# EFFECTS OF AUTOMATION ON REVENUE COLLECTION AT BORDER POINTS, DEPARTMENT OF IMMIGRATION, KENYA

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# DECLARATION

This research paper is my original work and has not been presented for any award in any other university.

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This research paper has been submitted with my approval as the University Supervisor.

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# ACKNOWLEDGEMENT

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# ABBREVIATIONS AND ACRONYMS

**CIGRPS**    Computerized Internally Generated Revenue Processing System

**GRA**    Ghana revenue authority

**KACC**    Kenya Anticorruption Commission

**KRA**    Kenya Revenue Authority

**NGOs**    Non-Governmental Organizations

**SPSS**    Statistical Package for Social Sciences

**SSADM**    Structured Systems Analysis and Design Methodology

**VIF**    Variance Inflation Factor

**URA**    Uganda Revenue Authority

# ABSTRACT

Revenue collection is an important activity for all organizations (Edem, 2017). Revenue denotes the inflows that make the achievement of organization objectives possible. Automation of revenue collection system focuses on putting resources into current innovations for instance: ICT with the end goal to redesign the income framework to accomplish joining and data partaking in order to improve proficiency and adequacy of the framework.The Department of immigration instituted automation of its process in the year 2015 following the enactment of the e-citizen program. Preliminary data reveals wide deviations in the total revenue collected (Immigration Department, 2018). The deviations are observed across the 35 border points, with some border points revealing high revenue (JKIA year 2017/2018=kes 1.246B) while other shows negligible revenue (For instance, Muhuru Bay year 2017/2-18=kes 34,300). Therefore, this study sought to determine to determine the effect of automation on revenue collection by border points under the Department of Immigration, Kenya. The study applied explanatory research to explain how one variable (the dependent variable) is influenced by a set of independent variables. The study used an event study approach. The study applied t-test analysis check whether revenues spanning 3 years before automation were significantly different from revenues collected in the 3 years following automation. The point of reference is year 2015. The study population involved the 35 operational border points under the department of immigration, Kenya. Secondary dataset was analyzed using SPSS software. Quantitative data analysis techniques including descriptive and inferential statistics were used. The particular descriptive statistics include means and standard deviations. The inferential statistics include t-test, correlation and multiple linear regression analysis. The independent t-test findings revealed that there was significance difference in total revenue collected between the period before automation year and period after automation years. Additionally, the regression results revealed positive and significant relationship between the independent and dependent variables. Based on the findings, the study concluded that automation on revenue collection at border points and positive and significant impact on the total revenue collected. This was shown by the sharp increasing trend of amount of revenue collected after automation, 2015 being the reference year. The study recommended that future studies to conduct event studies on automation in other departments and government agencies for the purpose of comparison of findings.

# CHAPTER ONE : INTRODUCTION

## 1.1 Background of the study

Revenue collection is an important activity for all organizations (Edem, 2017). Revenue denotes the inflows that make the achievement of organization objectives possible. The need to meet revenue collection targets is therefore an important preoccupation of private enterprises, government and Non-Governmental organizations (NGOs). The inability to meet revenue collection targets may lead to liquidity problems (liquidity preference theory) and financial distress (financial distress theory), a situation where organizations are unable to meet their current and future obligations (Song'e, 2015). In extreme cases, failure to achieve revenue may lead corporate failure, or threaten the going concern of an enterprise. The collapse of enterprises may have negative implications on stakeholders (stakeholder theory) and shareholders (shareholder wealth maximization theory), which include complete lack or poor service delivery, lost employment opportunities, lost future revenues, among others (Maaka, 2013). To ensure that organization objectives are met, strategies to ensure that these revenue targets are met are put in place. Automation of revenue collection has been one of the preferred strategies to boost revenue collection in organizations (Njenga, 2017).

Border points are no exception to the challenge of low revenue collection. Border points operating under the department of immigration are mandated to collect revenue which is expected to aid in the service delivery. Failure to meet revenue collection targets by border points may have negative implications on the meeting of either the stakeholder or the shareholders objectives. For instance, it may be difficult to have adequate financial allocations for delivering immigration services (Mutisya, 2014).

Previous studies such as Maaka (2013),Song'e, (2015), Edem, (2017) reveal that revenue collection is a crucial part of any organization activity and hence cannot be ignored. Oduor, Sevilla, Wanyoike, Mutua (2016), Gitaru (2017), Mutisya (2014), Njenga(2014) make a case for the role of automation in boosting revenue collections in several contexts such Machakos, Kiambu counties, Kenya Revenue Authority among others.

### 1.1.1 Automation of Revenue Collection

Automation of revenue collection system focuses on putting resources into current innovations for instance: ICT with the end goal to redesign the income framework to accomplish joining and data partaking in order to improve proficiency and adequacy of the framework (Mutisya, 2014). Manual tasks have proven to be inadequate in their efforts to record and disseminate information within the various government institutions and departments in the absence of automated systems. These tasks currently require huge labour and financial resources for their successful implementation. An automated system can perform all these tasks more efficiently and accurately with just a click of a button hence preventing wastage of resources (Njenga , 2014). The motivation of the current study is to establish whether the introduction of automation in the department of immigration in the form of e-citizen (a software that enables online service delivery and revenue collection) led to an increase in revenue collection (Gitaru, 2017).

Computerization is defined as an innovation by which a procedure or system is performed without human help (Frohm, 2008). Song'e(2015) characterizes automation as the formation of innovation and its application with the end goal to control and screen the generation and conveyance of different goods and services. Maaka(2013) characterizes

mechanization as the utilization of machines and innovation to make forms keep running alone without manpower. Unfortunately, automation does not generally satisfy desires; the requirement for human intercession in instances of unsettling influences and framework disappointments is still high. Brilliant automation is characterized by as the human part of automation whereby automation is accomplished with a human touch. Be that as it may, there is an inclination among industry to consider automation investment as a dark or white choice. This might be imperfect, since there is no generally a need to particularly pick between people or machines. The collaboration and assignment division between the human and the machine ought to rather be seen as a variable factor which can be known as the level of automation. Along these lines, recognizing and actualizing the correct level of computerization control could be an approach to keep up the viability of a framework. For this reason, automation can be measured using five levels, with the lowest level being totally manual and the highest level being totally automatic and this is referred as the Levels of Automation reference scale (Frohm, 2008). Local studies such as Gitaru (2017) suggested the use of the number of transactions using the KRA Simba system as the measure of automation. Kimani (2016) suggests that cost automation should be the measure of level of automation. Njagi (2011) measured automation process as the outcomes of automation such as low direct labour costs, high speed and throughput, low unit costs and low variability. Owino, Senaji and Ntara (2017) suggest that automation should be measured through activities such as online billing, online receipting, online payments, and online responses. Mutisya (2014), Noronaa (2016) and Nkote and Luwugge (2010) measure automation as a binary variable or event, that is, lack or presence of automation is a dummy variable which is binary in nature. This

implies that the concept of automation can be understood to mean the levels of automation, the inputs and activities that go into automation (the costs/investment in such automation as well as the number of transactions carried out through and automated process) as well as an outcome ( reduced labour costs, increased speed of production, low costs of production per unit and low variation in production process and outcomes.

### 1.1.2 Revenue Collection

In line with economic theory of the firm, revenue is the amount that an organization receives from selling its products and services (Kyengo, 2014). Revenue is the turnover or gross sales of an organization, and it is measured as a product of number of units or services sold multiplied by the price per unit. This definition applies to economic entities that engage in the production of goods and services (Gitaru, 2017).

However, revenue may not necessary be generated from a production of good of services process. Organizations that do not produce goods or services for sale may receive revenue from other parties for the purpose of sustaining their activities. Examples of such organizations include some special government departments and nonprofit making organizations. Border points deliver services related to immigration, issuance and management of Visas, among other things. The payments that are paid to border points for the delivery of such services are denoted as revenue. Revenue collection can be used to imply the activity of ensuring that the revenue is generated, recorded and safeguarded, or the actual revenue collected (Noronaa, 2016).

Kondo (2015) suggests that revenue collection should be regarded to be the same as financial performance. Oyier (2016) suggests that revenue collection is one of the indicators of financial performance. Owino et al (2017) suggests that revenue collection

is synonymous with organization Performance. Gituma (2017) suggests that revenue collection includes; increased revenues, compliance in debt settlement, timely payment, and efficient service delivery. From the foregoing discussion, it is clear that the concept of revenue collection depends on the where it is being applied.

### 1.1.3 Automation and Revenue Collection

Automation is expected to bring about improvements in business process management since it is geared at saving costs of operations, saving time and enhancing the quality of the processes (Kimani, 2016). An automated process is expected to consume less manpower compared to one that is manual. Raw materials such as papers work and energy are also assumed to decline with the use of automation. An important aspect of automated process is that if it is managed well, it can provide an audit trail which provides feedback about the efficiency, the effectiveness and any manipulation by users. This has the effect of reducing resource wastage, reduction of fraudulent activities, increased ability to make strategic decisions arising out of the information generated and the overall improvement in outcomes (Owino et al., 2017)

Automation of the revenue collection process has been praised for the increase in revenues in organizations. The benefit that automation accords to revenue collection has also been established among county governments in Kenya. Several Government ministries, departments and state-owned enterprises have taken advantage of automation in a bid to improve revenue collection.Gituma (2017) report a significant and positive relationship between automation and revenue performance at Kenya Revenue Authority after the introduction of the Simba system. Oduor et al (2016) report a marked improvement in revenue collection after automation of Kiambu county revenue collection

process. Mutisya (2014) reveal that the revenue levels of MachakosCounty improved after automation of the revenue collection process. However, it is not clear as to whether the revenue collection of other entities would improve after automation as there are many factors, other than automation that may influence the success of revenue collection efforts.

## 1.1.4 Border Points under Department of Immigration

Border points are areas designated by the department of immigration to ensure that immigrants have received services related to registrations, Visa issuance, and travel assistance among others. The department of Immigration has not been without its fair share of challenges. A report by the Kenya Anticorruption Commission (KACC) dating as old as year 2006 highlighted that the department was facing problems such as; forgeries of travel documents and Visas, shortage of staff leading to poor service delivery, long distances between ports of entry, use of parallel receipts by cashier ,unjustified and over application for work permits, abuse on regulations relating to renew of permits, inadequate automation and lack of computerized equipment, poor management information systems, poor staff training development and inadequate allocation of funding ( KACC, 2006).

These shortcomings prevalent earlier have been managed, for example, illicit enrollment of outsiders, simple control, imitations and stealing. The Kenyan Government has gone an additional mile to concoct an Alien Registration System used to enroll refugees and outsiders inside the outskirts of Kenya and to issue significant enlistment testaments and Refugee Identity Cards. On another front, the legislature has gained ground in adjusting itself to the new constitution of Kenya by authorizing some new laws. The Citizenry and

Immigration Act made a law in 2012 have presented higher duties, re-classification of grants and the evacuation of the business visa in addition to other things the introduction of e-citizen in the year 2015 was expected to increase the revenue collection in all the border points. However, there is little or no empirical evidence on the effect of the automation of revenue collection and service delivery through e-citizen (Directorate of Immigration and Registration of persons, 2016).

There are 35 border points in Kenya. These include Nakuru, Embu, Nyeri, Isiolo, Kisii, Bungoma, Jkia, Wilson, Namanga, Loitokitok, Lokichogio, Moyale, mandera, Wajir, Eldoret, Suam, Mombasa, Moi Airport, Kilindini Sea Port, Shimoni, Malindi, Lamu, Lungalunga, Kilifi, taveta, Vanga, Kisumu, Kisumu Airport, Busia, Malaba,. Isebania, Lwakhakha, Muhuru bay, Airport, Mbita. Closed border points include Garrisa, Ijara, Liboi (Directorate of Immigration and Registration of persons, 2016).

Preliminary data reveals wide deviations in the total revenue collected (Immigration Department, 2018). The deviations are observed across the 35 border points, with some border points revealing high revenue while other shows negligible revenue. The difference are also observed across the years with some years having high revenues while others showing low revenue. In addition, the targets for revenue collection have been missed year in year out. The differences in border point performance, year by year performance and the missed targets may indicate underlying factors. Global and local studies such as Noronaa(2016), Ayegba(2013), Nkote and Luwugge (2010). Gitaru (2017); Owino, Senaji and Ntara (2017) and Oduor et al (2016) reveal that automaton has a positive effect on the revenue collection of organizations. However, none of the identified studies focused on the automation (e-citizen) under the department of

Immigration, Kenya. It is for this reason that this study wishes to find out if automation at the department of immigration in Kenya played a role in the revenue collection by border points.

## 1.2 Research Problem

Automation of the revenue collection process is expected to yield increase in revenue collection in organizations. Automation is expected to bring about improvements in business process management since it is geared at saving costs of operations, saving time and enhancing the quality of the processes and increasing the revenue collection (Kimani, 2016). The Department of immigration instituted automation of its process in the year 2015 following the enactment of the e-citizen program. Preliminary data reveals wide deviations in the total revenue collected (Immigration Department, 2018). The deviations are observed across the 35 border points, with some border points revealing high revenue (JKIA year 2017/2018=kes 1.246B) while other shows negligible revenue (For instance, Muhuru Bay year 2017/2-18=kes 34,300). The difference are also observed across the years with some years having high revenues (for example, year 2017/2018= kes 10B, while others showing low revenue (for example year 2011/2012= kes 5.6B) . In addition, the targets for revenue collection have been missed year in year out. The differences in border point performance, year by year performance and the missed targets may indicate the presence of underlying factors. Failure by border points to meet the revenue targets may affect the service delivery of the common citizen, destabilize government business and lead to poor economic growth.

Global studies such as Noronaa (2016) adopted primary data collected from questionnaires, interviews while the current study adopts secondary data only. While

Noronaa (2016) performed descriptive analysis, the current study will apply t-tests and regression analysis. Ayegba (2013) study did not establish the link between automation and revenue collection but rather proposed a technical solution in the form of a software aimed at improving revenue collection. The study by Ayegba (2013) did not underscore other factors that could influence revenue collection. The paper by Nkote and Luwugge (2010) failed to make use of secondary data and also did not perform a conclusive pre and post automation analysis. It also failed to underscore other factors that influence revenue collection.

Local studies such as Gitaru (2017) did not make reference to theories such as transaction costs theory, financial distress theory or liquidity preference theory but made reference to Taxation theories. In addition, Gitaru (2017) failed to make a pre and post assessments of effect of automation. Finally, the study adopted a macroeconomic approach to the choice of variables while the current study focused on micro/ internal variables. Owino, Senaji and Ntara (2017 failed to make us of secondary data. In addition, they did not perform a pre and post automation analysis of revenue. They failed to make reference to the theory of transaction costs economics, resource based view .Oduor et al (2016) failed to take into consideration other factors that may influence revenue collection other than automation. The study also failed to underscore a comprehensive theoretical framework to guide the study. The study did not apply t-tests and regression analysis, a marked departure from the current study. In particular, none of the identified studies focused on the effect of automation on the revenue collection of border points under the department of Immigration, Kenya. The study therefore attempts to find out; What is the effect of

automation on revenue collection by border points under the Department of Immigration, Kenya?

## 1.3 Research Objective

To determine the effect of automation on revenue collection by border points under the Department of Immigration, Kenya.

## 1.4 Value of the Study

The study results will be beneficial to scholars of finance, public finance management as well as automation scholars. This is because the study will yield update information the effect of automation on revenue collection. The findings may be crucial in validating the application of theories such a systems theory, transaction costs theory, liquidity preference theory, financial distress theory and resource based view of the firm.

The results of this study may have practical implications to the management of revenue collection at border points. The underlying determinants of revenue collection may be applied to solve real life problems in data revenue collection. Consequently, the results would inform strategies that would lead to an improvement in revenue collection, not only at border points but also in other organizations.

The study may help the National Treasury and the revenue collecting arm known as Kenya Revenue Authority (KRA) to revise the legal framework that addresses revenue collection at national government level as well as at County government level. In addition, counties may also revise county specific legislation that deals with revenue generation.

# CHAPTER TWO : LITERATURE REVIEW

## 2.1 Introduction

This chapter is divided into five sections. A section on theoretical literature captures the theories that inform the study variables. The second section discusses determinants of revenue collection. The third section presents the empirical review. The fourth section presents the conceptual framework while the fifth presents the summary of literature review.

## 2.2 Theoretical Literature

A theory is a set of principles used to explain, account for a certain action. It gives evidence of the various decisions that have been made. The following theories will be used in this study;

### 2.2.1 The Transaction Cost Theory

The Transaction Cost way to deal with the hypothesis of the firm was made by Ronald Coase in 1937. Transaction Cost is the expense of accommodating some good or service through the market as opposed to having it given from inside the firm. It is a hypothesis representing the real expense of redistributing creation of goods and services including exchange costs, contracting costs, coordination expenses, and inquiry costs. The considerations of all expenses are viewed as when settling on a choice and not simply the market costs. Basically this hypothesis delineates the settle on versus purchase choice for organizations. Coase opposes the theory that without considering exchange costs it is

difficult to see legitimately the working of the financial framework and have a sound reason for building up monetary arrangement

The theory was important in showing the relationship between the rationales for automation. Organizations such as the Department of Immigration need to automate so that the costs per unit of collecting revenue are lower. With lower costs, organizations can meet their targets.

## 2.2.2 Liquidity Preference Theory

In macroeconomic theory, liquidity preference is the interest for cash, considered as liquidity. The idea was first created by John Maynard Keynes in his book. The General Theory of Employment, Interest and Money (1936) to clarify assurance of the loan cost by the free market activity for cash.

The theory suggests that everyone in this world likes to have money with him for a number of purposes. These purposes include transactional purposes, precautionary purposes, and speculative purposes. The theory was important in showing the rationale for enhancing revenue collection. The department of Immigration needs to enhance its revenue collection because it needs money for transactional purposes.

## 2.2.3 Financial Distress Theory

The Finance Distress theory was proposed by Gordon M J in the year 1971.The theory suggest that financial distress is a condition in which an organization cannot meet, or experiences issues satisfying its budgetary commitments to its banks, ordinarily because of high settled expenses, illiquid resources, or incomes touchy to financial downturns. An organization under financial distress can cause costs identified with the circumstance, for

example, more costly financing, opportunity cost of projects, and less gainful employees. Employees of a high firm more often than not have bring down assurance and higher pressure which could constrain them out of their employments.

The theory was important in showing the rationale for organizations attempting to enhance revenue collections. This was because failure to enhance revenue collection would lead to financial distress. The department of Immigration may suffer from financial distress if it fails to enhance its revenue.

### 2.2.4 Resource Based Theory

The Resource-based View (RBV) of the Firm is a way to deal with business vital administration that rose in 1990s. Real advocates were Wernerfelt, B. under the book known as The Resource-Based View of the Firm, Prahalad and Hamel under the book known as The Core Competence of The Corporation and Barney, J. under the book known as Firm Resources and Sustained Competitive Advantage. Be that as it may, its inceptions can be followed as far back as Edith Penrose under the book known as The Theory of the Growth of the Firm" (1959). The methodology depends on the idea that organizations comprise of different sorts of substantial and impalpable assets – resources, forms, aptitudes, data, information, and so forth. At the point when these assets are joined, they make business capacities (saw as an exceptional sort of asset), some of which, either exclusively, or in mix, make an arrangement of center abilities that give a feasible upper hand to the firm.

The relevance of this theory was that it addresses staff training as a way to improve the resources of the department of immigration. It also informs as the rationale for applying

revenue collection incentives to motivate the revenue collection team. It also argues for the need to have adequate budgets for revenue compliance and litigation costs.

## 2.3 Determinants of Revenue Collection

### 2.3.1 Automation

Owino et al (2017) conducted a study on effect of innovation in revenue collection processes on organizational performance of Nairobi City County. The study found that that online billing process, online receipting process, online payment and online responses affect the organizational performance to a very great extent. Oduor et al (2016) concentrated on determining the effect of receiving computerized income gathering framework and its impacts on administration and administration conveyance in Kiambu County. There was an expansion of 60% change in income accumulation inside the primary period of the usage of CountyPro framework.

### 2.3.2 Staff Training

Kimutai, Mulongo and Omboto (2017) assessed the effect of Training in Revenue Mobilization on County Socio-Economic Development in Kenya and concluded that training has a significant effect on socio-economic development ($\beta$= 0.644, p<0.05). Kondo (2015) evaluated the impact of Revenue Enhancement Strategies On Financial Performance Of Kenya Revenue Authority) and concluded that staff training, computerized operations , tax payer education and revenue collection points have solid, positive and huge impact monetary performance of KRA. Additional preparation on the changes and modernization at immigration ought to be upgraded to enhance the abilities, learning and expert limit of the representatives to build income.Kosaye (2018) assessed the  factors affecting revenue collection of county governments in Kenya, a case of

Marsabit county and noted that the county government does not ensure all revenue collection staff has relevant skills in revenue collection and this was partly responsible for the low revenue performance of Marsabit County.

### 2.3.3 Revenue Collection Incentives

Khan, Khwaja, Olken (2017) conducted a study on Property charge test in Pakistan boosting charge gathering and enhancing performance. The creators reasoned that the motivating force plans delivered generous and unambiguous outcomes on expense income collection. The treatment group outflanked the control assemble by a margin of in excess of 12 rate focuses in absolute expense accumulations over the two-year treatment period. Of the three plans actualized, the income based honorarium plot performed best as far as effect on accumulations. The creators proposed an income based honorarium. Expense authorities were remunerated with reward pay corresponding to the extra income they gathered over a predefined benchmark, which was dictated by the memorable levels of duty accumulation for each assessment circle. The creators proposed income in addition to honorarium plot. This plan was like the previously mentioned; anyway checks against over-forceful duty gathering were consolidated by calculating in appraisal precision and citizen fulfillment, through an outsider overview. The creators likewise proposed adaptable reward plot. In this plan, assess authorities were compensated with extra reward pay toward the year's end that was restrictive on performance

### 2.3.4 Revenue compliance

Kamolo (2014) noted that leakages that happen as a result of troublesome collection, misrepresentation and under-accumulation could be decreased by streamlining and automating the income accumulation process. Punishments might be naturally connected

to late installments. Day by day revealing of money receipts and due installments to be gathered ought to be naturally created by the framework.

Kosaye (2018) assessed the factors affecting revenue collection of county governments in Kenya, a case of Marsabit county and noted that the county government internal audit report address weaknesses in the internal control system and independent reconciliations of revenue collection on regular basis is done.

## 2.4 Empirical Review

Gitaru (2017) examined the effect of system automation on income accumulation in Kenya revenue authority. This investigation utilized expressive examination outline. The examination utilized optional information gathering. The examination used KRA Customs information for the money related a long time after Simba System. The period chose was from July 2007 to June 2016. The information was broken down utilizing Gretl and exhibited in figures and tables. The investigation discoveries built up that the quantity of exchanges, expanded fundamentally after the usage procedure this implies because of income frameworks computerization a high number of imported dispatches were prepared and gone through the brought together Document Processing (DPC). Gitaru (2017) did not make reference to theories such as transaction costs theory, financial distress theory or liquidity preference theory but made reference to Taxation theories. In addition, Gitaru (2017) failed to make a pre and post assessments of effect of automation. Finally, the study adopted a macroeconomic approach to the choice of variables while the current study focused on micro/ internal variables.

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Oduor et al (2016) concentrated on discovering the effect of receiving automated income collection system and its impacts on administration and administration conveyance in Kiambu County. The investigation results for the time of May-June 2014 demonstrated an upsurge in income acknowledgment and granular perceivability of area incomes and patterns. There was an expansion of 60% change in income gathering inside the principal period of the usage of CountyPro framework. The study likewise uncovered that 74% of respondents were happy with the automated revenue collection. At long last the examination uncovered the requirement for further preparing on utilization of CountyPro system in all regions to enhance client acknowledgment. Political generosity, suitable change administration and client acknowledgment are vital to fruitful performance of automated revenue collection in Counties. Oduor et al (2016) failed to take into

consideration other factors that may influence revenue collection other than automation. The study also failed to underscore a comprehensive theoretical framework to guide the study. The study did not apply t-tests and regression analysis, a marked departure from the current study.

Mutisya (2014) tried to establish the impacts of Revenue Collection Automation and usage challenges looked by the administration at Machakos County in Kenya. The examination included a longitudinal causal investigation enhanced by in and out subjective meetings. The population study was Machakos County comprising of eight (8) sub counties. Judgmental sampling was utilized in choosing two sub counties from the eight existing sub-counties dependent on the size and level of movement. The investigation utilized both primary and secondary information sources. The essential information was gathered utilizing a interview guide while secondary data was gotten from past records and reports of the manual systems from the county's Finance department, from 2011 to 2014. Trend analysis was used to bring out the comparison between the period before and after automation of revenue collection in Machakos County. Chi-square was used to test whether the change in the level of automation has a relationship to the increase in revenue collection in Machakos County. The findings were presented line graphs and tables while explanation to the tables and figures was given in prose. Mutisya (2014) focus on Machakos County while the current study focuses on a government department namely, Department of Immigration Border Points. While Mutisya (2014) applied chi-square non parametric analysis to establish the effect of automation on revenue collection, the current study applies a parametric analysis . The

current study also does not make use of any primary data and this is a marked departure from Mutisya (2014).

Noronaa (2016) study was to look at the automation of tax collection by the Ghana Revenue Authority. Subsequent to meeting twenty (20) authorities from the Asokwa part of Ghana Revenue Authority (GRA) in automation system it tends to be said that the automation is a great observing instrument for GRA. The exploration report's findings dependent on meeting of staff of GRA‟s encounters with automation, showed a proficient and successful methods for duty organization. The proof proposes a beneficial outcome of automation systems use and the expense of tax administration, and compelling methods for revenue collection Moreover, automation was essentially related with tax clearance time. The exploration makes critical experimental commitment to investigating tax automation and administration cost, time proficiency and adequacy of revenue collection. The outcomes are steady with the thought that automation prompts proficiency in tax administration. All things considered, the essential point of computerized revenue collection (automation system) must be to drastically build up cash receipts and better checking with the end goal to viably maintain the utility and create an adequate rate of return identified with the system. Noronaa (2016) embraced primary data gathered from questionnaires, interviews while the current investigation receives secondary data as it were While Noronaa (2016) performed descriptive analysis, the current study will apply t-tests and regression analysis.

Ayegba (2013) carried out a study on automated internal Revenue Processing System: A Panacea for Financial problems the Kogi State.The Kogi State of Board of Internal Revenue is in charge of the gathering and the management of internal revenue which is

the financial backbone of the state. The information concerning the collection and management by the board was gathering using interviews, group discussions, document study and direct observation. In regard to the information which was gathered various problems inherent in the previous method of operation were extracted. This research is undertaken so as to provide a way forward to the challenges that are recognized in the revenue collection and management in order to provide Kogi State a sound financial base. An integration of Structured System analysis and Design Methodology (SSADM) and Design Methodology was deployed in order to come up with a feature rich software program called Computerized Internally Generated Revenue Processing Systems. (CIGRPS).The application was developed by the use of MySQL Data base platform as beckoned and visual basic 6.0 as front end. The exercise of the application lead to finishing of the identified challenges. Ayegba(2013) study did not establish a relationship between automation and revenue collection however it proposed a technical solution which was in the form of a software which was targeted to improving the revenue collection .The study by Ayegba (2013)also  did not overlook at other factors which could affect revenue collection.

Nkote and Luwugge (2010) investigated the reception of automation by Uganda Revenue Authority (URA), a semi-self-ruling office commanded with duty organization in Uganda. The appropriation of mechanization in URA was gone for accomplishing proficiency and increment income. The number of inhabitants in the investigation comprised of the 200 specialized workers of URA situated in Kampala District. The span of the example was 109 respondents including charge authorities from all bureaus of URA. It included 2 Commissioners, 5 Assistant Commissioners, 13 Station Managers, 30

Supervisors, and 59 Revenue Officers working in URA workplaces situated in Kampala locale. The paper makes noteworthy experimental commitment to investigating charge computerization and organization cost, time proficiency and viability of income accumulation. A portion of the outcomes are conflicting with the thought that computerization prompts productivity in duty organization. The paper by Nkote and Luwugge (2010) failed to make use of secondary data and also did not perform a conclusive pre and post automation analysis. It also failed to underscore other factors that influence revenue collection.

## 2.5 Conceptual Frame work

A conceptual framework is a diagrammatical expression of the relationship between a set of independent variables on one side and a dependent variable on the other. The framework shows the sub constructs that's re used to measure every variables. The arrows depict the direction of hypothesized relationship. Figure 2.1 depicts the expected relationship between automation and other determinants of revenue collection

**Figure 2.1 Conceptual Model**

**Independent Variables**                                          **Dependent Variable**

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┌─────────────────────────────┐
│ Automation                  │
│   • Automation Costs        │──────────────┐
└─────────────────────────────┘              ▼

┌─────────────────────────────┐
│ Staff Training              │
│   • Training costs          │──────────►
└─────────────────────────────┘                    ┌──────────────────────────┐
                                                    │ Growth                   │
┌─────────────────────────────┐                    │   • Revenue (Kes)        │
│ Revenue Collection Incentive│              ──────►│                          │
│   • Revenue      collection │──────────►          └──────────────────────────┘
│     incentives              │
└─────────────────────────────┘

┌─────────────────────────────┐
│ Compliance and legal practices │
│   • Costs of revenue        │──────────►
│     compliance              │
│     litigations/prosecutions│
└─────────────────────────────┘
```
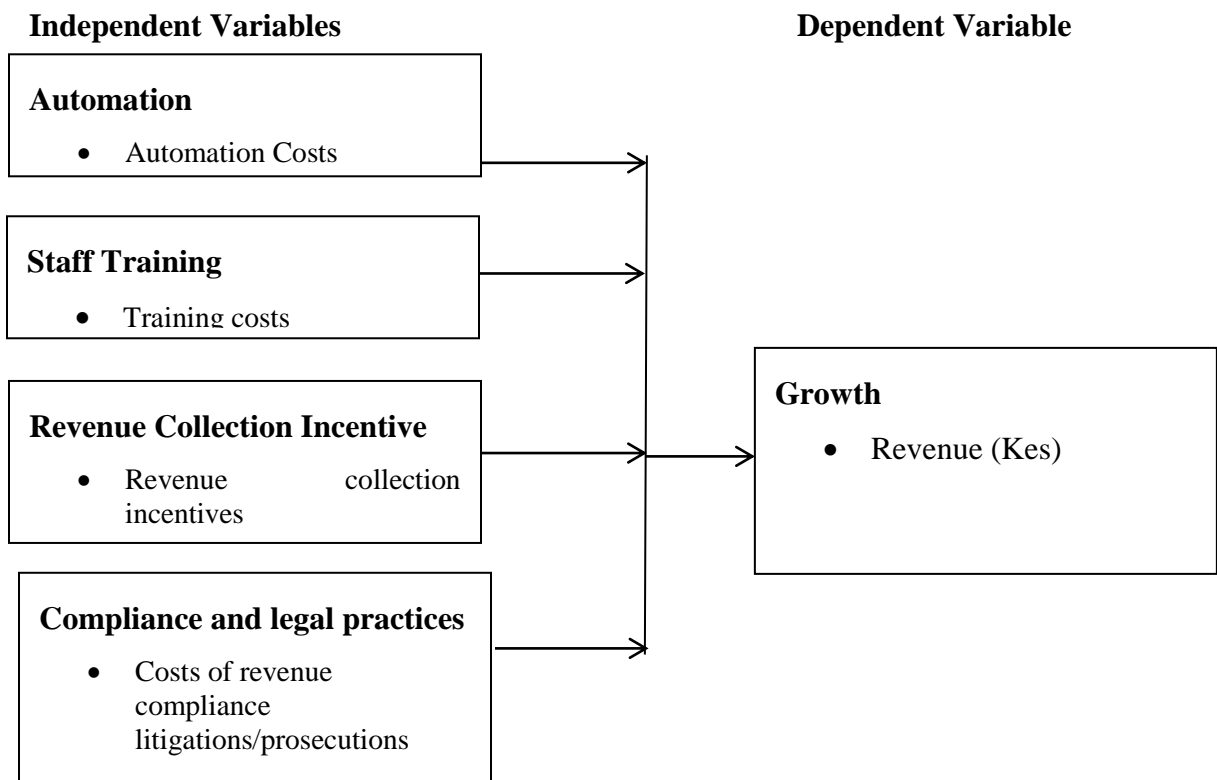
**Source: Author (2018)**

**2.6 Summary of the Literature Review**

Gitaru (2017) did not make reference to theories such as transaction costs theory, financial distress theory or liquidity preference theory but made reference to Taxation theories. In addition, Gitaru (2017) failed to make a pre and post assessments of effect of automation. Finally, the study adopted a macroeconomic approach to the choice of

variables while the current study focused on micro/ internal variables. Owino et al (2017 failed to make us of secondary data. In addition, they did not perform a pre and post automation analysis of revenue. They failed to make reference to the theory of transaction costs economics, resource based view .Oduor et al (2016) failed to take into consideration other factors that may influence revenue collection other than automation.  The study also failed to underscore a comprehensive theoretical framework to guide the study. The study did not apply t-tests and regression analysis, a marked departure from the current study.

# CHAPTER THREE: RESEARCH METHODOLOGY

## 3.1 Introduction

The chapter presents the steps and procedures that will be used to answer the research question that was posed at the introduction of this study. Specifically, the chapter discusses methods that were used to answer the question of whether automation plays a role in the revenue collection by border points under the department of immigration, Kenya. To achieve this, the chapter addressed research design issues, population and sampling aspects, data collection as well as data analysis methods.

## 3.2 Research Design

The structure of investigation and the plan so conceived as to obtain research questions answers is known as research design. The study applied explanatory research to explain how one variable (the dependent variable) is influenced by a set of independent variables. Kothari (2005) asserted that an explanatory survey explains the relationship between a set of variables under study. Explanatory research design was applied by the researcher to explain the effect of automation on revenue collection of border points under the department of immigration, Kenya (Directorate of Immigration and Registration of persons, 2016).

## 3.3 Population

The study population involved the total number of operational border points under the department of immigration, Kenya. There are 35 autonomous border points under the

department of immigration. For the purposes of this study, a census methodology was adopted since 35 borders are not too many to warrant a sampling approach. The list provided at the appendix was thereof form the sampling frame (Directorate of Immigration and Registration of persons, 2016).

## 3.4 Data Collection

Secondary data from the Department of Immigration will be utilized for this study.  The data is arranged monthly and spans from border point to border point. The financial year for government departments runs from July to June and it is on this basis that a financial year will be identified. Two sets of data were collected. The first data set will be for revenue for border points spanning 3 years before automation and 3 years after automation. The breakpoint/event point showing the introduction of automation is the year 2015. The choice of this year is because it is the year in which the e-citizen was launched. The second data set was a monthly time series capturing 36 data points before automation and 36 monthly data points after automation. The data sets are available from (Directorate of Immigration and Registration of persons, 2016).

## 3.5 Reliability and Validity

It is crucial to conduct diagnostic tests when performing parametric analysis (examples of parametric analysis include t-test, correlation and regression).This is because parametric analysis assumes that the data is normally distributed. The assumption is also extended to the error term which is generated from regression of such data. The relevant diagnostic tests performed include; Normality, multicollinearity and heteroscedasticity tests. Normality will be tested using skewness and kurtosis and using histograms. For

multicollinearityVariance inflation factor (VIF) will be utilized and for heteroscedasticity Levene test will be utilized.

## 3.6 Data Analysis

The secondary dataset was analyzed using SPSS software. Quantitative data analysis techniques including descriptive and inferential statistics will be used. The particular descriptive statistics include means and standard deviations. The inferential statistics include t-test, correlation and multiple linear regression analysis.

### 3.6.1 T-test Analysis

The study used an event study approach. The study applied t-test analysis check whether revenues spanning 3 years before automation were significantly different from revenues collected in the 3 years following automation. The point of reference is year 2015.

### 3.6.2 Analytical Model

The study used multiple regression model to investigate the effect of automation on revenue collection of border points under Department of Immigration. Below is the basic from of the regression model that was used to assess the relationship between independent and dependent variables.

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

Where:

Y = Monthly Revenue collection by all border points  (kes )

$X_1$ = Monthly automation costs by all border points  (kes )

$X_2$ = Monthly training costs by all border points (kes )

$X_3$ = Monthly revenue collection incentives by all border points (kes)

$X_4$ = Monthly revenue compliance /legal/prosecution costs by all border points (kes)

$\epsilon$ = Error term

$\beta_{0\ is}$ the constant;

$\beta_1, \beta_2, \beta_3, \beta_4$ are the regression coefficients

The findings of this study will be presented using tables.

### 3.6.3 Test of Significance

The R squared will be used to check for goodness of fit,  F-statistics was used to check for model significance, the model regression coefficients will be used to explain the rate of effect of X on Y and the P-values was checked for the level of significance. The tests were performed at 95% confidence level and at 5% significance level.

# CHAPTER FOUR: DATA ANALYSIS AND PRESENTATION

## 4.1 Introduction

This chapter presents the data analysis, results and findings interpretation. Findings are presented in tables and graphs. The main purpose of the study was to determine the effects of automation on revenue collection at border points department of immigration in Kenya. The target population was all the 35 border points. The secondary data was collected across six years, three years before automation and three years after automation with 2015 being the automating year. The data was imported to excel for refining and to SPSS for data analysis.

## 4.2 Descriptive Statistics

Descriptive statistics were done to show the nature and trends of the data. Table 4.1 shows the descriptive result for total revenue collected from 2013 to 2018 financial years.

**Table 4.1 Descriptive results for Total Revenue.**

| years | N | Mean | Std. Deviation | Std. Error |
|-------|-----|-----------------|----------------|-------------|
| 2013  | 35  | 197,426,910.37  | 383750359.7    | 64865649.85 |
| 2014  | 35  | 230,200,408.15  | 426476588.4    | 72087700.65 |
| 2015  | 35  | 256,840,843.98  | 513659858.8    | 86824363.03 |
| 2016  | 35  | 327,894,848.92  | 633973421.6    | 107161066.9 |
| 2017  | 35  | 421,367,549.97  | 759052562.2    | 128303300.5 |
| 2018  | 35  | 479,549,137.52  | 866084072.7    | 146394927.8 |
| Total | 210 | 318,879,949.8   | 623004990.8    | 42991428.75 |

Source: Survey Data, 2018

From the figure above, the total mean of collected revenue between 2013 and 2018 was 318,879,949 and the standard deviation was 623004990.8. The total revenue means of individual years shows an increasing trend from 197,426,910.37 to 479,549,137.52 which is supported by increase of standard error from 383750359.7 to 866084072.7.

Further descriptive statistics were done for the monthly dependent and dependent variables. Table 4.2 represents the summary of results.

**Table 4.2 Descriptive Summary Results**

|  | Mean | Std. Deviation |
|---|---|---|
| Total  Border Revenue | 409,603,845.47 | 151243994.9 |
| Total Border Automation Costs | 1,046,448.75 | 951334.01 |
| Total Border Training expenditure | 317,228.85 | 784079.27 |
| Total Border Revenue Collection Incentives | 128,181.33 | 648363.90 |
| Total Border compliance/Legal/prosecution costs | 3,427,253.39 | 2822628.65 |

Source: Survey Data, 2018.

Table 4.2 revealed that total monthly border revenue had mean of 409,603,845.47 and a standard deviation of 151243994.9. Total border automation costs had a mean of 1,046,448.75 and standard deviation of 951334.012. Further, total monthly border training expenditure had a mean of 317,228.85 and a standard deviation of 784079.2725, while total border revenue collection incentives had a mean of 128,181.33 and a standard deviation of 648363.9. The results also revealed that the total border compliance, legal or prosecution costs had a mean of 3,427,253.39 and standard deviation of 2822628.65

**4.3 Diagnostic Test**

The study conducted diagnostic tests before performing parametric analysis. This is because parametric analysis assumes that the data is normally distributed. The assumption is also extended to the error term which is generated from regression of such data. The relevant diagnostic tests performed were; Normality, multicollinearity and heteroscedasticity tests.

**4.3.1 Normality Tests**

Normality was tested using skewness and kurtosis and using histograms. Zero skewness implies perfect normally distributed data while skewedness of between -1 and +1indicates that the data is normally distributed, although with incidence of slight negative or positive skewness. Excess kurtosis of 3 implies that the peakedness of the data matches normally distributed data. Kurtosis of more than 3 indicates that the data is leptokurtic, with peakedness which is higher than that of normally distributed data. Kurtosis of less than 3 indicates that the data is platykurtic, with peakedness that is lower than that of a normal distribution. Table 4.1 shows the summary of results.

**Table 4.3 Skewness and Kurtosis Tests**

|  | Total Border Revenue | Total Border Automation Costs | Total Border Training expenditure | Total Border Revenue Collection Incentives | Total Border compliance/ Legal/prosec ution costs |
|---|---|---|---|---|---|
| Skewness | 0.216 | 0.598 | 0.696 | 0.178 | 0.247 |
| Std. Error of Skewness | 0.201 | 0.201 | 0.201 | 0.201 | 0.201 |
| Kurtosis | 0.152 | 0.092 | 0.391 | 0.005 | 2.192 |
| Std. Error of Kurtosis | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |

Source: Survey Data, 2018.

A skewness statistic of 0.216 indicates that the data for the total border revenue was right skewed but the values were closely distributed around the mean and hence the data was not affected by outliers. The kurtosis statistic of 0.152 indicates that the data for the variable was leptokurtic, implying that the peakedness is higher than that of a normal distribution. To get rid of this problem, extreme outliers were removed to make the data less tailed and assume the normal distribution.

A skewness of 0.598 indicates that the data for total border automation cost was right skewed but the values were closely distributed around the mean and hence the data was not affected by outliers. The kurtosis statistic of 0.092 indicates that the data for the variable leptokurtic, implying that the peakedness is higher than that of a normal distribution. Similarly, extreme outliers were removed to make the data less tailed and assume the normal distribution.

A skewness statistic of 0.178indicates that the data for total border revenue collection was right skewed but the values were closely distributed around the mean and hence the data was not affected by outliers. The kurtosis statistic of 0.005 indicates that the data for the variable is mesokurtic, implying that the peakedness is almost that of a normal distribution.

A skewness statistic of 0.696 indicates that the data for border training expenditure was right skewed but the values were closely distributed around the mean hence the data was not affected by outliers. The kurtosis statistic of 0.391 indicates that the data for the variable is leptokurtic meaning that the peakedness is higher than that of a normal distribution. Extreme outliers were removed from the data to make it less tailed.

Further normality test was carried using histogram. Figure 4.1 shows the histogram results for the dependent variable.
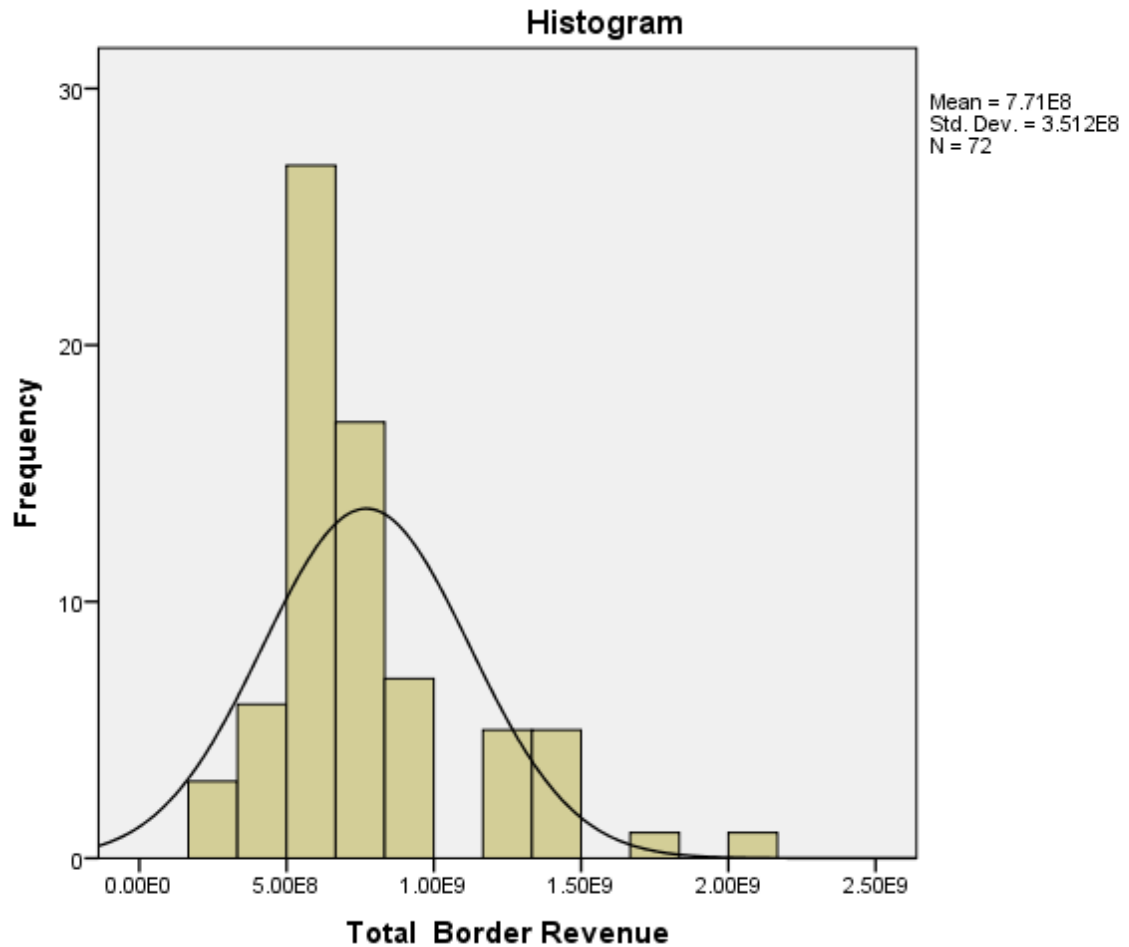


**Figure 4.1 Histogram of the dependent variable.**

The plots for the histogram and normal probability depicted in figure 4.1 confirm the normality of the study sample. Consequently, the results of the t-test and multiple regression analyses adopted by study are therefore valid.

### 4.3.3 Multicolinearity Test

Multicolinearity tests were carried using variance inflated tests. Table 4.2 represents the summary of results.

**Table 4.4Variance Inflated Factor Results**

|  | Tolerance | VIF |
| --- | --- | --- |
| Total Border Automation Costs | 0.27 | 3.704 |
| Total Border Training expenditure | 0.282 | 3.549 |
| Total Border Revenue Collection Incentives | 0.523 | 1.913 |
| Total Border compliance/Legal/prosecution costs | 0.658 | 1.521 |
| Aggregate |  | **2.67175** |

Source: Data, 2018

Multicollinearity was assessed in this study using the Variance inflation factors (VIF). According to Field (2009) VIF values in excess of 10 is an indication of the presence of Multicollinearity. The variance inflation factor results were established to be 2.67175 which is less than 10 meaning there is no Multicollinearity.

### 4.3.4 Heteroskedaticity Test

Levene's test was used to test the null hypothesis that the population variance is the same for all values of the predictor variable. If the test's P-value was below 0.05 (P<0.005), then it was deemed that the difference in sample variances have little chance to have occurred based on random sampling from a population with same or equal variance. In view of this, the null hypothesis was rejected and the assumption made was that there is a difference between the variances in the population. In the presence of heteroscedaticity

transformation of variables can be done to increase homoscedasticity. Table 4.3 shows the summary of results

**Table 4.5 Heteroscedaticity Summary of Results**

|  | Levene Statistic | Sig. |
|---|---|---|
| **Total Border Revenue** | 0.902a | 0.592 |
| **Total Border Automation Costs** | 2.238b | 0.103 |
| **Total Border Training expenditure** | 1.390c | 0.134 |
| **Total Border Revenue Collection Incentives** | 0.752d | 0.776 |
| **Total Border compliance/Legal/prosecution costs** | 0.982e | 0.542 |

The null hypothesis is constant variance, and the p-values for the variables are above <0.05 which is greater than the normal p-value of 0.05 therefore, null hypothesis cannot be rejected since there is constant variance and thus presence of homoscedaticity.

## 4.4 T-test Analysis

The study will applied t-test analysis check whether revenues spanning 3 years before automation were significantly different from revenues collected in the 3 years following automation. The point of reference is year 2015. Table 4.4 below was shows the results.

**Table 4.6 T-test Results.**

| Dummy | | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| Revenue | 0 | 105 | 228156054.0 | 44097507.3 | 107216191 |
| | 1 | 105 | 409603845.5 | 75427077.2 | 192483010 |

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | |
|---|---|---|---|---|---|---|
| | | F | Sig. | t | df | Sig. (2-tailed) |
| Reve nue | Equal variances assumed | 13.255 | 0 | 2.128 | 208 | 0.035 |
| | Equal variances not assumed | | | 2.128 | 167.658 | 0.035 |

An independent sample t-test was conducted to compare if there was any significant changes in revenue before and after automation. There was difference between the two period, before automation (M= 228156054, SD= 43034783) and after automation (M= 4096003845.5, SD=7360922). The difference was significant as reported in the t-scores for revenue (t= 2.128, $p$=0.035). The results were tandem with that of Oduor et al (2016) who concentrated on discovering the effect of receiving automated income collection system and its impacts on administration and administration conveyance in Kiambu County. The results revealed that was an expansion of 60% change in income gathering

inside the principal period of the usage of County Pro framework. The study likewise uncovered that 74% of respondents were happy with the automated revenue collection.

The trend of total revenue collected is before and after automation is shown in the figure 4.2.
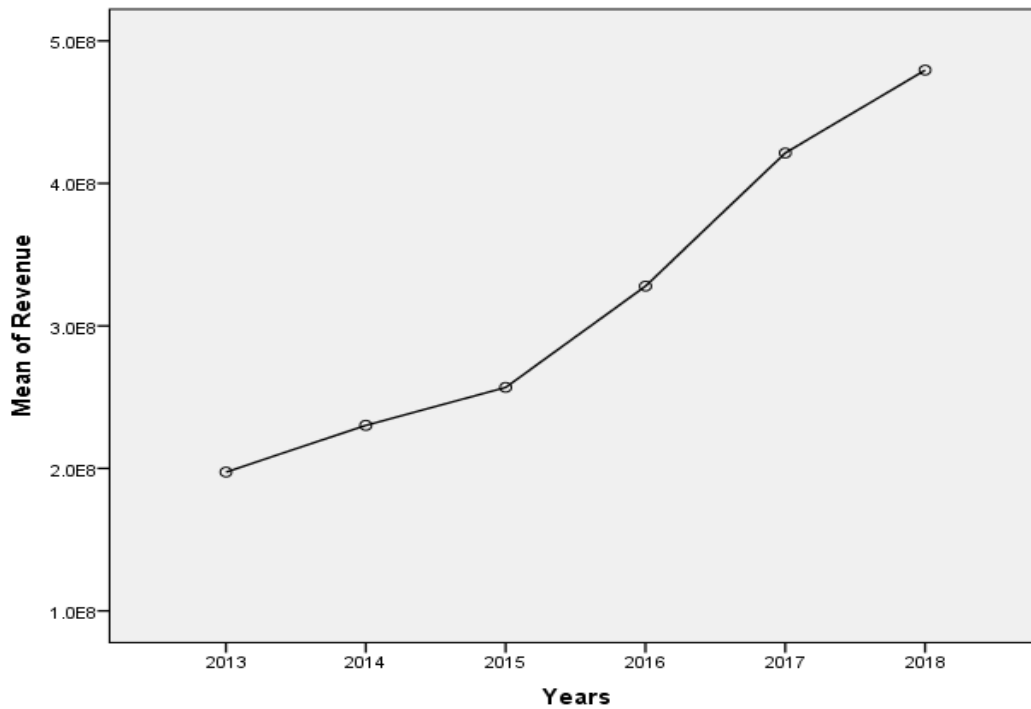


**Figure 4.2 Total Revenue collection before and after the automation year.**

The figure above shows the trend of total revenue collection before and after automation. It is evident that, total revenue collection has been increasing, however, after the automation, the revenue collection increased sharply. This sharp increase manifests the impact of automation.

**4.5 Regression Analysis**

The study used multiple regression model to carry regression analysis. Table 4.5 presents the summary of results.

**Table 4.7 Regression Results**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | | | |
|---|---|---|---|---|---|---|---|
| 1 | .971 | 0.943 | 0.939 | | | | 86527502.04 |

| Model | | | df | Mean Square | | F | Sig. |
|---|---|---|---|---|---|---|---|
| 1 | Regression | | 4 | 2.06445E+18 | | 275.738 | .000 |
| | Residual | | 67 | 7.48701E+15 | | | |
| | Total | | 71 | | | | |

| | | Unstandardized Coefficients | | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|---|
| | | B | Std. Error | | Beta | | |
| (Constant) | | 185137.2 | 21405.47 | | | 8.649 | .000 |
| Border Automation Costs | | 3.41 | 11.969 | 0.016 | | 0.285 | .007 |
| Border Training expenditure | | 3.385 | 24.672 | 0.03 | | 0.137 | .009 |
| Border Revenue Collection Incentives | | 2.804 | 0.112 | 1.011 | | 25.035 | .000 |
| Border compliance/Legal/prosecution costs | | .031 | 0.988 | -0.074 | | 0.314 | .044 |

The model was fit and significant as indicated by F statistic ($F = 275.738, p = .000$).

This was supported by R square of 0.94 which explains the extent to which the independent variables explain the dependent variable was 94.3%, implying the model was highly robust.

From the regression results, monthly border automation costs is positively and significantly related to monthly revenue collection ($\beta$= 3.41, $p$= 0.007). That implies a unit change of monthly automation costs would change total monthly revenue by 3.41. Further, the regression reveals that monthly border training expenditure is also positively and significantly associated with total monthly revenue ($\beta$= 3.385, $p$= 0.009). Additionally, monthly border revenue collection is positively and significantly related to total monthly revenue ($\beta$= 2.804, $p$= 0.00) which means that a unit change of monthly revenue collection incentives would change total monthly revenue collection by 2.804. Finally, the regression results revealed that monthly border compliance and legal fees were positively and significantly related to total monthly revenue collection ($\beta$= 0.31, $p$= 0.044). The results were consistent with those of Noronaa (2016) whose study looked at the automation of tax collection by the Ghana Revenue Authority. The findings of the study revealed that improvement of revenue collection through automation, training and other internal variables expenditures significantly increased revenue collection in Ghana.

The regression equation extracted from the above regression results was:

*Y= 185137.2 + 3.41 $X_1$+3.385 $X_2$+2.804 $X_3$+0.31 $X_4$+ $\varepsilon$*

Where:

Y = Monthly Revenue collection by all border points (kes )

$X_1$ = Monthly automation costs by all border points (kes )

$X_2$ =Monthly training costs by all border points (kes )

$X_3$ = Monthly revenue collection incentives by all border points (kes )

$X_4$ = Monthly revenue compliance /legal/prosecution costs by all border points (kes )

$\varepsilon$ = Error term

$\beta_{0\,is}$ the constant;

$\beta_1, \beta_2, \beta_3, \beta_4$ are the regression coefficients

**CHAPTER FIVE : SUMMARY, DISCUSSION AND RECOMMENDATIONS.**

**5.1 Introduction**

This chapter addressed the summary of the findings, the conclusions and the recommendations. This was done in line with the objective of the study.

**5.2 Summary of the findings**

This section provides with the summary of the study findings which was done in line with the following objective: Effects of objective on revenue collection at border points, department of Immigration, Kenya. The independent t-test findings revealed that there was significance difference in total revenue collected between the period before automation year and period after automation years. The results were tandem with that of Oduor et al (2016) who concentrated on discovering the effect of receiving automated income collection system and its impacts on administration and administration conveyance in Kiambu County. The results revealed that was an expansion of 60% change in income gathering inside the principal period of the usage of County Pro framework. The study likewise uncovered that 74% of respondents were happy with the automated revenue collection.

The findings are relevant and explained by the theory of financial distress. The theory was important in guiding the department to strategic decision of automation. From the results, it is evident that the revenue collection improved by a big margin after collection and therefore justifying the decision of automating. Assumptions are made that supposing the department failed to enhance revenue collection through automation would create chances for financial distress. The impact of automation is seen by the increase in

revenue collection and therefore, the department of Immigration has been able to avoid financial distress.

Additionally, the study sought to determine the relationship between dependent and independent variables. The study found that all the independent variables which were total monthly automation costs, total monthly training expenditure, total monthly revenue collection incentives and total monthly compliance and legal fees contributed positively to total monthly revenue collection. This was revealed by the regression results which showed positive and significant relationship between the variables. The results were consistent with those of Noronaa (2016) whose study looked at the automation of tax collection by the Ghana Revenue Authority. The findings of the study revealed that improvement of revenue collection through automation, training and other internal variables expenditures significantly increased revenue collection in Ghana.

The explanation to this effect is anchored by resource based theory which depends on the idea that organizations comprise of different sorts of substantial and impalpable assets – resources, forms, aptitudes, data, information, and so forth. At the point when these assets are joined, they make business capacities (saw as an exceptional sort of asset), some of which, either exclusively, or in mix, make an arrangement of center abilities that give a feasible upper hand to the firm. From, this point of view, the department enhanced the independent variables such as automation assets as reported by automation costs and staff skills as reported in training expenditure. These two factors improved the revenue collection making it an easy and convenient way of transacting in border points hence improvement of revenue collection.

Additionally, to prevent leakages of revenue, legal compliance is an important element for the performance of the department. As in the study of Kamolo (2014) who noted that leakages that happen as a result of troublesome collection, misrepresentation and under-accumulation could be decreased by streamlining and automating the income accumulation process. Punishments might be naturally connected to late installments. Day by day revealing of money receipts and due installments to be gathered ought to be naturally created by the framework. Therefore, this explains the positive relations between total monthly revenue collection and legal compliance fees.

**5.3 Conclusion**

Based on the findings, the study concluded that automation on revenue collection at border points and positive and significant impact on the total revenue collected. This was shown by the sharp increasing trend of amount of revenue collected after automation, 2015 being the reference year.

The study also concluded that staff training as presented by the total monthly training expenditure, is crucial in facilitating automation process. By training staffs, competency levels are improved as well as the motivation of the employees who collect the revenue. Therefore, departments should always purpose to budget training expenditure and train the staffs to enhance the functioning of the department processes and tasks.

Further, the study also concluded that total revenue automation costs improve revenue collection. The positive relationship between the two variables means that the more automating assets the more revenue collected. Additionally, compliance fees are crucial in preventing revenue collection loop holes and ensuring that all revenue which is

supposed to be collected is collected. Therefore, the study concluded that legal measures are important in revenue collection in any department.

## 5.4 Recommendation

Based on the study, automation is an assured way of increasing total revenue collection in immigration department. The study has revealed ways in which the department can automate to improve revenue collection. Among the best practices have been identified in literature which the ICT department and the managers of immigration department can replicate. The practices identified above can be enhancedto improve revenue collection.

Automation can be improved by competent ICT team and ICT equipment. The best strategy for the department is therefore to continue investing in ICT in order to improve the automation processes. Additionally, the department can invest on their staff so as to improve retention and avoid new training costs.

Finally, the study recommends future studies to conduct event studies on automation in other departments and government agencies for the purpose of comparison of findings.

## 5.5 Limitations of the Study

One of the limitations of the study is that it did not consider the effects of election year 2013 and 2017. Usually, statistics have shown that during election years, economic events such as migration decreases due to the fear of potential ruckus. This was plain evident in year 2008/2009 where the post-election violence affected the security and migration of people across border points hence low revenue returns for the immigration department.

The study did not analyze external factors that may affect migration of people across the border points. Perhaps, social political factors undermined the migration across one or

few border points in a particular period, or economic activity was so high at in one region during particular year hence increasing border point migration. These among other factors were not taken into consideration and could have influenced revenue collection at border points.

## 5.6 Suggested Areas of Further Research

Suggested areas of the study should look at the influence of external factors that affect revenue collection at border points. This will look at analyzing critical factors that migration department ought to consider in order to make their decisions on revenue collections yield successful outcomes.

Finally, the study recommends future studies to conduct event studies on automation in other departments and government agencies for the purpose of comparison of findings.

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# APPENDICES

## APPENDIX I (a) : Secondary data collection template

| Border point | Revenue before automation | | | Revenue after automation | | |
|---|---|---|---|---|---|---|
| | July 2012 to June 2013 | July 2013- June 2014 | July2014- June 2015 | July 2015 /June 2016 | 2016/2017 | **2017/2018** |
| Airport | 1,112,825,778.61 | 1,246,121,769.10 | 1,772,178,258.60 | 1,950,912,944.85 | 1,856,140,611.70 | 1,984,403,795.15 |
| Bung'oma | 5,911,852.00 | 9,043,121.00 | 13,804,360.00 | 14,717,516.00 | 16,908,437.00 | 18,890,478.00 |
| Busia | 80,887,378.40 | 130,083,412.63 | 179,279,446.85 | 189,235,213.00 | 290,004,668.40 | 580,667,771.70 |
| Eldoret | 5,911,852.00 | 19,043,121.00 | 23,804,360.00 | 11,717,516.00 | 22,908,437.00 | 25,890,478.00 |
| Embu | 12,144,720.00 | 19,176,000.00 | 24,025,000.00 | 15,660,360.00 | 28,756,500.00 | 3,472,719.00 |
| Isebania | 5,911,852.00 | 19,043,121.00 | 23,804,360.00 | 11,717,516.00 | 22,908,437.00 | 25,890,478.00 |
| Isiolo | 71,887,378.40 | 121,083,412.63 | 130,279,446.85 | 150,425,643.00 | 300,004,668.40 | 570,667,771.70 |
| Iwakhaka | 80,925,148.40 | 130,137,124.63 | 179,354,986.85 | 210,360,261.00 | 2,144,363.06 | 847,961.20 |
| Jkia | 1,112,825,778.61 | 1,246,121,769.10 | 1,772,178,258.60 | 1,950,912,944.85 | 1,856,140,611.70 | 1,984,403,795.15 |
| Kilifi | 1,331,806.90 | 3,935,162.33 | 3,090,792.00 | 4,257,887.40 | 4,456,807.60 | - |
| Kisii | 190,036,666.67 | 197,419,200.00 | - | 162,864,000.00 | 256,423,990.00 | 453,234,245.00 |
| Kisumu | 1,012,825,778.61 | 1,046,121,769.10 | 1,672,178,258.60 | 2,050,912,944.85 | 1,956,140,611.70 | 2,184,403,795.15 |
| Kisumu airport | 12,144,720.00 | 19,176,000.00 | 24,025,000.00 | 15,660,360.00 | 28,756,500.00 | - |
| Lamu | 37,770.00 | 53,712.00 | 75,540.00 | 116,672.00 | 139,694.67 | 180,189.50 |
| Loitotok | 12,144,720.00 | 19,176,000.00 | 24,025,000.00 | 15,660,360.00 | 28,756,500.00 | - |
| Lokichogio | 2,825,778.61 | 6,121,769.10 | 2,178,258.60 | 10,912,944.85 | 18,140,611.70 | 84,403,795.15 |
| Lungallunga | 37,770.00 | 53,712.00 | 75,540.00 | 116,672.00 | 139,694.67 | 180,189.50 |
| Malaba | 62,864,000.00 | 90,036,666.67 | 97,419,200.00 | 56,423,990.00 | 33,994,224.00 | - |

| | | | | | |
|---|---|---|---|---|---|
| Malindi | 5,911,852.00 | 19,043,121.00 | 23,804,360.00 | 11,717,516.00 | 22,908,437.00 | 25,890,478.00 |
| Mandera | 12,864,000.00 | 10,036,666.67 | 17,419,200.00 | 26,423,990.00 | 43,994,224.00 | - |
| Mbita | 12,144,720.00 | 19,176,000.00 | 24,025,000.00 | 15,660,360.00 | 28,756,500.00 | - |
| Moi Airport | 80,887,378.40 | 130,083,412.63 | 179,279,446.85 | - | 290,004,668.40 | 580,667,771.70 |
| Mombasa | 190,036,666.67 | 197,419,200.00 | 200,134,462.00 | 433,994,224.00 | 256,423,990.00 | 162,864,000.00 |
| Mombasa | 1,331,806.90 | 3,935,162.33 | 3,090,792.00 | 4,257,887.40 | 4,456,807.60 | - |
| Moyale | 8,087,378.40 | 13,083,412.63 | 17,279,446.85 | 17,744,897.00 | 29,004,668.40 | 58,667,771.70 |
| Muhurubay | 1,331,806.90 | 3,935,162.33 | 3,090,792.00 | 4,257,887.40 | 4,456,807.60 | - |
| Nakuru | 12,144,720.00 | 19,176,000.00 | 24,025,000.00 | 15,660,360.00 | 28,756,500.00 | - |
| Namanga | 1,331,806.90 | 3,935,162.33 | 3,090,792.00 | 4,257,887.40 | 4,456,807.60 | - |
| Nyeri | 2,825,778.61 | 6,121,769.10 | 2,178,258.60 | 2,912,944.85 | 3,156,140,611.70 | 1,984,403,795.15 |
| Shimoni | 5,912,852.00 | 19,343,121.00 | 23,894,360.00 | 11,797,516.00 | 22,912,437.00 | 26,890,478.00 |
| Taveta | 1,331,806.90 | 3,935,162.33 | 3,090,792.00 | 4,257,887.40 | 4,456,807.60 | - |
| Vanga | 2,864,000.00 | 3,036,666.67 | 4,419,200.00 | 5,423,990.00 | 53,994,224.00 | 69,012,891.00 |
| Wajir | 37,770.00 | 53,712.00 | 75,540.00 | 116,672.00 | 139,694.67 | 180,189.50 |
| Wilson | 1,137,770.00 | 1,253,712.00 | 1,275,540.00 | 1,516,672.00 | 2,139,694.67 | 2,180,189.50 |

## Appendix 1(b)

| Count | year | Month | Total Border Revenue | Total Border Automation Costs | Total Border Training expenditure | Total Border Revenue Collection Incentives | Total Border compliance/Legal/prosecution costs |
|---|---|---|---|---|---|---|---|
| 1 | 2012 | 12-Jul | 596,914,582.85 | 1,193,829.17 | 250,704.12 | 131,321,208.23 | - |
| 2 | 2012 | 12-Aug | 743,549,648.25 | - | - | 163,580,922.62 | 7,435,496.48 |
| 3 | 2012 | 12-Sep | 652,147,210.10 | - | - | 143,472,386.22 | 6,521,472.10 |
| 4 | 2012 | 12-Oct | 635,058,922.05 | - | - | 139,712,962.85 | - |
| 5 | 2012 | 12-Nov | 593,424,146.60 | - | - | 130,553,312.25 | - |
| 6 | 2012 | 12-Dec | 614,784,279.60 | - | - | 135,252,541.51 | - |
| 7 | 2013 | 13-Jan | 624,068,086.80 | - | - | 137,294,979.10 | - |
| 8 | 2013 | 13-Feb | 757,437,555.15 | 1,514,875.11 | 318,123.77 | 166,636,262.13 | 7,574,375.55 |
| 9 | 2013 | 13-Mar | 536,548,349.00 | 1,073,096.70 | 225,350.31 | 118,040,636.78 | - |
| 10 | 2013 | 13-Apr | 603,853,364.05 | - | - | 132,847,740.09 | - |
| 11 | 2013 | 13-May | 624,044,437.50 | - | - | 137,289,776.25 | - |
| 12 | 2013 | 13-Jun | 655,419,551.20 | - | - | 144,192,301.26 | 6,554,195.51 |
| 13 | 2013 | 13-Jul | 603,853,364.05 | 1,207,706.73 | 253,618.41 | 132,847,740.09 | - |
| 14 | 2013 | 13-Aug | 624,044,437.50 | 1,248,088.88 | 262,098.66 | 137,289,776.25 | 6,240,444.38 |
| 15 | 2013 | 13-Sep | 655,419,551.20 | 1,310,839.10 | - | 144,192,301.26 | 6,554,195.51 |
| 16 | 2013 | 13-Oct | 674,734,406.38 | 1,349,468.81 | - | 148,441,569.40 | 6,747,344.06 |
| 17 | 2013 | 13-Nov | 692,301,885.75 | - | - | 152,306,414.87 | - |
| 18 | 2013 | 13-Dec | 674,734,406.38 | 1,349,468.81 | 283,388.45 | 148,441,569.40 | - |
| 19 | 2014 | 14-Jan | 828,405,993.69 | 1,656,811.99 | 347,930.52 | 182,249,318.61 | - |
| 20 | 2014 | 14-Feb | 857,406,787.70 | - | - | 188,629,493.29 | 8,574,067.88 |
| 21 | 2014 | 14-Mar | 910,371,592.35 | 1,820,743.18 | - | 200,281,750.32 | - |
| 22 | 2014 | 14-Apr | 287,493,649.25 | 574,987.30 | 120,747.33 | 63,248,602.84 | 2,874,936.49 |
| 23 | 2014 | 14-May | 805,059,304.80 | 1,610,118.61 | 338,124.91 | 177,113,047.06 | - |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 24 | 2014 | 14-Jun | 681,869,476.20 | 1,363,738.95 | 286,385.18 | 150,011,284.76 | - |
| 25 | 2014 | 14-Jul | 287,493,649.25 | 574,987.30 | 120,747.33 | 63,248,602.84 | 2,874,936.49 |
| 26 | 2014 | 14-Aug | 805,059,304.80 | 1,610,118.61 | 338,124.91 | 177,113,047.06 | - |
| 27 | 2014 | 14-Sep | 681,869,476.20 | - | - | 150,011,284.76 | 6,818,694.76 |
| 28 | 2014 | 14-Oct | 463,213,789.75 | 926,427.58 | 194,549.79 | 101,907,033.75 | - |
| 29 | 2014 | 14-Nov | 431,080,304.45 | 862,160.61 | - | 94,837,666.98 | - |
| 30 | 2014 | 14-Dec | 547,087,464.60 | - | - | 120,359,242.21 | - |
| 31 | 2015 | 15-Jan | 500,988,872.80 | - | - | 110,217,552.02 | - |
| 32 | 2015 | 15-Feb | 530,569,727.65 | 1,061,139.46 | 222,839.29 | 116,725,340.08 | 5,305,697.28 |
| 33 | 2015 | 15-Mar | 643,047,405.80 | 1,286,094.81 | 270,079.91 | 141,470,429.28 | 6,430,474.06 |
| 34 | 2015 | 15-Apr | 607,935,484.40 | - | - | 133,745,806.57 | 6,079,354.84 |
| 35 | 2015 | 15-May | 536,872,017.30 | - | - | 118,111,843.81 | - |
| 36 | 2015 | 15-Jun | 684,903,354.35 | 1,369,806.71 | 287,659.41 | 150,678,737.96 | - |
| | Automation | Automation | Automation | Automation | Automation | Automation | Automation |
| 1 | 2015 | 15-Jul | 287,493,649.25 | - | - | 91997967.76 | - |
| 2 | 2015 | 15-Aug | 431,080,304.45 | - | - | 137945697.4 | - |
| 3 | 2015 | 15-Sep | 463,213,789.75 | 1,852,855.16 | 963,484.68 | 148228412.7 | 13,896,413.69 |
| 4 | 2015 | 15-Oct | 500,988,872.80 | 2,003,955.49 | 1,042,056.86 | 160316439.3 | - |
| 5 | 2015 | 15-Nov | 530,569,727.65 | 2,122,278.91 | 1,103,585.03 | 169782312.8 | 15,917,091.83 |
| 6 | 2015 | 15-Dec | 547,087,464.60 | - | - | 175067988.7 | - |
| 7 | 2016 | 16-Jan | 681,869,476.20 | 2,727,477.90 | 1,418,288.51 | 218198232.4 | 20,456,084.29 |
| 8 | 2016 | 16-Feb | 681,869,476.20 | - | - | 218198232.4 | 20,456,084.29 |
| 9 | 2016 | 16-Mar | 839,250,873.10 | 3,357,003.49 | - | 268560279.4 | - |
| 10 | 2016 | 16-Apr | 658,628,282.60 | - | - | 210761050.4 | - |
| 11 | 2016 | 16-May | 761,431,897.10 | - | - | 243658207.1 | 22,842,956.91 |
| 12 | 2016 | 16-Jun | 710,918,821.80 | 2,843,675.29 | 1,478,711.15 | 227494023 | 21,327,564.65 |
| 13 | 2016 | 16-Jul | 364,550,682.75 | - | - | 116656218.5 | - |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 14 | 2016 | 16-Aug | 368,280,156.15 | - | - | 117849650 | - |
| 15 | 2016 | 16-Sep | 514,702,053.15 | - | - | 164704657 | - |
| 16 | 2016 | 16-Oct | 544,745,853.86 | - | - | 174318673.2 | 16,342,375.62 |
| 17 | 2016 | 16-Nov | 587,785,892.05 | - | - | 188091485.5 | 17,633,576.76 |
| 18 | 2016 | 16-Dec | 666,635,007.05 | 2,666,540.03 | - | 213323202.3 | - |
| 19 | 2017 | 17-Jan | 802,706,432.90 | - | - | 256866058.5 | 24,081,192.99 |
| 20 | 2017 | 17-Feb | 803,809,533.40 | 3,215,238.13 | - | 257219050.7 | 24,114,286.00 |
| 21 | 2017 | 17-Mar | 889,961,274.75 | - | - | 284787607.9 | 26,698,838.24 |
| 22 | 2017 | 17-Apr | 915,504,432.00 | - | - | 292961418.2 | 27,465,132.96 |
| 23 | 2017 | 17-May | 1,283,312,827.74 | 5,133,251.31 | 2,669,290.68 | 410660104.9 | - |
| 24 | 2017 | 17-Jun | 1,285,252,470.45 | 5,141,009.88 | - | 411280790.5 | - |
| 25 | 2017 | 17-Jul | 1,339,250,873.10 | - | - | 428560279.4 | 40,177,526.19 |
| 26 | 2017 | 17-Aug | 1,261,431,897.10 | 5,045,727.59 | 2,623,778.35 | 403658207.1 | 37,842,956.91 |
| 27 | 2017 | 17-Sep | 1,310,918,821.80 | - | - | 419494023 | - |
| 28 | 2017 | 17-Oct | 1,481,869,476.20 | 5,927,477.90 | 3,082,288.51 | 474198232.4 | - |
| 29 | 2017 | 17-Nov | 1,458,628,282.60 | - | - | 466761050.4 | - |
| 30 | 2017 | 17-Dec | 1,761,431,897.10 | - | - | 563658207.1 | 52,842,956.91 |
| 31 | 2018 | 18-Jan | 2,085,827,518.45 | 8,343,310.07 | 4,338,521.24 | 667464805.9 | - |
| 32 | 2018 | 18-Feb | 943,536,831.15 | - | - | 301931786 | 28,306,104.93 |
| 33 | 2018 | 18-Mar | 1,451,373,054.60 | - | - | 464439377.5 | 43,541,191.64 |
| 34 | 2018 | 18-Apr | 1,406,132,683.05 | - | - | 449962458.6 | - |
| 35 | 2018 | 18-May | 991,598,885.90 | - | - | 317311643.5 | 29,747,966.58 |
| 36 | 2018 | 18-Jun | 1,216,208,570.40 | - | - | 389186742.5 | 36,486,257.11 |

**APPENDIX II : List of border points**

| Border Point |
| --- |
| 1. Nakuru, |
| 2. Embu, |
| 3. Nyeri, |
| 4. Isiolo, |
| 5. Kisii, |
| 6. Bungoma, |
| 7. Jkia, |
| 8. Wilson, |
| 9. Namanga, |
| 10. Loitokitok, |
| 11. Lokichogio, |
| 12. Moyale, |
| 13. mandera, |
| 14. Wajir, |
| 15. Eldoret, |
| 16. Suam, |
| 17.  Mombasa , |
| 18. Moi Airport, |
| 19. Kilindini Sea Port, |
| 20. Shimoni, |
| 21. Malindi, |

| |
|---|
| 22. Lamu, |
| 23. Lungalunga, |
| 24. Kilifi, |
| 25. taveta, |
| 26. Vanga, |
| 27. Kisumu, |
| 28. Kisumu Airport, |
| 29. Busia, |
| 30. Malaba, |
| 31. . Isebania, |
| 32. Lwakhakha, |
| 33. Muhuru bay, |
| 34. Airport, |
| 35. Mbita. |