

**THE EFFECTS OF THE AUTOMATION OF CUSTOMS PROCESS ON THE
EXPORT OF BULK PETROLEUM PRODUCTS FROM KENYA.**

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DECLARATION

This Management Research Project is my original work and has not been presented for examination in any other university.

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DEDICATION

This study is dedicated to my dear husband, Symon, without whose support this feat would not have been achieved, to our sons Samuel, Michael and Murathime, who inspire us to work that much harder, and to my Mum, Hannah who kept pushing me to complete this work when no one else would.

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ABSTRACT

The purpose of the study was to find out the effect of the automation of customs processes on the exportation of bulk petroleum products from Kenya as implemented by the Kenya Revenue Authority in 2005. The researcher carried out a survey of all the 25 oil companies with operations in Kenya, and that sold petroleum products in the region at the time. A descriptive research design was used to guide the research process. Thirty senior executives drawn from oil marketers in the region were purposively targeted for the research. Data was collected using a structured questionnaire. The data was analyzed using descriptive statistical techniques and inferential statistics. This entailed summaries in frequency tables and bar charts. Spearman's Rank Correlation Coefficients were computed to establish the relationships between the study variables.

Major findings of the study revealed that automation had a significant positive effect in the customs business processes on a number of fronts. The study established a strong and significant positive correlation between change in corruption initiated by customs officials and customs automation ($r=.632, p<.001$). Equally, there was a positive change in perceived corruption according to 60% of the respondents. Similar findings were registered on both perceived and actual corruption initiated by oil marketers. Improvements were also registered in the accuracy of declarations with a strong and significant positive correlation between accuracy of declaration and automation of customs processes ($r=.685, p<.001$). Majority of the respondents also observed positive change in the sealing of revenue leakage points. However, the study revealed an inverse relationship between customs automation and the speeds of both in-coming and outgoing cargo declaration and release. Further findings revealed a negative and significant relationship between customs automation and oil marketers' business performance indicators such as ROCE, profitability, turnover and lead time. The oil companies experienced challenges in business processes, time frames, human resource capacity and online communication with Kenya Revenue Authority officials.

The automation of customs on transit and export of bulk petroleum products has had both positive and negative effects to its key stakeholders. Kenya Revenue Authority have achieved its key objectives of customs automation as seen through reduction in corruption

actual and perceived corruption at customs, widening of tax-payer base, accuracy of cargo declarations and the sealing of revenue leakage points. Oil marketers also benefit in terms of integration with regional affiliates. However, the impact on exporters of bulk petroleum products has been largely negative. This is seen in reduced return on investment, profitability and turnover, due to longer lead-time occasioned by delayed access to goods.

In order to establish more accurate results, at individual firm level, further studies could be extended in the subject of the impact of customs automation on oil marketers by controlling for firm-specific factors such as strategy or organizational culture.

The possibility of using the automated process to become authorized economic operators also provides an area of further research, on how both KRA and oil marketers have taken advantage of the automation to implement the concept of authorized economic operators, and impact of the same on oil marketers in the East African region.

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LIST OF ABBREVIATIONS

COTS	-	Commercial Off-The-Shelf
DRC	-	Democratic Republic of Congo
DTI	-	Direct Trade Input
ICT	-	Information Communication and Technology
ISCM	-	Integrated Supply Chain Management
KRA	-	Kenya Revenue Authority
LPG	-	Liquefied Petroleum Gas.
KPRL	-	Kenya Petroleum Refinery Ltd
PWC	-	Price WaterHouse Coopers
ROCE	-	Return on Capital Employed
SOA	-	Service Oriented Architecture
SPSS	-	Statistical Package for the Social Sciences
UNECE	-	United Nations Economic commission of Europe
EDIFACT Transport	-	Electronic Data Interchange for Administration, Commerce and Transport
WCO	-	World Customs Organization
XML	-	Extentisible Markable Language
eDOC's	-	Electronic Documents

CHAPTER ONE: INTRODUCTION

1.1 Background

Petroleum products are a key source of energy not only to the Kenyan economy but through out the world. This makes petroleum products trading a key aspect of the growth of an economy. Petroleum products also contribute significant incomes to governments in terms of duties and taxes. As a result, revenue authorities pay very close attention to petroleum trading. Kenya also acts as a transit point for petroleum products destined to the neighboring landlocked countries. Whenever goods leave one country into another they go through a customs process. The role of customs has also been evolving to include provision of trade statistics, spot and control illicit trade and facilitation of trade. Trade facilitation simply addresses the logistics of moving goods through ports or more efficiently moving customs documentation associated with cross-border trade (Wilson, Mann and Otsuki, 2005). This is over and above the traditional and key role of revenue collection.

Customs compliance requirements have been affecting a growing number of businesses involved in the cross-border movement of goods and the manufacture of goods under bonded conditions (Kerr, 2009). In Kenya, the role played by the customs department in the smooth flow of petroleum products has steadily gained prominence since the year 2005. The environment in which oil and petroleum firms operates has also become increasingly turbulent and complex. Public opinion and individual norms and values have changed and society's expectations and the demands it makes on petroleum companies are now higher than before (Oomens and Bosch, 1999). This change in the oil trading environment and the high expectations the government has for its customs department create a need for automation of the customs process.

1.1.1 Concept of Customs

The concept of customs is a world wide one. Customs is an authority or agency in a country responsible for collecting and safeguarding customs duties and for controlling the flow of goods in and out of a country. A customs duty is a tariff or tax on the import of or export of goods. In Kenya customs is a department in the Treasury under the Ministry of Finance. Kenya and her neighbors, Uganda and Tanzania are subject to the East Africa

Customs union of March 2004. The payment of duties consist a cost for any business. It therefore creates opportunity for some to attempt evasion leading to illicit trade or other forms of corruption where one can pay less than they ought, or avoid duty payment all together by diverting duty free goods meant for neighbouring countries into the local market Businesses in Africa perceive the impact of customs as mostly unfavorable, a mixture of obvious and subtle impediments (McTiernan, 2006). The impact is felt in three main ways. i) Cost, due to fees and staff that have to be engaged to 'handle all the required customs procedures. ii) Time, due to elongated times clearing goods at border points and iii) Flexibility as goods are tied up in customs processing are not available for sale. On the other hand, government perceives the role of customs as core in its ability to run a country. The main reason being, that customs is the main collector of revenue used to run governments. The additional roles that customs play include provision of trade statistics that can be used in policy formulation, facilitation of trade, and policing the borders to curb trade in illicit good or goods that may put the security of a nation in jeopardy, e.g. military equipment.

1.1.2 Concept of Automation

The concept of automation is gaining the increasing attention of both researchers and practitioners in the field of technology and strategic management (Lozier and Chittipeddi, 1996). Technological issues are not phenomena found only in large firm's domain (Robinson and Pearce, 1994). Wartick and Mahon (1994) describe technological management as a process by which a business can identify, evaluate and respond to social and political issues which may impact significantly upon it. The working definition used by King (1982) is that automation is a natural response to a condition or pressure on the business that involves possible outcomes that are important to, or of possible high impact on the business's overall performance. According to Bigelow, Fahey and Mahon (1993) automation will have an impact on the business performance and ability to meet its objectives. Further, Dutton and Ottensmeyer (1987) mention the fact that technological advancements are classified as strategic because they can alter the business's performance if left unnoticed or unaddressed.

Automation of systems as a strategic management issue has also continued to evolve with time. In less than three decades, technological advancement and automation has become

established as a distinct discipline to add value to organizations (Issue Management Council, 2005). Dutton and Jackson (1987) state that the assumption underlying most organizational theory, research and practice is that the short term effectiveness and long-term survival of organizations are determined by the actions they take in response to their external environment. Bigelow, Fahey and Mahon (1993) point out that the strategic management in technology of issues is prominent in discussions of organizations response to environment turbulence. The need for an organization to respond to technological changes in its macro environment is therefore key to its survival and indeed continued relevance.

The automation of customs processes therefore becomes a concept that is desired by both the government, as a collector of revenues and the businesses. The change is viewed by the customs department as necessary in order to stay relevant, in bringing the much needed revenues to run government business while at the same time encouraging the now technologically savvy business community to be compliant with tax regulations. The businesses also see themselves as a key stakeholder in the hope that compliance will reduce the negative aspects of the customs process on their operations. It involves the lodging of declarations on line. The Kenyan government introduced an automated customs system dubbed *simba* in 2005. Through this system, goods are tracked from entry to exit and collection of relevant taxes enforced through online monitoring.

1.1.3 The Concept of Import and Export

The concept of import and exports of goods and services is the backbone of international trade. It is brought about by businesses seeking to take advantage of prevailing opportunities in a particular country (Yabs, 2006). A number of Kenya's neighbors do not have petroleum deposits that are exploitable and are land locked. Kenya on the other hand is a maritime country with a sea port that allows easy delivery of petroleum products from other parts of the world. The Kenyan businessmen have therefore sought to take the opportunity to sell petroleum products to these landlocked neighbors by exploiting their strength, the sea port. Kenya is also preferred as a transit country because of the shorter distance from the port of Mombasa to these countries' interiors. Competition by the port of Dar es salaam does exist but is hampered by the longer on land journey to the destination markets. As a result petroleum products destined to Northern Tanzania,

Uganda, Rwanda, Burundi, Eastern DRC, Southern Sudan and sometimes Somalia are transited through Kenya. The Kenya Revenue Authority (KRA) allows goods destined to these countries to come in to the country duty free for transit as long as the required accounting procedures and timelines are observed.

Kenya also does process her own petroleum products at the local refinery. Customs treats these as if they were destined to the local market. It is possible to sell these to the neighbors through an export compensation scheme where one presents proof of export and is refunded duties paid on the same. Some of the imports originally destined to the local market and for which duties have been paid can also be exported through this scheme.

1.1.4 The Rationale for Automation of the Customs Process

The question then begs, why automate the customs process. The automation is expected to yield gains such as reduced corruption, improved accuracy of declarations, speeding up of the declaration and clearance process, reduction of the cost of goods clearance, increase in revenue collection by sealing revenue leakage points, ease of access to customs officials through on-line communication, widening of the taxpayer base and improved record keeping for the mutual benefit of customs and the businesses. Such data can be easily retrieved for clarifications, analysis and use in policy development. It is upon this background that this research is formulated to study the effects of automation of the customs process on the export of bulk petroleum products from Kenya. The study examined to what extent these improvements have been achieved after the automation and how the businesses have been affected by it.

1.1.5 Oil Industry in Kenya

The main source of energy in Kenya is actually wood fuel, which accounts for about 70% of all energy consumed. Petroleum and electricity currently account for only 21% and 9%, respectively. The Government's sector-development priorities include measures to shift the pattern of energy consumption towards modern forms of energy (i.e. electricity and petroleum), in order to protect the environment and to provide energy forms necessary for economic growth (PWC, 2008).

There is therefore great potential for growth in these other forms of energy. The main players in the petroleum sector are various petroleum companies involved in the distribution of petroleum products. There are about five main companies and a growing number of independent oil distribution companies also referred to as new entrants that have sprung up since the liberalization of the sector: the Kenya Petroleum Refinery Limited (KPRL), which operates the only oil refinery in the country, and the Kenya Pipeline Company Limited, which operates the pipeline that runs from Mombasa to Nairobi, Nakuru, Kisumu and Eldoret. There are plans to extend the pipeline to Uganda (PWC, 2008).

The petroleum sector was deregulated in late 1994 with the deregulation of retail prices of petroleum products and of the importation of crude oil and refined products. However, the sub-sector could not be fully deregulated mainly because of the market's dependence on KPRL for liquefied petroleum gas (LPG), and the absence of a viable infrastructure for its importation. Therefore, the Government requires oil companies to import and process crude oil through the refinery to satisfy the requirements for LPG. The Government introduced an open tender system for the importation of crude to the refinery and refined products for use in the region. Under this system a tender for importation of crude and refined products is awarded to an individual oil company, which then imports the same for the whole industry and supplies to the other oil companies (PWC, 2008).

In the recent past, questions have been raised about KPRL's commercial viability and the plant's inability to produce environmentally friendly products e.g. low sulphur diesel and the poor technology that make refining locally a lot more expensive than importing finished products. Stakeholders are divided on whether to shut down the plant in favor of processed imports or invest in a more modern and efficient new plant. A consultative process has been launched to determine the exact value of investment required to upgrade the refinery and prevent closure. The sale of KPRL shares by multinationals that have operated in Kenya in the last half of the century, namely Shell, BP and Chevron, to new ones is seen as another opportunity for re-examination of the value of the investment.

In the Kenya petroleum industry, Oil companies can be categorized in two main categories: the major oil companies and the new entrants. The major oil companies are

the companies with more than 5% of the market share while the new entrants are the rest with the exception of National Oil Corporation which is a parastatal. They include: Shell, Total Kenya, Libya Oil (formerly ExxonMobil) and Kenol Kobil. The major oil companies constitute more than 69% of the total market share accessed through the port of Mombasa while the rest share the 31%. The new entrants or independents are the new companies established after the liberalization in 1994. They include; Gapco, Bakri International, Galana oil, Engen Kenya, Hass Petroleum, Petro Oil, Oilcom, Dalbit Petroleum, Triton Petroleum, MGS International, Intoil, Gulf Energy, Muloil, Addax Kenya, Hashi Energy, Riva Oil, Fossil, Jade Petroleum, and Metro Petroleum. These have stamped their authority in the export business, controlling more than 60%, while the majors control only 30%.

1.2 Statement of the Problem

Automation issues in management is a managerial function that helps corporations identify, analyze, and respond to social and political concerns that can significantly affect them (Greening and Gray, 1994). Due to the potential of automation activities to influence organizational outcome variables, the function has received generous attention from strategic management scholars. However, prior scholars have not examined what impact the automation process in customs processing of bulk petroleum products exports has had on the oil companies in the East African region.

Prior to liberalization in October 1994, a significant feature of Kenya's oil industry was a relatively high level of government's direct participation, and a correspondingly low level of private sector involvement. Seven marketing and distribution companies were responsible for procuring, importing and exporting their own oil. The National Oil Corporation of Kenya was mandated to supply 30% of the crude oil requirement into the country. Since liberalization, the government has licensed many companies to engage in petroleum trading, especially import and export, wholesale and retail of petroleum products. This move was intended to enhance competition and as a result, improve the price to the customer. However, despite this initiative, the smooth flow of goods through customs has remained a challenge.

The independent oil companies were the oil companies established after liberalization and currently commanding an export market share of 60%. These have been struggling to compete with the major oil companies in a bid to establish their competitive strength and as well position themselves strategically in the regional market, an effort that is clearly bearing fruit in the regional market place. These firms have also been accused, in collusion with customs officers, of compromising the customs process and as a result creating an uneven playing field between them and the majors. There has also been concern over revenue leakage through diversion products meant for the export market into the local market without payment of requisite duties. This is one of the motivations for automation of the customs process. There is also the question of return on investment, where majors feel that they have put in quality investment in the Kenyan infrastructure but the benefits are reaped by “cherry pickers” who have invested little but are taking the lion share of the regional market. The regional market currently consumes approximately 30% of all bulk petroleum products passing through Kenya. This study also established findings that will inform policy makers in respect to this particular perceived problem.

It seems that a lot of researchers have been interested in studying the oil industry in Kenya as there are numerous scholars that have studied the industry in different disciplines. For instance, Amolo (2002) studied the process of benchmarking order delivery for continuous improvement. Kapacha (2002) did an investigation into the factors that make the edible oil industry competitive. Muthaura (2002) surveyed the operations of service stations in the oil industry using Terry Hills’ framework models. Munuve (2003) focused on the customer perceptions of the differentiating features of fuel cards offered by firms in the oil industry in Kenya. Odhiambo (2006) explored the relationship between equity structure and corporate performance of firms in the oil industry in Kenya. Karuri (2007) also did a study on the oil industry and focused on the competitive priorities and trade offs in physical distribution. Tuitock (2007) did a study on benchmarking health, safety and environmental performance measurement practices in the industry. A study by Isaboke (2001) came closest to the current study but was focused on investigating how major oil companies respond to the threat of new entrants in exporting oil products.

As can be observed, no study has been done on automation of customs processing of exports in the oil industry. This constitutes a gap in literature that this study sought to bridge. Automation of customs on export by oil companies in Kenya are operating in a rapid changing environment with different issues impacting on their viability. According to Dutton and Jackson (1997), attempts to understand the process through which business decision makers learn about the external environment and implement their technological responses has been through strategic issues management. The problem of this study was therefore to find out the effect of the automation of customs processes on the exportation of bulk petroleum products from Kenya.

1.3 Objective of the Study

The main objective of the study was to find out the effect of the automation of customs processes on the exportation of bulk petroleum products from Kenya

1.4 Significance of the Study

The outcome of this research would benefit the Kenya Revenue Authority. It would provide them feedback from their most important customer, the taxpayer on how effective this change has been. The study examined to what extent the following areas of customs interface have been improved or deteriorated by the change, reduction of corruption, improvement in accuracy of declarations, speeding up of the declaration and clearance process, reduction of the cost of goods clearance, increase in revenue collection by sealing revenue leakage points, ease of access to customs officials through on-line communication, widening of the taxpayer base and improved record keeping for the mutual benefit of customs and the businesses. It would therefore provide useful information on what went well and where there is room for improvement. This information would inform the authority's future decisions and actions with regard to their trade facilitation role, tackling corruption and change management.

The research would also provide the business community an analytical perspective of how the automation has changed their operating environment with respect to the factors mentioned above. They can use this information to redesign their organizations to respond to the new customs environment. The business community can also use the information from the customs automated database to build cases to the government when

need arises. This is because the KRA data is would be considered trustworthy by other government departments. The community can also apply the revelations of the study in determining how heavily management should get involved in the customs aspects of the business. Whether it should continue being a small department which is manned by low qualified staff and largely outsourced or its role and perception needs to change. How much resource to allocate to this role and its impact to the bottom line can also be informed by the findings of this study. The outcome of the research would also help the Government in its trade facilitation role. This aspect of business in Kenya would also be available for academicians.

CHAPTER TWO: LITERATURE REVIEW

2.1 Automation

Wagner (1995) asserts that automated systems in customs are one of the most important tools for simplifying international trade procedures. As a complement to customs reform, automation is an integral part of customs modernization (Cavusgil, 1994). It also stimulates the increased use of Information and Communications Technology (ICT) by other governmental departments and private sector stakeholders, whose activities involve customs operations. They include various government agencies, importers, exporters, freight forwarders, carriers, customs brokers, terminal operators, banks, and shipping and insurance agents (Meneghetti *et al.*, 2000).

As part of an overall customs reform and modernization programme, automated customs procedures replace the manual processing of customs documents by the computer-assisted treatment of electronically-transmitted information. Before this can happen, documents and customs procedures have to be reviewed and aligned with international standards, conventions and other instruments. This is the critical exercise that would allow customs reform and modernization to become instrumental for the introduction of international standards and recommended best practices (Meneghetti *et al.*, 2000).

2.1.1 Implementing Customs Automation Systems

A successful implementation of customs automation systems requires that a number of conditions be met from the outset: strong political backing of the reform and modernization processes by the government and customs management; a transparent and collaborative approach by the project management to generate support from staff and external users, including brokers and agents (cooperation between the public and private sectors); a phased implementation of the customs automation systems; the implementation of international conventions, standards and other instruments, including a national customs tariff based on the harmonized system and documentation; an overall review and amendment of the customs law and other related legal instruments to ensure compatibility with the new procedures, notably the electronic lodgment of clearance data and the introduction of a single administrative document where applicable (Wagner, 1995).

Customs' main functions are to control the cross-border flow of goods, ensure compliance with government rules and regulations, to collect the duties and taxes due according to the national customs tariff and tax code, and to protect the country against the import of goods and materials intended for illegal purposes, and against terrorist activities (Cavusgil, 1994). Abbas and Swierez (1991) note that this complex work can be facilitated through the use of computer systems consisting of comprehensive and integrated software packages with a number of functionalities or modules, such as: cargo control – to monitor all movements of import, transit and export, and ensure that all goods are either duly cleared before release or a mechanism is in place that allows for the release prior to clearance; declaration processing – to capture and process data for duty and tax collection; payment and accounting – to register and account for payments by importers and exporters; intelligence operations – to store and exchange data for risk profiling and enforcement, and risk management to select consignments bearing a higher risk of concealing duties and taxes, or those prone to smuggling and trafficking illegal substances and materials; statistics and reporting – to extract data for foreign trade statistics and to generate management reports for customs.

Meneghetti *et al.* (2000) asserts that customs automation is a highly technical and complex project and ICT is very important in all phases of implementation. Usually an ICT Division within the customs authority will be responsible for the operation and support of all ICT systems. Often, international ICT experts are included in the initial stages to build the system and to train local computer staff in running and maintaining the project. Owing to this extensive training their qualifications and IT capacities can increase their value on the job market to a point that they often are reluctant to stay beyond the implementation phase. Therefore, only competitive employment conditions will ensure their continuous support (Abbas and Swierez, 1991).

Upgrading and replacement of computer equipment is a reality that cannot be avoided. As early as possible customs administration should, therefore, make sure that required funds will be available at the appropriate time, for example through the collection of a user fee for each transaction, reflecting the actual and projected costs of systems upgrade and replacement (Wagner, 1995).

2.1.2 Benefits and Costs

Customs automation mainly results in increased transparency in the assessment of duties and taxes, substantial reductions in customs clearance times, and predictability. All these factors will eventually lead to direct and indirect savings for both government and the trading community. More specifically, benefits usually include simpler, more transparent procedures and documents, based on international standards, faster electronic lodgment of customs declarations, using Direct Trader Input (DTI) or other on-line connections, reduced customs clearance times and less physical examination of shipments owing to the use of risk management applications. There is also increased collection of duties and taxes and less fraud due to the uniform application of laws and regulations, the automated calculation of duties and taxes as well as built-in security. Another benefit is the reduction of customs auditing of documents and records after release of the goods can also be expected, and separation of payment of duties and taxes from the physical clearance of goods (under deferred payment schemes, e.g. payment by week or month). There is also enhanced capacity building of staff and management in both customs and the private sector (e.g. through training courses on simplified procedures and documents based on international norms, UN recommendations and WCO standards). Improved and timely foreign trade statistics as trade data are an automatic by-product of the computerized system (Meneghetti *et al.*, 2000).

Cost implications for the implementation and operation of an automated customs system vary from country to country, depending on the initial state of ICT applications in the customs administration (e.g. existing computer systems and reform programmes), the scope of the project and the level of locally available professional skills to support the modernization process (Meneghetti *et al.*, 2000). Implementation costs are mainly linked to hardware requirements, software development or purchase, training and expert consulting needs, more precisely hardware requirements, i.e. the procurement of computers and related ICT equipment, and connectivity, i.e. access to the necessary telecommunication infrastructure. This component is directly dependent on the number of physical sites to be computerized (including ports, border and regional offices), the characteristics of the territory (mountainous terrains, archipelagos, inaccessible passes,

etc.); and the refurbishment of buildings (customs headquarters, regional offices and border posts) where automation components will be installed (Mechling *et al.*, 1995)

There will also be software requirements, such as the need for computer programs to transform documents into required formats and automate customs transactions and procedures. The necessary software will either have to be purchased or developed as well as installed, often by national and/or international advisers and experts. In addition, the key software elements will have to be customized to reflect local conditions, such as tariff structure and content (De Toni *et al.*, 1999). Training requirements, that is costs linked to the installation, operation and maintenance of hardware and software. This will largely depend on the level of skills available and the resulting training needs of customs staff and management. In addition, costs and delays occur due to other factors including legislative reforms, or the need to build new offices or new telecommunication networks (De Toni *et al.*, 1999).

De Toni *et al.* (1999) state that automation of customs processing for imports and exports within countries must be the long term objective. Usually, both the starting point and methodology adopted in each country will vary considerably. Any attempt to introduce a uniform regional system would not be a feasible proposition. However in the long term there could be advantages if customs administrations were able to access each other's automated information as a means of improving customs control and also achieving savings in the resources currently devoted to data capture (Cavusgil, 1994). In the shorter term what can be achieved is harmonization of the basic data requirements and the adoption of UN-EDIFACT standards. It should also be the aim to use regional expertise on automation to assist those countries that are in the early stages of planning automation. However, any initiatives that are implemented should not cause any country to be regressive with regards to the stage of computerization of their customs procedures (Mechling *et al.*, 1995). Customs automation needs to ensure maximum use of information technology in the efficient performance of all international trade and customs functions and activities with the aim of substantially reducing or eliminating paper transactions. Such systems need to comply with UN-EDIFACT to enhance linkage.

customs after arriving at the point of entry or exit in the country remained a challenge. Enterprises were more likely to report that customs and trade regulations were serious obstacles in countries where processing delays were longer. Wilson (2006) observed that although customs and administrative procedures are necessary for the smooth application of trade and other policies, they can thicken the borders between trading partners if the customs and administrative procedures are more stringent than necessary or inefficient.

2.2.1 Paperless Trading

One of the most immediate, and far-reaching, steps towards automation of customs processes is the establishment of a “paperless” trading process that is, allowing or requiring customs documents and declarations to be filed electronically. In addition to eliminating the many obvious problems with paper documents – including data storage and retrieval, and human error associated with manual entry – paperless trading significantly speeds up the customs clearance process (Calof, 1994). In a paperless environment, trading partners can electronically submit information about their consignments prior to arrival at the border. This allows customs to process information and target suspicious consignments in advance of their physical arrival. Customs can also provide trading partners with electronic notification of the release status immediately after a consignment comes into customs’ control (Mechling *et al.*, 1995).

2.2.2 Single Window

This paperless environment can be taken a step further with the establishment of a Single Electronic Window, a facility that allows parties involved in trade and transport to lodge standardized information and documents with a single entry point to fulfill all import, export, and transit-related regulatory requirements (Calof, 1994). It is, in other words, a process by which trading partners can submit all necessary data, whether required by customs or other government agencies, at once, in a standardized format. Once the data has been submitted through this single entry point, the responsibility lies with the government for ensuring that all relevant agencies are provided access to the necessary information. The implementation of a Single Window ensures that the trade partner will not have to submit the same data to multiple government authorities, and significantly reduces redundant paperwork within the government. In instances where physical

inspection of the goods is necessary, the government agencies involved can achieve further efficiency by ensuring that inspection is coordinated as well (Calof, 1994).

2.2.3 Risk Management

Chetty and Hamilton (1996) argue that in addition to helping facilitate smooth cross-border trade, a paperless environment can aid customs agencies in their primary missions of controlling the border and collecting revenue. With the volume and speed of modern international trade, it is impossible for customs agencies today to inspect every individual consignment that passes through their control. Because of this, customs agencies have turned to risk management techniques to help them identify and target suspicious consignments (and people) for further inspection. Although it is possible to implement a risk management system without having an automated system in place, automation makes the system much more efficient, consistent, and accurate. An automated risk management system can combine the information received electronically from trade partners (prior to the arrival of the consignment), historical data on shipments and compliance, and intelligence fed in by customs and other government agencies. This combination of timely and broad-based information can increase the consistency and reliability with which fraudulent and illegal shipments are detected, while simultaneously expediting the processing of legitimate shipments (Chetty and Hamilton, 1996).

2.3 Authorized Economic Operator

With the use of consistent risk management processes comes the possibility of developing a program of expedited processing and release for Authorized Economic Operators – trade partners who meet specific requirements laid out by customs (these could include, for example, the electronic filing of documentation in advance of shipment and a track record of full customs compliance). With an accurate and reliable risk management system in place, customs can release Authorized Economic Operators' goods based on a minimum amount of information – thus reducing transit time, encouraging consistent compliance with customs regulations, and freeing up customs resource to focus on targeted suspicious consignments (Chetty and Hamilton, 1996).

This set up can be taken another step further with the implementation of an Authorized Supply Chain program. In an Authorized Supply Chain, all participants in the supply

chain – everyone handling a consignment from shipment to arrival have verified security procedures in place and have been authorized by customs. In an Authorized Supply Chain, security and control would be extended to the supply chain in its entirety, through the use of Uniform Consignment References (UCR), allowing the use of simplified reporting procedures.

2.4 Customs Functions

An automated system offers benefits beyond the core functions of customs clearance and customs control as well. For example, with an electronic system, data such as trade statistics can be generated much more quickly and with much higher accuracy than in a manual system. Revenue collection, too, can be improved with an automated system; accounting and payment processes can be built into the system to aid in the tracking and collection of payments due (Hair, *et. al.*, 1995).

The benefits of an automated system are obvious. For customs, faster and more accurate processing of more shipments, using fewer resources; for trade, elimination of redundant paperwork, and expedited release of goods, allowing for faster shipments and more tightly managed supply chains. However, there are also a number of issues and challenges that need to be addressed before the switch to a paperless environment can be made. The most serious of these issues is the effect that a move to an automated environment can have on trade and government partners who deal with customs on a daily basis. Any change to the system for filing customs documents and declarations will have an impact on the trade, and a change mandating the adoption of new technology will be particularly burdensome. Trade partners may have to revamp many of their internal processes, or even invest in compatible systems or software, in order to meet the requirements of the automated system. This concern may be especially relevant in developing countries. Without cooperation from trade partners, even the well-designed automated system will be ineffective.

Similarly, implementation of a Single Window requires cooperation from other government agencies; without the active participation of all government agencies with border control responsibilities, the utility of the Single Window system is greatly diminished (Hair, *et. al.*, 1995). In addition, any automated system must be implemented

within a country's legal framework. In some cases, there may be legal impediments, such as requirements for hard-copy signatures or paper copies – that prevent the full benefits of a paperless environment from being realized. In all cases, though, systems should be designed for flexibility and adaptability, to allow it to be kept up-to-date with changing laws, regulations, international agreements, and technological advances (Chetty and Hamilton, 1996).

2.4.1 Technology Solutions

Hair, *et. al.* (1995) assert that the latest technologies and international best practices facilitate the development of this kind of adaptable, interoperable, collaborative system. Rather than rely on expensive, proprietary, custom-built solutions, customs agencies are frequently turning to open source commercial off-the-shelf (COTS) software for its adaptability, standards compliance, transparency, and low cost. Standards compliant open source software can be customized to meet an individual country's characteristics, needs, and customs legislation, while remaining flexible enough to adapt to changing national and international requirements (Lim *et al.*, 1996). Similarly, a system based on Service Oriented Architecture (SOA) produces benefits in terms of adaptability and interoperability. Service Oriented Architecture refers to a framework for designing computer systems, where each service provided by the system exists as its own discreet module. These loosely connected modules can be used by other systems, and can interact with each other. Thus, an organization can efficiently link multiple disparate systems together through a series of reusable modules (Hair, *et. al.*, 1995).

Web-based systems, in particular, can be used to increase interoperability and collaboration. Systems operating over the Internet allow both customs agencies and trade partners to operate in a familiar environment, using international standards such as XML, and reduce the need for investments in software and systems. Web-based systems can simplify communications between customs and trader partners, and can allow customs agencies to collaborate on-line. Whatever type of automated system is implemented, however, a truly interoperable and collaborative environment is impossible without a data model, a model that describes how data is represented and used (Hair, *et. al.*, 1995).

2.4.2 Data Model

To ensure that automation of core customs procedures results in increased efficiency and allows for regional collaboration, a standardized data model should be developed, based on international best practices. A Data Model lays out a framework of standards, harmonized data sets, and electronic messaging guidelines to be used in sharing of customs information between and among customs and trade partners. Implementing a standardized model for information exchange and communication can reduce costs, expedite cross-border trade, and simplify compliance. The Data Model itself can be broken down into two parts: a Business Process Model and an Information Model, both of which can be described using the international standard Unified Modeling Language (UML) (Hair, *et. al.*, 1995).

2.4.3 Business Process Model

Business Process Modeling is a technique for describing, analyzing, and optimizing business processes. Using a modeling language, a business process model shows the progression of activities submissions from trade partners, automated systems processes, electronic notifications, actions by customs authorities, and so on carried out as part of the overall customs process. By taking a big-picture view of the process, examining associates, dependencies, and other characteristics (Cavusgil, 1984).

Business Process Modeling can be used to design an optimized process for implementing the automation of the core customs procedures discussed above. The Business Process Model should take into account relevant international agreements – including the Revised Kyoto Convention, the WCO Guidelines on Integrated Supply Chain Management (ISCM) and the WCO’s SAFE Framework of Standards – as well as modern best practices in areas such as E-customs, Single Window, and risk management (Ambler and Styles, 2000).

2.4.4 Challenges

Although the benefits of setting up of data model are overwhelming, there are a number of issues that need to be thoroughly examined and planned for, to assure that the process is smooth and the expected benefits are realized. As with the automation of core customs procedures, many of these issues centre around the affects of change on customs services⁴

relationships with trade and other government agencies. Additionally, the variety of technical solutions available, and the implications of each of them for system design, cost, and flexibility, requires a thorough examination, and consultation with trade and government partners (Lim *et al.*, 1996). Once again, it is vitally important in developing a data model that consultations with trade partners begin early in the process. Although nearly all of the standards outlined here have been developed through collaborative processes, and are internationally accepted, their affects on trade partners can be dramatic especially so for developing countries and small/medium businesses. While there are significant benefits to trade from, for example, harmonized data sets and the Single Window concept, the ability of companies to implement the necessary internal changes and the short-term cost of doing so, needs to be considered (Ambler and Styles, 2000). Similar care needs to be taken when implementing an electronic messaging standard. Maximum long-term benefit can only be gained by implementing a system that is fully-compliant with international standards, and that is flexible enough to adapt to changing standards in the future. At the same time, the cost of such a change – to both customs and the trade – needs to be taken into consideration. The differences in the various options, EDIFACT, XML, UN/ECE eDoes, web-based solutions, and others should be thoroughly explored in consultation with trade partners (Hair, *et al.*, 1995).

Implementing these international standards and developing a data model require revisions of some countries' customs regulations, and the regulations of other agencies with border-control responsibilities. In most cases, these changes will need to be in the direction of simplifying customs codes to allow for the use of the standardized and minimized data sets recommended by the WCO (Ambler and Styles, 2000). Additionally, national regulations, processes, documentation, and formats may need to be changed to allow for effective information exchange between customs agencies. For example, the customs regulations detailing information requirements for imports and exports would need to be changed and standardized in order to successfully implement harmonized data sets. Likewise, before a Single Window can be put into operation, national regulations regarding requirements of other border-control agencies would need to be examined and possibly changed.

There is a great deal to be gained from the automation of customs processes and the adoption of a regional, standards-compliant data model (Lim *et al.*, 1996). The benefits reach far beyond customs – regional business can become more efficient, improving national economies; governments can increase, and more accurately track revenues from customs; national security can be improved and the flow of illicit goods and people stemmed. And these benefits can be multiplied even further through regional cooperation and information sharing. Yet there are also significant risks and challenges. The costs of implementing these systems can be large, and the indirect costs to trade partners can be even larger (Lim *et al.*, 1996). Abbas and Swierez (1991) say that care needs to be taken that technologies are chosen that are both powerful and widely-supported. A great deal of work will be required to ensure that new methods, technologies, and standards are adopted in compliance with national laws and regulations, and done so consistently across the region. By working closely with trade and other stakeholders, and by taking advantage of international standards and best practices, these concerns can be mitigated and efficient, effective customs systems can be put in place and harmonized across the region to the benefit of everyone (Lim *et al.*, 1996).

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the procedure that was adopted in order to achieve the objectives of the study and to address the research problem. It explains the type of data used, the population, the sampling technique, the sample size and the methods of data collection and analysis.

3.2 Research design

The research was descriptive. Descriptive design according to Cooper and Schindler (2001:12) "is a study that strive to discover answers to the questions who, what, when, where and sometimes how". The design was used to describe the effect of automation of the customs process on the export of bulk petroleum products from Kenya. The variables examined were: the impact on customs business processes, impact on oil firms and the implementation challenges.

3.3 Population

The population of the study comprised of all oil companies with operations in Kenya, and that sold petroleum products in the region at the time of the automation. According to industry information, there were 25 oil companies trading in the country at the time under examination.

3.4 Sample size

The sample size was made up of 30 senior executives drawn from the 25 oil marketers operating in the region at the time under study, purposively selected since they were most likely respondents to provide relevant data for analysis. This sample size is supported by a number of scholars. Saunders, et al., (2009) suggest the undertaking of between 25 and 30 interviews for a general study. Similarly, Mugenda and Mugenda (2003) assert that for correlational research, 30 cases or more are required. In addition, Denscombe (2003) argues that, whatever the theoretical issues, the simple fact is that surveys and sampling are usually carried out in small scale research involving between 30 and 250 cases.

3.5 Data Collection Instrument and Procedure

The study collected both primary and secondary data. The primary data was collected using a structured questionnaire that was sent to the respondents using both drop and pick method and mail. Secondary data was obtained mainly from books, journals, magazines and government websites and other stakeholders such as KPC, KPRI, KRA, Petroleum Institute of East Africa, Pipeline Coordinator and Ministry of Energy.

3.6 Data Analysis

The data collected was edited statistically for accuracy, uniformity, consistency and completeness and arranged to enable coding and tabulation before final analysis. Descriptive statistics was used to analyze data because it enables the comparison of variables numerically (Saunders, et al. 2009). Spearman's Rank Correlation Coefficients were computed to establish the relationships between the study variables. Summary statistics inclusive of tables and percentages was used for presentation purposes.

CHAPTER FOUR: DATA ANALYSIS

4.1 Introduction

The objective of the study was to find out the effect of the automation of customs processes on the exportation and transiting of bulk petroleum products from Kenya. This chapter presents the analysis of the study findings. It begins with a descriptive analysis of general information from respondents. Subsequently, it provides the analysis of the effects of automation on custom's business processes. Further, it analyses the impact of customs automation on the exporters of bulk petroleum products. Lastly, it presents the analysis of challenges experienced by the oil companies in the automation of customs on transit and export of bulk petroleum products.

4.2 General Information

The general information sought from the respondents included age, education, experience and management cadre of respondents.

4.2.1 Age

Table 4.1 below shows the distribution of respondents by age.

Table 4.1 Age of Respondent

Class	Distribution		
	Frequency	Percent	Cumulative Percent
Below 30 years	2	6.7	6.7
30 - 40 years	22	73.3	80.0
41 - 50 years	5	16.7	96.7
Over 50 years	1	3.3	100.0
Total	30	100.0	

According to Table 4.1 above, majority of the respondents were aged between 30 – 40 years (73.3%), followed by those aged between 41 – 50 years (16.7%). The table also shows that some 6.7% of the respondents were aged below 30 years whereas 3.3% were aged over 30 years.

4.2.2 Education

The study sought to establish respondent's highest level of education. Table 4.2 below shows the results.

Table 4.2 Level of Education

Level of education	Distribution		
	Frequency	Percent	Cumulative Percent
Diploma	0	0.0	0.0
Undergraduate	15	50.0	50.0
Post graduate	15	50.0	100.0
Total	30	100.0	

Fifty percent (50%) of the respondents had attained post-graduate level of education whereas another 50% had undergraduate education. The table shows that no respondent was a diploma holder.

4.2.3 Experience

The study sought to determine the level of experience respondents had in the oil industry in terms of number of years.

Table 4.3 Years of Experience in the Industry

Experience	Distribution		
	Frequency	Percent	Cumulative Percent
Less than 3 years	1	3.3	3.3
3 - 5 years	1	3.3	6.7
6 - 10 years	23	76.7	83.3
Over 10 years	5	16.7	100.0
Total	30	100.0	

Table 4.3 above shows that majority of the respondents (76.7%) had worked in the industry between 6 – 10 years while 16.7% of the respondents had over 10 years industry experience. However, some 3.3% had worked in the industry between 3 – 5 years whereas another 3.3% of the respondents had less than 3 years experience in the industry.

4.2.4 Management Cadre

The study sought to establish the management cadre (position held) of the respondent in the oil company. Table 4.4 below displays the distribution of respondents by their level in the management hierarchy.

Table 4.4 Management Cadre

Cadre	Distribution		
	Frequency	Percent	Cumulative Percent
Lower level management	1	3.3	3.3
Middle level management	24	80.0	83.3
Upper level management	5	16.7	100.0
Total	30	100.0	

Eighty percent (80%) of the respondents were in middle level management, followed by 16.7% in upper level management and lastly, 3.3% of the respondents were in lower level management.

4.3 The Effects of Automation on Custom's Business Processes

The variables examined in the study included: corruption, perceived corruption, speed of in-coming cargo, speed of outgoing cargo, accuracy of declarations, cost of clearance, sealing of revenue leakage, online access to customs officials, record keeping and tax payer base. Table 4.5 below shows Spearman's correlation results for the study variable and their relationship with customs automation, given at 0.05 and 0.01 levels. A descriptive analysis of each variable is presented in the subsequent tables.

Table 4.5 Correlation between Change in Custom's Business Processes and Customs Automation

			Customs Automation	1	2	3	4	5	6	7	8	9	10	11	12	
Spearman's rho	Customs Automation	Correlation Coefficient	1.000													
		Sig. (2-tailed)														
		N	30													
1	Change in Corruption Initiated by Customs Officials	Correlation Coefficient	.632(**)	1.000												
		Sig. (2-tailed)	.000													
		N	30	30												
2	Change in Perceived Corruption initiated by Customs Officials	Correlation Coefficient	.682(**)	.914(**)	1.000											
		Sig. (2-tailed)	.000	.000												
		N	30	30	30											
3	Change in Corruption Initiated by Marketers	Correlation Coefficient	.729(**)	.849(**)	.887(**)	1.000										
		Sig. (2-tailed)	.000	.000	.000											
		N	30	30	30	30										
4	Change in Perceived Corruption initiated by Marketers	Correlation Coefficient	.603(**)	.907(**)	.914(**)	.913(**)	1.000									
		Sig. (2-tailed)	.000	.000	.000	.000										
		N	30	30	30	30	30									
5	Change in Speed of Incoming Cargo Declaration and Release	Correlation Coefficient	-.325	-.387(*)	-.176	-.315	-.204	1.000								
		Sig. (2-tailed)	.080	.035	.352	.089	.280									
		N	30	30	30	30	30	30								
6	Change in Speed of Outgoing Cargo Declaration and Release	Correlation Coefficient	.109	.026	-.051	-.039	-.071	-.174	1.000							
		Sig. (2-tailed)	.567	.890	.787	.837	.709	.357								
		N	30	30	30	30	30	30	30							

7	Change in Accuracy of Declarations	Correlation Coefficient	685(**)	.912(**)	.986(**)	.878(**)	.882(**)
		Sig. (2-tailed)	.000	.000	.000	.000	.000
		N	30	30	30	30	30
8	Change in Cost of Clearance Process	Correlation Coefficient	.552(**)	.832(**)	.898(**)	.835(**)	.874(**)
		Sig. (2-tailed)	.002	.000	.000	.000	.000
		N	30	30	30	30	30
9	Change in Sealing of Revenue Leakage Points	Correlation Coefficient	-.001	-.026	.051	.039	-.026
		Sig. (2-tailed)	.995	.890	.787	.837	.890
		N	30	30	30	30	30
10	Change in Access to Customs Officials via *Online Communication	Correlation Coefficient	.647(**)	.920(**)	.926(**)	.853(**)	.859(**)
		Sig. (2-tailed)	.000	.000	.000	.000	.000
		N	30	30	30	30	30
11	Change in Record Keeping by KRA	Correlation Coefficient	.013	-.226	-.245	-.026	-.321
		Sig. (2-tailed)	.947	.229	.191	.891	.084
		N	30	30	30	30	30
	Change in Widening of Taxpayer Base	Correlation Coefficient	.481(**)	.680(**)	.680(**)	.661(**)	.680(**)
		Sig. (2-tailed)	.007	.000	.000	.000	.000
		N	30	30	30	30	30

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

* Correlation is significant at the 0.05 level (2-tailed).

- 198	033	1 000					
295	864						
30	30	30					
- 212	- 073	888(**)	1 000				
260	703	000					
30	30	30	30				
- 357	.153	064	033	1 000			
053	419	737	864				
30	30	30	30	30			
- 264	- 006	934(**)	829(**)	.006	1 000		
158	975	000	000	.975			
30	30	30	30	30	30		
- 175	144	- 168	- 193	154	- 129	1.000	
356	448	.374	306	418	.495		
30	30	30	30	30	30	30	
- 315	- 062	675(**)	758(**)	.277	.667(**)	- 069	1.000
.090	.744	000	000	.135	000	.716	
30	30	30	30	30	30	30	30

4.3.1 Corruption Initiated by Customs Officials

The study sought to establish how respondents rated improvement in regards to corruption initiated by custom officials following automation of customs processes. Table 4.6 shows the findings.

Table 4.5 Change in Corruption Initiated by Customs Officials

Response	Distribution		
	Frequency	Percent	Cumulative Percent
Significant positive change	15	50.0	50.0
Positive change	12	40.0	90.0
No change	3	10.0	100.0
Total	30	100.0	

Fifty percent (50%) of the respondents said that there was significant positive change, followed by 40% who observed positive change. However, 3% of the respondents did not see any change in corruption initiated by customs officials following automation. The correlation matrix (Table 4.4) showed that there was a strong and significant positive correlation between change in corruption initiated by customs officials and customs automation ($r=.632, p<.001$). This means that a direct relationship subsisted between customs automation and reduced corruption at Customs.

The study further sought to establish whether there was any change in perceived corruption initiated by customs officials.

Table 4.6 Change in Perceived Corruption initiated by Customs Officials

Responses	Distribution		
	Frequency	Percent	Cumulative Percent
Significant positive change	15	50.0	50.0
Positive change	3	10.0	60.0
No change	12	40.0	100.0
Total	30	100.0	

The table shows that up to 60% of the respondents perceived that there was positive change in corruption by custom officials. However, 40% of the respondents were of the opinion that there was no change. The study established a strong and significant positive correlation between positive change in perceived corruption and customs automation.

4.3.2 Corruption Initiated by Marketers

Table 4.7 below shows the responses regarding change in corruption initiated by marketers following automation.

Table 4.7 Change in Corruption Initiated by Marketers following Automation

Responses	Distribution		
	Frequency	Percent	Cumulative Percent
Significant positive change	16	53.3	53.3
Positive change	14	46.7	100.0
No change	0	0.0	
Total	30	100.0	

The table shows that all the respondents were of the opinion that there was positive change in corruption initiated by marketers following customs automation. Fifty three percent (53.3%) of the respondents observed significant positive change whereas 46.7% noticed positive change. This variable also had the strongest positive correlation with customs automation ($r=.729$) which was also highly significant ($p<.01$). This means that customs automation was related with positive changes in corruption. The study further sought to establish whether there was effect on perceived change in corruption initiated by marketers.

Table 4.8 Change in Perceived Corruption initiated by Marketers

Responses	Distribution		
	Frequency	Percent	Cumulative Percent
Significant positive change	15	50.0	50.0
Positive change	12	40.0	90.0
No change	3	10.0	100.0
Total	30	100.0	

Fifty percent (50%) of the respondents were of the opinion that there was significant positive change in perceived corruption initiated by marketers following customs automation. Subsequently, 40% also noticed positive change in perceived corruption. However, some 10% of the respondents realized no change in perceived corruption initiated by marketers. The correlation results (Table 4.5) showed a strong and significant positive relationship between customs automation and change in perceived corruption initiated by marketers.

4.3.3 Speed of In-Coming Cargo

The study sought to establish whether there was any improvement in the speed of in-coming cargo and declaration of release.

Table 4.9 Change in Speed of In-coming Cargo Declaration and Release

Responses	Distribution		
	Frequency	Percent	Cumulative Percent
No change	3	10.0	10.0
Negative change	2	6.7	16.7
Significant negative change	25	83.3	100.0
Total	30	100.0	

According to Table 4.9 above, majority of the respondents claimed that there was significant negative change in speed of in-coming cargo declaration and release, following automation of customs (83.3%). Another 6.7% also observed negative change whereas 10% of the respondents did not notice any change at all. The correlation result for this variable also showed that there was a negative correlation between customs automation and the speed of in-coming cargo declaration and release although the correlation was not significant ($r = -.325$, $p > .05$). This means that an inverse relationship subsisted between customs automation and the speed of in-coming cargo declaration and release.

4.3.4 Speed of Outgoing Cargo

The study also sought to find out whether there was any improvement in the speed of outgoing cargo declaration and release following automation of customs processes.

Table 4.10 Change in Speed of Out-going Cargo Declaration and Release

Responses	Distribution		
	Frequency	Percent	Cumulative Percent
Positive change	0	0.0	0.0
No change	3	10.0	10.0
Negative change	1	3.3	13.3
Significant negative change	26	86.7	100.0
Total	30	100.0	

Table 4.10 above shows that, respondents observed significant negative change in the speed of out-going cargo declaration, and release following customs automation (86.7%). The table shows that some 3.3% of the respondents noticed negative change while 10% noticed no change. The table shows that no respondent observed positive change in the speed of out-going cargo declaration and release. Nonetheless, the correlation results (Table 4.5) showed that there was a weak positive but insignificant relationship between customs automation and the speed of out-going cargo declaration and release ($r=.109, p>.05$). Therefore, the results show nothing more than random variation in correlation.

4.3.5 Accuracy of Declarations

The study sought to establish whether there was improvement in the accuracy of declarations due to customs automation.

Table 4.11 Change in Accuracy of Declarations

Responses	Distribution		
	Frequency	Percent	Cumulative Percent
Significant positive change	15	50.0	50.0
Positive change	4	13.3	63.3
No change	11	36.7	100.0
Total	30	100.0	

Fifty percent (50%) of the respondents saw significant positive change in accuracy of declaration. Another 13.7% of the respondents noticed positive change. However, 36.7% of the respondents noticed no change at all, whereas no respondent claimed there was a negative change in the accuracy of declarations. The study also established that there was a strong and

significant positive correlation between accuracy of declaration and automation of customs processes ($r=.685, p<.001$).

4.3.6 Cost of Clearance

The findings on the change in cost of clearance process following customs automation is shown in Table 4.12 below.

Table 4.12 Change in Cost of Clearance Process

Responses	Distribution		
	Frequency	Percent	Cumulative Percent
Positive change	5	16.7	16.7
No change	4	13.3	30.0
Negative change	7	23.3	53.3
Significant negative change	14	46.7	100.0
Total	30	100.0	

The table shows that 46.7% of the respondents realized significant negative change and a further 23% observed negative change. While 13.3% of the respondents did not notice any change in cost of clearance process, some 16.7% were of the opinion that there was positive change. However, the study established a positive and significant correlation between customs automation and improvement in cost of clearance process ($r=.552, p<.01$).

4.3.7 Sealing of Revenue Leakage

The study sought respondents' opinion as to whether there was any improvement in the sealing of revenue leakage points due to automation of customs processes. Table 4.13 below shows that 86.7% of the respondents observed positive change. However, 3.3% of the respondents observed no change whereas 10% of the respondents claimed there was significant negative change. Nonetheless, the findings showed a weak and insignificant relationship between change in the sealing of revenue leakage points and customs automation ($r=.01, p>.05$).

Table 4.13 Change in Sealing of Revenue Leakage Points

Responses	Distribution		
	Frequency	Percent	Cumulative Percent
Positive change	26	86.7	86.7
No change	1	3.3	90.0
Significant negative change	3	10.0	100.0
Total	30	100.0	

4.3.8 Online Access to Customs Officials

The study sought to establish whether there were improvements in access to customs officials via online communication due to customs automation.

Table 4.14 Change in Access to Customs Officials Online

Responses	Distribution		
	Frequency	Percent	Cumulative Percent
Significant positive change	15	50.0	50.0
Positive change	7	23.3	73.3
No change	8	26.7	100.0
Negative change	0	0.0	
Total	30	100.0	

Fifty percent (50%) of the respondents observed significant positive change and another 23.3% realized positive change. However, 26.7% of the respondents did not notice any improvements in access to customs officials online. Nonetheless, no respondent claimed there was a negative change. The findings revealed a strong and significant positive correlation between customs automation and access to customs officials online ($r=.647, p<.01$).

4.3.9 Record Keeping

Table 4.15 below shows that all the respondents noticed improvements in record keeping by KRA. The table shows that 86.7% of the respondents noticed positive change and an additional 13.3% of the respondents observed significant positive change. The correlation matrix (Table 4.5) however showed that the relationship between this variable and customs automation was not significant ($r=.013, p>.05$)

Table 4.15 Change in Record Keeping by KRA

Responses	Distribution		
	Frequency	Percent	Cumulative Percent
Significant positive change	4	13.3	13.3
Positive change	26	86.7	100.0
No change	0	0.0	
Total	30	100.0	

4.3.10 Tax Payer Base

The study sought to determine whether there were any improvements in the widening of tax payer base. The study found out that respondents observed a positive change (66.7%) and a significant positive change (33.3%). No respondent observed a negative or zero change in the widening of taxpayer base following customs automation. The study showed that there was a positive and significant correlation between change in widening of taxpayer base and customs automation ($r=.481, p<.01$).

Table 4.16 Change in Widening of Taxpayer Base

Responses	Distribution		
	Frequency	Percent	Cumulative Percent
Significant positive change	10	33.3	33.3
Positive change	20	66.7	100.0
No change	0	0.0	
Total	30	100.0	

4.4 The Impact of Customs Automation on Exporters of Bulk Petroleum Products

The variables examined in this section included: return on capital employed, profitability, turnover, lead time and affiliate integration. Table 4.17 below shows Spearman's Rho significant at 0.05 levels. The findings for each sub-variable are subsequently described in respective contingency tables.

Table 4.17 Correlation between Customs Automation and Business Indicators of Oil Firms

			Customs Automation	1	2	3	4	5
Spearman's rho	Customs Automation	Correlation Coefficient	1.000					
		Sig. (2-tailed)						
	1 Return on Capital Employed	N	30					
		Correlation Coefficient	-.040	1.000				
		Sig. (2-tailed)	.008					
	2 Profitability	N	30	30				
		Correlation Coefficient	-.228	-.268	1.000			
		Sig. (2-tailed)	.025	.152				
	3 Turnover	N	30	30	30			
		Correlation Coefficient	-.247	-.414(*)	.286	1.000		
		Sig. (2-tailed)	.018	.023	.125			
	4 Time Taken to Access Products	N	30	30	30	30		
		Correlation Coefficient	-.555	.058	.337	.218	1.000	
		Sig. (2-tailed)	.036	.761	.068	.248		
	5 Integration with Regional Affiliates	N	30	30	30	30	30	
		Correlation Coefficient	.071	.083	.104	.089	-.013	1.000
		Sig. (2-tailed)	.708	.662	.586	.640	.945	
		N	30	30	30	30	30	30

* Correlation is significant at the 0.05 level (2-tailed).

4.4.1 Return on Capital Employed

The study sought to establish respondent's rating of the impact of the automation of customs on export of bulk petroleum products in terms of return on capital employed.

4.18 Impact of Customs Automation on Return on Capital Employed

Rating	Distribution		
	Frequency	Percent	Cumulative Percent
Greatly increased	0	0.0	0.0
Increased	0	0.0	0.0
No change	2	6.7	6.7
Reduced	25	83.3	90.0
Greatly reduced	3	10.0	100.0
Total	30	100.0	

According to table 4.18 above, 83.3% of the respondents said return on capital employed reduced and another 10% said it greatly reduced. Some 6.7% however realized no change while no respondent observed an increase in return on capital employed following customs automation. The correlation results in Table 4.17 showed that a weak negative but significant correlation existed between customs automation and return on capital employed ($r=-.040$, $p<.05$). This means that there was an inverse relationship between the automation of customs on exports of bulk petroleum products and oil companies' return on capital employed.

4.4.2 Profitability

The study sought to establish how automation of customs on exports of bulk petroleum products impacted on the profitability of oil marketers.

Table 4.19 Impact of Customs Automation on Profitability

Rating	Distribution		
	Frequency	Percent	Cumulative Percent
Greatly increased	0	0.0	0.0
Increased	0	0.0	0.0
No change	1	3.3	3.3
Reduced	27	90.0	93.3
Greatly reduced	2	6.7	100.0
Total	30	100.0	

Ninety percent (90%) of the respondents claimed that profitability reduced and another 6.7% said profitability greatly reduced as a result of customs automation. Only 3.3% of the respondents did not observe any change in profitability due to customs automation whereas no respondent saw an increase in profitability. The study found out that there was a significant negative correlation between customs automation and the profitability of petroleum oil companies ($r=-.228$, $p<.05$).

4.4.3 Turnover

The results on rating of impact of automation of customs on exports of bulk petroleum products on the turnover of oil firms are shown in Table 4.20 below.

Table 4.20 Impact of Customs Automation on Turnover

Rating	Distribution		
	Frequency	Percent	Cumulative Percent
Greatly increased	0	0.0	0.0
Increased	1	3.3	3.3
No change	2	6.7	10.0
Reduced	25	83.3	93.3
Greatly reduced	2	6.7	100.0
Total	30	100.0	

Table 4.20 above shows that 83.3% of the respondents rated the impact on turnover as reduced and a further 6.7% rated it impact as greatly reduced. The table further shows that some 6.7% of the respondents saw no change in turnover due to customs automation whereas some 3.3% realized an increase on turnover. The correlation matrix (Table 4.27) showed that a significant negative relationship subsisted between customs automation and turn over of oil companies ($r = -0.247, p < .05$). The findings reveal an inverse relationship between these variables.

4.4.4 Lead Time

The study sought to establish respondent's rating of the impact of automation of customs on exports of bulk petroleum products in terms of time taken to access goods.

Table 4.21 Impact of Customs Automation on Lead Time

Rating	Responses		
	Frequency	Percent	Cumulative Percent
Greatly increased	3	10.0	10.0
Increased	26	86.7	96.7
No change	1	3.3	100
Reduced	0	0.0	
Greatly reduced	0	0.0	
Total	30	100.0	

Table 4.21 above shows that lead time had increased according to 86.7% of the respondents while 10% of the respondents said it greatly increased following the automation of customs

processes. The table also shows that 3.3% of the respondents realized no change in time taken to access goods whereas no respondent rated the impact on lead time as reduced. The correlation result for this variable showed a strong and significant negative relationship between lead time and customs automation ($r=-.555, p<.05$).

4.4.5 Affiliate Integration

The findings on the impact of automation of customs on oil companies' integration with regional affiliates is shown in Table 4.22 below.

Table 4.22 Impact on Integration with Regional Affiliates

Rating	Distribution		
	Frequency	Percent	Cumulative Percent
Greatly Increased	15	50.0	50.0
Increased	15	50.0	100.0
No change	0	0.0	
Reduced	0	0.0	
Greatly reduced	0	0.0	
Total	30	100.0	

The table shows that all of the respondents were of the opinion that integration with regional affiliates increased as a result of automation of customs. Fifty percent (50%) of the respondents said integration greatly increased whereas another 50% said it increased. The study established a positive relationship between customs automation and oil companies' integration with regional affiliates, although the relationship was insignificant ($r=.071, p>.05$).

4.5 Challenges Experienced by the Oil Companies due to Automation of Customs

The study assessed the challenges in terms of business processes, KRA time frames, human resource, communication and lead time. The findings are analyzed in the subsequent charts below.

4.5.1 Business Process

The study sought to establish the extent to which integration incompatibility with oil companies' business processes was a challenge occasioned by the automation of customs on transit and export of bulk petroleum products.

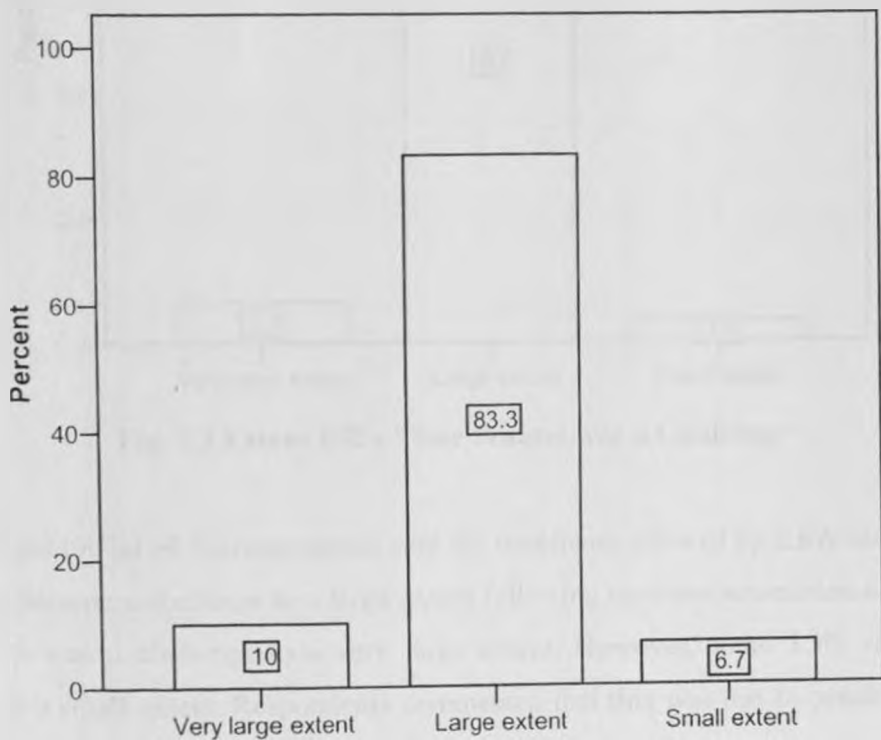


Fig 4.1 Extent Integration Incompatibility with Business Process was a Challenge

According to figure 4.1 above, 83.3% of the respondents observed that integration incompatibility with business process was a challenge to a large extent, followed 10% of the respondents who claimed it was a challenge to a very large extent. Lastly, some 6.7% said integration incompatibility was a challenge to a small extent.

4.5.2 KRA Time Frames

The study sought to establish whether the time frame allowed by KRA for preparation and go live became a challenge due to the automation of customs on transit and export of bulk petroleum products.

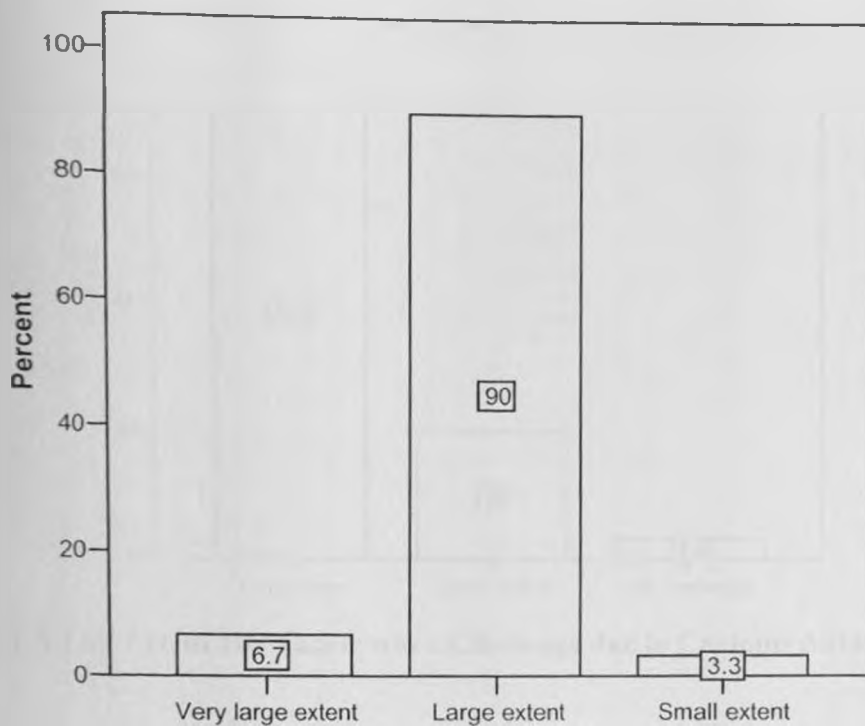


Fig. 4.2 Extent KRA Time Frames was a Challenge

Ninety percent (90%) of the respondents said the timeframe allowed by KRA for preparation and go live became a challenge to a large extent following customs automation while another 6.7% said it was a challenge to a very large extent. However, some 3.3% said it was a challenge to a small extent. Respondents commented that this was due to penalties imposed on non-compliance during transition period.

4.5.3 Human Resource

The research endeavored to establish the extent to which human resource factor in the business posed a challenge due to automation of customs on transit and export of bulk petroleum products. Figure 4.3 below shows that 76.7% of the respondents said human resource factor was a challenge to a great extent, 20% said it posed difficulties to a small extent whereas only 3.3% of the respondents said HR posed no challenge.

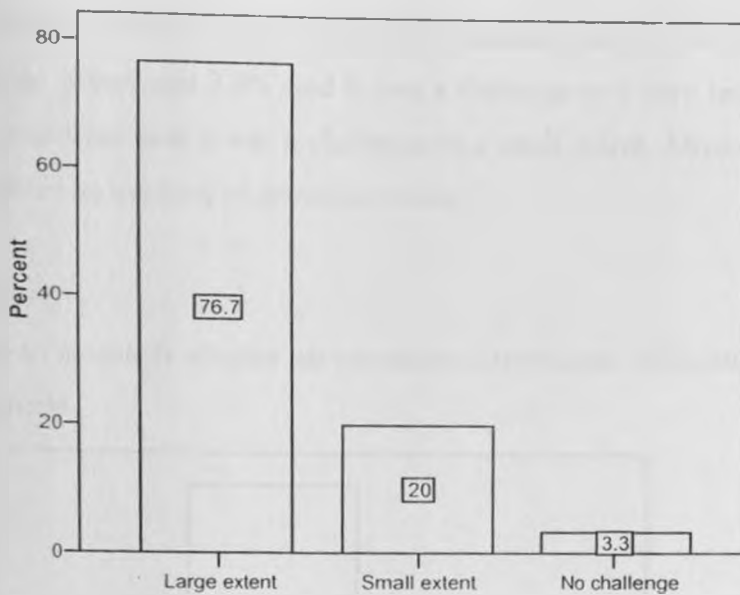


Fig. 4.3 The Extent HR Factor was a Challenge due to Customs Automation

4.5.4 Communication

The study also sought to establish whether communication to and from KRA posed a difficulty as a result of automation of customs on transit and export of bulk petroleum products.

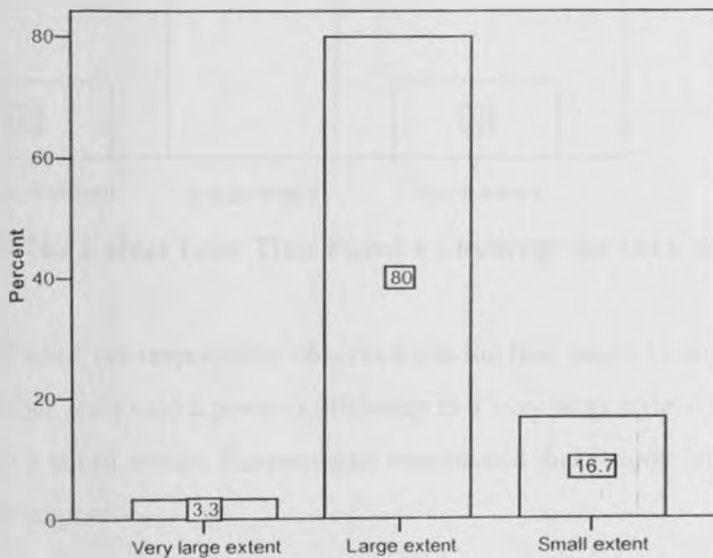


Fig 4.4 The Extent Communication to and From KRA became a Challenge

Eighty percent (80%) of the respondents said communication to and from KRA was a challenge to a large extent and 3.3% said it was a challenge to a very large extent. Further, 10% of the respondents said it was a challenge to a small extent. Most of the respondents registered difficulties on tracking of document status.

4.5 Lead Time

The study sought to establish whether oil companies experienced difficulties in the lead time to access to products.

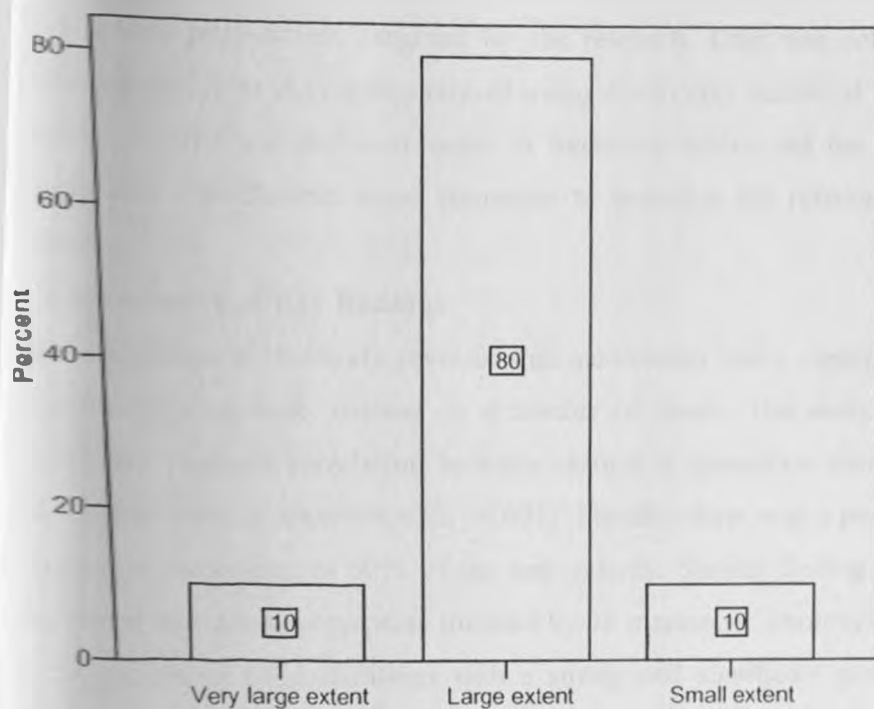


Fig. 4.5 The Extent Lead Time Posed a Challenge for Oil Companies

Eighty percent (80%) of the respondents observed that the time taken to access products was a challenge and another 10% said it posed a difficulty to a very large extent. Lastly, 10% said it was a challenge to a small extent. Respondents commented that it took longer than before to access products for export.

CHAPTER FIVE: DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The purpose of the study was to find out the effect of the automation of customs processes on transiting and exportation of bulk petroleum products from Kenya. The researcher carried out a survey of all the 25 oil companies with operations in Kenya at the time of automation and that sold petroleum products in the East African region. A descriptive research design was used to guide the research process. Thirty senior executives drawn from oil marketers in the region were purposively targeted for the research. Data was collected using a structured questionnaire. The data was analyzed using descriptive statistical techniques and inferential statistics. This entailed summaries in frequency tables and bar charts. Spearman's Rank Correlation Coefficients were computed to establish the relationships between the study variables.

5.1.1 Summary of Key findings

Major findings of the study revealed that automation had a significant positive effect in the business processes at customs on a number of fronts. The study established a strong and significant positive correlation between change in corruption initiated by customs officials and customs automation ($r=.632, p<.001$). Equally, there was a positive change in perceived corruption according to 60% of the respondents. Similar findings were registered on both perceived and actual corruption initiated by oil marketers. Improvements were also registered in the accuracy of declarations with a strong and significant positive correlation between accuracy of declaration and automation of customs processes ($r=.685, p<.001$). Majority of the respondents also observed positive change in the sealing of revenue leakage points. However, the study revealed an inverse relationship between customs automation and the speeds of both in-coming and outgoing cargo declaration and release. Further findings revealed a negative and significant relationship between customs automation and oil marketers' business performance indicators such as ROCE, profitability, turnover and lead time. The oil companies experienced challenges in business processes, time frames, HR and online communication with KRA officials.

Chapter discusses the study findings, draws conclusions in view of the discussion and considers the implication for policy and practice. The chapter adopts a systemic approach, beginning with the effects of automation on custom's business processes, the impact of customs automation on the exporters of bulk petroleum products, and lastly; the challenges experienced by the oil companies in the automation of customs on transit and export of bulk petroleum products.

2 Discussion

2.1 The Effects of Automation on Business Processes at Customs

Corruption is one challenge that KRA have continuously grappled with. The automation of customs was largely expected to significantly reduce corruption from both customs officials and oil marketers. This objective seems to have been achieved as majority of the respondents in this study observed significant positive change in actual and perceived corruption at customs. This is reinforced by a strong and significant positive correlation ($r=.632, p<.001$). Comparatively, improvement in perceived and actual corruption initiated by oil marketers was observed as better than that initiated by customs officials. This finding is inevitable since subjectivity of responses, emanating solely from the point of view of the oil executives, could not be avoided. Nonetheless, that customs automation has significantly reduced corruption – being the variable with the strongest positive correlation from either front – is a milestone for the petroleum oil sector. As such, the independent companies hitherto accused of colluding with customs officers and compromising the customs process and as a result creating an uneven playing field between them and the majors has been technically contained.

Coupled with the foregoing is the concern over revenue leakage through diversion products meant for the export market into the local market without payment of requisite duties. Majority of the respondents observed positive change in the sealing of revenue leakage points. This reinforces Chetty and Hamilton's (1996) argument that in addition to helping facilitate smooth cross-border trade, a paperless environment can aid customs agencies in their primary missions of controlling the border and collecting revenue.

toni *et al.* (1999) held that the core functions of customs control and customs clearance, especially, see major gains in efficiency through the use of ICT. Indeed, majority of the respondents saw significant positive change in accuracy of declaration. Another 13.7% of the respondents noticed positive change with the correlation results showing a strong and significant positive relationship between accuracy of declaration and automation of customs processes ($r=.685, p<.001$). Benefits to this have been argued out in previous literature. Hair, *et al.* (1995) for example, suggests that with an electronic system, data such as trade statistics can be generated much more quickly and with much higher accuracy than in a manual system. Revenue collection, too, can be improved with an automated system; accounting and payment processes can be built into the system to aid in the tracking and collection of payments due. All of the respondents in this study observed improvements in the widening of taxpayer base following customs automation.

Other benefits accrued through the *Simba* system include improvements in access to customs officials via online communication due to customs automation. In addition, while the study noted that the relationship between record keeping and customs automation was not significant ($r=.013, p>.05$), practical implications of a paperless environment has been shown previously by Mechling *et al.* (1995). Among them, trading partners can electronically submit information about their consignments prior to arrival at the border. This allows customs to process information and target suspicious consignments in advance of their physical arrival. Customs can also provide trading partners with electronic notification of the release status immediately after a consignment comes into customs' control.

The automation of customs on transit and export of bulk petroleum products was among others, expected to yield gains in the speeding up of the declaration and clearance process. However, majority of the respondents in this study claimed that there was significant negative change in the speed of both in-coming and outgoing cargo declaration and release, following automation of customs. This is reinforced by the correlation result which showed an inverse relationship between customs automation and the speed of in-coming and outgoing cargo declaration and release. This mirrors previous findings in a study conducted by Clarke (2009) which found that customs clearance process were longest and average time that it takes

imports and exports to clear customs after arriving at the point of entry or exit in the country remain a challenge in international business.

The automation was also expected to lead to a reduction of the cost of goods clearance. However, majority of the respondents observed a negative change contrary to expectations. This sentiment echoes McTiernan's (2006) earlier observation that businesses in Africa perceive the impact of customs as mostly unfavorable, a mixture of obvious and subtle impediments, of which costs was first and foremost. On the other hand, it goes contrary to claims by Abbas and Swiercz (1991) that automation of customs clearance procedures and information exchange can result in lower costs.

5.2.2 The Impact of Customs Automation on Oil Companies

Unlike the gains accrued to KRA, the study did not establish equivalent gains to oil marketers. Majority of the respondents in the study felt that return on capital employed have reduced following customs automation. Indeed, the inferential statistics revealed an inverse relationship between the automation of customs on exports of bulk petroleum products and oil companies' return on capital employed. Likewise, majority of the respondents claimed that profitability reduced. As such, the findings agree with Mahon (1993) who argued that automation will have an impact on the business performance and ability to meet its objectives. This is also consistent with Dutton and Ottensmeyer (1987) who mentioned the fact that technological advancements are classified as strategic because they can alter the business's performance if left unnoticed or unaddressed.

Similar findings are observed on the impact of automation on turnover. This can be linked to subsequent findings on lead time. Majority of the respondents observed that lead time had increased. Indeed, the correlation result showed a strong and significant negative relationship between lead time and customs automation ($r = -.555, p < .05$). This goes against the implied reasoning by Chetty and Hamilton (1996) that with customs automation processes is the possibility of developing a program of expedited processing thus reducing transit time. Benefits expected of any automation are therefore subject to multiple factors unique to each sector. While oil marketers have responded to this handicap by increasing their lead time for

deliveries, this situation puts a downward pressure on the fiscal leverage and profitability of oil firms thus having undesirable bottom-line effects for these stakeholders.

The findings on the impact of automation of customs on oil companies' integration with regional affiliates revealed that respondents were of the opinion that integration with regional affiliates increased as a result of automation of customs. This is perhaps the only positive benefits directly accruing to the exporters of bulk petroleum products.

5.2.3 Challenges Experienced by the Oil Companies

The study assessed the challenges in terms of business processes, KRA time frames, human resource, communication and lead time. The findings showed that majority of the respondents observed integration incompatibility with business process. This includes the need for computer programs to transform documents into required formats and automate customs transactions and procedures. In addition, the key software elements have to be customized to reflect local conditions, such as tariff structure and content. Any change to the system for filing customs documents and declarations has an impact on the trade, and a change mandating the adoption of new technology can be particularly burdensome. Trade partners may have to revamp many of their internal processes, or even invest in compatible systems or software, in order to meet the requirements of the automated system. As De Toni *et al* (1999) argued, this concern may be especially relevant in developing countries.

Further, there are training requirements; that is costs linked to the installation, operation and maintenance of hardware and software. This largely depends on the level of skills available and the resulting training needs of staff of the oil firms. The research endeavored to establish the extent to which human resource factor in the business posed a challenge due to automation of customs on transit and export of bulk petroleum products. The findings showed that majority of the respondents said human resource factor were a challenge to a great extent. Respondents mainly cited the cost and logistics surrounding retraining as the reasons for the difficulties experienced. Clearing agents were cleared only after KRA training and certification which slowed down business operations.

Coupled with the HR challenges, majority of the respondents said the timeframe allowed by KRA for preparation and go live became a challenge to a large extent following customs automation. Respondents commented that this was due to penalties imposed on non-compliance during transition period. Previous studies by Kerr (2009) have observed that customs compliance requirements have been affecting a growing number of businesses involved in the cross-border movement of goods and the manufacture of goods under bonded conditions. This invites suggested alternatives such as a single window system. However, implementation of a Single Window requires cooperation from other government agencies. Hair, *et. al.* (1995) cautioned that without the active participation of all government agencies with border control responsibilities, the utility of the Single Window system is greatly diminished. In addition, any automated system must be implemented within a country's legal framework. In some cases, there may be legal impediments, such as requirements for hard-copy signatures or paper copies – that prevent the full benefits of a paperless environment from being realized. Difficulties were also registered by oil marketers in tracking of document status.

Wilson (2006) argued that, although customs and administrative procedures are necessary for the smooth application of trade and other policies, they can thicken the borders between trading partners if the customs and administrative procedures are more stringent than necessary or inefficient. This study established that the time taken to access products was the greatest challenge. Respondents commented that it took longer than before to access products for export. Indeed, implementation of the Simba system met resistance from the oil marketers largely due to this reason. They argued that system design should have been supported by a research from marketers or more detailed stakeholder engagement. In addition, implementation should have been piloted. These emphasize the argument by Wagner (1995) that a successful implementation of customs automation systems requires that a number of conditions be met from the outset. This includes a transparent and collaborative approach by the project management to generate support external users, including brokers and agents, and a phased implementation of the customs automation systems.

5.3 Conclusion

The automation of customs on transit and export of bulk petroleum products has had both positive and negative effects to its key stakeholders. Kenya Revenue Authority have achieved its key objectives of customs automation as seen through reduction in corruption actual and perceived corruption at customs, widening of tax-payer base, accuracy of cargo declarations and the sealing of revenue leakage points. Oil marketers also benefit in terms of integration with regional affiliates. However, the impact on exporters of bulk petroleum products has been largely negative. This is seen in reduced return on investment, profitability and turnover, due to longer lead-time occasioned by delayed access to goods.

5.4 Implications for Practice

While gains yielded by KRA are evident, reaping the benefits of customs automation at the expense of some stakeholders is not tenable. Oil marketers are immediate stakeholders whose interests should be secured as a matter of policy. A more collaborative approach that takes into account a detailed stakeholder engagement through among others, a baseline survey is necessary for continuous systems improvement. While the implications of adopting a single window system may be enormous, legislative flexibility is needed to allow for systems redesign that considers the merit of a single window system, perhaps on a pilot basis to evaluate the ramifications. This may require lobbying from the part of oil marketers. At the firm level however, oil companies realize that government action is part of the ever changing external environment which they have limited-to-zero control and they must continuously scan and respond strategically. Strategic options available may include integration or mergers. The marketers should also seek to have KRA elevate the compliant ones to approved economic operator status. This process should be made easier by the data now automatically available in KRA systems. This concept has the potential to respond to the profitability related concerns by the marketers making the automation a win-win solution for both the marketers and the revenue authority.

Although this study was conducted with a bias to the perspectives of petroleum oil exporters operating in Kenya, the findings reflect issues associated with industry level forces across international borders which are increasingly important to oil marketers and governments the

world over. The practice implications are therefore applicable globally irrespective of local uniqueness.

5.5 Suggestions for Future Research

Just like most other researches, this study was not without its limitations. While the insights gained from the empirical data are fundamental in informing continuous automation reforms at customs, a probabilistic technique encompassing a larger sample would significantly increase the reliability of statistical estimates. In order to establish more accurate results, further studies could be extended in the subject of the impact of customs automation on oil marketers by controlling for firm-specific factors such as strategy or organizational culture. A case study approach could perhaps present an ideal starting point.

The potential gain by oil marketers may also be actualized if the compliant ones take advantage of the automated process to become authorized economic operators. The negative impact they experienced from his automation could be mitigate by enhanced use of the system. This therefore provides an area of further research on how both KRA and oil marketers have taken advantage of the automation to implement the concept of authorized economic operators, and impact of the same on oil marketers in the East African region.

REFERENCES

- Abbas, A. & Swierez, P.M. (1991). "Firm size and export behavior: Lessons from the Midwest", *Journal of Small Business Management*, pp.71-8.
- Ambler, T. & Styles, C. (2000). *The Silk Road to International Marketing*, Englewood Cliffs, NJ: Prentice-Hall.
- Calof, J. L. (1994). "The relationship between firm size and export behavior revisited", *Journal of International Business Studies*, Vol. 25 pp.367-87.
- Cavusgil, S.T. & Zou, S. (1994). "Marketing strategy-performance relationship: an investigation of the empirical link in export market ventures", *Journal of Marketing*, Vol. 58 pp.1-21.
- Chetty, S.K. & Hamilton, R.T. (1996). "The process of exporting in owner-controlled firms", *International Small Business Journal*, Vol. 14 No.2, pp.12-25.
- Clarke, R. G. (2009). Beyond Tariffs and Quotas: Why Do African Manufacturers Not Export More? *Emerging Markets Finance & Trade*, Vol. 45, No. 2, pp. 44-64.
- Cooper, D.R.& Schindler, P.S. (2005). *Business Research Methods*. NY: McGraw Hill Irwin.
- De Toni, A., Meneghetti, A., Nassimbeni, G. & Tonchia, S. (1999). *Imprese artigiane e innovazione*. Milano: Franco Angeli.
- Denscombe, M. (2003). *The Good Research Guide*. 2nd Edition. Maidenhead, Philadelphia: Open University Press.
- Hair, J. F., Anderson, E.A., Tatham, R.L. & Black, W.C. (1995). *Multivariate Data Analysis with Readings*. 4th ed., Englewood Cliffs, NJ: Prentice-Hall.
- Kerr, T. (2009). Ramping Up Customs Compliance Reviews, *China Business Review*, 49
- Lim, J. S., Sharkey, T.W. & Kim, K.I. (1996). "Competitive environmental scanning and export involvement: an initial inquiry", *International Marketing Review*, Vol. 13 No.1, pp.65-80.

Mechling, G. W., Pearce, J.W. & Busbin, J.W. (1995), "Exploiting AMT in small manufacturing firms for global competitiveness", *International Journal of Operations & Production Management*, Vol. 15 No.2, pp.61-76.

Meneghetti, A., Nassimbeni, G. & Tonchia, S. (2000), "Innovation and performance in small manufacturing firms: results of an empirical research", *International Journal of Technology Management*.

Mugenda, O. M. and Mugenda, A. B. (2003). *Research Methods: qualitative and Quantitative Approaches*. Nairobi: ACTS Press.

Saunders, M., Lewis, P. and Thornhill, A. (2009). *Research Methods for Business Students*. (5th, Ed.) Harlow: Pearson Education Limited.

Styles, C. & Ambler, T. (1994), "Successful export practice: the UK experience", *International Marketing Review*, Vol. 11 No.6, pp.23-47.

Wagner, J. (1995), "Exports, firm size, and firm dynamics", *Small Business Economics*, Vol. 7 pp. 29-32.

Westhead, P. (1995), "Exporting and non-exporting small firms in Great Britain – a matched pairs comparison", *International Journal of Entrepreneurial Behaviour & Research*, Vol. 1 No.2, pp.6-36.

Wilson, J. W., Mann, C. L. & Otsuki, T. (2005). *Assessing the Benefits of Trade Facilitation: A Global Perspective*. Washington DC: The World Bank

Wilson, N. (2006). Examining the Trade Effect of Certain Customs and Administrative Procedures, *OECD Trade Policy Working Paper No. 42*

Zou, S. & Stan, S. (1998), "The determinants of export performance: a review of the empirical literature between 1987 and 1997", *International Marketing Review*, Vol. 15 No.5, pp.333-56.

APPENDICES

APPENDIX I: QUESTIONNAIRE

SECTION A: GENERAL INFORMATION (Kindly [] tick as appropriate)

1. What is your age?

Below 30	[<input type="checkbox"/>]
30-40	[<input type="checkbox"/>]
40-50	[<input type="checkbox"/>]
Above 50	[<input type="checkbox"/>]
2. How long have you been working at this industry?

Less than 3 years	[<input type="checkbox"/>]
3-7 years	[<input type="checkbox"/>]
7-10 years	[<input type="checkbox"/>]
Over 10 years	[<input type="checkbox"/>]
3. What position do you hold in the company?

Lower level management	[<input type="checkbox"/>]
Middle level management	[<input type="checkbox"/>]
Upper level management	[<input type="checkbox"/>]
4. What is your highest level of education?

Diploma	[<input type="checkbox"/>]
Undergraduate	[<input type="checkbox"/>]
Postgraduate	[<input type="checkbox"/>]
5. Are you aware of what KRA is doing concerning automation of customs process for transit and exportation of bulk petroleum products?

Yes	[<input type="checkbox"/>]
No	[<input type="checkbox"/>]
6. If your response in 5 above is 'Yes', to what extent was your business affected by the way the automation is managed?

Very great extent	[<input type="checkbox"/>]
Great extent	[<input type="checkbox"/>]
Moderate	[<input type="checkbox"/>]
Low extent	[<input type="checkbox"/>]
Very low extent	[<input type="checkbox"/>]

SECTION B: EFFECT OF AUTOMATION ON CUSTOMS BUSINESS PROCESSES

7. In your own view, did the automation of customs documentation of transit and exports of bulk petroleum products have any gains?

Yes

No

8. If your answer in (7) above is yes, how can you rate improvement in the following aspects following in terms of importance?

	Significant positive change	Positive change	No change	Negative change	Significant negative change	Comments
Corruption initiated by customs officials						
Perceived corruption initiated by customs officials						
Corruption initiated by marketers						
Perceived corruption initiated by marketers						
Speed of in-coming cargo declaration and release						
Speed of out going cargo declaration and release						
Accuracy of declarations						
Cost of cargo clearance process						
Sealing of revenue leakage points						
Access to customs official via online communication						
Record keeping by KRA						
Widening of tax payer base						

SECTION C: THE IMPACT OF CUSTOMS AUTOMATION ON EXPORTERS OF BULK PETROLEUM PRODUCTS

9. How can you rate the **impact** of the automation of customs on exports of bulk petroleum products in terms of the following indicative factors for your business?

Indicative Factors	Greatly increased	Increased	No change	Reduced	Greatly reduced
Return on Capital employed					
Profitability					
Turnover					
Lead time					
Affiliate Integration					

SECTION D: DIFFICULTIES / CHALLENGES EXPERIENCED BY OIL FIRMS FOLLOWING AUTOMATION OF CUSTOMS

10. To what extent were the following difficulties/challenges experienced in the automation of customs on transit and export of bulk petroleum products?

	Very large extent	Large extent	Small extent	Very small extent	No challenge	Comment
Integration incompatibility with business process						
Time frame allowed by KRA for preparation and go live						
Human factor in the business						
Communication to and from KRA						
Lead time for access to products						
Any other. Please specify						

Additional comments on 14 above

11. How did you deal with the barriers rated above?

12. If the automation of customs on export of bulk petroleum products was to be done all over again, what could you recommend to be done differently?

THANK YOU FOR YOUR COOPERATION