICMS COSIS CAMIS MMS, has contributed to enhanced levels of tasks execution at the port.					

SECTION 3: SMART GATES

Please indicate the extent to which you agree or disagree with the following statements. (Please tick 1 for Strongly disagree, 2 for Disagree, 3 for Neutral, 4 for Agree and 5 for strongly agree).

		1	**2**	**3**	**4**	**5**
a)	The use of smart gates plays a significant role in customs performance					
b)	The use of port gates significantly influences customs performance					
c)	The use of CFS gates plays a significant role in customs performance					
d)	The use of mega ports has improved customs performance					

SECTION 4: NON-INTRUSIVE TECHNOLOGY

Please indicate the extent to which you agree or disagree with the following statements. (Please tick 1 for Strongly disagree, 2 for Disagree, 3 for Neutral, 4 for Agree and 5 for strongly agree).

		1	**2**	**3**	**4**	**5**
a)	The use of non-intrusive technology greatly boosts the performance of the customs department					
b)	The use of X-Ray scanners, laser detectors and gamma ray technology influences customs performance					
c)	The organization has invested adequately in non-intrusive technology to improve customs performance					
d)	The non-intrusive technology greatly influences customs performance in speed and efficiency.					

SECTION 5: EFFECT OF TECHNOLOGY ON CUSTOMS PERFORMANCE

Please indicate the extent to which you agree or disagree with the following statements. (Please tick 1 for strongly disagrees, 2 for Disagree, 3 for Neutral, 4 for Agree and 5 for strongly agree).

		1	**2**	**3**	**4**	**5**
a)	The adoption of integrated information technology has led to the improvement in the customs performance.					
b)	Embracing risk management has led to improve customs performance in terms detecting contrabands and minimizing Revenue loss					
c)	The use of integrated systems in the operations of customs administration is to increase productivity and greater economic growth					
d)	The quality of service improvement in the customs is attributable to the adoption of integrated technology.					

THANKYOU FOR YOUR ASSISTANCE