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# **The Impact Of System Automation On Revenue Collection in Kenya Revenue Authority. (A Case Study of SIMBA)**

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**THE IMPACT OF SYSTEMAUTOMATIONON REVENUE COLLECTION IN  
KENYA REVENUE AUTHORITY  
A CASE STUDY OF SIMBA**

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## **LIST OF ABBREVIATIONS/ACRONYMS**

KRA	KENYA REVENUE AUTHORITY
GDP	GROSS DOMESTIC PRODUCT
UNCTAD	United Nations Conference on Trade and Development
IDF	IMPORT DECLARATION FORM
VAT	VALUE ADDED TAX
DPC	DOCUMENT PROCESSING CENTER
ANOVA	ANALYSIS OF VARIANCE
SD	STANDARD DEVIATION
SE	STANDARD ERROR

## **DEFINITION OF TERMS**

A) Automation - The technological upgrade undertaken by Kenya Revenue Authority as part of its strive to increase tax collection and reduce tax loopholes especially caused by tax evasion

B) Revenue Collection - This is the funding received by any organization. For KRA it refers to tax collections' that forms part of major collections by the organization. This research focuses on customs tax collections as the revenue collection

## ABSTRACT

The objective of the study was to examine the impact of system automation on revenue collection in Kenya revenue authority. This study employed descriptive study design. The study used secondary data collection. The study utilized KRA Customs data for ten financial years after Simba System. The period selected was from July 2007 to June 2016. The data was analyzed using Gretl and presented in figures and tables. The study findings established that the number of transactions, increased significantly after the implementation process this means that due to revenue systems automation a high number of imported consignments were processed and passed through the centralized Document Processing Center (DPC). The study findings also established that the revenue collected increased at an increasing rate after the implementation of Simba system. As a result of system, the shilling experienced a strong local currency then depreciated. The shilling has ever since been declining so sharply over the years against the US Dollar. This has a overall effect on the revenue collected in the sense that when the Kenyan shilling is weakened against the dollar i.e. one kshs trading for a very high value for the US dollar, the revenue collected will be of low value. The results established that the revenue collected was directly proportional to the exchange rates due to the positive sign in the coefficient. The number of transactions, as predicted by the econometric model, has positive relationship with revenue collection process. In conducting analysis of variance in the Gretl software, the probability value of p-value  $2.6e-013$  was obtained showing that the regression model was significant in predicting the relationship all the coefficients and revenue collected at 95% level of significance. The study findings established that there was a significant increase in the revenue collected after the automation to the simba system. In view of number of transactions completed, the numbers of transactions were more in the period after the automation to Simba system as shown in the figure above. The number of transactions, increased significantly after the implementation process this means that due to revenue systems automation a high number of imported consignments were processed and passed through the centralized Document Processing Center (DPC).The Exchange rates had an inverse effect on the revenue collected after the automation to the Simba system. The shilling experienced a strong local currency then depreciated. The shilling has ever since been declining so sharply over the years against the US Dollar. This has an overall effect on the revenue collected in the sense that when the Kenyan shilling is weakened against the dollar i.e. one kshs trading for a very high value for the US dollar, the revenue collected will be of low value.The inflation rate was 10.5% in 2009 which increased to 15.2 in 2010 before slowing to 5.33% in 2011. This implies that the consumer price index in 2011 was 5.33.Since the study concluded that revenue collected is inversely related to exchange rates as was shown in the regression analysis, this study recommended that the policy makers should take relevant measures to ensure stable equilibrium for the exchange rates as they adversely affect the revenue collection process. The policy makers need to evaluate the best exchange rate policy for optimal economic development. There was a high inflation rate over the years after automation, the study recommended that the

policy makers come up with policies to control the inflation rate in Kenya as it has a negatively impact on the entire revenue collection process. The study recommended that the ICT department should ensure that there is effective project coordination and change management for success of this automated system. Further, the department should ensure that there is a good data system and that is compatible with the system's needs.

## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1. Preview of Organisation under study**

The Kenya Revenue Authority was established by an Act of Parliament Cap. 469 as an Independent tax administration organization with autonomy from the Treasury. It was established in 1994 and has been operational since 1995.

Established in 1995, Kenya Revenue Authority (KRA) has the responsibility of collecting revenue on behalf of the Kenyan government to finance service delivery to an estimated population of over 44 million, which increases by one million per annum (Macharia, 2016)

The core mandate of KRA is enhancing the mobilization of Government revenue, providing effective tax administration and sustainability in revenue collection (Government of Kenya (GOK), 2003). This functions were initially handled by various departments under the ministry of Finance. KRA was meant to address the institutional constraints that were believed to hinder implementation of the tax reforms. The treasury is responsible for setting tax policy while KRA ensures that policy with respect to revenue mobilization is implemented.

The specific functions of the Authority are:

- I. To assess, collect and account for all revenues in accordance with specific laws set out in the first part of the First Schedule and the revenue provisions of the second part of the First Schedule;
- II. To advise on matters relating to the administration of, and collection of revenue under the written laws or the specified provisions of the written laws; and
- III. To perform such other functions in relation to revenue as the Minister for Finance may direct.

KRA key mandate is revenue collection, therefore revenue to GDP ratio has been one of the key performance indicators for KRA. In 2015/16 KRA managed to

attain revenue to GDP ratio of 18.2% for total revenues and 17.3% for exchequer revenues. This achievement is as a result of KRA reforms such as Simba system that have enhanced compliance with the tax system and ensured stable tax revenue collections. Furthermore, the reform measures have enhanced revenue collection through increased tax base, reduced compliance costs and efficient revenue administration. The strong revenue performance has been matched by improvements in customer service, primarily driven by initiatives in automation, integrity and enhancing professionalism in service delivery

## **1.2. Background of the Study**

Revenue collection has become an integral part of any society. It has emanated from early history of civilization through which government got funding so as to sustain its operations for the public good (Broadway, 2012). Tax revenue collection should comply with best practices of equity, ability to pay, economic efficiency, convenience and certainty (Visser & Erasmus, 2005).

Just like any other organisation, the government also looks at all ways and means to reduce the expenditure so as to have a reciprocate effect of the public national debt of the economy (Ireland P. , 1994). Various accounting and control procedures are usually adopted in order to ensure that the spending is in line with government policy and framework. Some of the controls include budgetary measures, checks and balances and many others. This engulfs the whole rationale of any corporate be it public or non-public institution which institutes to lower expenditure and increase in revenue so as to attain ultimate objectives (IMF, 2014)

Indeed these basic fundamentals play a role into the determinant of the efficiency of any operation including the efficiency of the government operations, hence, aspirations towards increase in revenue collections. Application of technological solutions towards the strategic goals for government is a key step towards

transforming government into an entity that can keep abreast of the needs, requirements and expectations of today's modern world (De Wulf & Sokol, 2005).

Automation which inculcates usually technological enhancement in terms of upgraded hardware and software so as to curb inherent risks relating to revenue reductions or the vice versa for expenditures (Ireland P. N., 1994)

In Addition, automation of process at revenue collection points has a positive impact on the tax clearance time (Haughton & Desmeules, 2001). Conversely, The automation of Tax system rather than just affecting the revenue collection, expenditure and clearance time as highlighted above, will also impact the overall staffing, confirming that the right measure of tax assessment has been undertaken so as to deter underpayments and tax evasions, and proper ways of accountability and audit trails instigated so as to curb embezzlements. This usually attained successfully by synchronizations of various systems in various systems towards a common repository mapping which is a fundamental tool in automation (Dramod K, 2004)

Such Automation is enfranchised not only in the revenue collection administration but many other governmental and non-governmental institutions so as to not only obtain maximum on the key objectives but also smooth run other operations as well as deter any risks from (De Wulf & Sokol, 2005)

### **1.3. Customs Modernization**

The Revised Kyoto Convention is the generally accepted reference point for the key principles of customs modernization (Honoham, 2003). The history of taxation has evolved from long time aging back to six thousand years B.C where a common

principle that of a levy imposed to citizens which is administered centrally and then utilised for the common good. The tax system has evolved through the ages of roman empire, grafting to the early ages of ancient civilization to colonialism up to the technological age we are in today with the basic principle of collecting some money from the citizens so as to be administered locally and spent for the public good (Chamey & Alberta , 1983)In early human history, tax collectors used the most rudimentary methods; some of these methods were so crude that they gave the profession a bad name (UNCTAD, 2008) . Over a period of time, there has been a different perception pinned to the tax system and customs recently has been linked to trade and facilitation so as to give a more noble look to the taxing activity (Ashok, 2007)

#### **1.4. KRA Automation**

KRA is committed to technological transformation in tax administration processes. For instance in the Financial Year 2014-2015, the Board of Directors was committed to increasing the level of automation in the Authority from 90.6% to 92.4%. Similarly, the 6<sup>th</sup> Corporate Plan seeks to promote uptake of information management systems to increase efficiency and minimize cost of doing business both to the taxpayer and the Authority. Furthermore, it seeks to strengthen revenue administration capacity by KRA transforming into a single collector and a lead border agency. This will be achieved through automation of internal processes of the Authority and electronic control of movement of goods into and out of Kenya. Major strides have been made towards automation of processes per department. For instance all the processes in legal services and internal audit departments are fully

automated. Similarly, high levels of automation have been attained in Domestic taxes department (95%), marketing and communication (75%), traffic revenue department (78%), investigations and enforcement(78%) Finance(71%) and ICT 59%. These automation levels are depicted clearly in figure 2 below.

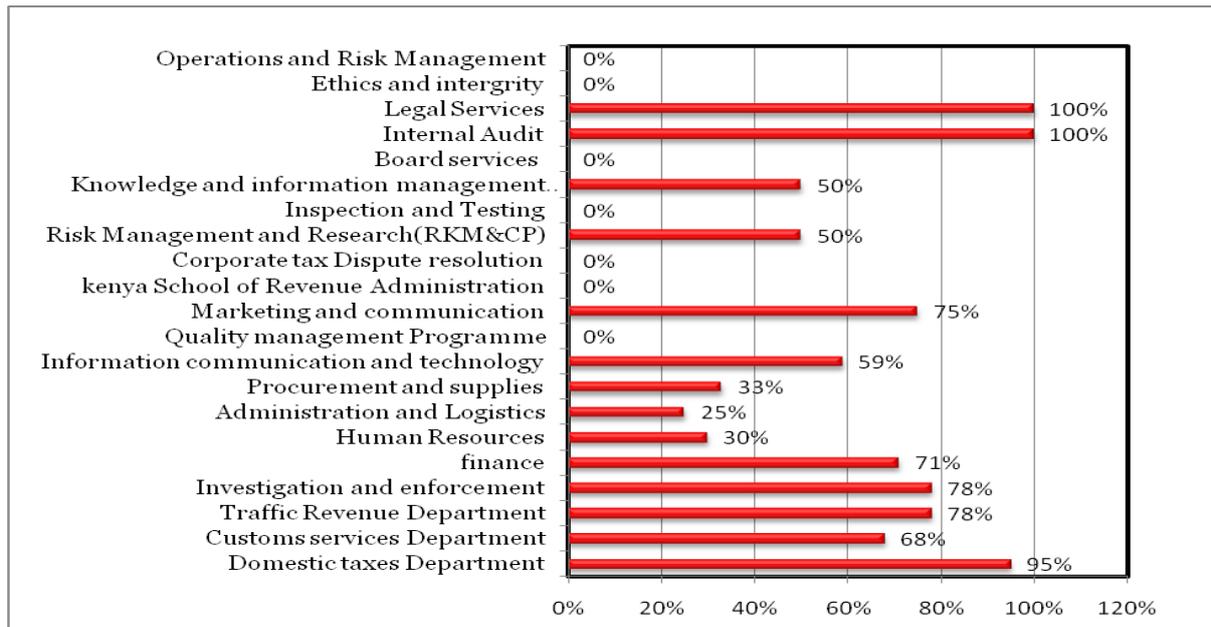


Figure1: ICT System Modernization per Department

Source: Corporate Support Services , ICT Division, 2017

### 1.5. Systems in Use at KRA Customs and Border Control Department and type of taxes collected in customs division

KRA has undertaken a massive automation strategy in line with its objectives. Some of the systems that are associated with the Customs and Border Control operations are as follows;

- a) Regional Electronic Cargo Tracking System – These are gadgets and softwares to track vehicles carrying transit goods. Usually linked to the northern corridor
- b) Cargo Manifest – This reconciles between lodgements made by the shipping line and the declarants so as to assess any volume variances
- c) Customs Oil Stocks Information System – Used for stock monitoring and basis of calculation of volume for petroleum products
- d) manifest management System - Used by Shipping lines to declare items brought into the country
- e) Kenya Revenue Authority Valuation System – A database for creating a basis of valuation of goods and services imported
- f) Air Passengers Service charge – used to calculate fees payable for passenger on boarding the air crafts

The Kenya Revenue Authority is a parastatal Authority with the mandate of collecting revenue on behalf of the national government. Customs basically collects revenue on goods that are either imported or exported, though mostly imported goods. Some of the revenue collected by customs comprise of the following;

- a) Import Declaration Form (IDF) - 2.25% IDF fee for every import made to the Republic of Kenya
- b) VAT- Most goods fall in Vatable Supplies, hence, most incur a charge of 16% Input VAT, though Zero Rated Supplies will incur no VAT.

- c) Duties – Most goods are subject to duty upon arrival. These range from 0% to over 100% for other sensitive goods.
- d) Railway Development Levy – this is 2.5% of FOB price of all the goods entering the county
- e) Excise Duty – Goods that are subject to excise duty
- f) Petroleum Levy – Levies and taxes to be paid on petroleum products that enter the county
- g) Integrated Customs Management System – A new enhanced system that will link various modules so as to have one repository unlike currently where different databases are managed

## 1.6 Brief History of KRA Customs reforms path

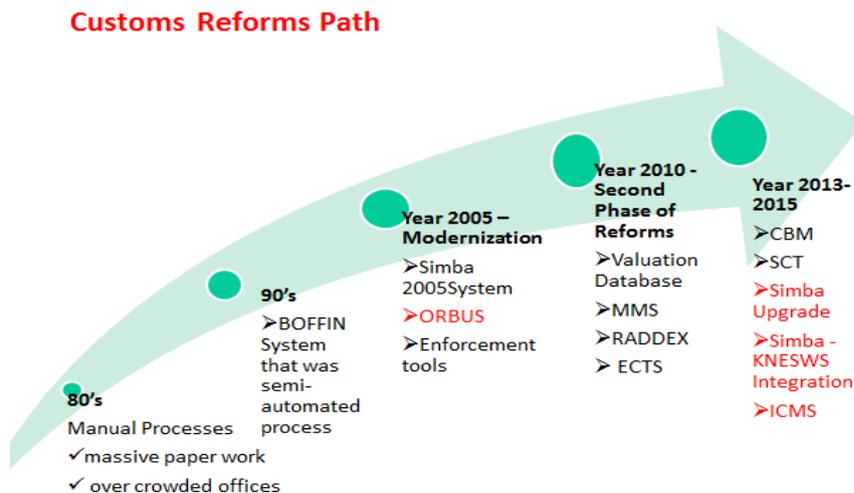


Figure 2: Customs Reformation Path

Source: Class notes PGD KESRA 2016

According to the sixth corporate annual plan, KRA intends to provide consistent frameworks for achieving efficiency and effectiveness. Any organisation strives to achieve the best, and nowadays pegging on technology is undertaken so as to achieve the most (Saguna, 2003).

KRA has undergone the same route. In the early 80's manual processes were used in the almost all the processes. Thereafter, in 1989 the BOFFIN system was implemented which was a semi-automated system which was written in Cobol and runs of Wang Hardware.

Due to lack of reliable customs system which was also cited by IMF besides other bodies, KRA sought to go forth and implement the SIMBA system in 2005. Which was a web based system.

Systems that were running parallel to the SIMBA system were as follows:

- TRADE-X is the Customs clearance management module.
- LEUK provides an interlinking between Customs agents and Shipping line agents. Its currently replaced with the Manifest Management System (MMS)
- PAYBOX links the banks with the customs department which is replaced with payment gateway system
- ORBUS module facilitates electronic contact between Customs and Customs agents, Ship agents, carriers as well as regulatory government agencies.

The SIMBA system came together with many other transformations and reforms from within the institution and this engulfed a whole philosophy of customs reform modernisation (Waweru, 2006).

After a successful implementation, SIMBA possessed yet a number of loop holes that allowed tax evaders to go away with tax payments.

In the same spirit of embracing technological advancement, another set of technological reforms so as match out with newer requirement.

The Electronics Container Tracking Systems (ECTS) was adopted. This was both hardware and software. The hardware included seals to be kept in every goods that

were to be transported on transit to neighbouring countries. This had to be done since a lot of tax evaders were using transit goods for dumping.

A valuation database was also implemented in-order to ensure that under valuation of imported goods was eradicated.

Finally, a strive towards the regional integration of the northern corridor in line with the ECTS that has already taken place in early 2017 and the awaiting of the implementation of the Integrated Customs Management System (ICMS) which will be an upgraded SIMBA is likely to take place by mid this year, portrays the spirit of the organisation of keeping tandem with the technological upgrades in order to meet emerging need but this study will focus on simba system.

### **1.7. Statement Problem**

Automation of revenue collection has added a fresh touch to the once choking Kenya Revenue Authority (KRA), with tax evasion minimised and improved business efficiency recorded. With the introduction of simba system in place of Boffin which was previously used, the taxman collected Sh534 billion during the 2009/2010 financial year compared to Sh298 billion collected in the 2004/2005 period, a great improvement. This technology shift among other factors has helped record an increase of 22 per cent to the gross domestic product (GDP), and has seen the government realise a 95 per cent target. “Automation has reduced the cost of revenue collection and interaction between the taxpayer and staff, a fertile area for corruption (Masese, 2011)

The system has enhanced a seamless flow of information between KRA, Central Bank of Kenya and other government departments in the areas of cargo clearance, both on air and sea, taxpayer registration, returns processing, customer service, copy of

records, payments on specific tax heads and tax clearance certificates. With this technology, the duration of filing tax returns has reduced from two weeks to 30 minutes, while that of clearing cargo reduced from between 6 to 15 days to between 2 and 6 days (Masese, 2011)

However, this system lacks a standardisation policy for hardware which is eating into the pockets of the taxpayer making it inefficient. Vandalism is another nightmare that affects business operations when it occurs and still cases of tax evasion, unmet revenue targets are still experienced even after its introduction, thus leading to a research to investigate the impact of systems reforms on revenue collection in KRA.

## **1.8. Objectives of the Study**

### **1.8.1. General objective**

The general objectives of the study will be to examine the impact of system automation on revenue collection in Kenya revenue authority.

### **1.8.2. Specific objectives**

- i. To determine the impact of the number of transactions completed on revenue collection after Simba Upgrade
- ii. To establish the impact of inflation on revenue collection after Simba Upgrade
- iii. To determine the effect of exchange rate on revenue collection after Simba Upgrade

## **1.9. Justification of the Study**

To attain Vision 2018 objectives, KRA requires a more ambitious revenue framework to eliminate the budget deficit and achieve average revenue growth of 24.3%. In this regard, the Authority has set ambitious revenue target on various categories of tax heads and key among them is the import duty that is expected to grow by 14.78% from

82.19 billion to 94.32 billion for the 2016/2017 financial year and 13.59% for the 2017/2018 financial year from 94.32 billion to 107.1 billion. The study will therefore aim at establishing the impact of the Simba systems in use at the customs on revenue collection which is aimed to drive the ambitious framework of the customs department and seal possible loopholes.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1. Theoretical Literature**

(Cooper & Kleinschmidt, 1996) in their research found high correlation between new technology strategy and firm performance. Similarly (Zahra & Covin, 1993) found a clear correlation between business strategy-technology strategy fit and a firm performance

Some of the theories that relate to the impact of automation have been highlighted below

##### **2.1.1 Theories touching automation with regard to technology**

###### **2.1.1.1 Social Presence Theory**

Advocated by (Short, Williams, & Christie, 1976) which originates from a communication research. It posited that communication media differs in the degree of social presence as the quality of communication which is nowadays brought up by technology affects the way people interact.

The theory was further evolved and elaborated further by (Gunawardena, 1995)

###### **2.1.1.2 Technological Determinism**

Technological determinism (TD), is a reductionist theory and states that technology is a social structure or a force which drives change. TD changes the organisational culture, structure, reporting line, norm and many other aspects including the modes of operations.

The two main hypothesis that technological determinism depends are;

- a) belief that the technical base of a society is the fundamental condition affecting all patterns of social existence
- b) belief that technological change is the single most important source of change in a society

Critics like (Chandler, 2000) states that other than technological issue other factors have driving forces and some of them include political issues, class interests, economic pressures, educational background, general attitudes and others.

TD has also had a long and controversial history in the social sciences in general and in organization studies in particular. Critics of TD argue variously that technology itself is socially determined, that technology and social structures co-evolve in a nondeterministic, emergent process, or that the impact of any given technology depend mainly on how it is implemented which is in turn socially determined. Given the proliferation of new technologies in modern capitalism, the TD debate is continually renewed.

### **2.1.2.3 Theory of Social Determinism**

According to the proponents of this theory, it is the human race which shapes technology and not vice versa, because technologies are continually re-interpreted by users and given new, often unexpected trajectories. While the internet was first used as a communication and information searching engine, it has now developed to other uses including E- business, marketing media and social interactive media. The central premise of this theory that (Mackenzie &

Wajeman, 1999) refer to as the 'social shaping of technology' (SST), was that what matters is not technology itself, but the social or economic system in which it is embedded. Their view provides an antidote to what they call "naïve Technological Determinism" and caution that those who have not recognized the ways in which technologies are shaped by social and economic forces have not gotten very far. They dismiss the theory of Technological Determinism as mere "technological politics" that has fascinated historians, philosophers, and political scientists. Bijker and Law also make a forceful argument that the idea of 'pure' technology is nonsense. Technologies always embody compromise. Political, economics available raw material all of these are thrown into the melting pot whenever an artifact is designed or built. Technologies do not, we suggest, evolve under the impetus of some necessary inner technological or scientific logic. They are not possessed of an inherent momentum. If they evolve or change, it is because they have been pressed into that shape. (William & Edge, 1996) hold the same view and posit that organizational, political, economic and cultural factors do influence the design and implementation of technology. The above arguments do suggest that it is not only technology that affects society, but that social factors do affect technology as well.

## **2.2 Theory touching revenue collection**

### **2.2.1 Empirical Literature**

(Aamir , et al., 2011) identified restructuring of the tax system as an important determinant in an economies' revenue collection. Restructuring the tax system at federal level was central to the entire process of economic reforms. Direct tax reforms at federal level formed key component of wider reforms in fiscal and economic sector of Pakistan. Like in other developing countries, in India also

the tax reforms aimed at correcting fiscal imbalances (Panday, 2006) The rise of the value added tax (VAT) around the world has been one of the most important tax developments of recent times. This tax is considered to have advantages compared with other taxes, because it eliminates cascading, allows for zero rating of exports, and is broad based and difficult to evade. A very slightly modified form of VAT was general sales tax (GST) which was imposed in Pakistan in 1991 tax reforms.

(Osoro, 1993) examined the revenue productivity implications of tax reforms in Tanzania. In the study, the tax buoyancy was estimated using double log form equation and tax revenue elasticity using the proportional adjustment method. For the study period, the overall elasticity was 0.76 with buoyancy of 1.06. The study concluded that the tax reforms in Tanzania had failed to raise tax revenues. These results were attributed to the government granting numerous tax exemptions and poor tax administration.

(Chipeta, 1998) evaluated effects of tax reforms on revenue collection in Malawi for the period 1970 to 1994. The results indicated buoyancy of 0.95 and an elasticity of 0.6. The study concluded that the tax bases had grown less rapidly than GDP. (Kusi, 1998) studied tax reform and revenue productivity of Ghana for the period 1970 to 1993. Results showed a pre-reform buoyancy of 0.72 and elasticity of 0.71 for the period 1970 to 1982. The period after reform, 1983 to 1993, showed increased buoyancy of 1.29 and elasticity of 1.22. The study concluded that the reforms had contributed significantly to tax revenue productivity from 1983 to 1993.

(Teera, 2002) examined the tax system and tax structure of Uganda to investigate the factors effecting revenue collection in the country. He used the time series data of the period 1970 to 2000 and estimated a model. His results showed that agriculture ratio, population density and tax evasion affect all type of taxes. GDP per capita showed the surprising negative sign. Tax evasion and openness (as measured by import ratio) showed the significant negative impact. Aid variable showed positive sign since aid in Uganda always supported imports especially raw material so not surprisingly.

(Muthama, October 2013) did a study on change management practices adopted by Kenya Revenue Authority in its reform and modernization programme. The objective of this study was to determine the Change Management Practices adopted by KRA. The study was conducted through a case study of KRA. It was found that there have been a lot of changes in the firm that have prompted the management to effectively manage change. New departments have been created, others merged while others split in a bid to deliver better services to clients. Similar to organizations, resistance to change was inevitable but the management was able to contain the pressures that wanted status quo to prevail.

### 2.3. Conceptual Framework

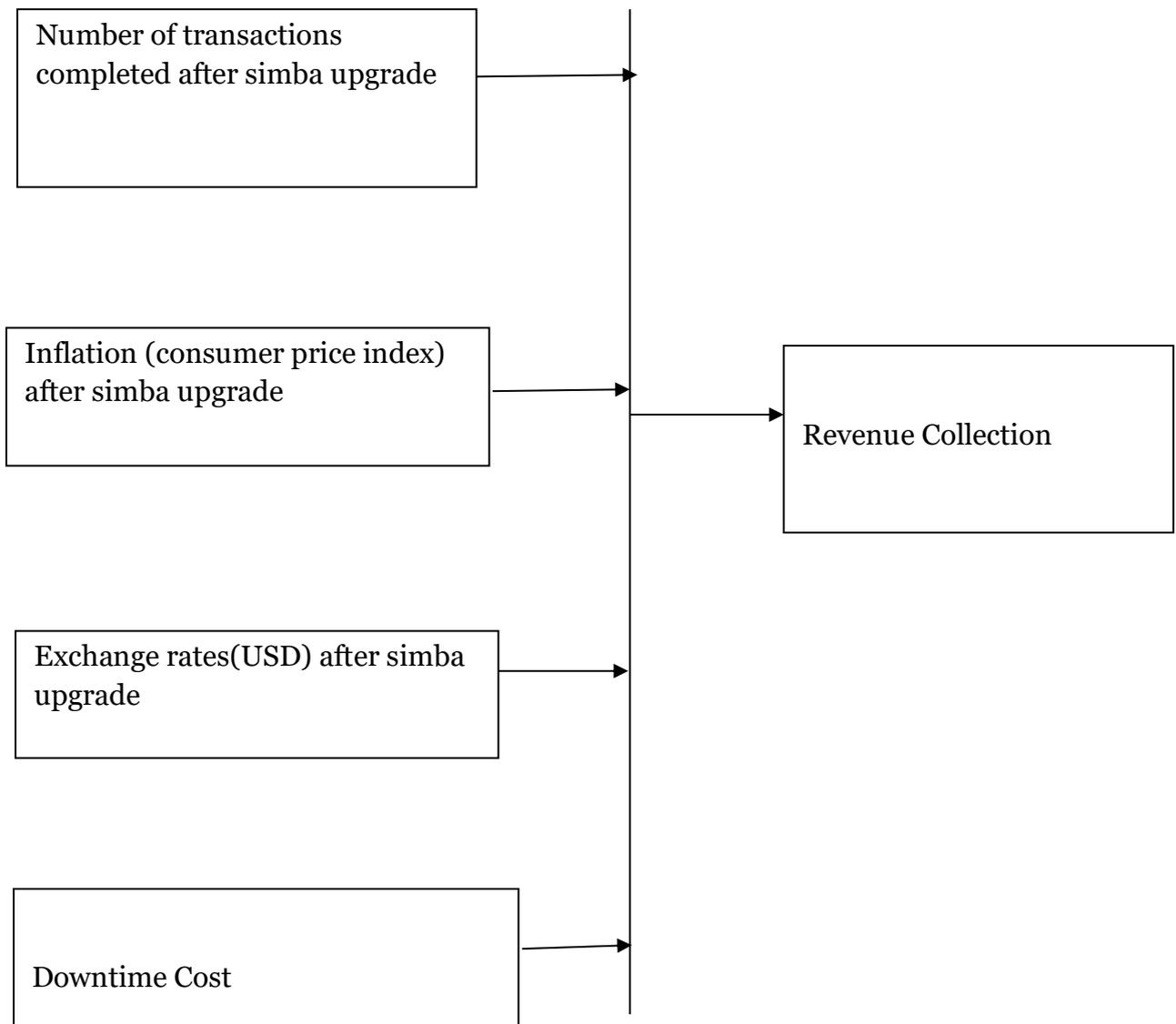


Figure 2.1. Conceptual Framework

## CHAPTER THREE

### RESEARCH METHODOLOGY

#### **3.1. Introduction**

This section looks at the methods used in this study. It discusses issues to do with the specification of the model, sources of data, the model and definition of variables. The study will cover the period 2008-2015.

#### **3.2. Research Design**

The study will use of descriptive (deductive) study design. The descriptive studies summarise a report on an experiment or data set which helps one to draw conclusions on the data collected (Cresswell, 2008)

#### **3.3. Data Collection and Analysis**

Secondary data collected analysed using Gretl software. This particular software was chosen because of its user-friendliness and accessibility. The study will collect data on total revenue collected in eight (8) years for the current customs operating Systems implementation and other national bodies. Data will be presented in figures and tables, summary statistics of the mean, and standard deviation. In addition, the correlation matrix of the independent variables will be created. The result of the regression of the model will then be developed and tables will be used to show the regression results for the customs performance.

#### **3.4.1. Model Specification**

This model was initially adapted by (Nkote & Luwugge , 2010) who used the model in order to deduce the automation impacted minimally on revenue generation in Uganda.

The same model was used by (Muthama, October 2013). She used operating cost as the independent variable. She was comparing between the BOFFIN and SIMBA system up until 2007.

One of the objectives of this study was to examine the relationship between the various system reforms e.g. inflation, number of transactions, and exchange rates on revenue generated.

The following multiple regression model will be used to show if system automation has an impact on revenue collection after simba was implemented.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon$$

Where:

Where Y= Revenue Collected by customs service departments in Kshs

X<sub>1</sub>= Number of transactions completed (Annually)

X<sub>2</sub> = Exchange rates (USD)

X<sub>3</sub>=Inflation (Consumer Price index)

X<sub>4</sub>= System Downtime cost

ε= Error Term

### **3.4.2. Suitability of the Model**

The model found to be most appropriate in this study because it provides enough guidance as to whether revenue collected is affected by the system since the independent variable affecting the system being number of transactions completed monthly and inflation will in itself prove revenue collected. Important to take note is that there are other non-system aspect which can also affect revenue that have not been included in the model.

## CHAPTER FOUR

### DATA ANALYSIS, RESULTS AND DISCUSSION

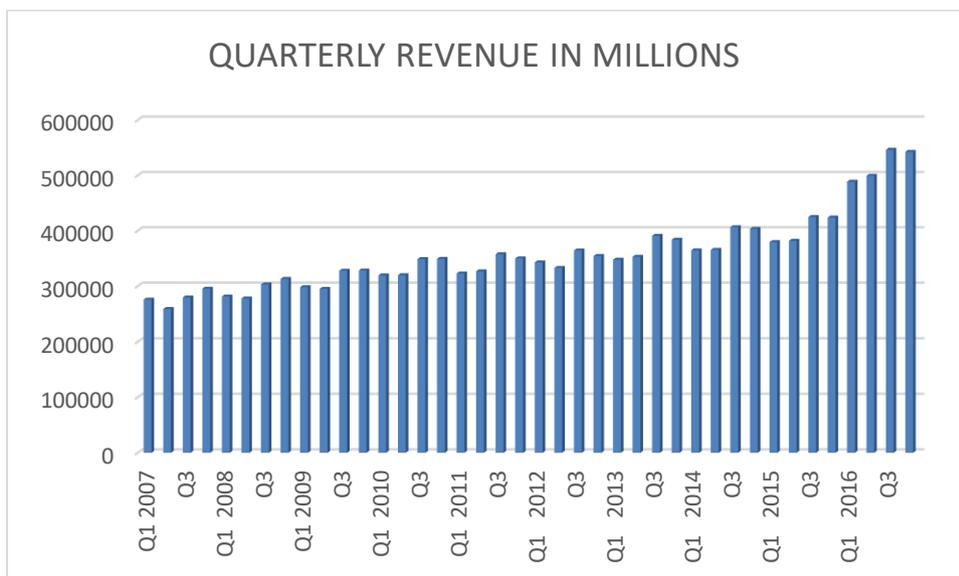
#### 4.1 . Introduction

This chapter discusses findings that were obtained in the analysis, using the methodology that was discussed in chapter three above. The chapter discusses the summary statistics of the variables that were used and the other statistical measures of the variables. The data collected and analyzed is secondary and is obtained from Kenya Revenue Authority records.

#### 4.2 Data Presentation

The data for the dependent and independent variables was analysed and presented in bar graphs as shown below. The purpose was to show the behaviour of the variables after the simba system was implemented. The bar graphs will depict a pictorial rendition of statistical data of the various variables showing comparisons of the financial years and the effect of the implementation of the simba system over the years .

Figure 2.3: Revenue Collected



Source: (Economic Survey, 2017)

Revenue collected increased at an increasing rate after the implementation of Simba system. . As a result of system implementation, efficiency levels in the organization in revenue collection were high. This was largely because the implementation of Simba

system allowed coordinated declaration of custom values in a centralized system regardless of the office location.

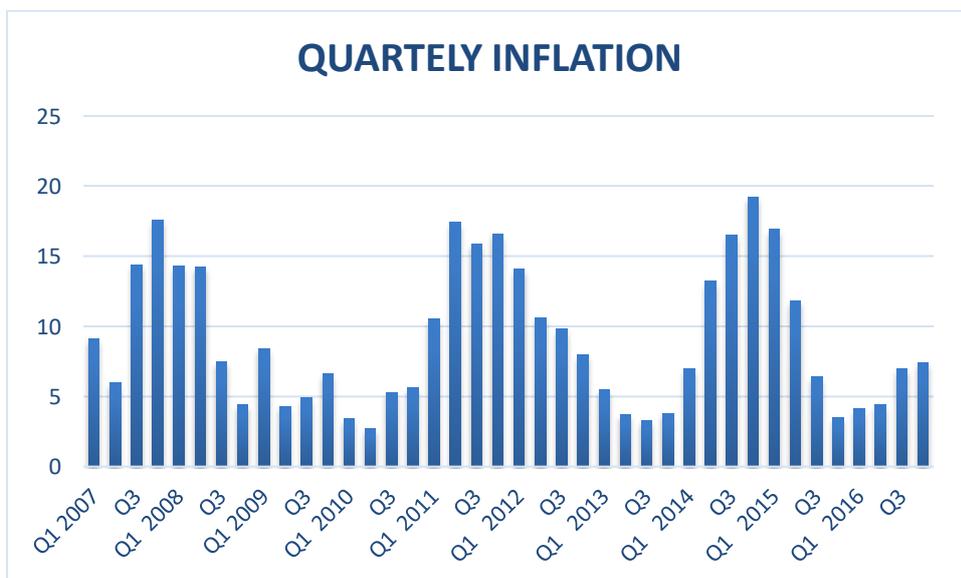
Figure.2.4: Number of Transactions Completed



Source: (Kenya Revenue Authority, 2017)

The numbers of transactions were more in the period after the automation to Simba system as shown in the figure above. The number of transactions, increased significantly after the implementation process this means that due to revenue systems automation a high number of imported consignments were processed and passed through the centralized Document Processing Center (DPC).

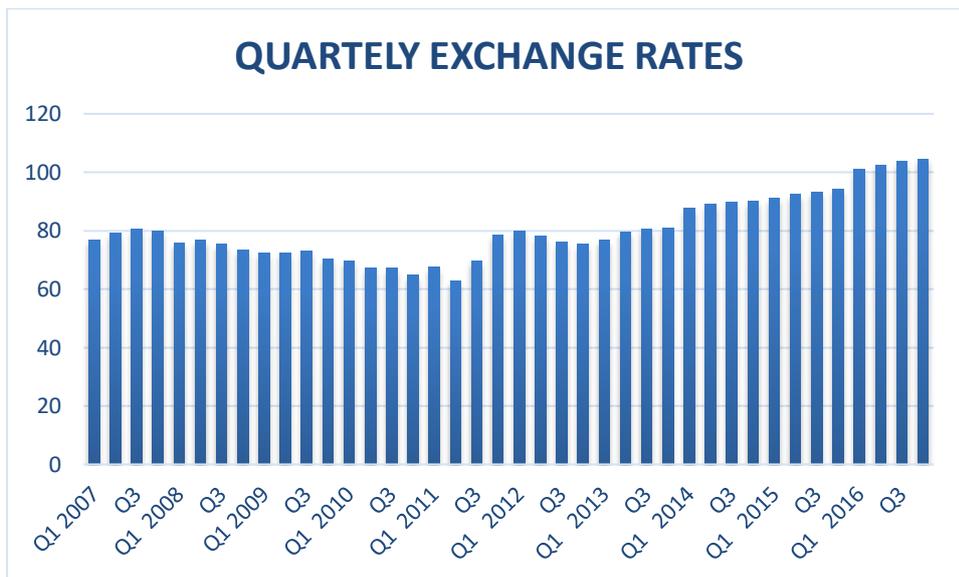
Figure 2.5: Inflation(consumer price index)



Source: (Economic Survey, 2017)

After automation, the inflation rate was 10.5% in 2009 which increased to 15.2 in 2010 before slowing to 5.33% in 2011. This implies that the consumer price index in 2011 was 5.33 percent. In 2012 the consumer price index hit an all time high of 13.78 percent. Inflation can affect domestic demand and thereby adversely affect GDP growth, consequently having an impact on the revenue collection.

Figure.2.6. Exchange rates (USD)



Source: (World Bank Data , 2017)

After the automation to the Simba system, the shilling experienced a strong local currency then depreciated. The shilling has ever since been declining so sharply over the years against the US Dollar. This has a overall effect on the revenue collected in the sense that when the Kenyan shilling is weakened against the dollar i.e. one kshs trading for a very high value for the US dollar, the revenue collected will be of low value.

### 4.3 Regression Analysis

The study further conducted a regression model for the period after automation to Simba system to establish the relationship between Simba system performance variables and Revenue collection. The summary of the findings were presented below.

**Model 1: OLS, coefficients results using 107 observations**  
**Dependent variable: REVENUECOLLECTED**  
**Heteroskedasticity-robust standard errors, variant HC1Gretl**

TABLE 1 Model 1: OLS, using observations 1-40

Dependent variable: REVENUECOLLECTEDINMILLIONS				
	coefficient	std. error	t-ratio	p-value
-----				
const	279763	31446.5	8.896	1.65e-010 ***
QUARTELYINFLATION	-1618.57	943.651	-1.715	0.0951 *
QUARTELYEXCHANGE~	173.298	48.6049	3.565	0.0011 ***
NOOFTRANSACTIONS~	-0.404819	0.520615	-0.7776	0.4420
DOWNTIMECOST	0.310233	0.166421	1.864	0.0707 *

From the above model, a regression analysis was done so as to determine the relationship between Revenue Collected and the independent variables. The regression equation was:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon$$

Inputting the values after regression was done on the above equation we get:-

$$Y = 279763 - 0.4048X_1 + 173.298X_2 - 1618.57X_3 + 0.3102X_4 + 29148.66$$

[0.5206]    [48.6049]    [943.651]    [0.1664]

\*standard errors in parenthesis

From the above holding all the other factors constant, the revenue collected will be Ksh. 2.7976billion. A unit change in the number of transactions completed holding the other factors constant will decrease the revenue collected by Ksh. 0.4 billion; A unit change in Exchange rates (USD) holding the other factors constant will increase the revenue collected by Kshs. 1.73 billion; a unit change in Inflation (Consumer Price index) holding the other factors constant will decrease the revenue collected by Kshs. 1.6 billion. The control factor is system downtime with a coefficient value of 0.3102.

On inflation rate the study found out that the inflation rates were high as indicated by the consumer price index and there was no steady change in the inflation rates after automating to Simba system.

The exchange rates of Kenyan shillings against the United States dollar has been unstable over the period of study. As shown in the econometric model, the results established that the revenue collected was directly proportional to the exchange rates due to the positive sign in the coefficient.

The number of transactions, as predicted by the econometric model, has positive relationship with revenue collection process, this implies that due to automation of the revenue system, a high number of goods transactions passed through the centralized Document Processing Center (DPC).

The study conducted an Analysis of Variance (ANOVA), in order to test the significance of the model. The results are shown below:

**TABLE 2      Analysis of Variance:**

	Sum of squares	df	Mean square
Regression	1.5253e+011	4	3.81324e+010
Residual	2.97376e+010	35	8.49644e+008
Total	1.82267e+011	39	4.67352e+009

$$R^2 = 1.5253e+011 / 1.82267e+011 = 0.836846$$

$$F(4, 35) = 3.81324e+010 / 8.49644e+008 = 44.8804 \text{ [p-value } 2.6e-013]$$

The objective was to check on whether there was a significant statistical relationship between the independent variable and the dependent variable. In the above analysis of variance table, the probability value of p-value 2.6e-013 was obtained showing that

the regression model was significant in predicting the relationship all the coefficients and revenue collected at 95% level of significance.

**TABLE 3 ;Results of r-squared, standard error of regression, adjusted r-squared and p-value of the model.**

Mean dependent var	358107.9	S.D. dependent var	68363.11
Sum squared resid	2.97e+10	S.E. of regression	29148.66
R-squared	0.836846	Adjusted R-squared	0.818200
F(3, 36)	38.94797	P-value(F)	2.14e-11

From the above summary of the model, the independent variable contributed to 81.82 % of the variation in the revenue collected as explained by the adjusted r-squared. The standard error of regression of the model was 29148.66 while the p-value was 2.6e-013 thus implying that the model was significant as it was below the stated level of significance of  $\alpha = 0.05$

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSION, RECOMMENDATIONS AND LIMITATION OF THE STUDY**

#### **5.1 : Summary**

The study findings established that there was a significant increase in the revenue collected after the automation to the Simba system.

In view of number of transactions completed, the numbers of transactions were more in the period after the automation to Simba system as shown in the figure above. The number of transactions, increased significantly after the implementation process this means that due to revenue systems automation a high number of imported consignments were processed and passed through the centralized Document Processing Center (DPC).

The Exchange rates had an inverse effect on the revenue collected after the automation to the Simba system. The shilling experienced a strong local currency then depreciated. The shilling has ever since been declining so sharply over the years against the US Dollar. This has an overall effect on the revenue collected in the sense

that when the Kenyan shilling is weakened against the dollar i.e. one kshs trading for a very high value for the US dollar, the revenue collected will be of low value

The inflation rate was 10.5% in 2009 which increased to 15.2 in 2010 before slowing to 5.33% in 2011. This implies that the consumer price index in 2011 was 5.33 percent. In 2012 the consumer price index hit an all-time high of 13.78 percent. Inflation can affect domestic demand and thereby adversely affect GDP growth, consequently having an impact on the revenue collection.

## **5.2: Conclusion**

The study concludes that the revenue system automation has contributed to increased Revenue collection. The study further concludes that automation of revenue collection processes offers great deal of significant management; the revenue collected is strongly related to the number of transactions completed, the study further concludes that there is a direct relationship between number of completed transactions and the revenue collected as was predicted in the econometric model. The study concludes that there is an inverse relationship between inflation rate and the revenue collected. The study further concludes that the inflation rate has been relatively high over the study period. The study also concludes that revenue collected is inversely related to exchange rates as was shown in the regression analysis.

## **5.3: Policy Recommendations**

Since the study concluded that revenue collected is inversely related to exchange rates as was shown in the regression analysis, this study recommends that the policy makers should take relevant measures to ensure stable equilibrium for the exchange rates as they adversely affect the revenue collection process. The policy makers need to evaluate the best exchange rate policy for optimal economic development.

Since there was a high inflation rate over the years after automation, the study recommends that the policy makers come up with policies to control the inflation rate in Kenya as it has a negatively impact on the entire revenue collection process.

Finally, the study recommends that the ICT department should ensure that there is effective project coordination and change management for success of this automated system. Further, the department should ensure that there is a good data system and that is compatible with the system's needs.

#### **5.4: Limitations of the study**

The accuracy of data presented in this study is subject to accuracy of data collected by the SIMBA system in Kenya Revenue collection Authority. Another limitation of this study is that not all factors that could affect revenue collection was put into account, as there are other non-system factors that could affect revenue collected that were not included in the model.

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## APPENDICES

### APPENDIX 1 : Revenue collected by customs services departments in million kshs.

YEARS		QUARTERLY REVENUE IN MILLIONS
2007	Q1	275761
	Q2	258812
	Q3	279575
	Q4	295386
2008	Q1	281332
	Q2	277854
	Q3	303053
	Q4	313010
2009	Q1	298176
	Q2	295130
	Q3	327867
	Q4	328297
2010	Q1	319289
	Q2	319696
	Q3	348672
	Q4	349189
2011	Q1	322884

	Q2	326704
	Q3	357640
	Q4	350036
2012	Q1	342820
	Q2	332800
	Q3	364423
	Q4	354344
2013	Q1	347736
	Q2	352973
	Q3	390817
	Q4	383776
2014	Q1	364583
	Q2	365499
	Q3	406451
	Q4	403379
2015	Q1	379509
	Q2	381828
	Q3	424864
	Q4	423883
2016	Q1	488511
	Q2	499156
	Q3	546257
	Q4	542345

**Source: (Economic Survey)**

#### **APPENDIX 2 : Number of transactions completed annually**

<b>YEARS</b>		
D2007	Q1	59401
	Q2	61091
	Q3	68053
	Q4	62423
2008	Q1	68618
	Q2	68325
	Q3	68830
	Q4	68823
2009	Q1	83185
	Q2	82199
	Q3	88567
	Q4	90973
2010	Q1	87506
	Q2	80293
	Q3	88651
	Q4	88493
2011	Q1	98694
	Q2	97550

	Q3	101551
	Q4	111992
2012	Q1	118119
	Q2	124007
	Q3	137193
	Q4	131717
2013	Q1	130780
	Q2	123658
	Q3	128612
	Q4	134754
2014	Q1	131973
	Q2	124833
	Q3	123637
	Q4	123856
2015	Q1	134543
	Q2	141021
	Q3	127436
	Q4	128190
2016	Q1	131516
	Q2	133376
	Q3	164421
	Q4	151688

**Source : Kenya Revenue Authority**

### **APPENDIX 3: Inflation rates (consumer price index)**

YEARS		QUARTELY INFLATION
2007	Q1	9.1
	Q2	6
	Q3	14.4
	Q4	17.6
2008	Q1	14.3
	Q2	14.2
	Q3	7.5
	Q4	4.4
2009	Q1	8.4
	Q2	4.3
	Q3	4.9
	Q4	6.6

2010	Q1	3.4
	Q2	2.7
	Q3	5.3
	Q4	5.6
2011	Q1	10.5
	Q2	17.4
	Q3	15.9
	Q4	16.6
2012	Q1	14.1
	Q2	10.6
	Q3	9.8
	Q4	8
2013	Q1	5.5
	Q2	3.7
	Q3	3.3
	Q4	3.8
2014	Q1	7
	Q2	13.2
	Q3	16.5
	Q4	19.2
2015	Q1	16.9
	Q2	11.8
	Q3	6.4
	Q4	3.5
2016	Q1	4.1
	Q2	4.4
	Q3	7
	Q4	7.4

**Source: (Economic Survey)**

#### **APPENDIX 4: Exchange rates US dollar**

<b>YEARS</b>		<b>QUARTELY EXCHANGE RATES(US DOLLARS)</b>
2007	Q1	76.89
	Q2	79.08
	Q3	80.52
	Q4	79.95
2008	Q1	75.81
	Q2	76.62

	Q3	75.27
	Q4	73.49
2009	Q1	72.35
	Q2	72.44
	Q3	72.97
	Q4	70.46
2010	Q1	69.68
	Q2	67.28
	Q3	67.16
	Q4	64.74
2011	Q1	67.46
	Q2	62.95
	Q3	69.76
	Q4	78.42
2012	Q1	79.89
	Q2	78.06
	Q3	75.95
	Q4	75.32
2013	Q1	76.70
	Q2	79.64
	Q3	80.69
	Q4	80.84
2014	Q1	87.80
	Q2	88.90
	Q3	89.90
	Q4	90.21
2015	Q1	91.11
	Q2	92.33
	Q3	93.28
	Q4	94.25
2016	Q1	101.14
	Q2	102.37
	Q3	103.61
	Q4	104.57

**Source : world bank data**

#### **APPENDIX 5: downtime cost**

YEARS		DOWNTIME COST
2007	Q1	9241
	Q2	12844
	Q3	16447
	Q4	20076
2008	Q1	23466
	Q2	24726

	Q3	30847
	Q4	34447
2009	Q1	38074
	Q2	41647
	Q3	45427
	Q4	48481
2010	Q1	52442
	Q2	56405
	Q3	59647
	Q4	63488
2011	Q1	66490
	Q2	74944
	Q3	75410
	Q4	77470
2012	Q1	81420
	Q2	84400
	Q3	85420
	Q4	92490
2013	Q1	95474
	Q2	99434
	Q3	10919
	Q4	11053
2014	Q1	11040
	Q2	11375
	Q3	117348
	Q4	120914
2015	Q1	124513
	Q2	128115
	Q3	131790
	Q4	135421
2016	Q1	138922
	Q2	142513
	Q3	146210
	Q4	149697

**Source :Kenya National Bureau of Statistics**