THE EFFECT OF CARGO SCANNING ON REVENUE COLLECTION AT THE PORT OF MOMBASA IN KENYA

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

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DECLARATION

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

…….. ……

Signature Date

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HDB335-C16-2493/2016

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

…….. ……...

Signature Date

BEN MUMIA- CPA-K, M.I.N.C.U

LECTURER KESRA

DEDICATION

I wish to dedicate my research work in a special way to the very special and most helpful people before and during my research, first my mum Florence and my husband Jackson who have molded the person in me today. The Kenya school of Revenue Administration has a special space in my heart as being the learning and training institution where love and understanding is a priority. I am specifically indebted to my supervisor for his priceless guidance towards successful completion of this project.

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LIST OF ABBREVIATIONS AND ACRONYMS

CBC- Customs and border control

CSD-Customs service department

CSD-Container screening device

HVO- Head of verification Officer

KRA – Kenya Revenue Authority

KPA- Kenya Ports Authority

SAGA- Semi Autonomous Government Agency

WCO- World Customs Organization

WTO- World Trade Organization

DEFINITION OF KEY TERMS

Container Inspection System:

The container/vehicle inspection systems comprise three major series: the fixed, the mobile and the reloadable systems. They are designed for the customs service to inspect cargo containers without opening them (Robert 2012).

Container Screening Technology: The container-screening device (CSD) is the tool for checking for materials that can be used to build weapons of mass destruction, concealed contraband and illegal substances, and identifying fraudulently labeled containers (Andrew 2017).

Non-Intrusive Inspection Technology: Active, non-intrusive interrogation technologies are inspection systems that take advantage of an externally applied "source" to perform traditional imaging of, or to stimulate characteristic emissions from, an inspected object (WTO 2015).

Scanning downtime: This involves the selection, operation and maintenance of the non - intrusive cargo scanning. The operation of scanners and possible enhancements to scanning machines (Keen and Mansour 2010).

Scanning operator: The recruitment and training of image interpreters. Provision of selectivity and risk assessment of software package (WCO 2012)

Scanning procedure: The term ''scan'' means utilizing nonintrusive imaging equipment, radiation detection equipment, or both, to capture data, including images of a container (Keen and Mansour 2010).

ABSTRACT

The dual missions of ensuring national security and collecting duties and taxes are driving many governments towards implementing policies to maintain the integrity of the supply chain. Customs authorities in many parts of the world are grappling with the problem of significant tax loss, cargo theft and non-compliance to regulatory procedures. Cargo owners on the hand are more concerned with just in time and reliable deliveries, cost effective logistics and maintaining integrity of their cargo. The purpose of this study was to determine the effects of cargo scanning on revenue collection at the port of Mombasa in Kenya. The study was a descriptive research design. Cluster sampling was used to select a sample of the customs officers. The population of interest was 165 custom officers. A structured questionnaire was used to collect the information. Validation of instruments was done by discussing with the respondents and by the research supervisor. Frequencies and percentages were used to analyze the data. The findings pointed out that scanning procedures positively affected revenue collection by 0.232 or 23.2% while scanner downtime was found to affect revenue collection strongly on the negative way, by a 29.5% effect on the revenue collection. It was recommended that the number of scanners to be increased to cover more containers as well as reducing congestion at the scanning unit and delays. The number of trained scanner operators and image analysts should be increased at the station so as to maximize the efficiency of the scanner unit in detections and targeting. There should be proper maintenance of the scanners to avoid scanner downtimes and form a mixed partnership between government (KRA/CUSTOMS) and other private industries. Further, the port requires substantial reforms and upgrading to reach international standards and to meet the demands of a growing and increasingly integrated East African community. It is hoped that the results from this research will be useful to policy makers in Kenyan customs department, KPA and other stakeholders in developing best approaches in improving security of the supply chain thus creating a conducive environment for trade.

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Customs administrations play important roles, which vary from country to country. Their primary tasks relate to facilitation of legitimate goods across administrative boundaries. Tax revenue collection should comply with best practices of equity and promote economic growth. Their duties also include implementation of wide range of government policies such as revenue collection from import tariffs and export taxes, protection against terrorist activities the enforcement of quantitative restrictions on imports or exports of commodities among others (WCO 2012).

Wolfe (2013) states that cargo scanning or non-intrusive inspection refers to non-destructive methods of inspecting and identifying goods in transportation systems. It is more effective, cost efficient and saves time as compared to inspecting physically. The system creates deterrent effect, can detect special nuclear materials, and can reduce congestion at port. In coming up and applying effective and efficient customs controls, policymakers and administrators must admit and manage the unavoidable conflict of interest between government agencies expectations and the commercial community desire for fast, predictable, and reliable clearance and release formalities which are harmonized between countries (Bastan2009).

According to Bakshi (2011), it is imperative for the customs administrations to go for better methods employing superior security. Thus, the introduction of scanners. From a business perspective, if Customs were to unpack suspicious containers, three containers could be done a day. The cargo scanner now aims to do a hundred inspections a day on a highly targeted and non-intrusive basis (Robert 2012). For every single scan that Customs does, they open a case, do the scan, verify and come up with a result, generate a marked-up image, and then manage the findings (in the case of a hit) in a very structured way through other inspection processes, such as stops, unpack, tailboard or impound.

According to Andrew (2017), imaging machines are expensive to purchase and operate, and the imaging process takes time; inspecting containers by hand is labor intensive and takes much longer. Both the cost of imaging and commercial interests in keeping trade flowing have led

CBC to adopt a risk-based imaging strategy, focusing on the containers that it determines to be high risk. Automated systems have been proven capable of introducing massive efficiencies to business processes that can result in increased revenue collections Zhou and Madhikeni (2013). Scanners are used worldwide to inspect baggage and cargo for hidden and prohibited items.

Keen and Mansour (2010) postulates that the scanning process also eliminates fraud, theft and bribery; because all actions are recorded as cases, the same principle applies to Customs' new baggage scanners, which are currently being installed at 10 different Customs offices around the country. This scanning system also helps increase auditability. Customs has the ability to investigate cases, re-investigate cases, check for quality control, interrogate findings, and can determine who did what.

Cargo scanners in all the main ports of entry are set for upgrade and additional ones installed as the Kenya Revenue Authority (KRA) moved to seal tax leaks amid shortfalls in revenue collection. The taxman said the existing scanners would be upgraded to provide sharper image quality and boost their speed and detection capabilities (Keen and Mansour 2010). KRA introduced scanners at the Mombasa Port as part of a wider strategy to curb tax cheats who often made false declaration of goods handed for processing. The basic strategy for modernizing Customs administration is to establish transparent and simple rules and procedures and foster voluntary compliance by building a system of self-assessment buttressed by well-designed audit policies

Mombasa port is the main gateway for Kenya's imports and exports and has become one of the major ports in East and Central Africa region handling about sixteen million tons of cargo each year. The Mombasa port is located on the east coast of Africa approximately midway between the South African Port of Durban and major ports in the Red Sea and the Middle East. It is Kenya's and indeed East Africa's biggest and busiest seaport (Business weekly magazine 2016) The port is the main gateway to East and Central Africa serving a vast hinterland of more than 120 million people in Kenya, Uganda, Rwanda, Burundi, Eastern DRC, South Sudan, Ethiopia, Somalia and Northern Tanzania. At the Mombasa port, there are two scanners. A fixed and mobile scanner.

Andrew (2017), states that customs services department (CSD), within Kenya Revenue Authority (KRA), is the principal agency tasked with ensuring the smooth flow of trade at entry ports in Kenya. The major task of the CSD is to facilitate smooth flow of imports and exports in

and out the custom territory; to collect revenue and enforce prohibitions and restrictions laws assigned in order to protect the society from harmful products like weapons, contrabands and psychotropic drugs. Customs services department has set a Scanner unit that encompasses use of scanning technology as a measure of revenue collection (Njeru 2009).

Mobile cargo scanners are used to provide excellent screening features with flexible maneuverability and rapid deployment. It can provide flexible scanning heights, offset scanning angle and various scanning modes for the best operational mobility and efficiency.

1.2 Problem statement

Public revenue collection is an integral component of fiscal policy and administration. It is the fuel of every government and the main instrument of government funding. With growing donor fatigue and dwindling domestic revenue reserves in most developing countries, the need to strengthen national revenue collection systems has become particularly imperative. Yet, devising efficient means of collecting tax revenue remains a daunting challenge, especially in developing countries. Notwithstanding the pressing need to increase revenue inflows, revenue collection should not be at the sacrifice of economic and citizen welfare. Tax revenue collection should comply with best practices of equity, ability to pay, economic efficiency, convenience and certainty (Zhou and Madhiken 2013).

The introduction of scanners by Kenya Revenue Authority has elicited mixed reactions from the industry players. While cargo owners are in support of the cargo being scanned, the other stakeholders involved are objecting it based on the costs associated with its implementation. Therefore, this study is to investigate the role played by the Cargo scanners, challenges of the scanners and how they promote efficiency and accountability of Kenya Revenue Authority procedures and revenue collection at the Mombasa Port. According to Rodgers (2014), the scanning technology is now used worldwide to check cargo, containers, luggage and other shipments, but a scanner is only as effective as its operation.

To have the proper training of the operators for the scanners is imperative in the identification of what is considered contraband or illegal items for entry into Kenya. With the proper training the operators will increase the efficiency of the revenue collection and reduce the amount of time which would be needed for the physical inventory of the containers. The Kenya Revenue Authority introduced the scanners as a wider strategy to curb tax cheats who often made false declaration of goods and to prevent prohibited and restricted goods. The scanners will

supplement the customs operation at the Mombasa Port that is tasked with monitoring of the cargo and human movement to prevent tax leaks and tackle security threats. This argument corresponds to an earlier statement by Andrew (2017), who argued that while looking at the importance of technology endeavors to provide the balance between quality service delivery and enforcement to enhance revenue compliance.

1.3 Research objectives

1.3.1 General objective

The purpose of this study is to investigate the effect of cargo scanning on revenue collection at the Port of Mombasa.

1.3.2 Specific objectives

i. To establish the effect of scanning procedures on revenue collection at the Port of Mombasa.
ii. To determine the effect of scanning downtime on revenue collection at the Port of Mombasa.
iii. To determine the effect of scanning operator on revenue collection at the Port of Mombasa.

1.4 Research questions

i. What is the effect of scanning procedures on revenue collection at the Port of Mombasa?
ii. What is the effect of scanning downtime on revenue collection at the Port of Mombasa?
iii. What is the effect of scanning operator on revenue collection at the Port of Mombasa?

1.5 Justification

This study is significant to several stakeholders. First to scholars and academicians, this study is designed to increase body knowledge to the scholars of scanners and revenue collection in Kenya. The study will also be important to KRA since it will help in maximizing revenue collection due to the fact that there will be an increased level of security of the monitored cargo. In addition, it will assist in defeating vulnerabilities associated with cargo, which may lead to loss of revenue.

To the Port agencies, the study will help them to receive and act on secure shipment data from the point of origin without relying on shipping partners or any other third party To the Government, this study will help them in management benefits including cost, revenue increase, greater effiency and heightened security. This will also help in reduction of corruption and

promotion of integrity. To the other stakeholders, the study will provide business support services with the purpose of improving voluntary levels of compliance

To the other governmental agencies, the findings of this study will allow for data mining that will enable them in making more informed decision-making as data can be analyzed across various parameters. Finally, for importers and exporters, the findings of this study will provide them with the visibility and security status of their containerized cargo shipments. It will also suggest areas for further research so that the future scholars can pick up these areas and study further

1.6 Scope of the study

The study was carried out at the Mombasa Port in Kenya, which is located in the city of Mombasa. According to the Daily Nation (2017), KRA deployed four scanners at the Mombasa port to increase efficiency. Three fixed scanners and one mobile scanner. The two fixed scanners are found at the Cargo scanning unit in the port whereby in this case one is manual and the other one is a digital scanner. The other fixed scanner is at a place known as Kapenguria, which is within the Mombasa port.

1.7 Limitations of the study

Collecting the completed questionnaires from the respondents was quite a challenge. At some instances, the questionnaires were not returned. I had circulated 115 questionnaires to the participants, hoping to receive much data but at the end only received 72.

At the offices, some of the respondents blatantly refused to complete the questionnaire, citing lack of time and pressure of achieving set targets. Some respondents thought I was spying on them and refused to complete the questionnaire. Despite all these challenges, the response from the custom officers was satisfactory to draw useful conclusions.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The chapter covers: concept of cargo scanners in relation to revenue collection coalescing relevant information regarding theoretical foundation, empirical review, conceptual framework, critique on the existing literature reviews, a summary of the literature and the research gap.

2.2 Theoretical Review

2.2.1 Internationalization Theory

Buckey (2009) considers the Innovation Related model as an innovative process because it requires a pro-active approach that implies a favorable attitude toward international expansion. This model analyses the development and introduction of scanners, which has promoted import and export activities as a development learning curve. The models focus on the learning sequence in connection with adopting an innovation. The various Innovation-Related models can be viewed as the incentives to start exporting and importing. It's noted that the firm is not interested in exporting at Stage X and is willing to fill unsolicited orders or is partially interested at Stage Y. This implies an external change agent or "Push" mechanism to initiate the export decision. The latter models describe the firm as a more interested party and active in the first two stages. An internal change agent is probably a more relevant reason as to why a firm would move to the next stage of internationalization (Rugman 1986).

Markusen (1995) examined the internationalization process theories, organizations generally their operation strategies. This means that they first start with export modes then gradually enter more committed modes like foreign – country-based subsidiaries. Exportation earns our economy much revenue especial when the issues of trust are upheld when it comes to cargo being scanned and well trucked from point of origin to the point of destination. The Uppsala model suggests that internationalization can be viewed as a dynamic cycle. In this case, the change in the state of internationalization depends on the state of internationalization. The distinction therefore between state and change aspects of internationalization is emphasized. In contrast, the Innovation-Related models view scanners as an innovation for the firm Buckey (2009). Both of these models view internationalization as a sequential incremental process with a varying number of stages.

2.2.2 Technological Determinism

Karl (1844) simply puts Technological determinism (TD) as the idea that technology has important effects on our lives. The first major elaboration whose theoretical framework was grounded in the perspective that changes in technology are the primary influence on human social relations and organization structure. It indicates that as an example, the computer is one technology that has promoted in society expectations of immediacy, and ability to multitask by engaging in several tasks simultaneously or in overlapping and interactive ways.

Inventions in technology such as the introduction of non-intrusive inspection methods like using the scanners have made it convenient to perform any form of transaction (Wood 2004). Mc Luhan (1962), an anthropologist has these human historical developments (inventions and innovations) as follows: Today man has developed extensions for practically everything he used to do with his body. The evolution of weapons begins with the teeth and fist and ends with the atom bomb (Whitey 2000). Money is a way of extending and storing labor. Our transportation networks now do what we used to do with our feet and backs. In fact, all manufactured material things can be treated as extensions of what man once did with his body or some specialized part of his body (McLuhan 1962)

TD has also had a long and controversial history in the social sciences in general and in organization studies in particular. Critics of TD argue variously that technology itself is

Socially determined, that technology and social structures co-evolve in a nondeterministic,

Emergent process, or that the effects of any given technology depend mainly on how it is implemented which is in turn socially determined. Given the proliferation of new technologies in modern capitalism, the TD debate is continually renewed.

2.2.3 System theory.

Ludwig (1974) developed the systems theory where he emphasized that systems are open and interact with their environments, and that they can acquire qualitatively new properties through emergence. Rather than reducing an entity e.g. the human body to the properties of its parts or elements, systems theory focuses on the arrangement of and relations between the parts that connect them into a whole. This particular organization determines a system (Klir1991). The cargo scanner is a type of a system that includes the stage of, input and the output process of scanning and hence generating the information.

Klir (1991) added a change in one part of the system would affect the operation and output of other parts and the operation and output of the system as a whole. This theory attempts to find predictable patterns of behavior of these systems and generalizes a whole. The stability, growth or of a system will depend upon how well that system is able to adjust by its operating environment. Any type of a system like scanners will exist to accomplish some purpose that must also aid in the maintenance of the system or else cease to operate as that defined system hence leading to system failure. The goal of systems science is systematically discovering a system's dynamics, constraints, and conditions and elucidating principles that can be used to systems at every level (Jay 1960).

Karl (1844) explains the systems theory as broadly applicable concepts and principles, as opposed to concepts and principles applicable to one domain of knowledge. It distinguishes, dynamic or active systems and static or passive systems. Active systems are activity structures or components that interact in behaviors and processes. Passive systems are structures and components that are being processed. E.g., a program is passive when it is a disc file and active when it runs in the RAM memory. The field is related to systems thinking and systems engineering.

2.3 Conceptual Framework

Independent variable **Dependent variable**

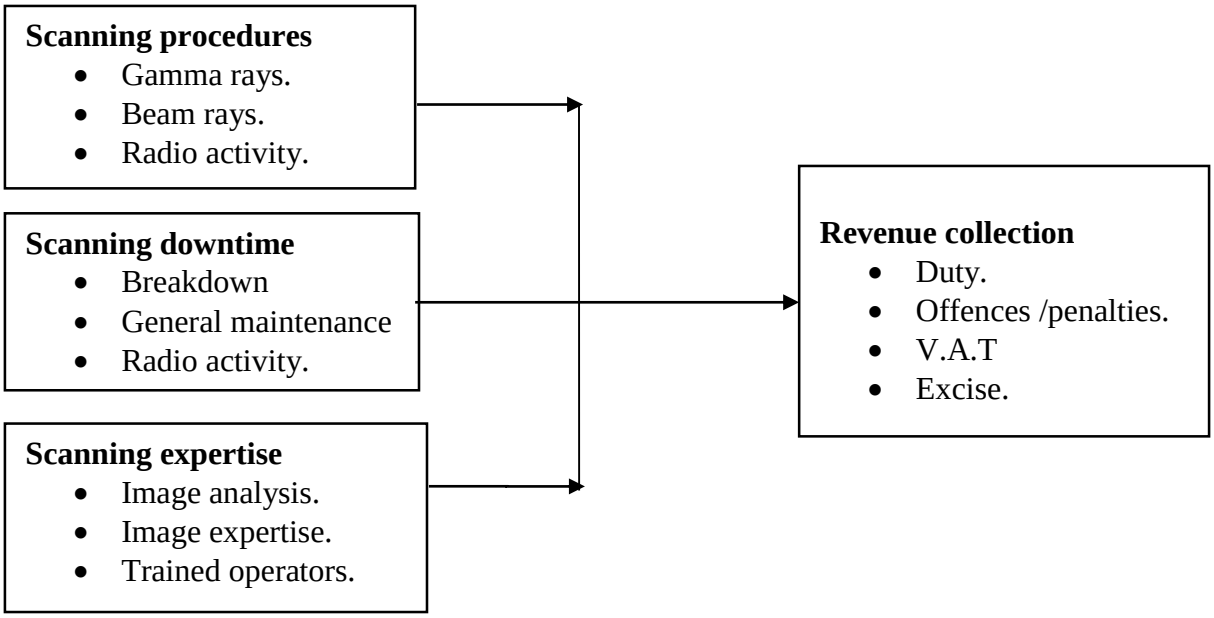


Figure 2.1Conceptual framework

2.4 Review of variables

2.4.1 Scanning procedures

Utilization of scanning equipment for non- intrusive inspection is a recently implemented concept which was put in place after the events of September 2011 in New York City to enhance security at major ports. The use of the scanning technique proves very useful in the protection of our sources of revenue and proper taxation of goods (WTO 2015)

Due to the recent growth of trade, there have been threats to the supply chain security in the world. Therefore, there is need for customs administrations to check for containers, trucks and other vehicles carrying cargo. The containers are checked to ensure no contra-bands, smuggled goods, drugs, explosives and any mis declared cargo (Bastan 2009). The scanning procedure was introduced to ensure compliance and security with trade supply chain.

Flisch (2016) states that customs officers are responsible for the care and protection of goods as well as compliance and movements of goods at the port. The officers also verify if the goods being transported coincide with their declarations. This is done by the use of scanners. The non-intrusive inspection of the containers takes place in the cargo-scanning department at the

Mombasa Port. The main objective is to improve the speed and accuracy of customs procedures using the no- intrusive technology, hence promoting the revenue collection (Bakshi 2011).

According to Rodgers (2014), the scanning process involves the truck carrying the container guided by the custom officer into the scanning area. Usually the driver comes out of the truck and waits 200 meters away in the shielded waiting area. Both the fixed and the mobile scanners are composed of a housing that contains x-ray source device which passes over the container. The personnel with the skills of operating the scanner analyses the images created (Bastan 2009).

The trained personnel analyze the images that have been created by the scanners. The officers are fully trained to use the scanners including their safety. They can easily identify any concealed, under declared cargo in containers, (Bichou 2011). This may lead to seizing, the cargo, or the owner may be penalized. This promotes revenue collection.

In the scanning area, there is a designated area for certain materials for safety measures. There is an exclusion zone that is equipped with barriers and alarms. No one is allowed there when scanning is underway. There are CCTV systems too which ensure against unauthorized access during scanning operations (Bastan2009).

According to Woodell (2009), when scanning is taking place, there are protocols put in place to ensure that when radioactivity is detected there are systems that will terminate the power to the scanners instantly. The beam by nature is thin and does not dissipate. This result in a low level of radiation in the area where the scanning is taking place Placards and signs are posted to ensure that no one accidentally enter the tunnel. Also, part of the intrinsic design of the scanning area is designated to eliminate the escape of radiation. Lastly, all entry and exit doors are interlocked to ensure that when radiation is present, they cannot be opened (Rodgers 2014).

When the scanning is ongoing, the radiation dosage monitors are supposed to check the system in order to ensure the radiation levels are per. The detectors used in the scanners are extremely sensitive and ensure that the minimum power is utilized to check for the correct amount of radiation required for an image during scanning (Rodgers 2014). The truck, the container or its contents absorb no radiation. At the Mombasa Port scanning of the containers is done every day to ensure that it meets the international standards safety standards employed (WTO 2015). During each inspection, custom officers ensure all aspects of scanning equipment are checked, including all safety related features.

As cargo is examined, operation of the safety protocols and procedures are confined. All safety doors, emergency shutdown devices, etc. and stop devices operation and the safety is confirmed through the surveillances camera and their progress is monitored (Bastan 2009). There is a control center that displays the status of inspections. The scanner operator is able to check all the declared data easily.

The information can be sent to container freight stations where targeted containers are checked. Images created from inspections can also be sent to other inspection sections in customs departments and to container freight stations where containers that have been targeted are checked and content of cargo is verified (Wolfe 2013). This promotes revenue collection.

World custom organization (2012), state the example of how non-intrusive inspections can promote Revenue collection far exceeds the charges, at least for ports with high volume. The Great Britain is an example which acquired revenue by over GBP5 billion by reducing the smuggling of tobacco products. That shows how much revenue can be generated in a short time using this procedure. Also, the South Africa Revenue Service (SARS 2016) reports that the first scanner at Durban, which assisted in discovering the large amounts of undeclared imports and smuggled goods. The shippers enjoyed the fact that scanning process reduces the amount of time needed for physical inspections.

2.4.2Scanner downtime

Fully operational facilities are a must. Bakshi (2011) states that downtime detracts from the ability to protect the revenue system against illegal and undeclared items. Diligent year- round operation with compliance ensures the continued revenue generation. Scanner operations have to be consistent at least every day. This is necessary to check for the flow of traffic across different borders. Accuracy should be the factor in achieving well set operations. It is important to check and ensure vehicles are correctly positioned and scanned. The scanner operators analyze images created. All data is collected and analyzed. In addition, there is also the need for detailed administration and equipment care (Bastan 2009).

All the U.S.-bound containers are 100% scanned. According to Luther (2015) he states that it involves the use of radiation scanners and portable non-intrusive devices. The only problem in today's technology is that it cannot detect shielded radiation that must be resolved urgently. That is to detect dangerous materials like dirty bombs and nuclear contents in containers which

are transported in special containments with a certain thickness of steel protecting radiating substances.

According to WCO ((2012), the non-intrusive devices can only scan approximately 20 containers per hour and hence give a greater accurate result and less need of physical inspection. Due to possible high radiation levels, scanners are required to be in concrete to extend the peripheral area. Annual scanning capacity is estimated to be 52 00 containers per year. This takes into consideration of the different scanners, location and training and speed vary from location to location. The main advantage of this is that the cargo scanners tend to give a greater accurate result and hence tertiary inspection becomes low (KPA 2011). Different scanners have different characteristics hence vary on their operations. Their results also vary depending on different effects with regard to their location, organization of transport to and from the scanner on ports and terminals

Jaccard (2014) postulates that while revenue collection objectives are reportedly achieved and even exceeded in some cases, the physical insertions of the scanning sites have not always been well thought of. There should be rapport established with the port and trade communities as well as the government agencies concerned. Complaints have been heard in some areas concerning high cost being provided by the logistics operators as well as delays in the cargo flow which happen due to unnecessary physical inspection. The effectiveness of the capacity building and know-how transfer components has also been questioned in some cases (Bakshi 2011)

Chase *et.al,* (2011) states that revenue growth from shipment through port; rail or road traffic can easily shift from Kenya to others countries. With Kenya charging zero scanning fees in its shipments, an even with a small differential in Port costs, manufacturers and shippers are able to put a few cents per unit. Though, the effect of developing the ports and expansion of trade is likely going to be affected negatively. This may lead to loss of revenue. Our scanning process being 100% may cause loss of revenue. The paper by De Wulf (2009) on the introduction of scanning devices should improve efficiency and accuracy of custom procedures. This can meet the government's needs as well as unnecessary trade outcome.

Costs of scanning procedure will be very difficult to assess at first until it has been implemented at all facilities. Added costs will pass to the final customer resulting in a slowdown in trade and economic growth (Clark 2009). Moosa and Imad (2009) agree that firstly, full scanning is

considerable. The US legislation requires both radiation and scanning. There are no set international on U.S legislation which standardize the equipment. Without these standards implementations at export would be very difficult.

The 100% performance of a scanner cannot do away with interference of goods are scanned. The efficiency of scanning results would depend, crucially, on the reliability of the security systems of port authorities at the scanning unit, which is usually different across the world. Moosa and Imad (2009).

Additionally, the scanning requirement focuses on maritime containerized cargo only, whereas materials used for mass destruction may be transported by other means. According to Clark (2009), such weapons are transported by different means considering the fact that others may be too heavy to be shipped. Therefore, it's not quite easy to conclude a case saying 100% scanning can be best and accurate as compared to risk targeted controls of dangerous weapons.

2.4.3 Scanner operators

Daily operations require a variety of duties to be performed rapidly. It needs skilled personnel with a detailed understanding of their duties. This absolutely is considered because of the scanning operations require at the Mombasa port. The scanning unit at the port requires trained operators who have an acute understanding of the tasks they need to perform (Wolfe 2013).

According to Hill et.al, (2009) the degree of trained individuals who can operate scanners is normally held by customs departments. The scanner operators should be equipped with skills of accuracy, precise and fast in running the day to day operations at the Mombasa port. They are acquired with the skills to excel in scanner operations: spatial perception, color identification, sustained attention, mental rotation, visual closure, and others (Paul 2008).

Image inspection is challenging, since they are much cluttered as they overlap making it challenging for the scanner operator. With varied objects whose appearance looks similar, the operator may have difficulty in learning visual appearances (Keen and Mansour 2010) In

addition, some images may appear to be translucent unlike optical images of natural scenes which may complicate the operator's interpretation

Scanner operators are required to check all the images that come from container transactions at the Mombasa port. The scanner operators at the Mombasa port port are trained to inspect all the images. They are also trained in machine vision and learning to automate similar search tasks in other departments and this promotes revenue collection (Hill, *et.al* 2009). However, application to X-ray images, outside of biomedical applications, appears to be mostly limited to image pre-processing.

Kdikom (2010) argues that although training of scanner operators is time-consuming and costly to generate. The custom operators using the technique use different numbers of images that can be retrieved from different threat objects and select them making it possible to train the officers to detect small metallic threats in scanning images.

The cargo canners are used worldwide to inspect baggage and cargo for hidden and prohibited items; however, scanners cannot identify suspicious images without skilled, trained operators (WTO 2015). Operators need broad ideas of detection experience. The operators are assessed to ascertain their knowledge and suitability for detailed, analytical work. This assessment looks at a number of areas, including special perception, color identification, attention to anomalies and visual closure (Paul 2008).

Moreover, current technology is not able to meet full scanning requirements. During scanning, systematic barges and transshipment containers may end up creating headaches for the operators. Terminal operator at the port indicates that at such moments they do not see a possible solution to scan barge and transshipment containers (Clark 2009). Therefore, all containers will have to be brought to the x-ray scanner.

Therefore, each employee at the scanning unit has a role operating the scanner and coordinates all tasks associated with the scanner. This includes the task of how to start and shut down the scanner in order to optimize the entire operation.

2.5 Empirical Review

SARS (2016) conducted a study at the Port of Elizabeth harbor to determine the effect of scanners on custom processes. A descriptive research design was adopted; the population

consisted of custom officers and cargo owners. The study concluded two things. Primarily, it was concluded that scanning increased sea efficiency. Secondly, it was concluded that scanners had an effect on their transport system and the costs were potentially a barrier to trade and hence collection of revenue.

Another study by Luther (2015) on cargo scanners and revenue collection was undertaken at Durban Container Terminal. He had survey research design where he sampled operators and custom officers. The results of the study stated that the cargo scanners increased auditability despite the fact that there was inflation in transfer costs due to transferring of containers to the scanning area and back. According to him, there was need for installation of scanning machines and equipment.

Cirincione *et. al*. (2008*),* examined the effect of cargo scanners on customs department. A descriptive research conducted showed a barrier to the success of 100% maritime cargo container scanning. It was found out that costs associated with scanning the containers were pleasant and could easily be absorbed but when a container was to be scanned and then be inspected physically it increased the costs. Indirect costs like delay costs that could not be easily quantified were found out to be discouraging to the stakeholders when a container was scanned.

2.6 Critiques on the Existing Literature

There are various studies conducted by various researchers in reference to scanning cargo from one point to another. For example, SARS (2016) conducted a study at the Port of Elizabeth harbor to determine the effect of scanners on custom processes where it revealed that the scanners proved to affect the transport system and the costs were potentially a barrier to trade and hence collection of revenue. In addition, a study by Luther (2015) on cargo scanners it showed that the use of cargo scanners increased auditability. Though limitations were found in the studies conducted, the researchers concluded that the use of scanners is recommended in improving revenue collection in customs departments.

2.7 Summary

This chapter reviewed literature by other scholars and researchers on the subject of cargo scanners. Three main theories have been reviewed together with their variants. These main theories are systems theory, technological determinism and internalization theory. Technological determinism was grounded in technology where primary influence on human

social relations and organization structure while the system theory attempts to find predictable patterns of behavior of these systems and generalizes a whole. The internalization theory (I-R) model considers internationalization as an innovative process because it requires a pro-active approach, which implies a favorable attitude toward international expansion. This model analyses the development and introduction of scanners, which has promoted import and export activities as a development learning curve.

The empirical review was done where a number of studies explain the relationship of cargo scanners and revenue collection were reviewed. The studies were done outside Kenya. They have shed light on cargo scanners that have been borrowed for use in the study. From the review, both theoretical and conceptual frameworks have been articulated.

2.8 Research gaps

Given the fact, that there are a number of studies that have been conducted in reference to scanning cargo from one point to another, many scholars have looked at it. A study conducted at the Port of Elizabeth harbor to determine the effect of scanners on custom processes did not clearly explain how the scanners affect the revenue collection (SARS 2016). Another study was done on cargo scanners and revenue collection taken at Durban Container Terminal whereby it stated that the cargo scanners used to increase auditability despite the fact that there was inflation in transfer costs due to transferring of containers to the scanning (Luther 2015). It never showed clearly how the scanners had an effect on revenue.

These studies have focus more on scanner operation as a like between international trades. Emphasis should be kept at all, and if need be they should be evaluated to see how each individual channel contributes to the nation as far as revenue generation is concern.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter explores the methodology that was used in the study clearly explaining the research design, target population, sampling procedures and sample size, research instruments, validity and reliability of the instruments, data collection and data analysis. It explains sources of the data that were used, methods of data collection and the techniques to be used to analyze the collected data.

3.2 Research Design

The study used descriptive research design where it described how cargo scanners have influenced revenue collection at the Mombasa Port. Descriptive research evaluated proactive measures taken to ensure scanners are operational. It also enabled the researcher to gain understanding and insights that came up after introduction of scanners at the Mombasa port.

3.3 Population

Ngechu (2008) defines a population as set of people, elements, events, things or households that are under study. The population of this study consisted of all the 473 custom officers in Mombasa as per the KRA Human resource records of December 2017.

3.4 Sampling frame

A sampling frame consists of a list of all these within a population who can be sampled and may include individuals or institutions (Raymond 2009). This sampling frame consisted of 115 customs officers as provided by the Kenya Revenue Authority Supervisor in charge of the cargo-scanning unit.

Table 3.4 Sampling frame

POPULATION	SUBSETS	POPULATION
CLUSTER 1	CFS	22
CLUSTER 2	CFS	22
CLUSTER 3	CFS	22
CLUSTER 4	CFS	22
CLUSTER 5	CFS	22
CLUSTER 6	MOMBASA PORT	55
TOTAL		165

3.5 Sample and sampling technique

The study used a cluster-sampling technique. Cluster sampling is a technique where the total population is divided into groups called clusters (Refer the clusters to appendix v). Then all the elements in each cluster are sampled. The study used cluster sampling since it considers large populations hence it is economical for the researcher.

The study adopted the Slovin's formula in order to determine the sample size from the population.

$n = N / (1+Ne^2)$

Where; $n= 165/ (1+165x\ 0.05^2)$

$n = 115$

n is the sample size,

N is the population size,

e -the level of precision.

95% level of confidence will be used which gives p = 0.05 chance of deviation from the actual

POPULATION	STRATA	SAMPLE SIZE
CLUSTER 1	CFS	15
CLUSTER 2	CFS	15
CLUSTER 3	CFS	15
CLUSTER 4	CFS	15
CLUSTER 5	CFS	15
CLUSTER 6	MOMBASA PORT	40
TOTAL		**115**

3.6 Data collection instruments

The data was collected in this study using structured questionnaires. According to Mugenda and Mugenda (2009), questionnaires are commonly used to obtain important information about a population under the custom officers' questionnaires were used to solicit information about the relationship between the cargo scanners and revenue collection to the custom department on their operations with regard to profitability, costs and challenges faced. These were administered using interviews with the researcher.

3.7 Data collection procedure

The custom officers' questionnaires were used to solicit information about the benefits of cargo scanners to the custom departments, challenges faced and measures taken. The respondents were to indicate the degree of their agreements with the questionnaires collected from the respondents immediately after they are returned for review.

3.8 Pilot testing

Validity refers to the degree used to which evidence and theory support the interpretation of test score entailed by use of tests. Validity of the instrument will be checked by running the questions against the previous findings of how scanners have affected revenue collection in Kenya. Validity of research instrument was done

Reliability is considered a measure of internal consistency that is how closely related a set of items are as a group. The items in the instruments will be split into two. A split half technique will be used after the data is collected. A value through assistance of research supervisors of 0.7 or above for the two halves was interpreted as being reliable.

3.9 Data analysis

The researcher used quantitative methods for analysis. Quantitative methods enabled the researcher to understand the effective usefulness of the data collected. Quantitative data

from the questionnaire was coded and entered into the Statistical Package for Social Sciences (SPSS version 24.0) for analysis. This particular package was chosen because of its user friendliness. The data is presented in figures, tables and graphs. The outcome of quantitative analysis is useful in making inferences about the study. The research report is both objective and subjective and will be defined in the appropriate table.

The linear regression model:

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

Y - Revenue collection

β_0- constant term, the intercept indicates the collection without other variables under study

$\beta_1, \beta_2, \beta_3$- coefficients explaining the effects of independent variable X_1, X_2, and X3 to dependent variable Y

X_1- scanning procedures

X_2- scanning downtime

X_3- scanning operator

ε- The error term, other factors that might influence the revenue collection but not included in the study

CHAPTER FOUR

RESEARCH FINDINGS AND ANALYSIS

4.1 Introduction

This chapter represents analysis, findings discussion of the study as set out in the research objective and research methodology. It is aimed at establishing the effects of cargo scanning and revenue collection at the Kenya Revenue Authority in Kenya at the Mombasa port. The data was gathered from the 72 respondents who successfully completed the questionnaires.

4.2 Response Rate

The researcher had a target population of 115 officers stationed in the CFSs and the Mombasa Port. Out of the administered 115 questionnaires the researcher managed to get 72 duly filled questionnaires.

Table 4.2.1 Response Rate

	Frequency	**Percentage**
Respondent	72	62%
Non-respondent	43	38%
Total	**115**	**100%**

4.2.1 Pilot Results

Table 4.2.2 Pilot Results

Scale	**Cronbach's Alpha**	**Comments**
Scanning Procedures	0.815	Accepted
Scanner Downtimes	0.818	Accepted
Scanner Operators	0.709	Accepted
Revenue Collection	0.844	Accepted

Using the Cronbach's alpha to test the internal consistency of the data collection instrument, all the variables tested had an index of over 0.700 which is considered adequate measure of the

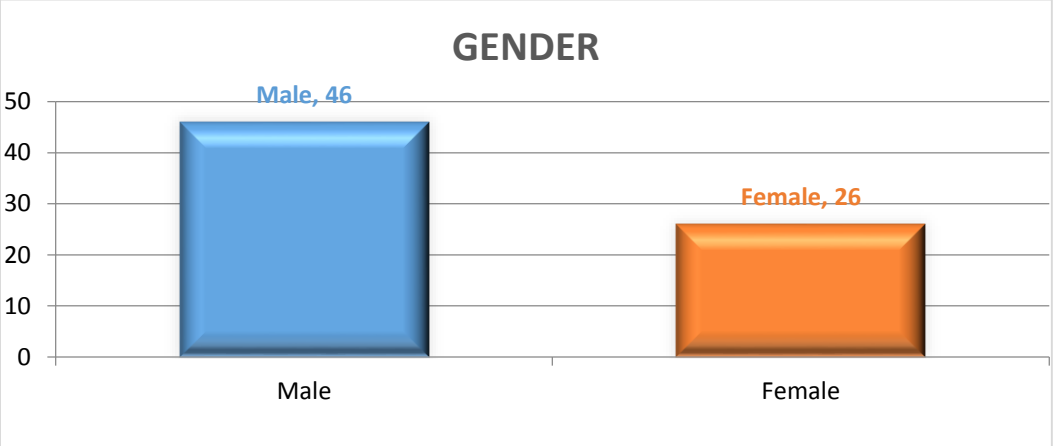
data collection internal consistency (2005). Scanner Procedures had Cronbach's alpha of 0.815, Scanner Downtimes had 0.818, Scanner operator had 0.709 while Revenue collection had 0.844 Cronbach's alpha index therefore sufficient to rule that the data collection instrument, questionnaire used was reliable.

4.3 Demographic analysis

The establishment of demographic data of respondents was guided by the following items; gender, highest level of education and training attained, their designation in the firm and number of years they have worked in that position.

4.3.1 Gender

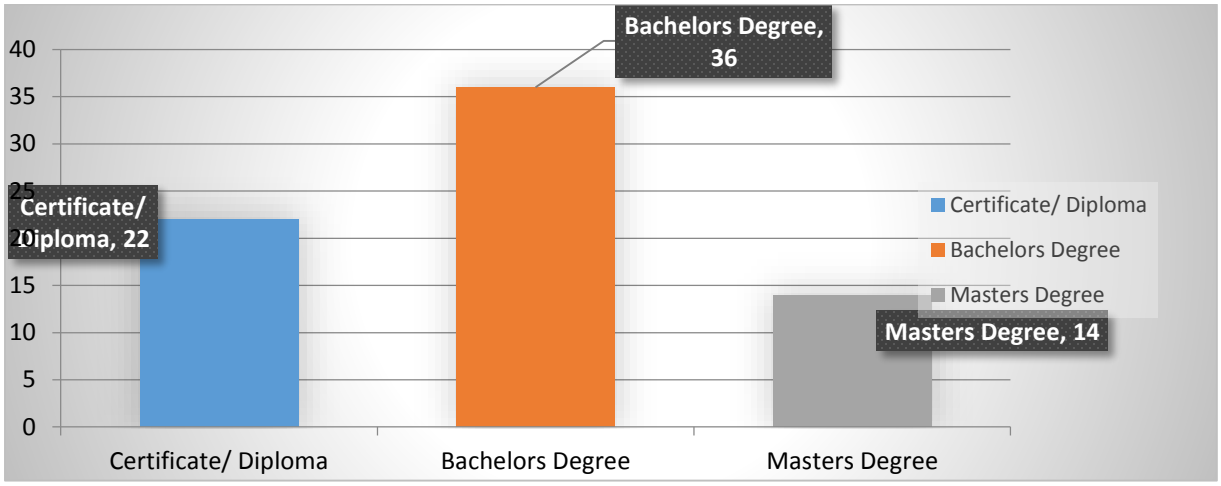
Figure 4.3.1: Gender



From the respondents it is evidenced that females took their time to respond to the study with 62% compared to their male counterparts who had 38% response.

4.3.2 Level of Education

Figure 4.3.2 level of Education.

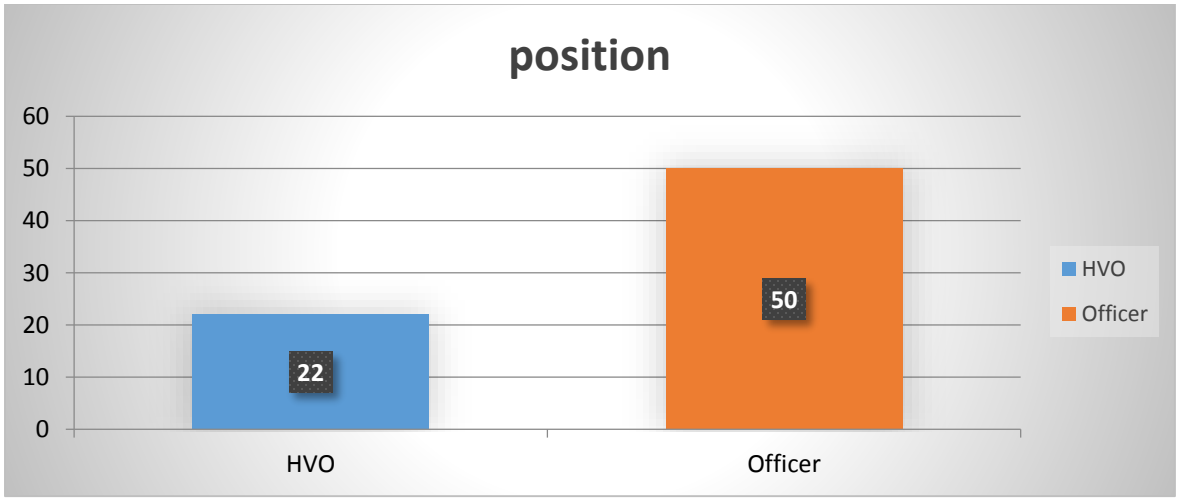


To achieve the objective of this study respondent were requested to react to set of questions, testing the employee's level of education and their current framework and whether they adhere to the regulatory framework of customs.

It is evident that most officers had acquired their bachelor degrees which is 50% compared to master's degree which is 19%.

4.3.3 Position

Figure 4.3.3 Position.



The research findings as reflected in figure 4.2.3 also show that majority of the employee's (69%) in the study are just custom officers while the 31% are the heads of verifications at the different container freight stations.

4.4 Descriptive Analysis

4.4.1Scanning procedures

Scanning procedures has affected the revenue collection, using the Likert scale questionnaire to investigate these having 5 as strongly agree to 1 as strongly disagree. Most of the respondents agree with the statement. The respondents agree with the statements from the questionnaire as evidenced from the mean and standard deviation of respective statements. Customs department uses scanners as a modern technology to detect prohibited and restricted cargo at the Mombasa Port has a mean of 4.1389 showing overall agree by the respondents. Scanning of cargo has helped reduced the time wasted for checking cargo as compared to physical inspection with a mean of 3.5833 and a standard deviation of 0.80623. Customs department uses scanners to collaborate with other stakeholders which are available in Kenya to curb diversion and security of cargo with a mean of 3.4167 and a standard deviation of 0.96732.Customs department uses scanners to collaborate with other stakeholders which are available in Kenya to curb diversion and security of cargo with a mean of 3.4167 and a standard deviation of 0.96732.Customs department uses X-ray technologies to curb tax cheats who often make false declarations with a mean of 4.0278 and a standard deviation of 1.02779.

Table 4.4.1 scanning procedures

Statement	Mean	STD. Dev.
Customs department uses the scanners as a modern technology to detect prohibited and restricted cargo at the Mombasa Port.	**4.1389**	**.89929**
Scanning of cargo has helped reduced the time wasted for checking cargo as compared to physical inspection	**3.5833**	**.80623**
Customs department uses scanners to collaborate with other stakeholders which are available in Kenya to curb diversion and security of cargo	**3.4167**	**.96732**
Customs department uses X-ray technologies to Curb tax cheats who often make false declarations	**4.027**	**1.02779**

4.4.2 Scanner Downtime

The questionnaire sought to measure the responses of the respondents with the statements from the questionnaire administered. Scanner downtimes distract the Authority's ability to protect revenue systems from illegal and undeclared gods (Bakshi, 2011). There are enough cargo scanners machines at the Mombasa Port that improve the speed of clearance has a mean of 3.75 and a standard deviation of 1.105. The cargo scanners improve compliance within the customs departments with a mean of 3.4722 and a standard deviation of 0. 97060. Cargo scanners act as a better method and tool of customs control 3.4722 and a standard deviation of 1.05522The costs associated with cargo scanners are high compared to physical inspection of cargo having a mean of 3.7778 with a standard deviation of 1.17379.

Table 4.4.2 Scanning downtime.

Statement	Mean	STD.Dev.
There are enough cargo scanners machines at the Mombasa Port that improve the speed of clearance	**3.7500**	**1.10518**
The cargo scanners improve compliance within the customs departments	**3.4722**	**0.97060**
Cargo scanners act as a better method and tool of customs control	**3.4722**	**1.05522**
The costs associated with cargo scanners are high compared to physical inspection of cargo	**3.7778**	**1.17379**

4.4.3 Scanner Operator.

The respondent's statistics agree with the questionnaire statements in the section, Customs department has enough skilled manpower to operate scanners at the Mombasa Port has mean of 3.8889 with a standard deviation of 1.03586. Customs department provide enough logistics for employees working at the scanning unit at the Mombasa port had a mean of 3.6389 with a standard deviation of 0.72320. Customs control divisions provide consistent capacity building training to officers with a mean of 3.1944 and a standard deviation of 0. 95077.Scanning of cargo has reduced corruption and promotes integrity to custom officers due to automation with a mean of 3.5 and a standard deviation of 1 .

Table 4.4.3 Scanner Operator.

Statement	Mean	STD.Dev.
Customs department has enough skilled manpower to operate scanners at the Mombasa Port.	**3.8889**	**1.03586**
Customs department provide enough logistics for employees working at the scanning unit at the Mombasa port.	**3.6389**	0 **.72320**
Customs control divisions provide consistent capacity building training to officers.	**3.1944**	**0.95077**
Scanning of cargo has reduced corruption and promotes integrity to custom officers due to automation.	**3.5000**	**1.0000**

4.4.4 Revenue Collection

The respondents strongly agree with the statements in this section as evidenced, the introduction of scanning cargo has promoted revenue collection due to improved levels of compliance having a mean of 4.4167 with a standard deviation of 0.7319. The cargo scanners have improved the port performance at Mombasa port hence promoting revenue collection3.9722 with a standard deviation of 0.87786. Training of scanner operators within customs departments promotes revenue collection3.8333 with a standard deviation of 0.97101. Well-coordinated scanning procedures improves cargo security hence revenue collection a mean of 4.1667 and a standard deviation of 0.69693.

Table 4.4.4 Revenue collection.

Statement	Mean	STD.Dev.
The introduction of scanning cargo has promoted revenue collection Due to improved levels of compliance	4.4167	.73193
The cargo scanners have improved the port performance at	3.9722	.87786

Mombasa port hence promoting revenue collection		
Training of scanner operators within customs departments promotes revenue collection	3.8333	.97101
Well-coordinated scanning procedures improves cargo security hence revenue collection	4.1667	.69693

4.5 Correlation Analysis

4.5.1 Pearson's Coefficient of correlation

Pearson Correlation Correlations

Model		S_procedure	S_downtime	S_operator	Revenue_collection
S_procedure	Pearson Correlation	1	.476**	.456**	.613**
	Sig. (2-tailed)		.000	.000	.000
	N	72	72	72	72
S_downtime	Pearson Correlation	.476**	1	.570**	.712**
	Sig. (2-tailed)		.000	.000	.000
	N	72	72	72	72
S_operator	Pearson Correlation	.456**	.570**	1	.539**
	Sig. (2-tailed)		.000	.000	.000
	N	72	72	72	72
Revenue collection	Pearson Correlation	.613**	-.712**	.539**	1
	Sig. (2-tailed)		.000	.000	.000
	N	72	72	72	72

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

The relationship between variables under study has also been established using Karl Pearson's coefficient of correlation (r). From the table above, there is a positive correlation between scanning procedures and scanner downtime of 0.476, scanning procedures with scanner operator has a 0.456 while that of scanner procedure to revenue collection has a positive correlation of 0.613. Scanner downtime has a positive correlation with the scanner operator of 0.570, while scanner downtime has a negative correlation to the revenue collection of-0.712

correlation to the revenue collection and scanner operator has a 0.539 correlation to the revenue collection.

4.6 Regression Analysis

4.6.1 Coefficient of determination (R^2)

Coefficient of determination

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.878a	.771	.750	.74930

a. Predictors: (Constant), PROCEDURES, DOWNTIME, OPERATOR

R is the simple correlation which indicates the degree of correlation; R indicates that there is a high degree of correlation given by 0.878. The amount of variation of the dependent variable that is explained by the independent variables under the study is R Square (R^2). The model summary indicated above shows that there is relationship between the dependent and independent variables. From the studied variables, the model explains a 77.1 % of the relationship to the dependent variable. While 22.9% of the factors are not explained by the factors under the study.

4.6.2Analysis of Variance ANOVA

The Analysis of variance from the table below indicates the study is significant, this is evidenced by the significance level of 0.00 which is below the minimum acceptable p value of 0.05 this implies that the regression model developed is significant and can predict the relationship between the dependent and independent variables. Based on confidence levels of 95% indicates a high reliability of the model, supported by P and F Values whereby the P value is given as 0.000 while F value is 35.971, this clearly supports the significance of the model obtained.

Table 4.6.2 Relationship analysis.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	60.589	3	20.196	35.971	.000[b]
	Residual	17.967	68	.561		

Total	**78.556**	**71**

a. **Dependent Variable: Revenue collection**
b. **Predictors: (Constant), S_operator, S_downtime, S_procedure**

4.6.3 Coefficients

Table 4.6.3 Multiple Regressions

Model	**Unstandardized Coefficients**		**Standardized**	**t**	**Sig.**
	B	**STD. Error**	**coefficients BETA**		
(Constant)	5.256	1.131		4.646	.000
S_procedure	.232	.068	.320	3.430	.000
S_downtime	-.295	.051	-.529	-5.784	.002
S_operaror	.236	.056	.367	4.187	.000

a. **Dependent Variable: Revenue collection**

The regression model to be used is as follows:

$$\mathbf{Y=\beta_0 +\beta_1X_1+\beta_2X_2+\beta_3X_3 + \varepsilon}$$

Therefore, the regression model obtained from the study will be as follows;

$$\mathbf{Y = 5.256 + 0.232X_1 -0.295X_2 + 0.236X_3 + \varepsilon}$$

Where;

Y - Revenue collection

β_0- constant term, the intercept indicates the collection when the variables under the study are zero.

$\beta_1, \beta_2, \beta_3$- coefficients explaining the effects of independent variable X_1, X_2, and X3 to dependent variable Y

X_1- scanning procedures

X_2- scanning downtime

X_3- scanning operator

ε- The error term, other factors that might influence the revenue collection but not included in the study

$Y = 5.256 + 0.232X1 - 0.295X2 + 0.236X3 + \varepsilon$

Revenue collection = 5.256 + 0.232 Scanner Procedures - 0.295 Scanner Downtime + 0.236 Scanner operator

The amount of revenue collected at the Mombasa port in Scanner units will be affected by the Scanning Procedures adopted, Scanner Downtimes avoided and Scanner operator.

Performance in terms of revenue collection will still be achieved when the variables under the study (independent variables; Scanning procedures, Scanner Downtime and Scanner operator) are zero. This value is given by 5.256 which is the Y-intercept in the regression model generated above.

A unit increase in improvement of Scanner procedures will improve revenue collection by 23.2%. the improvement in the scanner procedures will positively improve the revenue collection which is given by 0.232 or 23.2%

Scanner downtime affects negatively the revenue collections; a unit change in scanner downtimes will negatively affect the revenue collection by 29.5%. A unit change in the scanner downtime results to an inverse change in the corresponding revenue collection. A unit reduction in Scanner Downtimes results to a 29.5% increase in the revenue collection in port of Mombasa Scanner Unit.

Scanner operators will affect revenue collection positively; a unit increase in scanner operators' expertise improves the revenue collection at the port of Mombasa by 23.6%.

CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Introduction

This chapter provides the summary of the research findings and conclusions on the effects of cargo scanning on revenue collection at the port of Mombasa. The conclusions and recommendations are provided in the chapter so as to improve on the revenue collection at port of Mombasa and later on the areas for further research by other researchers to further examine other ways for improving revenue collection at the port of Mombasa.

5.2 Summary of findings

5.2.1 What is the effect Scanning Procedures on revenue collection at the Port of Mombasa?

The study findings established that there was a significant effect of the Scanner Procedures on the Revenue Collection. This effect has resulted from the increase in revenue collection after the implementation of scanning cargo as compared to the physical verification of goods. Prior to the introduction of scanners, the average collection of revenue was low. Most of the respondents agree that scanning of cargo has promoted revenue. From the model generated, Scanning Procedures positively affects Revenue collection by 0.232 or 23.2%. Scanning procedures with scanner operator has a 0.456 while that of scanner procedure to revenue collection. The findings are significant from the model with the P value of 0.000 which is less than 0.05 this clearly supports the significance of the model obtained.

5.2.2 What is the effect of Scanner Downtime on revenue collection at the Port of Mombasa?

The Scanner Downtime was found to affect Revenue Collection strongly on the negative way (-0.295), a 29.5% effect on the Revenue Collection. Majority of the respondents are in agreement that scanner downtime had a negative effect on revenue collection at the Mombasa Port. The study looked at the extent which scanning downtime had an effect within customs control. Clearly, the effect of scanning downtime is concerned with transition consults. The respondents agree that enough cargo scanners machines at the Mombasa Port are effective, ensures cargo safety and reliability. Scanner downtime has a negative correlation to the revenue collection of-0.712 correlation to the revenue collection. P value of 0.000 which is less than 0.05 this clearly supports the significance of the study.

5.2.3 What is the effect of Scanner Operator on revenue collection at the Port of Mombasa?

The Scanner operator positively affects the Revenue Collection by a 23.6%, the individuals who operate the Scanners and their expertise towards the operation as well as the speed in operation and image analysis to provide for exact detections which are efficient. Traceability of individual or group actions is of essence where important data is concerned. Scanning of cargo has reduced corruption and promotes integrity to custom officers due to compliance with custom laws. The study also looked at the extent to which training of scanners operators within customs departments had an impact on revenue collection. Scanner operator has a coefficient of correlation r, 0.539 correlations to the revenue collection indicating a significant effect on the revenue collection. P value of 0.000 which is less than 0.05 this clearly supports the significance of the study.

5.3 Conclusions

The purpose of the study was to investigate the effects of cargo scanning on revenue collection at the Port of Mombasa, therefore from the findings, the study concludes that;

1. Scanning Procedures has moderate positive effects on the Revenue Collection at the Mombasa Port Scanner unit. Their introduction and operation at the port affects positively the revenue collected at the Scanner Unit.
2. Scanner Downtimes significantly affects the Revenue Collection negatively, the frequent scanner downtimes cause the unit to miss out on revenue collections.
3. Scanner operator has a positive effect on the revenue collection at the scanner unit. The expertise of the operator and the image analysts' influences the revenue collected based on the number of containers scanned and the containers targeted.

5.4 Recommendations

Based on the conclusions above, it was recommended that;

1. The number of scanner to be increased to cover more containers as well as reducing congestion at the scanning unit and delays. Also, the number of Scanners will cover the problem of scanner downtimes.
2. Proper maintenance of the scanners to avoid scanner downtimes and form a mixed partnership between government (KRA/CUSTOMS) and other private industries to overcome cost limitations associated with the scanners

3. Increment on the number of trained Scanner operators and image analysts at the station so as to maximize the efficiency of the scanner unit in detections and targeting.

5.5 Areas for further research

The study focused on the three independent variables namely scanner procedures, scanner downtime and scanner operator and how they affect the dependent variable revenue collection. From the model obtained, the coefficient of Determination the model indicated that the independent variables studied explained 77.1 % of the relationship to the dependent variable. While 22.9% of the factors are not explained by the factors under the study. Therefore, the researcher recommends further studies to be conducted on other effects of Cargo scanning on Revenue Collection.

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APPENDIX I: RESEARCH AUTHORIZATION LETTER

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 Ms. Emily A. Oduor of admission number HDB335-C016-2493/2016is a bona fide student of the Kenya School of Revenue Administration (KESRA), Mombasa Campus. She is in her 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. Ms. Oduor 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 her to collect information that relates to her research from your organization.

Thank you for your support and cooperation.

Yours sincerely,

Winfred Jillani
Ag. Principal – KESRA, Mombasa Campus.

Tulipe Ushuru Tujitegemee !

KENYA VISION 2030

APPENDIX II: QUESTIONNAIRE

This research work is intended to explore the general over view of THE EFFECT OF CARGO SCANNING ON REVENUE COLLECTION AT THE PORT OF MOMBASA. Any response you provide here is strictly confidential and will be used exclusively for the research purpose. Your honesty in responding the right answer is vital for the research outcome to be reliable.

SECTION A: DEMOGRAPHIC INFORMATION

Gender:

Male ( ) Female ( )

Highest level of Education and training attained?

Certificate/Diploma ( ) Bachelor's Degree ( ) Master's Degree ( )

Please state your designation in the firm……

Number of years you have worked in the position

Below 5 years ( ) 5-10 years ( ) 11- 15 years ( ) above 15 years ( )

SECTION B: SCANNING PROCEDURE

5= Strongly Agree, 4= Agree, 3= Neutral, 2= Disagree, 1= Strongly Disagree

	PARAMETERS	5	4	3	2	1
	Customs department uses the scanners as a modern technology to detect prohibited and restricted cargo at the Mombasa Port.					
	Scanning of cargo has helped reduced the time wasted for checking cargo.					
	Customs department uses scanners to collaborate with other stakeholders which are available in Kenya to curb diversion and security of cargo					
	Customs department uses X-ray technologies to curb tax cheats who often make false declarations					

SECTION C: SCANNER DOWNTIME

5= Strongly Agree, 4= Agree, 3= Neutral, 2= Disagree, 1= Strongly Disagree

	PARAMETERS	5	4	3	2	1
	There are enough cargo scanners machines at the Mombasa Port that improve the speed of clearance					
	The cargo scanners improve compliance within the customs departments					
	Cargo scanners act as a better method and tool of customs control					
	The costs associated with cargo scanners are high compared to physical inspection of cargo					

SECTION D: SCANNER OPERATOR

5= Strongly Agree, 4= Agree, 3= Neutral, 2= Disagree, 1= Strongly Disagree

	PARAMETERS	5	4	3	2	1
	Customs department has enough skilled manpower to operate scanners at the Mombasa Port					
	Customs department provide enough logistics for employees working at the scanning unit at the Mombasa port					
	Customs control divisions provide consistent capacity building training to officers					
	Scanning of cargo has reduced corruption and promotes integrity to custom officers due to automation					

SECTION E

5= Strongly Agree, 4= Agree, 3= Neutral, 2= Disagree, 1= Strongly Disagree

	PARAMETERS	5	4	3	2	1
	The introduction of scanning cargo has promoted revenue collection due to improved levels of compliance					
	The cargo scanners have improved the port performance at Mombasa port hence promoting revenue collection					
	Training of scanner operators within customs departments promotes revenue collection					
	Well-coordinated scanning procedures improves cargo security hence revenue collection					

APPENDIX III: CONTAINER FREIGHT STATION CLUSTER ZONES IN MOMBASA

CLUSTER 1- PORT

CLUSTER 2- KIBARANI

CLUSTER 3- SHIMANZI

CLUSTER 4- CHANGAMWE

CLUSTER 5- FERRY

CLUSTER 6- JOMVU