**EFFECT OF COUNTY GOVERNMENT REFORMS ON REVENUE COLLECTION**

**PERFORMANCE IN KAKAMEGA COUNTY, KENYA.**

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**A research thesis submitted in partial fulfillment of the requirements for the award of the degree of Master of Science in Economics of Masinde Muliro University of Science and Technology.**

**NOVEMBER 2023**

## DECLARATION.

I hereby declare that this is my original work and has not been presented for a degree or any other award in any other university.

Sign………………………………….. Date……………………………………

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ECO/G/01-70072/2020

## CERTIFICATION

The undersigned certify that they have read and hereby recommend for acceptance of Masinde Muliro University of Science and Technology, a thesis entitled 'The effect of County Government Reforms on Revenue collection Performance in Kakamega County, Kenya.'

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## DEDICATION

This thesis work is dedicated to my family members and close friend Angelica Haule for their continued support and prayer throughout this academic journey. They are an inspiration in my life.

## ACKNOWLEDGEMENTS.

# ABSTRACT.

Globally, revenue is viewed as a critical element of any state as it provides needed finances used to support key government projects such as investment in human capital, infrastructural development, and administering services to citizens and businesses. Kakamega County initiated revenue reforms in 2019 to improve revenue collection. However, the county is still experiencing massive deficits and shortfalls in its revenue collection which has hindered the completion of key projects and caused inefficiencies in service provision. The study specifically examined the effect of County government reforms on revenue collection performance in Kakamega County. The study addressed four specific objectives which include; to examine the effect of cashless reform on revenue collection performance, determining the effect of Public Sector Revenue Management (PSRM) system reform on revenue collection performance and then to analyze the effect of toll fee reform on revenue collection performance in Kakamega County. Finally, to examine the moderating effect of inflation on revenue collection performance and revenue reforms in Kakamega County. The following theories informed the study; Revenue diversification theory, expediency theory of taxation, Keynesian theory on taxation and classical taxation theory. A comparative analysis was carried out to find out the effect of reforms on revenue collection using secondary data before the reforms and after the reforms. Descriptive, correlational and causal comparative research designs were chosen by the study. Secondary data was collected for thirty six-month period before the revenue reforms as from July 2016 to June 2019 and thirty-six-month period after the revenue reforms as from July 2019 to June 2022. Data in this research was analyzed using both descriptive and inferential statistics. Descriptive statistics measured were: mean, standard deviation, minima and maxima. Pearson Correlation coefficient was also calculated. In the study, pre-estimation diagnostics tests included Unit root and Philip Perron tests for stationarity. Results indicated that after reforms, parking fee had a moderate positive relationship with revenue collection performance (0.450), PSRM system reform had a strong positive relationship with revenue collection performance (0.641), toll fee had a moderate positive relationship with revenue collection performance (0.473) and Inflation as the moderating variable had a weak negative relationship with revenue collection performance (-0.291). From regression analysis, model estimates after reforms were (0.184, $p < 0.05$), (0.131, $p<0.05$) and (0.263, $p<0.05$) for cashless system reform, toll fee reform and PSRM system reform respectively. The study further indicated that inflation as a moderating variable was statistically significant (-0.154, $p<0.05$). Post estimation diagnostics tests carried out include; Breusch-Godfrey LM test which revealed that there is no autocorrelation, the Variance Inflation Factors (VIF) that showed there's no multicollinearity, Breusch -Pagan test whose results showed the error terms were homoscedastic and at last the Jarque-Bera test that showed that residuals are normally conveyed. To enhance performance and collection of revenue, the study recommended that Kakamega County should come up with modern ways of revenue collection. Additionally, the County should come up with a simplified and cost-effective system to enhance revenue collection. The study further recommended severe sanctions on tax evaders. The discoveries from research will be utilized by policy makers to enhance revenue collection within Kakamega County. Also, the findings will help the Kakamega County Revenue Agency (KCRA) staff to give insights on policy reforms within the county and their causal effect on revenue collection performance.

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## LIST OF ABBREVIATRIONS AND ACRONYMS.

**PSRM**          Public Sector Revenue Management system.

**POS**          Point of Sale Machine.

**SBP**          Single Business Permit.

**IMF**          International Monetary Fund.

**USA**          United States of America.

**UK**          United Kingdom.

**VAT**          Value Added Tax.

**KCB**          Kenya Commercial Bank.

**ICT**          Information Communication and Technology.

**USSD**          Unstructured Supplementary Service Data.

**ECDE**          Early Childhood Development Centers.

**GNP**          Gross National Product.

**OLS**          Ordinary Least Squares.

**GDP**          Gross Domestic Product.

**PIN**          Personal Identification Number.

***606#**          USSD code that is used for payment of revenue within the county.

**VIF**          Variance Inflation Factor

**FFV**          Fresh Fruits and Vegetables.

**CBK**                Central Bank of Kenya.

**KNBS**           Kenya National Bureau of Statistics

## OPERATIONAL DEFINITION OF KEY TERMS.

**Taxes**: compulsory and involuntary financial fees levied on individuals and corporations

enforced by the government.

**Structured revenue stream:**  this is a revenue stream whose payment is well defined

and cannot  be affected by the preexisting economic conditions such as slaughter

fee, toilet fee, toll fee and SBPs

**Unstructured revenue stream**: this is a revenue stream that is affected by the

preexisting

economic conditions in that its amount keeps on fluctuating, an example is the

market fees.

**Public Sector Revenue Management system (PSRM) reform**.  Is a secure revenue

collection

Portal that enables the administration of revenue.

**Point of Sale machine:** this is a device used for receipting at the point which a client has

made

the payment. Used mostly when collecting parking and market fees.

**Single Business Permit:** is a compulsory license to be paid by all the business owners

within the County. The license is paid specifically for doing business.

**Cashless system reform**: this is a system implemented by the county government of

Kakamega to aid in revenue collection without handling of cash by the revenue

collectors. all the payments using the system are done through the clients'

phones.

**International Monetary Fund:** an international organization that serves to stabilize the

international monetary system and acts as a monitor to the world's currencies.

**County government Reforms**: these are revenue reforms that have been adopted by

Kakamega County to help improve and increase local revenue within the county.

**Revenue Collection Performance**: the annual revenue collection performance within the Kakamega County.

**Toll fee reform:** is a reform adopted by Kakamega County to help collect revenue in the public sector vehicles by use seasonal monthly stickers.

<center>**CHAPTER ONE**</center>

<center>**INTRODUCTION**</center>

## 1.1 Background of the Study.

Taxes are compulsory and involuntary financial fees levied on individuals and corporations enforced by governments. Globally, revenue is considered and ranked as the largest source of income for any country. According to the World Bank, the ability to collect revenue from the world economies in the USA, Asia, and Europe, has enhanced them to back ventures for human capital and arrangement of administrations for citizens and businesses

Georgia is among the European nations that offer the best example of tax revenue reforms. In 2004, Georgia implemented strict reforms such as reforming its tax code, simplifying taxes, lowering tax rates, and eliminating small local taxes with insufficient income. According to the IMF Finance and Development article, corporate income was taxed at 15% and the VAT was reduced from 20% to 18%. Tax deficits from lower rates are counterbalanced by a more extensive tax base, way better compliance, and more tightly authorization. The Georgian government made it less demanding to pay charges by submitting electronic returns. With the reforms made by the Georgian government, the revenues of the state increased (Akitoby, 2018). Tax cuts increased government revenues and improved the state's economy, (refer to Appendix I).

In China, Waikei and Wingender (2015), looked into how reforms in revenue contributed to the growth of the economy. From their article, Waikei and Wingender checked into the

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reforms that were introduced by the state of China which included; revamping the progressive income tax, increasing social contributions, introduction of taxes on real estate development and finally increasing the value added tax on commodities. With the reforms introduced it was discovered that the amounts collected exponentially increased which led to the growth of China's economy. Further, it was noted that the increase in revenue improved the fiscal deficits that were being experienced in China.

According to Mabugu and Simbanegavi (2015), in their article Tax and Expenditure Reforms in Africa, African governments Implement tax reforms to increase tax revenue. The changes included introducing a general tax system, simplifying the tax system, and improving tax administration. With the reforms introduced by the African governments, revenue collected has continuously grown within the continent.

Zhou and Madhekani (2013), in their article talk about the procedures, systems and hindrances in the revenue collection process of Zimbabwe as a country. They succinctly noted that for Zimbabwe to overcome the burden of borrowing and financing of its projects, fiscal soundness was required to be put in place. Revenue mobilization and administration by Zimbabwe was marred with challenges that needed a long term and lasting fix. Zhou and Madhekani in their article reviewed the sources of revenue, challenges faced in revenue collection process, revenue leakages and measures to enhance revenue collection. From their study it was noted that Zimbabwe put in place structures and reforms that could push the agenda of revenue improvement and collection. Besides the reforms and developments in revenue collection, Zhou and Madhekani noted that revenue collection was still experiencing massive pilferages and the process was engulfed with corrupt officials.

Nigeria and Lagos state in particular had a stellar performance in revenue collection that is according to Olufemi, Dopemu and Unam (2015). The increase and improvement in revenue collection in Lagos state was an issue that warranted investigation from Olufemi, Dopemu and Unam. In their article, they assessed what impact tax reforms had on the generation of revenue in the state of Lagos. In the study, Olufemi, Dopemu and Unam used a time series approach. It was noted that Lagos experienced a tremendous increase in revenue generation as from 2006 due the reforms introduced in the said year. The increased generation of revenue was due to the concentration of tax reforms by Lagos state with a less dependence on the internal revenue generation. In conclusion, Olufemi, Dopemu and Unam noted that the reforms positively and significantly contributed the growth of revenue which enabled Lagos state to perform its responsibilities.

According to Osoro Cephas (2020), the Eastern African countries that is Kenya, Uganda, and Tanzania adopted the tax regime that was left behind by colonial powers. The main sources of revenue in the region have been PAYE, VAT, Corporate tax, customs, and excise duty. With improved technology in the region, countries in the region have digitized their tax collection as their main tax revenue reform. Digitization has improved and enhanced revenue collection within the region and Kenya in particular. Kenya's revenue collection has grown tremendously in the past years.

Ouma Duncan (2019), in his journal delved into how tax reforms have affected revenue, the growth of Kenya's economy and the political environment experienced in the country. The variables under investigation were, reforms, economic growth and the political environment with their subsequent effect on total taxes. From their study, it was noted that the reforms significantly impacted on the revenues. The increase in revenue

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was also positively affected by the growth in the country's Gross Domestic Product that was on an upward trajectory. On the political environment, Ouma concluded that government effectiveness and operational efficiency impacts positively on revenue collection.

Gituku Francis (2011), categorically investigated reforms and productivity of revenue in Kenya. His major bone of contention was the imbalance in the economy occasioned by government revenue and expenditure. The imbalance was caused by the fiscal shortfalls in the economy resulted by low revenue collections in the economy. The continuous deficits in the economy hindered the operations of Kenyan government since it was unable to finance its investment projects. According to Gituku, with the ailing revenue collection sector, urgent revenue reforms were needed to boost the collection. Gituku asserted that reforms did not have an impact on revenue collection from 1990-2010 due to the buoyancy and elasticity of the models that were used. Gituku noted that despite the reforms, the tax system was not productive thus the impact of the reforms was insignificant.

Kakamega County was born after the promulgation of the 2010 Kenyan constitution that led to devolution. According to Ouma Timoty (2015), looked into how multiple taxation led to the survival of small businesses in Kakamega. It is through the findings he had on the survival of these small businesses that there was an urgent need of reforms on taxation in Kakamega.

Kakamega County has prioritized revenue reforms to increase revenue collection as one of the measures to mobilize needed resources to meet the county's development agenda. According KCRA (2019), some of the dominating revenue reforms adopted by

Kakamega County include the introduction of a cashless system on revenue collection performance, the introduction of the Public Sector Revenue Management (PSRM) system on revenue collection performance and the introduction of toll fee reform on revenue collection performance.

From surveys and studies carried out such as that of Odhiambo (2020) in the Standard newspaper, it was noted that the reforms put forward by the county had a positive impact on revenue collection. It was noted with interest that revenue within the county has exponentially grown and Kakamega County is among the best-performing counties when it comes to revenue collection. It was ranked position five countrywide with a collection of 198.2 million in July, August, and September 2020. Nairobi City County topped the list with 1.5 billion, followed by Kiambu (452.3 million), Nakuru (294.2 million), and Machakos 206 million. Odhiambo (2020). Although there was an increase in revenue collection, it should be noted that revenue collection was negatively affected by the contagious Covid19 disease that was severely experienced in 2019 and 2020. The Covid 19 outbreak led to the dismal performance of revenue collection.

According to Odhiambo (2020), the county government in consultation with various stakeholders and departments should come up with well-defined structures and reforms to enhance revenue collection within the county. Revenue is a key project which when maximized by the county can lead to the raising of needed resources for economic development. With the amount collected from revenue, the money can be used for funding key projects within the county such as infrastructural development, improving the health sector, and improving human capital, Odhiambo(2020)

**1.2 Statement of The Research Problem.**

Taxes are a crucial source of income for the Kenyan government and the local governments. Since its inception, Kakamega County has prioritized revenue collection and considered it a fundamental project to the county government of Kakamega because revenue collection provides essential resources to finance key activities. Notably, revenue collection deserves serious attention to harness the required resources to help in actualizing the county's projects. Several studies done in Africa and the world over (Jandieri et al., 2019) have indicated positive relationships between revenue reforms and revenue collection performance. However, that seems not to be the case in Kakamega County. A survey carried out in 2019 by Kakamega County Revenue Agency (KCRA) reported that Kakamega County has the potential to generate approximately Ksh 3.5 billion in a financial year.

However, reports by Kakamega County Revenue Department revealed that in the financial years 2017/2018, 2018/2019, 2019/2020, and 2020/2021 only the following revenues were collected; 441.3 Million, 896.7 Million, 1.2 Billion, and 1.1 Billion and which led to percentage collection deficits as per the approximated target of 87.40%, 74.38%,65.71% and 68.57 % respectively (KCRA, 2021). To deal with these revenue collection deficits the county government of Kakamega introduced revenue reforms in 2019 (KCRA) to correct the inefficiencies and inequalities in revenue collection. This has not been achieved as expected. The contribution of the reforms in revenue collection in Kakamega County remains an issue that warrants examination. This study aims to determine the effect of revenue reforms in Kakamega County, Kenya.

**1.3 Objectives of the Study.**

**1.3.1 General Objective.**

The main aim of the study was to determine the effect of county government reforms on revenue collection performance in Kakamega County, Kenya.

**1.3.2 Specific Objectives**

Specifically, the study sought to:

To examine the effect of cashless reform on revenue collection performance in Kakamega County.

To determine the effect of Public Sector Revenue Management (PSRM) reform on revenue collection performance in Kakamega County.

To analyze the effect of toll fee reform on revenue collection performance in Kakamega County.

To examine the moderating effect of inflation on the relationship between revenue collection and revenue reforms in Kakamega County.

**1.4 Hypotheses of the study.**

Ho 1: There is no statistically significant relationship between revenue collection performance and the cashless reform in Kakamega County.

Ho 2: There is no statistically significant relationship between revenue collection performance and the Public Sector Revenue Management (PSRM) reform in Kakamega County.

Ho 3: There is no statistically significant relationship between revenue collection performance and toll fee reform in Kakamega County.

Ho 4: There is no statistically significant effect of inflation on the relationship between revenue reforms and revenue collection performance in Kakamega County.

## 1.5 Scope of the study.

The main aim of the study was to determine the effect of revenue reforms in Kakamega County. According to the 2019 census, Kakamega County has a population of 1,867,579. The county comprises twelve sub-counties namely Lurambi, Shinyalu, Ikolomani, Butere, Khwisero, Mumias West, Matungu, Mumias East, Navakholo, Malava, Lugari, and Likuyani. In the study, it is worth noting to state that for revenues of any state or authority to grow, there must be some mechanisms and reforms put in place. The study thus concentrated on the revenue reforms put in place by Kakamega County which included; the cashless system reform, Public Sector Revenue Management (PSRM) reform and toll fee reform. The study focused on a thirty-six-month period before reforms (July 2016 - June 2019) and a thirty-six month period after reforms (July 2019 - June 2022). The thirty six month period for the two periods are quite essential to give a comparative analysis to examine the effect of the revenue reforms in Kakamega County. Also, Kakamega County made its biggest milestone in revenue collection in 2019. The performance of revenue in the County after the reforms have been introduced will be used to inform the study. In the study, revenue diversification theory, Keynesian theory, and classical theory were used as the theories to explain revenue reforms under survey.

**1.6 Significance of the Study.**

This research is very important to many involved. First, policy makers will use the findings from the study to make informed policy decisions on matter relating to revenue. Results from the study will be used by Kakamega County under the department of Kakamega County Revenue Agency (KCRA) to make decisions about revenue collection. Also, the findings and conclusions from this study will be useful as they will be used to improve and strengthen the revenue collection system in Kakamega County. Finally the findings from the study will be used for academic research purposes. Researchers, students, and academicians will use the findings from the study to improve their knowledge and skills in matters of revenue.

**1.7 Limitations of the Study.**

The major restriction of the study was a challenge on the access to reliable and comprehensive data on revenue within Kakamega County. The availability and quality of data derived for the study poised as a serious hindrance. The limitation was reduced by working with data from various source both from the county and national government. The second challenge was the time frame under study. The reforms introduced in the study were limited only at the time frame which the study was carried out. Reforms from the County government will keep on evolving in future. The limitation was addressed by dealing with reforms which are long lasting and futuristic.

# CHAPTER TWO.

# LITERATURE REVIEW.

## 2.1 Introduction.

This section provides an overview on literature about the impact of revenue reforms on revenue collection to Kakamega County. Theoretical and empirical literature are reviewed in detail. A conceptual framework is reviewed to demonstrate the relationship between the variables.

## 2.2 Theoretical literature.

The research adopted the following four theories; Revenue Diversification Theory, Expediency Theory of Taxation, the Keynesian Theory on Taxation and Classical Theory. The theories were then linked to the study to determine their relevance.

### 2.2.1 Revenue Diversification Theory.

The income gap theory was developed in the year 1982 century by the economist John AC Conybeare to explain the effects of income differences between states. According to Conybeare (1986), one of the many predictions for measuring government behavior is that states will try to maximize their tax revenues by changing their tax base. Revenue diversification theory suggests that communities with greater income diversity have lower tax expenditures when other determinants of tax expenditures are controlled. With more than one tax base, tax income is maximized. In addition to growth, keep in mind that diversifying the revenue mix reduces the collection risk in that, Low income from one income will be compensated by higher income from another income.

This theory brought forward by Conybeare (1986), addressed all the variables in this study making the research under study supplement with other theories. Jimenez and Afonso (2022) worked on the theory to check into how diversification of resources and the tax base brought about the fiscal balance in the United States. In their study it was evident that United States of America was persistently facing fiscal deficits in their budgets. Jimenez and Afonso (2022) worked on the theory of revenue diversification noted that diversification of the tax base broadens the base and increases resource mobilization bringing about fiscal balance. The study anchored on revenue diversification theory since it is through diversification of the tax base that Kakamega County will realize more own source revenues.

The income diversification theory has some limitations that should be considered. According to Haggard Stephan (2011), developing countries' ability to diversify their tax base is limited by the ability to withdraw tax assets from their jurisdictions. Geographical diversity also indicates that these areas do not generate income. By contrast, Haggard Stephan (2011) pointed out that the situation is different in developing countries: while their tax bases are more diverse than in developed countries, they cannot be better than they are because of the administration's weakness. Haggard Stephan (2011) concluded that national rent and income inequality can be predicted by many factors, such as income or the economy of the state.

This theory depicts relevancy to the study as its main core objective of maximizing tax revenues through diversifying the tax base amplifies what the county is seeking through its revenue reforms: increasing revenue collection performance in Kakamega County. The various revenue reforms adopted by Kakamega County are viewed to improve and

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enhance revenue collection performance in the county. In addition, the county has diversified its tax base by coming up with various revenue streams such as market fees, land rates, SBPs, distribution licenses, advertisement fees, rent from county properties, motor vehicle stickers, and Building Plan approvals. With these various revenue streams, revenue collection within the county has been revamped since a drop in the collection from one revenue stream is offset by a higher collection from the other.

## 2.2.2 Expediency Theory of Taxation.

The theory was articulated by Alfred Buehler in 1936. According to this theory, people should contribute to the country's economy in line with their ability to do so based on their financial capability. Buehler (1936), income indicates that a person can pay taxes. Consequently, when a person owns property may not necessarily indicate the ability unless the property has some returns on it. Theoretically, Buehler (1936) stated that all tax claims should pass performance testing which should be important to authorities when choosing tax practices. According to the theory, there is pressure from financial, social, and political components in society. Each component in society looks to have its way when it comes to the interests they have with the authorities and the governments will try to work on satisfying their interests. In addition, authorities may not have sufficient capacity and efficiency to collect taxes at reasonable rates due constraining factor of the cost of collection. Bhartia (2009) in his review about the theory postulated that the creation of all taxes from success is full of concerns. Taxation has been used by authorities and governments as a tool to address social and health problems such as income inequality, inequality in the region, unemployment, and economic change.

Practicality is an important consideration in any tax proposal. If it is not possible to pay taxes, it is difficult to collect (Bhartia, 2009).

The theory was sought after as it is relevant to the study under review. According to Buehler (1936), people should contribute taxes according to their capacity. From the policy reforms, it is clear that revenue in the county has been divided into various streams which include; Single Business Permits (SBPs), toll fees, plot rates, parking fees, and market fees. The cashless system mainly deals with the market fee and parking within the county as their rates are paid via mobile phones. The fees paid via the phone are usually according to someone's capacity. On market fees, clients pay for barter fees depending on the amount of stock each one of them has e.g. a wholesaler will pay more revenue as compared to that client with a small stock. Bhartia (2009) introduced the theory of practicability in that payers with a huge financial capacity to bear the largest burden. This concept was adopted by Kakamega County Revenue Agency (KCRA) in that wholesalers will pay to as high as Ksh 3000 per lorry while small retailers will pay as low as 30. In addition, the capacity to pay taxes is also evidenced by how SBPs are paid. It is noted that large businesses such as wholesalers and supermarkets will pay more taxes in the form of SBPs as compared to smaller businesses. Larger businesses such as companies and agricultural producers will pay as high as Ksh 300,000 while small retail businesses in temporary structures will part with as low as Ksh 1700 and thus the concept resonated well with Bhatia (2009).

On the tenet of practicability from the theory by Bhartia (2009), it is relevant to the study as the taxes charged within Kakamega County are purely on the zoning of the stations. Some stations are more economically active than the rest. In terms of revenue collection,

the County has been zoned into Municipalities (Kakamega and Mumias Municipality), urban sub-counties (Butere, Malava, Shinyalu, Mumias East, Lugari, and Likuyani), and rural sub-counties (Mumias west, Navakholo and Matungu). From the mentioned zoning, taxes paid within the Municipalities are a bit high, followed by those in urban areas and then finally those in rural areas. The payment of different amounts depending on zoning sums up the concept of practicability illustrated in this theory. This explains how relevant the theory is to the study thus leading to its choice.

### 2.2.3 Keynesian Theory on Taxation.

The theory was created by British economist John Maynard Keynes (1883-1946) in 1936. He stated his main purpose in the book which talked about employment money and interest that he supported the intervention of the state in the economic management process. Keynes was well aware of the role that taxes play in supporting a nation's economic growth. Elsevier B.V (2020) strengthened the theory and postulated that taxes are the main source of income for the state and are used to finance public expenditures such as infrastructure, health, and social services.

According to Elsevier B.V (2020), during periods of economic prosperity ("boom"), the government must increase taxes to participate in economic growth. The government may choose to introduce new taxes that never existed in history to generate additional revenue. When there is a recession (economic recession), the government should reduce taxes on individuals and businesses. Therefore, the private sector will have more capital to reinvest and invest in projects that support economic growth. Elsevier B.V (2020) noted that a high level of taxation is essential for all states. Low taxes lead to low incomes that destabilize the economy. According to the theory, high taxes stimulate the economy; it

affects the stability of the economy and acts as a flexibility mechanism in the economic context (Elsevier B.V, 2020). He concluded his survey by stating that taxes play an important role in the system as they help the state in collecting needed resources.

Elsevier B.V (2020) in his analysis of the theory, he found out the limitations and criticisms within the theory. Some of the sharp criticism that can never be avoided is that the theory can easily cause inflation when implemented fully. Increasing taxes during expansionary fiscal policies by the state raises the cost of doing business. The producers incur a high cost of production and push these high costs to the final consumer by raising the prices of the commodities. Uncontrolled increases in the prices of commodities bring about inflation in the country.

According to the theory, taxes play a significant role when it comes to enhancing the economic growth of a country. It is through taxes that states raise resources which are used to expand the services offered by the state through investing in infrastructure and human capital. With a well-built expansive infrastructure, the economy of the state is likely to grow, Elsevier B.V (2020). This theory resonated with the study since the main policies under study adopted by the County government of Kakamega were to increase revenue collection. The taxes that will be raised through the revenues collected will be used for developmental projects in the County such as the construction of roads, markets, and the provision of agricultural products at subsidized prices. With the aforementioned services from the county, the economy of the country is likely to improve.

Some of the key policies adopted by the county lean towards digitizing revenue collection within the county. The reforms include cashless revenue collection, the introduction of the PSRM system, and toll fee collection within the county. All these

reforms were initiated to increase revenue collection which will be used to improve the economy of the county. Thus, Keynesian theory on Taxation is viewed as a relevant theory to the study.

## 2.2.4 The Classical Taxation Theory

The theory was formulated by Adam Smith in 1776. Smith articulated that taxation should follow the four main principles which include; convenience, certainty, fairness, and efficiency. The theory was strengthened by Weinzierl Matthew (2016) about the classical view of benefit based taxation.  In the theory, it was articulated that taxes should be proportional to how much a person benefits from living in society.  Weinzierl Matthew (2016)  while referring to the  second maxim of the theory, "taxes which each individual is bound to pay should be certain and not arbitrary, the time of payment, manner of payment, the quantity to be paid, ought all to be clear and plain to the contributor and to every other person." This allows people to calculate and make better plans.

In his maxim of convenience, according to Weinzierl Matthew (2016), "every tax ought to be levied at the time, or in a manner which is most likely convenient for the contributor to pay it." From his principles of taxation, it is argued that simpler and fairer taxes will promote economic growth.

The classical theory of taxation came up with the most integral axioms that should guide taxation. This theory is hitherto viewed as relevant to the study since the taxes imposed on the citizens by the County Government of Kakamega follow the principles that guide taxation initiated by Adam Smith.  On the principle of certainty, Weinzierl Matthew (2016), argues that there should be clarity on the amount to pay, the time to pay, and the

place to pay for. This incorporates well with the taxes levied by Kakamega County since they are usually clear on when to be remitted. The levies are charged in different amounts depending on the individual's ability to pay. The taxpayers are also certain about the amounts to pay, where to pay from, and the time frame in which they should comply.

In conclusion, the principles of taxation proposed by the Classical Theory of Taxation i.e. convenience, certainty, fairness, and efficiency are the guiding axioms used when levying fees in Kakamega County which conforms to Weinzierl Matthew's (2016)  thoughts about the theory . Thus, this theory is viewed as relevant to this study.


## 2.3 Conceptual review.

 Bayale (2023), studied the impact of tax reforms on tax performance in Togo. From his study it was evident that tax reforms introduced in Togo had a significant positive impact on tax collection .The reforms  on revenue collection  introduced by Kakamega County to marshal up the own source revenue had the same purpose as those introduced in Togo . The major reforms which were introduced by Kakamega County were: Cashless reform, Public Sector Revenue Management (PSRM) reform and toll fee reform. The reforms were introduced to seal the leakages and pilferages experienced in the revenue system. Revenue collection in the County is subdivided into various regions and from the data received, municipalities produce the largest amount for revenue. In this section the study reviewed the concept and how reforms impacted on revenue collection. Reforms in the study formed the exogenous variables while revenue collection formed the endogenous variable. The variables have been reviewed as followed.

### 2.3.1 Cashless system reform.

Severine Kessy (2020) described a cashless economy as one that uses e- payment in its operations. Severine Kessy (2020) checked on the impact of use of the cashless system in economic operations of Tanzania. Just like in Tanzania, the cashless reform was adopted by Kakamega County to help in collection of unstructured revenue streams such as parking fee and market fee. Market fee and parking fee was collected using the e-payment method in which clients were to pay for revenues using their mobile phones. According to Severine Kessy (2020), use of cashless in operations minimized the risk of direct handling of cash by the revenue officers on the field. The reform was aimed at sealing the revenue leakages experienced on the markets and parking lots within the county.

### 2.3.2 Public Sector Revenue Management (PSRM) system reform.

Tax administrations around the world are resorting to digitization to improve on operational efficiency and enhance internal control systems (Kamara, 2023). Accordin to Kamara (2023), authorities that implement use of digital platforms often increases productivity in their operations. Kakamega County initiated the use of Public Sector Revenue Managent (PSRM) tool as a digital platform to collect and administer revenue collection. PSRM reform was a digitized reform adopted by Kakamega County to help in invoicing and receipting of the structured revenue streams within the county. The system was also used in processing of the Single Business Permits (SBPs) and providing a platform on how much revenue has been collected by Kakamega County month wise per revenue stream. PSRM as a digital platform resonated well with Kamara (2023) findings

in it increased productivity and improved revenue administration within Kakamega County.

### 2.3.3 Toll fee reform.

The public transport sector plays a key role in Kenya's economy, Muchoki (2020). According to Muchoki(2020), regulating of the sector can benefit the growth of the economy of any government. Kakamega County introduced revenue from toll to increase the collection of revenue. According to Muchoki (2020), controlling of the transport sector improves collection of taxes and it was in the same spirit that Kakamega introduced the toll reform to harness the needed resources. The county came up with the reform to address the challenges that were being faced in the public transport sector. Kakamega County adopted monthly seasonal stickers for Public Sector Vehicles (PSVs) which replaced the initial toll collection that the vehicles had to pay on a daily basis. The seasonal stickers were to be paid at fee. Initially, toll collection was manual which involved direct handling of money by the revenue officers. This manual mode of toll collection was proven to be porous and had a lot of revenue leakages. The county was not fully realizing its potential in revenue collection.

### 2.3.4 Inflation rate.

Immervol Herwig (2000) investigated the impact of inflation on the economy and tax collection. In his study it was discovered that inflation had a negatve impact on revenue collection as it increased the cost of doing business .In the study, inflation rate was introduced as a moderating variable to act as an interface between the autonomous variable and the subordinate variable. The think about looked for to discover out the

impact inflation rate had on revenue collection performance. Inflation rate was measured by consumer price index.

### 2.3.5 Revenue performance.

According to Sheikh and Oluoch (2023), revenue performance in counties is the amount of own source revenue marshalled and accounted for by the local governments. Sheikh and Oluoch (2023) postulated in their survey that County governments need to increase their own source revenue to deal with the huge budget deficits which have been witnessed persistently in the recent past.   In the study, Revenue collection performance was the endogenous variable. It indicated the amount of revenues collected by Kakamega County from different revenue streams. Revenue collection was measured in two periods that included a period before the reforms (this is the period before the new reforms were implemented) and a period after reforms (this is the period in which the revenue reforms were implemented). The aim of the study was to discover if the revenue reforms implemented by Kakamega County had an impact on revenue collection performance.

### 2.4 Empirical literature.

### 2.4.1 Cashless system reform and Revenue Collection Performance.

Reforms on tax collection have been key in marshaling the amount of revenues collected in any country and Kenya is no exception. Kanyi (2015) delved into the tax reforms initiated by the Kenyan government on matters of revenue mobilization and collection within the country.  Kanyi's research was of great importance as it came at the point when Kenya's tax system and administration were marred with inefficiencies, inequalities, and imbalances. Her research was anchored on addressing the challenges

and deficits being faced in the country. Kanyi came up with a study to help improve the collections so that the Kenyan government can finance its expenditures. In her paper, she succinctly addressed the issue of digitization and electronic payment that was adopted by Kenya. It was worth noting that the new methods deployed in the country bore a lot of fruits as revenue collection improved. The changing trends in the world forced Kenya to drop the old systems of collection and replace them with more modern ways that were accepted and acknowledged by the tax administrators.

From the research, Kanyi put in place the use of descriptive and regression to analyze the impact the tax policies had on the taxes collected in the state. The findings by Kanyi in her research were that the policies put across by the Kenyan government positively impacted the amounts collected. The recommendations in Kanyi's research were that the Kenyan government should deploy more modernized and efficient policies in matters of resource mobilization. This approach could only better the collection within the country.

Arabadzhy, Zharnikova and Sobolieva (2021), investigated the transformation of non – cash payment in the European payment card market. The countries under study were: Ukraine, Poland, Sweden, Romania and Hungary. From the study, it was evident that the European nations mention shifted from using of cash and adopted non-cash payments in their transactions. The bank card system was introduced in the economy in which the populace used the debit and credit card to carry out their transactions. Despite the challenges faced by the card system in transactions, it was worth noting that non-cash payments led to increased transactions and revenues in banks. This was so because the risk of handling cash was mitigated.

Economic conditions combined with tax reforms are the major indicators of good tax administration and collection in any state. Gachanja (2012) in his survey combined the two indicators to check on the performance of resource mobilization in Kenya through the taxes collected. Gachanja in his study chose a ten-year period (2000- 2009) in which he utilized secondary data to check on the impact of the reforms with the prevailing economic conditions on tax administration and collection. Gachanja measured the economic conditions of the country by use of the Gross Domestic Product (GDP) and how it influenced the amount of taxes collected.

Gachanja in his quest to check on the impact of reforms and economic conditions on tax collection, deployed various statistical measures for analysis. From his analysis, it was evident that economic conditions contributed positively to tax administration and collection. From his research, he opined that better economic conditions will concurrently lead to increased tax collection. However, it was noted with concern that the tax reforms had a negative association with tax administration and collection. According to Gachanja the reforms put across by the Kenya Revenue Authority were counter-intuitive and ought to be looked into with a keen eye. He further recommended that the state should relook into the issue of reforms and modernization when it comes to resource mobilization.

A cashless economy has been the main agenda of most states in the modern world. Cashless systems in an economy reduce the risks of handling cash since most payments are made through digital platforms. Olanipekun (2013) in his survey concerning the challenges and prospects of cashless financial arrangement in Nigeria intuitively noted with concern how the cashless system has enhanced and improved the collection systems. The purpose of the approach was to drive the advancement and modernization of

Nigeria's electronic payment method in line with the vision of being among the best twenty economies in the world by the year 2020.

Nigeria sought after this electronic method of payment as it had more security features, was cost-effective, and was convenient to the Nigerians residing in urbanized areas and semi-urbanized areas.  Olanipekun noted that the electronic payment method had the following advantages to the economy of Nigeria; the system reduced handling of cash which was prone to risks and the mode of payment was more convenient to use as compared to the previous one. The electronic method of payment equally faced some setbacks which hindered its implementation.  The few setbacks included a poor infrastructure network in Nigeria, increased levels of illiteracy among Nigerians, and a lack of a distinct national identity.

Advancement in technology was cordially received and incorporated by the banking sector in Kenya. New technology has eased transactions and operations in financial institutions leading to increased profits and a large asset base.  Kamau (2014) studied the impact which cashless technology exchanges had on commercial banks in Kenya. She concentrated on how technology has enhanced operations within the banking sector in Kenya. Furthermore, it was noted that it is through technology that the bank's product base increased. Kamau concentrated on forty-three financial institutions in which he had data for five years2009-2013) from secondary sources of data.

The cashless technology that was adopted by the banking sector included; M-banking, the use of credit and debit cards, banking online, and the introduction of banking agents. Kamau noted that the use of cashless technology by commercial banks led to increased revenues collected which led to high profit margins.  It is through technology that the

banking sector has increased its operation and boasts of a large asset and product base. She further noted that the cashless technology was the main key in revolutionizing the banking sector and concluded that the service industry will keep on broadening its base as long as they incorporate the new technology in their operations.

The health sector in Kenya is one of the centers in which revenues are generated. Both the referral hospitals and Level four hospitals in the country adopted modern ways of collecting payments from patients once they receive treatment. Gichaba (2019) in his survey, focused on the impact of cashless payment mode in the county referral hospitals in Kenya within the forty-seven counties. According to Gichaba the most dominating cashless payments in this referral hospital included; electronic fund transfer (EFT), payment using mobile phones, using cheques for payment, and the adoption of bank credit cards in payment.

Gichaba in his survey concluded that the modern ways of collecting revenues in county referral hospitals had a noteworthy impact on revenue collection within those entities. The mode of payment sealed the revenue leakages being experienced in the hospitals within the counties and led to an exponential increase in collections. He further noted that the cashless method of payment was more secure and convenient for the hospitals. In conclusion, he alluded that hospitals and institutions adopt better modern methods for cash payment and cash management.

## 2.4.2 PSRM system reform and Revenue Collection Performance.

McCluskey, Franzsen and Kabianga (2018) studied the role of information Communication and technology (ICT) on revenue collection in four cities in Africa within three countries.  The cities under study were Arusha, Ndola, Kitwe and Kiambu in

which they were interested in finding out the role of ICT on collection of property taxes and other own source revenues. They looked into the challenges encountered in collection of revenue using ICT and the benefits derived. From their findings and conclusions it was evident that ICT provided a platform of enhanced revenue collection by use of e- payments. The four cities implemented the use of ICT in their operations despite the challenges encountered in the process.

Some of the dominating challenges were: the cities faced a risk of using a platform developed and maintained by a third party and cities faced the required technical support system which was missing.

It is essential by firms to cope up with the growing trends of Information Communication and Technology (ICT) so as to determine their day-to-day operations and their sustained existence. ICT has been fundamental in most government institutions from record keeping to production of the entities. Kipkemboi (2014) chose to check on the relationship between Information Communication and Technology and revenue generation in Nairobi City County. From his survey, it was essential to note that Nairobi City County settled on ICT reform as their key driver in revenue collection and generation within the city. Kipkemboi in his survey on collection within Nairobi County, chose the ICT policies and the perception the employees had towards ICT and how it impacted revenue collection. He further stated that the incorporation of ICT with revenue management and collection started in the United States of America. The USA was the first state to adopt the use of Technology in revenue collection.

From his work, Kipkemboi noted that revenue collection of Nairobi County was boosted and it exponentially increased. The increase in the collection was explained by the fact

that ICT addressed the loopholes and further sealed the revenue leakages that were being experienced in the capital. The adoption of ICT was a great milestone in revenue collection by Nairobi City County as it replaced the old inefficient system with a modern dynamic and convenient system. Kipkemboi concluded that ICT increases the productivity, effectiveness, and efficiency of counties in matters of revenue collection.

Mallick Hrushikesh (2021) in his study looked into the role of ICT and governance quality in tax revenue in India. Mallick (2019) concentrated on ICT infrastructure and quality governance on both direct and indirect taxes. The study came at a point at which India had introduced Goods and services Tax (GST) which was not different from Value added Tax (VAT). From the findings, it was surprising to note that ICT infrastructure and good governance had no positive significant effect on the taxes that were collected in India. The contrary outcome was explained by the fact that a greater scope of tax payers escaped out of the tax net and carried out the transactions out of ICT.

Mobilization of resources by the local governments in Kenya should be at the heart of any County for it to be self-sustaining. Any county that does not properly plan for its proper revenue collection systems and management is always destined for failure. Modern technology is key in helping the counties when it comes to the marshaling of the required resources. Githinji (2014), chose the Kenyan counties as his study area and he investigated the impact of modern technology and ICT on resource mobilization on the local governments. He focused on the growth of counties and their sustainability when it came to matters of tax collection. Githinji also noted that poverty levels within the counties could be reduced drastically once the issue of resource mobilization is addressed appropriately.

Githinji further noted that tax collection within the counties was still performing poorly due to the old methods of collection. His study was anchored on the need for counties to adopt ICT in their operations so that they could successfully enhance their resource mobilization techniques. Githinji noted that information Communication and Technology (ICT) had impacted positively counties' tax collection systems. He recommended that counties should embrace modern technology in their operations for efficient marshaling of resources.

Local authorities ought to adopt proper information systems when it comes to the collection of revenue. Digitization and modernization have been a pillar of any county when it comes to revenue collection. Odoyo (2013) delved into the matter of information systems and modern technology in the amounts of revenues collected by Homabay County, Kenya. Odoyo scrutinized the impact of Information Communications and Technology (ICT) and how it enhanced the control systems of Homabay County. He also looked into the impact of the information systems on the performance of revenue in Homabay County.

Odoyo chose to source data directly from the field and had a population of 2007 which had a mixture of local authority staff and traders. From the analysis, Odoyo noted that there was a positive association between information systems and modernization with the collection of revenue in Homabay County. He also stated that there is a noteworthy association between control systems and the amounts collected in terms of revenue. He concluded that counties to adopt a more flexible and robust modern method of collecting revenue. He further emphasized on firms to strengthen their internal systems to enhance their operations.

**2.4.3 Toll fee reform and Revenue Collection Performance.**

Zhou and Alouis (2013), investigated the effect of toll fee collection on revenue mobilization in Zimbabwe. Zimbabwe according to Zhou and Alouis (2013) implemented policies which led to a paradigm shift in collection of toll. According to their study, Zimbabwe introduced the toll gate systems on major highways to enhance and collect revenue for maintenance and repairs of the roads. The gate systems was replaced the ancient fuel levies and transit fees that were being charged on vehicles. Zhou and Alouis (2013) used a trend analysis on their study and compared with other previous years. From their findings, although the gate system relied on manual collection, it was evident that revenues mobilized and collected for toll increased subsequently in Zimbabwe.

Broadening the tax base is essential in increasing the taxes collected by any state or institution. Diversification into various streams by the government will lead to high collections. Furthermore, revenue diversification reduces the risk of collection, a deficit experienced in the collection of one stream is offset by high collections from the other. Toll fee was one of the revenue streams introduced by Kakamega County to increase the amounts collected within the County. Ngicuru (2016), chose Nairobi as his study area, and in which he majored in the distinct factors that affect the collection of revenue within Kenya's capital. His survey was anchored on diversification, administration of taxes, and structures put in place by the Nairobi government when it comes to collection. Ngicuru opined that diversification mainly concentrated on broadening the tax base, the administration was about the amount administered to the taxpayers while structures concentrated on the measures used in the capital to enable collection.

Ngicuru sourced his data directly from the field which he used to analyze the impact diversification, administration, and tax structures had on the amounts of revenue collected within Nairobi. From his insights, he found out that diversification broadens the tax base which in turn leads to increased revenue collection, a better administration with proper staff in place will give the best results when it comes to revenue collection and he then finished concluding that good structures are those which are simplistic in nature and flexible. The structures should be flexible to cope with the dynamic environment. Ngicuru recommended that counties diversify their bases to improve the amounts collected.

Levies are conditional charges imposed by governments on citizens, investors, or traders within a particular country. Levies can be an extra fee charged on businesses by the government to marshall up on the amount of taxes collected. Ogada (2019), delved into the levies introduced by Taita Taveta on a certain distinct type of business. He chose to concentrate on the vegetable and fruit vendors with Taita Taveta and the subsequent levies charged on their businesses. Ogada was also keen to check on the impact these levies had on the growth and sustainability of the same businesses. In his study, Ogada chose to use the questionnaire method and use of interview schedules when it came to the collection of data.

Ogada through the data collected, found out that levies imposed on small business traders negatively affect their operations. Levies will lead to a decline in the operations of these businesses if not handled properly by those in authority. The essence of introducing levies by governments is to increase the amounts collected. Ogada his survey notably noted that if the levies issue is not handled properly can lead to a decline in the operations

of businesses which in turn negatively affects the collection performance. Ogada recommended that governments should handle the issue of levies properly for them to improve the kitty of collection.

Various determinants will inform the amounts of revenue raised by any government in the world. One of the critical determinants that should never go unimplemented includes socio-economic factors. Socio-economic factors concentrate on the social being of the society which in turn have a hand in the collection of revenue. Apart from concentrating on other factors when it comes to raising taxes, governments should keep a keen eye on socio-economic factors. Onyango (2019), chose Siaya in his research and concentrated on the socio-economic factors that impacted the collection of revenue. The socio-economic factors chosen by Onyango while carrying out his survey in Siaya included legislation, enforcement, enhancement of automation, and political goodwill on the collection of revenue.

Onyango relied on staff from the county government of Siaya which he sourced for primary data. The employees were subjected to a questionnaire method in which they were asked how the chosen socio-economic impacted revenue collection. From the data collected an analysis was conducted by Onyango in which he concretely concluded that the socio-economic factors chosen which included; political goodwill, automation, legislation, and enforcement positively impacted revenue collection within Siaya. Onyango recommended that there is a need for authorities to enhance better socio-economic factors which will have an impact on the collection of revenue.

**2.4.4: Inflation and Revenue Collection Performance.**

Inflation as a macroeconomic variable negatively impacts the taxes collected by any state or organization since it reduces purchasing power. Inflation will also weaken the shilling against other currencies leading to low exchange rates between states. Gitaru (2009) studied the SIMBA system and its impact on revenue mobilization in Kenya and introduced the inflation rate in the country with its causal effect on the amounts collected under the new digital system. Gitaru used the readily available data from various government institutions and used a descriptive design to come up with his research.

Gitaru from his findings and examinations found out that the amount of imported goods increased within the country due to the introduction of the digital platform. An increase in the imports led to more taxes being collected within Kenya thus leading to huge revenues. Gitaru on the other hand noted with concern that the shilling experienced massive depreciation against other currencies, especially the dollar. With the weakened shilling Gitaru implied that the huge revenues collected were of low value to the state. This meant that the inflation rate impacted negatively on the amounts of revenue collected. Furthermore, from Gitaru's survey, it was noted that inflation within the country negatively affected the exchange rate.

For a firm to be efficient and effective in its operations it must be able to introduce modern technology which is dynamic and flexible. Modernization will help increase the incomes within the firm and more taxes will be collected in the economy. The major hindrance to the amounts collected by any government is the rate of inflation and poor exchange rate systems. Muthama (2013) looked into the modernization of systems in the collection of revenue by Kenya's receiver of revenue. Muthama in his research also

introduced inflation with its effects and the impact of the volatile exchange rate on the amounts collected. In the study, Muthama got his data from secondary sources and a comparative analysis was conducted to compare the previous years in which the country had no modern system with the years in which the country had the modern system.

The findings that Muthama had were that modern systems improved the amounts collected by the state. The new system was more efficient and effective in its collection as compared to the old system. However, the major setback in collection due to the modern system according to Muthama was the increasing rate of inflation and the volatile exchange rate. The two macroeconomic variables hindered the operation and thus led to low collections.

Immervol Herwig (2000), carried out analysis on the impact of inflation on income tax and social insurance contributions in Europe. In his study he investigated the colossal effect of inflation in collection of taxes in Germany, Netherlands and the United Kingdom. The study came at a point when inflation was negatively affecting the economies of the said European nations. From the findings it was clear that inflation had dire consequences on the economy which resulted to low revenue collection and also impacted negatively on the social insurance contribution. Herwig (2000), used a European tax benefit microsimulation model (EUROMOD) to analysis the impact of inflation. The model did not clearly explain the impact of inflation on taxes and social contributions.

In summary, it was noted that various studies have been conducted by researchers across the world who had an interest in the amounts of revenue collected and the reforms put in place. The studies indicated that each reform had its impact on the taxes collected. The

summarized table below indicates some of the similar studies that have been conducted

by different researchers. From the findings, the tables will address the knowledge gaps.

**2.5 Summary of literature review and Knowledge Gaps.**

**Table 2.1: Summary of Literature and Knowledge Gaps.**

| Author | Title | Findings & Conclusions | Knowledge Gaps | Address Gaps. |
|---|---|---|---|---|
| McCluskey,Franszen & Kabinga (2018) | The Role of Information Technology to Enhance Property Tax Revenue in Africa. | ICT enhanced collection of Property tax and own source revenue. | The system was developed and maintained by third party and lack of support staff. | PSRM system was maintained by the County which had adequate support staff. |
| Kipkemboi Rotich (2014) | ICT considerations& Revenue Collection | Increases productivity. Improves efficiency & | Bases only on ICT | Research chosen will be comprehensive. |

| | within Nairobi City County. | effectiveness | | |
|---|---|---|---|---|
| Kanyi Phostine (2015). | impact of Tax Policy Reforms on Tax Revenue in Kenya. | Positive correlations between tax Policy reforms &tax revenue in Kenya. | Inequality and inefficiency not addressed. | Inefficiency will be addressed. |
| Gachanja (2012) | The impact of Tax Reforms and Economic Factors on Tax Revenues in Kenya. | Changes have adversely contributed to charge income in whereas GDP emphatically | Never specified Tax Reforms. | Will address the issue of Tax Reforms. |

| | | impacted. | | |
|---|---|---|---|---|
| Arabadzhy, Zharnikova and Sobolieva (2021) | Transformation of Cashless Payments in the European Payment Card Market | Bank transactions and revenues increased. | Focussed on bank revenues alone and not revenues from the entire region. | Study will concentrate on major sources of revenue in the entire region(Kakamega County) |
| Ngicuru (2016) | Effect of Selected Factors Affecting Revenue Collection in Nairobi city County Government. | Revenue diversification increases amount of revenue collected. Good Tax administration increases | Does not address the issue of Tax structures properly. | Will look into the tax structures. |

| | | amount of revenue collected. Good tax structure increases revenue collected. | | |
|---|---|---|---|---|
| Githinji (2014) | Information and Communication Technology (ICT) on Revenue collection by Kenyan Counties. | ICT had a positive impact on revenue collection performance. | The study-based ICT only on revenue collection performance but did not specify the specific revenue | Revenue streams will be specified and there will be an introduction of structured and unstructured revenue streams. |

| | | | streams. | |
|---|---|---|---|---|
| Mallick,H. (2021) | Do Governance Quality and ICT Infrastructure Influence the Tax Revenue Mobilisation? An Empirical Analysis for India | ICT infrastructure and good governance have no positive significance effect on collection of revenue. | Transactions on revenue were carried outside ICT system | PSRM system is simple and efficient to use thus all transactions were through the system. |
| Onyango M.K (2019) | Analysis of socio-economic factors affecting revenue collection in | Legislation, enforcement, automation and political goodwill have | The socio-economic factors chosen do not advocate and promote | Revenue reforms will enhance reveneue collection performance. |

| | | | | |
|---|---|---|---|---|
| | Siaya County, Kenya | a significant effect on state of revenue collection in Siaya County | best practices of fostering sustainable and effective revenue collection. | |
| Gichaba. Z &Oluoch, O. (2019) | Effect of cashless payment systems on cash management of county referral hospitals in Kenya. | Cashless payment improved and enhanced revenue collection at county referral hospitals. | The study concentrated only on revenues from County referral hospitals which are usually very minimal. | The study will address the gap by concentrating on various sources of revenue in Kakamega County. |
| Olanipekun(2013) | Integrating | The cashless | Focussed on | Infrastructural development in the county |

| | Cashless Economic Policy in Nigeria. | economy increased convenience and reduced handling of cash | urban and semi urban areas only due to poor infrastructure | enabled implementation of the cashless system. |
|---|---|---|---|---|
| Kamau (2014) | Effect of cashless transactions and financial trading income on non-funded income in commercial banks in Kenya | Cashless transactions positively influenced the non- funded income in commercial banks. | The product base such as mobile banking, card usage and online banking did not clearly show how they positively impacted revenue | The cashless system in the study such as market fee and parking fee in the study positively impacted on revenue collection. |

| | | | collection. | |
|---|---|---|---|---|
| Zhou & Alouis (2013) | Mobilizing Domestic Revenue through Toll Gate Systems in Zimbabwe. | Toll revenue collected subsequently increased. | In the study a manual system of toll collection was used. This led to revenue leakages and pilferages. | A modernized system of toll fee collection was used in the study. |
| Ogada (2019) | Contributions of county levies to the total cost of fresh fruit and Vegetables' business in Taita Taveta County. | The levies imposed had a negative effect on performance of fresh fruits and Vegetables | Unbearable levies that crippled business. | The levies imposed are bearable and cost effective to the business sustainability in the county. |

| | | business. | | |
|---|---|---|---|---|
| Immervol, H. (2000) | The Impact of Inflation on Income Tax and Social Insurance Contributions in Europe. | Inflation negatively affected the economy which in turn affected taxes collected and social contributions. | The model used (Eueopean Tax Benefit Microsimulation Model (EUROMOD)) did not clearly illustrate the impact of inflation on tax collection and social contribution. | Inflation was used as a moderating variable and its effect on revenue collection was noticeable. |

**2.6 Conceptual Framework.**

Typically, a diagrammatic representation on how the factors; dependent variable, independent variable &moderating variable relate to each other and how they are measured. The subordinate variable is the amounts of revenue collected while the insubordinate variables are the revenue reforms by the county government of Kakamega.

**Conceptual Framework.**



Source: Author's computation

**Moderating Variable**
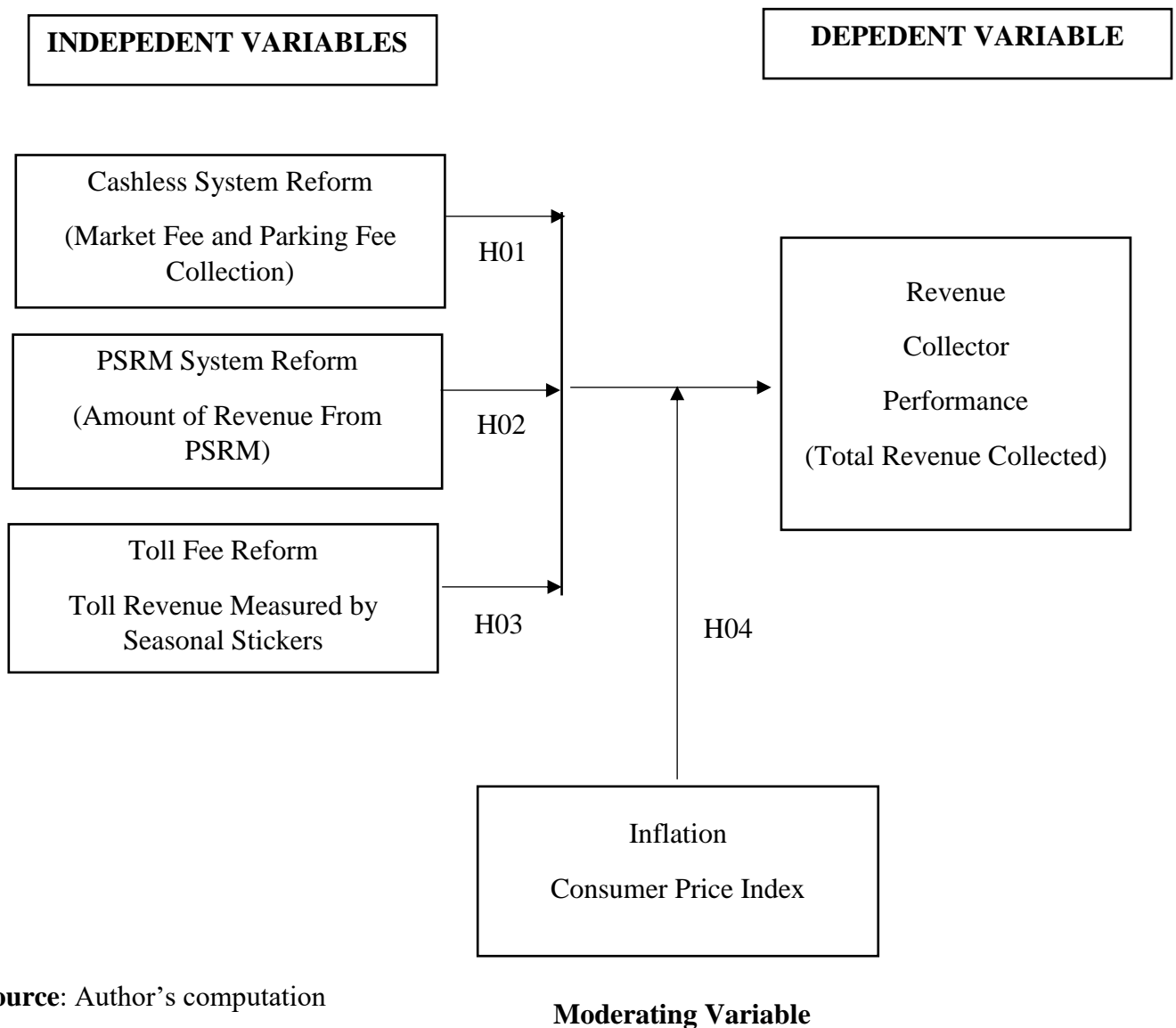
**Figure 2.1: Conceptual framework.**

In the conceptual framework, the independent variables were the cashless system reform, PSRM system reform and toll fee reform while the dependent variable is the revenue collection performance. Inflation which was measured by the consumer price index acted as the moderating variable in the study. From the conceptual framework figure, the variance of revenue collection performance is highly dependent on the reforms in that cashless system reform, toll fee reform and PSRM reform will either positively or negatively influence revenue collection. Inflation on the other hand negatively affects revenue collection since it increases the cost of doing business leading to fewer businesses operating. With fewer economic activity taking place, low revenue collection is realized.

# CHAPTER THREE.

# RESEARCH METHODOLOGY

## 3.1 Introduction.

Research methodology and design is discussed in this chapter. In summary the following was discussed: research design, study area, data collection and analysis, Diagnostic tests and finally specification of the research model.

## 3.2 Research Design.

According to Saunders, Lewis Philip and Thornhill Adrian (2007), a design can be named in terms of time, choice of methods or methodologies utilized to gather data. A descriptive research design, correlation research design and causal comparative research designs were chosen by the study. Descriptive research design was chosen because it illustrated patterns of the variables through the mean, standard deviation, maxima and minima. In addition, Mcombes (2019) elaborated on a descriptive research design as a design which precisely, in a systematic manner and methodically portrays a population, circumstance or phenomenon. The research too utilized a correlation research design. A correlational design in the study was centered on examining the correlation among the variables. The design reflected the quality and course between variables. Correlation design explained whether there was a positive or negative relationship between the variables in the study. Furthermore, the researcher also settled on a causal comparative design to check on the impact of the reforms on revenue collection. A causal comparative design, concurring to Oppenhimmer John (2022), is a strategy utilized to recognize cause- effect relationship between predictor variables and predicted variables.

## 3.3 Study Area

The focus of the study was on Kakamega County since it had implemented numerous reforms in revenue collection. Besides the reforms, Kakamega County was chosen as it experienced the greatest milestone and structural changes in revenue from 2019 and thus it was through the reforms that opted the researcher to carry out the study.    The county is located on longitude $34^0$ N $-34.7^0$ N and latitude $0.142^0$E-$0.744^0$E with a geological region of 3038. 8 km2 and a population of 1,867,579 as per the 2019 census. Kakamega borders Vihiga to the south, Siaya to the west, Bungoma and Transnzoia to the north, and Nandi and Uasin Gishu to the East (Kakamega registry office). Kakamega County is made up of twelve sub-counties which are: Lurambi, Shinyalu, Ikolomani, Butere, Khwisero, Mumias West, Matungu, Mumias East, Navakholo, Malava, Lugari and Likuyani. Agriculture is at the heart of earnings within the county as a majority of the population depends on it for their livelihood. Kakamega enjoys a diverse plentiful culture since it harbors different races and communities from across the world. Accumulation of capital in the region ranges from retail, agri-business, and provision of services to the people, estate development, and manufacturing. This has boosted the economy of Kakamega which gives it an edge and a tall comparative advantage as compared to its neighbors. Other than choosing the area, it is suitable as the research analyzed the effect reforms had on revenue collection in the county.

## 3.4 Data, Data Types and Data Collection.

Data for the various reforms to be used in the study was collected by use of data collection sheets.  Cashless system data which was measured by parking fee and market fee was collected from the dashboards used in revenue collection. Moreover, PSRM data

was collected which was measured by the sum collected from the SBPs and any receipting done through the Public Sector Revenue Management (PSRM) platform. In addition to that, toll fee data was collected and measured by the sum collected from public sector vehicles every month which was measured by the monthly seasonal stickers issued to the vehicles. In the study inflation whose data was easily sourced from government agencies was measured by the consumer price index. Lastly, revenue collection data was collected and measured by the entire collection in revenue for the two periods; July 2016 to June 2019 before the reforms and the period; July 2019 to June 2022 after the reforms. These two periods were quite essential as they provided the needed comparative analysis of revenue reforms on revenue collection. Data for revenue collection, cashless reform, PSRM reform, and toll fee reform was extracted from the departments within the County. Moreover, inflation data was extracted from the Central Bank of Kenya (CBK) and the Kenya National Bureau of Statistics (KNBS). Paul Dix (2020), author of Influx Data, characterized time series as arrangements of information focused and recorded in a period. The data is comprised of progressive estimations made from the same source over a time interval and are utilized to track change over time. The two periods were chosen as they were considered to give important comparative outcomes of revenue collection performance after the inception of the reforms in 2019. Data was collected using the data collection sheets.

### 3.5 Data Analysis and Presentation techniques.

### 3.5.1 Diagnostic Tests.

The assumption of Pearson correlation and linear regression models in the research was conducted by diagnostic tests. Both Pre-estimation and post estimation was carried out to check on the assumptions.

### 3.5.1.1 Pre-Estimation Diagnostic Tests.
**Normality Test.**

Normality is a test used to check on the error terms in the model which are presumed to have a constant variance and a mean of zero. Jarque Bera test was settled on by the researcher to test for normality in the study. Jarque Bera test according to Stephen Glen (2020) is a reliable test used to test for normality in data sets with large sample sizes. While using Jarque Bera to test for normality, the null hypothesis sates that variables are normally distributed; Ho> 0.05. On the other hand, alternative hypothesis states that variables are not normally distributed; Ha< 0.05.

**Unit Root Test.**

Unit Root Test was chosen to test for stationarity. Vijay Kumar (2021), alluded that a stationary series is one whose properties such as the mean, variance, covariance and standard deviation don't change with time. Unit root test was chosen in the research to test for non-stationarity inside the variables. In most cases, time series data is usually affected by serial correlation and thus the researcher opted for Augmented Dickey Fuller (ADF) and Philip Peron tests to check for stationarity. The null hypotheses for the tests

states that the series is non-stationary, $p<0.05$ while the alternative hypotheses for the tests states that the series are stationary, $p>0.05$.

### 3.5.1.2 Post-Estimation Diagnostic Tests.

Autocorrelation, multicollinearity, normality and heteroskedasticity were the post estimation diagnostic tests that were used in this study.

**Autocorrelation**. Smith (2023) described autocorrelation as measure between the association of residuals and their immediate previous values. The analyst utilized Breusch- Godfrey serial correlation LM test to test for Auto- correlation. Breusch-Godfrey test is a measurable test that checks in the event that autocorrelation exists in a time series model. The study utilized hypothesis testing to check for serial correlation. The hypotheses were tried as follows; Ho: The residuals are freely distributed meaning there's no serial correlation. Ha: The residuals are not freely distributed meaning they show serial correlation. From the above, it can be noted that we fail to dismiss the null hypothesis which states that there is no autocorrelation. In the analysis, a p value greater than 0.05 indicates lack of autocorrelation; Ho: $p>0.05$. While a p value less than 0.05 indicates presence of autocorrelation in the model; H1: $p<0.05$.

**Multicollinearity**: High interrelations between variables in a model indicates presence of multicollinearity (Hayes, 2021). Multicollinearity breeds large errors in the model leading to unreliable results. This research utilized variance inflation factor (VIF) to check for multicollinearity. The thumb rule is that the VIF ought to be less than 5. A VIF over 5 suggests that multicollinearity is very high.

**Normality**: Parametric tests require that the presumption of ordinariness to be met for the residuals. Normal distribution could be a symmetrical nonstop dissemination characterized by the average and standard deviation of the data (isixsigma.com). Test for ordinariness was first checked by use of the graphical method after which Jarque- Bera was introduced to check for normality. Normally the residuals should be normally distributed in the model; Ho >0.05. On the contrary, the alternative hypothesis is that the residuals are not normally distributed.

**Heteroskedasticity**: One of the OLS presumptions is that the residuals ought to have a steady variance (they ought to be homoscedastic). Breusch- Pagan/ Cook- Weisberg test was utilized to test for heteroskedasticity. While testing for heteroskedasticity, null hypothesis states that the residuals should have a constant variance; H0: P>0.05, meaning that the terms are homoscedastic. On the other hand, the alternative hypothesis states that the error terms have no steady variance.

### 3.5.2 Data Analysis.

Descriptive and inferential methods were deployed in the data analysis section. Hayes (2021), alluded that descriptive statistics help to depict and get the highlights of a specific data set by giving brief characteristics and measures of data. The measurements incorporated in descriptive statistics include; average, standard deviation, minima and maxima. Moreover, the research utilized correlation to analyze the relationship and the quality between an endogenous variable (revenue collection) and exogenous variables (reforms). Pearson's R, $R^2$, and adjusted R squared were calculated. A two-sample t-test was conducted to strike out the significant difference between the reforms. The t-test was to check if the reforms introduced had an impact on the amounts of revenue collected.

Multivariate analysis was also carried out to analyze the impact of reforms on revenue collection performance. In conclusion, revenue reforms were hypothetically tested to find out if they had a significant effect on the collection of revenue within Kakamega. The researcher sought to find out; HO: There's no significant relationship between the government reforms and revenue collection in Kakamega County. The statistical software chosen in the study was STATA. STATA was settled on by the researcher due to the nature of the data being used. It was deemed the best software as it gave a comprehensive analysis of the data and which resulted in meaningful information.

### 3.5.3 Economic Model Specification.

The analysis was conducted in a systematic manner as indicated below;

First multiple analysis was conducted to find out   the relationship between the predicted variable

(Revenue collection) and predictor variable (cashless, PSRM reform &Toll fee). The model below was used;

1.$Y = \alpha + b_1 x_1 + b_2 x_2 + b_3 x_3 + \mu$.

Where:

Y- is revenue collected by the County in a month.

$\alpha$- is a Constant. The sum of amount collected within the County when all factors are held constant.

b1- is the coefficient that clarifies the change in Y when X1 changes by a single unit

b2- is the coefficient clarifying the change in Y when X2 changes by a single unit.

b3- is the coefficient clarifying the change in Y when X3 changes by a single unit

$X_1$- represent Cashless System Reform

$X_2$- represent Public Sector Revenue Management system (PSRM).

$X_3$- represent Toll fee reform

$\mu$- represent the disturbance error term.

The above equation demonstrated the relationship between total collection and the reforms conveyed by the county. The variance of each parameter estimate were generated using the STATA software. The coefficient of determination ($R^2$) was used to measure the variation between Y (revenue collection performance) explained by the variation in the Cashless system ($X_1$), PSRM system($X_2$), and Toll fee collection($X_3$).

In the next step, a hierarchical regression analysis was conducted to find out the direct impact of inflation on the effect of the cashless system, PSRM system and toll fee on revenue collection performance after the implementation of the reforms. The model below was used;

2. $Y=\alpha+ b_1x_1+ b_2x_2+b_3x_3+b_4x_4+ \mu$

Y- Tax Revenue collected by the County in a month.

α- is a Constant. The amount of revenue collected in the County when all the independent variables are equal to zero.

$b_1$- is the coefficient that clarifies the change in Y when X1 changes by a single unit

$b_2$- is the coefficient explaining the change in Y when $X_2$ changes by a single unit.

$b_3$- is the coefficient explaining the change in Y when $X_3$ changes by a single unit.

$b_4$- is the coefficient explaining the change in Y when $X_4$ changes by a single unit.

$X_1$- represent Cashless System Reform

$X_2$ -represent Public Sector Revenue Management system (PSRM).

$X_3$- represent Toll fee reform

$X_4$- represent Inflation rate

μ represent the disturbance error term.

The multiple coefficient determination $(R_2^2)$ in the regression model including the moderating variable (Inflation) was compared to the multiple coefficients of determination $(R_1^2)$ without the moderating variable. A significance test was conducted to find out if the change in $R^2$ is statistically significant or not. A statistically significant change in $R^2$ implied that inflation contributed significantly to revenue collection performance in the regression model. This, in turn, implied that inflation had a significant influence on cashless reform, Public Sector Revenue Management system (PSRM) reform & toll fee reform, and revenue collection performance.

### 3.5.4 Description and Measurement of Variables.

The variables were described and measured in a summarized table as indicated in the next page.

**Table 3.1: Description and Measurement of the Variables**

| Variable | Description | Measurement | Expected sign |
|---|---|---|---|
| Revenue collection Performance | Revenues collected by the County. | Monthly total revenue collections | +/- |
| Cashless System | Revenues collected via the *606# cashless platform | Cashless dashboard. i.e Market and Parking fee paid via the platform. | +/- |
| PSRM system | System used for receipting of the revenue payments such as SBPs. | The PSRM collections i.e Revenue receipts processed through the PSRM. | +/- |
| Toll fee | Seasonal amount paid by the PSVs | Seasonal stickers i.e. Revenue from stickers. | +/- |
| Inflation | Increase in prices | Consumer price index | +/- |

**3.6 Ethical Consideration.**

This research put in practice the code of conduct required as per the ethics guideline. Information and data received from the various departments was confidential and can never be produced or discussed anywhere without any relevant permission. The National Commission for Science, Technology and Innovation (NACOSTI) processed the permit to be used for research so that no party was offended during the entire period.

# CHAPTER FOUR

## RESULTS AND DISCUSSION

### 4.1 Introduction.

The chapter presented an introduction of descriptive statistics, followed by a correlation analysis, and completed with a complex time series analysis. The research traces the relationship between County government reforms and revenue collection. The reforms under study were ;the cashless system reform (market fee and parking fee), Public sector Revenue Management (PSRM) reform, toll fee reform, and inflation measured by the consumer price index which acts as the moderating variable.

### 4.2 Descriptive statistics.

According to Hayes (2021), descriptive statistics helped describe the highlights of a specific data set by giving brief features and measures of data. The statistical measures under investigation for descriptive statistics included mean, maxima, minima and standard deviation. Darren George and Mallery Paul's (2018) view was that mean is a degree of central tendency that gives the average of the particular sample data being used while Standard deviation is used to measure the variability around the mean. Lastly, minima and maxima gave the smallest and largest values respectively in the data set.

**Table 4.1: Descriptive Statistics in millions of Kshs**

| Reforms | tax_rev | Toll_rev | mark_fee | park_fee | psrm_rev | CPI |
|---|---|---|---|---|---|---|
| | | | **Before** | | | |
| Count | 36 | 36 | 36 | 36 | 36 | 36 |
| Min | 16.71155 | 2.3758 | 0.29422 | 0.4379 | 9.775574 | 87.26 |
| Max | 91.00584 | 4.9428 | 2.93655 | 1.60029 | 86.71107 | 103.52 |
| Mean | 37.9356 | 3.736292 | 2.273183 | 0.780858 | 31.17702 | 95.47861 |
| S.D | 17.16141 | 0.625259 | 0.603193 | 0.25266 | 17.40314 | 4.573992 |
| Skewness | 0.986511 | -0.68494 | -2.02937 | 1.041738 | 1.119174 | -0.22765 |
| Kurtosis | 3.765801 | 2.653814 | 5.234542 | 4.424266 | 4.114672 | 2.192274 |
| | | | **After** | | | |
| Count | 36 | 36 | 36 | 36 | 36 | 36 |
| Min | 31.44148 | 0.2754 | 0.0688 | 0.19485 | 23.11347 | 103.83 |
| Max | 90.26357 | 3.9407 | 4.18171 | 3.07805 | 85.00286 | 124.22 |
| Mean | 54.66133 | 2.168123 | 1.635631 | 1.096914 | 49.76066 | 112.315 |
| S.D | 17.23538 | 0.815096 | 0.918204 | 0.649978 | 17.00809 | 5.8118 |
| Skewness | 0.450195 | -0.75869 | 0.894331 | 1.519791 | 0.426572 | 0.284836 |
| Kurtosis | 1.998401 | 3.429925 | 4.003204 | 4.873519 | 2.056631 | 2.043391 |
| | | | **Combined** | | | |
| Count | 72 | 72 | 72 | 72 | 72 | 72 |
| Min | 16.71155 | 0.2754 | 0.0688 | 0.19485 | 9.775574 | 87.26 |
| Max | 91.00584 | 4.9428 | 4.18171 | 3.07805 | 86.71107 | 124.22 |
| Mean | 46.29846 | 2.952207 | 1.954407 | 0.938886 | 40.46884 | 103.8968 |
| S.D | 19.04055 | 1.06943 | 0.835476 | 0.514834 | 19.47963 | 9.941233 |
| Skewness | 0.52158 | -0.49248 | -0.18286 | 1.175738 | 0.504161 | 0.181047 |
| Kurtosis | 2.505951 | 2.785907 | 3.102958 | 5.446207 | 2.489604 | 2.014944 |

**Source**: Author's computation based on STATA.

Table 4.1 shows a comparative descriptive analysis between the County government reforms (Before (0) and after reforms (1)) and revenue collection performance. From the table, the revenue collection performance before the reforms had a minima of Ksh 16.7 million and a maxima of Ksh 91.0 million. The revenue collection performance had a mean of Ksh 37.94 million and a standard deviation of Ksh 17.16 million. Before the reforms, toll fee reform had a minima of Ksh 2.38 million, maxima of Ksh 4.94 million, a mean of Ksh 3.74 million, standard deviation of Ksh 0.625 million. Market fees before the reforms had a minima of Ksh 0.294 million, maxima of Ksh 2.94 million, mean Ksh 2.27 million, the standard deviation of Ksh 0.603 million. Parking fee before the reforms had a minima of Ksh 0.438 million, maxima Ksh 1.60 million, mean of Ksh 0.781 million, and a standard deviation of Ksh 0.253 million. Additionally, Public Sector Revenue Management (PSRM) system before the reforms had a minima of Ksh 9.78 million, maxima of Ksh 86.7 million, a mean of Ksh 31.17 million, and a standard deviation of Ksh 17.4 million.

After the revenue reforms, revenue collection performance had a  minima of Ksh 31.4 million, maxima of Ksh 90.3 million, mean of Ksh 54.7 million with a standard deviation of Ksh 17.2 million.  Toll fees after reforms had a minima of Ksh 0.275 million, maxima of Ksh 3.94 million, a standard deviation of Ksh 0.815M, mean Ksh 2.17 million. After reforms, the market fee had a minima of Ksh 0.069 million, maxima of Ksh 4.18 million, a mean Ksh 1.64 million, standard deviation Ksh 0.918 million. Parking fees after reforms had a minima of Ksh 0.195 million, maxima of Ksh 3.078 million, standard deviation Ksh 0.650 million with a mean of Ksh 1.10 million.  Lastly, PSRM after

reforms has a minima of Ksh 23.1 million, maxima of Ksh 85.0 million, standard deviation of Ksh 17.0 million with a mean of Ksh 49.8 million.

From the analysis above, it was noted that revenue reforms had a positive impact on revenue collection performance based on the averages. Before the reforms, the mean revenue collection performance was Ksh 56 million lower than as compared to 54.7 million after the reforms. Revenue collections from parking fees and the Public Sector Revenue Management system (PSRM) also registered high averages after reforms as compared to before reforms (parking had 0.781 million as compared to 1.097 million while PSRM had 31.18 million as compared to 49.76 million). However, collections from toll fees and market fees registered lower averages the after reforms as compared to before reforms (3.73 million as compared to 2.16 million for tolls and 2.273 million and 1.95 million for market fees). This can be explained by the fact that market fees and toll fees were sharply affected during the months of Covid 19 (2019 to 2020) as there was minimal collection from the two streams.

Combined data indicated that revenue collection performance had a standard deviation of Ksh 19.04 million, a minima of Ksh 16.71 million, maxima of Ksh 91.0 million, mean of Ksh 46.3 million. Toll fees had a minima of Ksh 0.275 million, maxima of Ksh 4.94 million, a mean Ksh 2.95 million, and a standard deviation of Ksh 1.07 million. Market fees had a standard deviation Ksh 0.835 million, minima of Ksh 0.069 million, maxima of Ksh 4.18 million, mean Ksh 1.95 million. Parking fees had a minima of Ksh 0.195 million, maxima of Ksh 3.078 million, a mean of Ksh 0.939 million, and a standard deviation Ksh 0.515 million. Lastly, PSRM had a minima of Ksh 9.776 million, maxima

of Ksh 86.71 million, standard deviation of Ksh 19.48 million with a mean of Ksh 40.47 million.

## 4.3 Time Series Plots.

According to Elizabeth, Mathew and Cena (2020), time series plots are created by plotting a variable against time and are used in many disciplines to study, predict and forecast variables.

**Figure 4.1 Time series plot for revenue collection performance (Before reforms).**
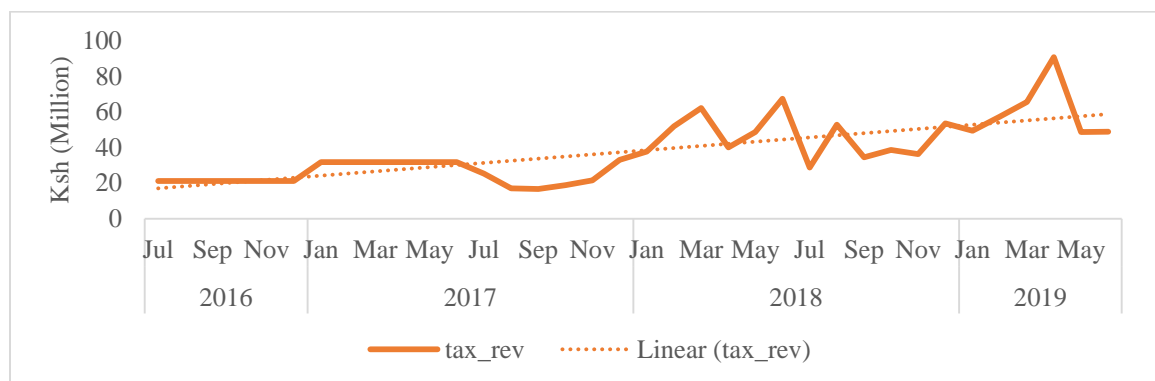


**Source**: Author's computation based on STATA.

Figure 4.1 is a time series plot representing the amount of revenue collected in Kakamega as from July 2016 to June 2019, period prior to reforms. From the plot above it is evident that revenue collection was growing though in unsystematic manner.

**Figure 4.2 Time series plot for revenue collection performance (After reforms).**
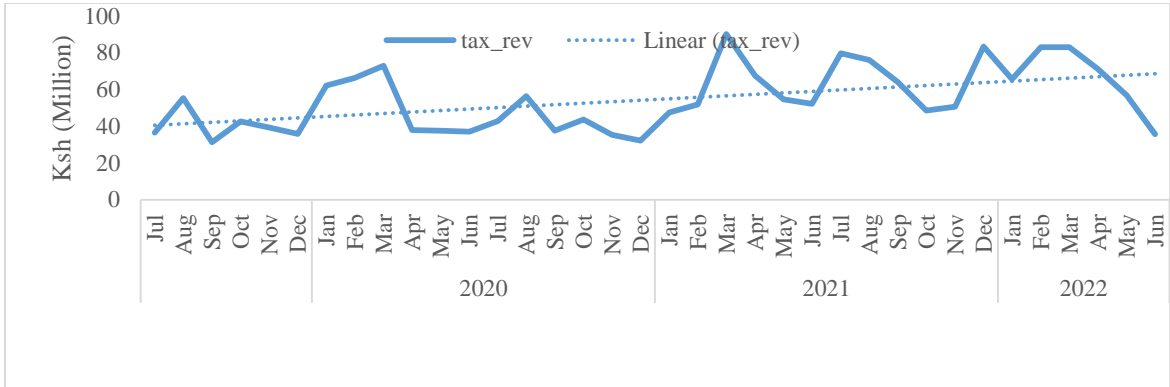


**Source:** Author's computation based on STATA.

As from July 2019 to June 2022 revenue collection experienced reforms which were introduced. From the figure it can be noted that collection of revenue had no specific pattern to predict from.

**Figure 4.3** Time series plot for revenue collection performance (Combined).



**Source:** Author's computation based on STATA.

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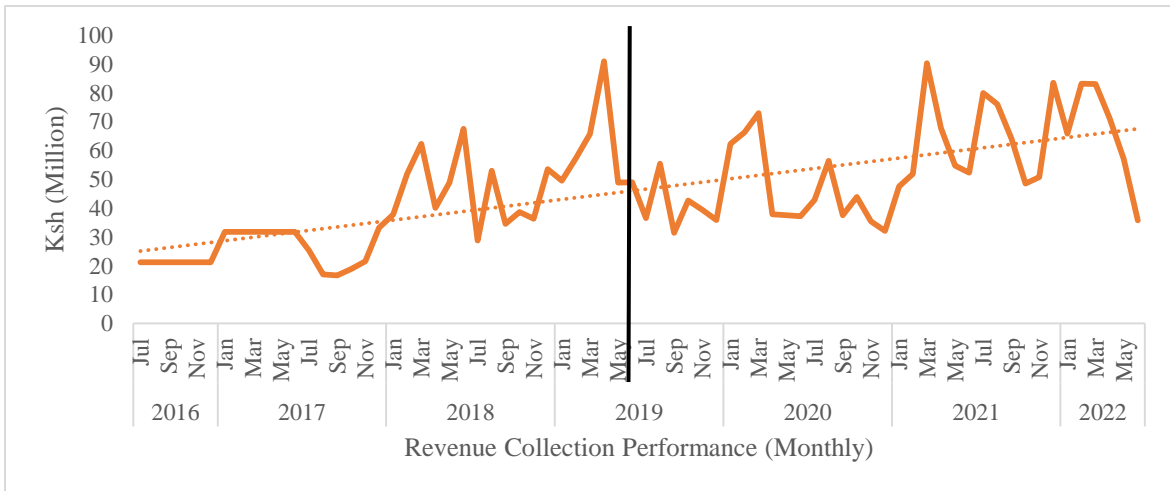
From the above time series plots on revenue collection performance, it's evident that revenue collection performance has no specific pattern to predict from. Different months have different revenue collection performances. High revenue collection is experienced in the first four months of the year, this slant can be clarified by the fact that a majority of structured revenues are paid within this period i.e. January to April. Furthermore, most licenses are paid in the early months hence this time has a fairly comparative advantage as compared to other periods. From the above plots, it was noted that as of January 2017, revenue was increasing though in an unsystematic manner. The highest being in March 2019 which was followed by a sharp decline in the subsequent months. The above plots indicate that the County registered low revenue collection from April 2019 to December 2020. This slant can best be clarified by the fact that there was an outbreak of the contagious Covid 19 pandemic which paralyzed economic activities not only in Kakamega County but the whole country.

**Figure 4.4 Time series plots for cashless revenue reform (Before reforms).**
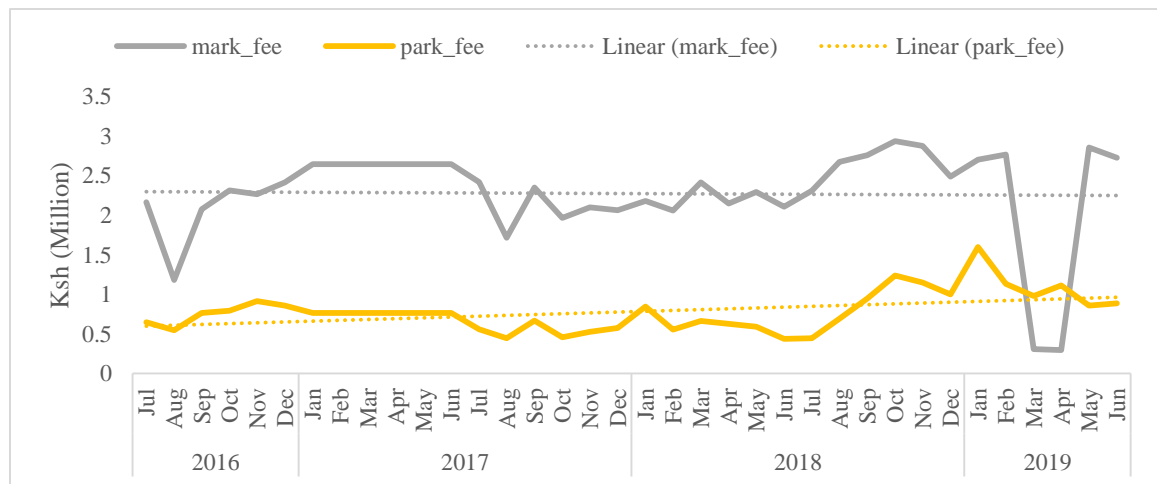


**Source:** Author's computation based on STATA.

Before the reforms, figure 4.4 shows an irregular pattern of market fee and a sharp decline in the month of March 2019 while parking depicts an increase but in an inconsistent manner.

**Figure 4.5 Time series plots for cashless revenue reform (After reforms).**
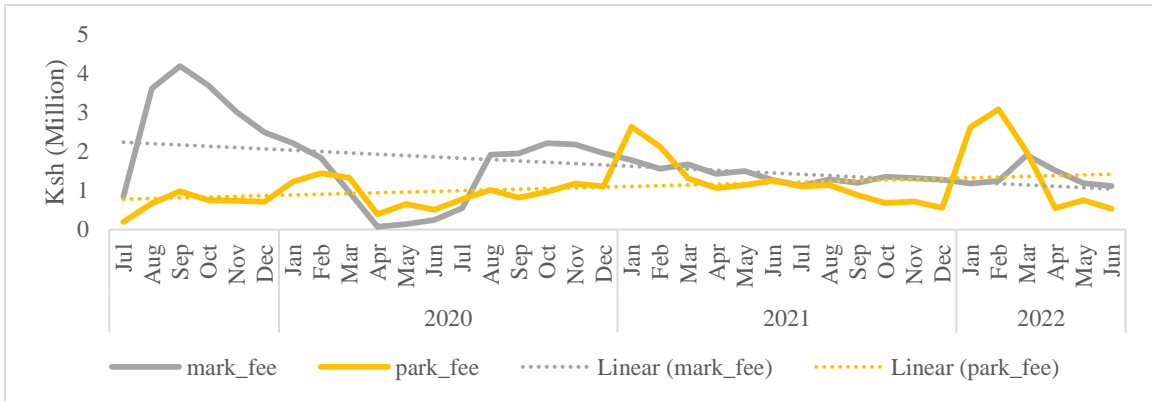


**Source:** Author's computation based on STATA.

After reforms, both market fee and parking fee had no particular pattern to predict from. The figures showed an inconsistent performance from the cashless reform.

**Figure 4.6 Time series plots for cashless revenue reform (Combined).**



**Source**: Author's computation based on STATA.

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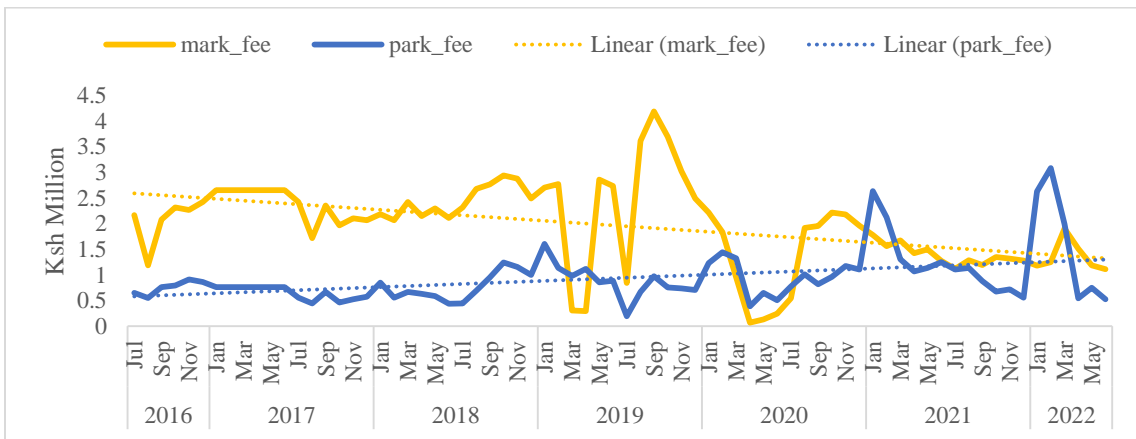
With the cashless system reform, both parking fee and market fee were under investigation. Figure 4.6 shows that market fee had a rising but inconsistent trend from 2016 and a sharp decline was experienced in March 2019. The decline was explained by the contagious Covid 19 which impacted negatively on the economy. From May 2020, market fee depicted a rising trend though it was inconsistent. On the other hand there was a sharp decline in parking fee in the months of April to June 2020. The sharp decline can be explained by the effects of Covid-19 which led to closure of markets and restriction of movement due to the nationwide curfew. Additionally parking fee showed an irregular trend in its collection from 2016 to 2022.

**Figure 4.7 Time series plots for toll fee reform (Before reform).**
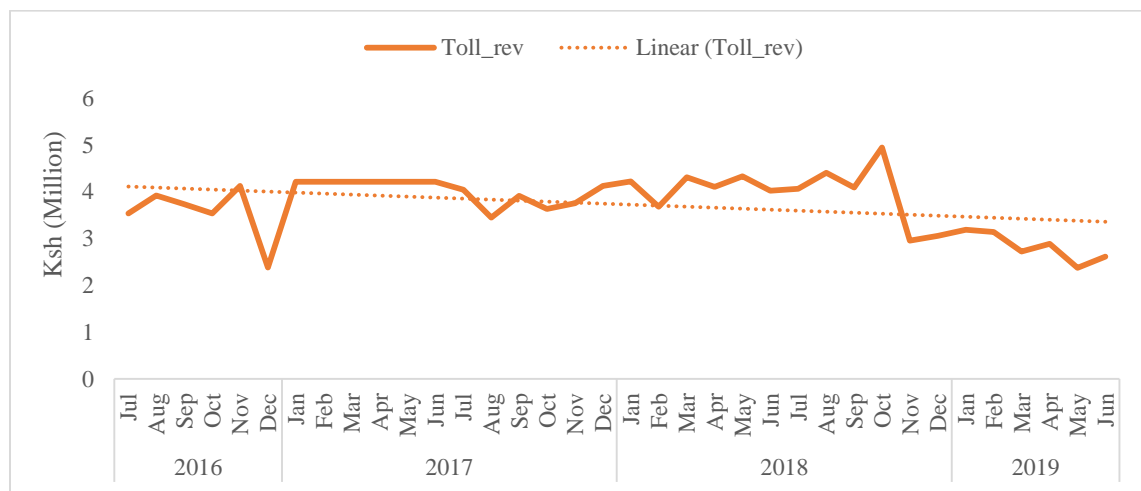


**Source**: Author's computation based on STATA.

Toll fee reform from the above plot was increasing in a consistent manner. The highest collection being in the month of October 2018 and the lowest being in December 2016.

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**Figure 4.8 Time series plots for toll fee reform (After reforms).**
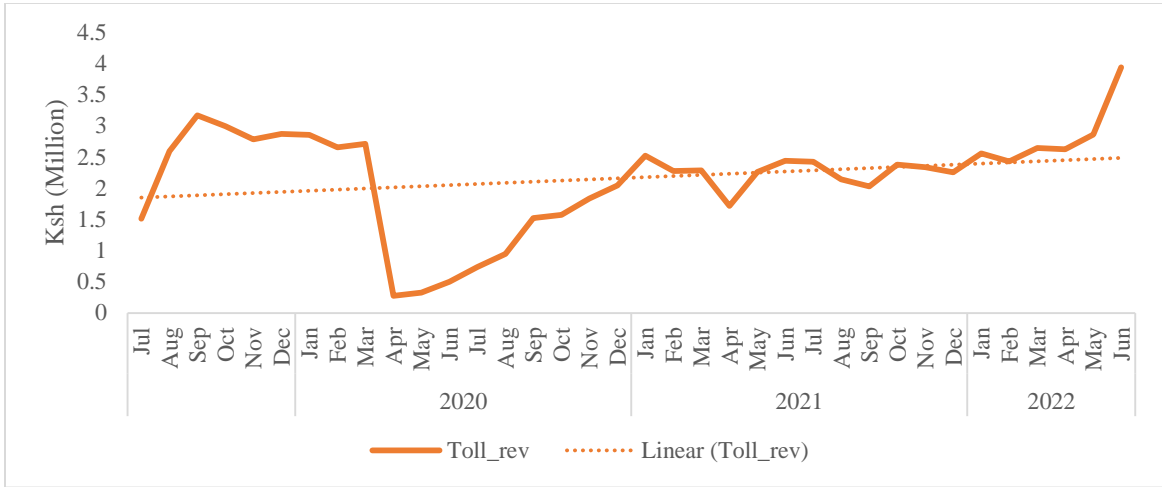


**Source**: Author's computation based on STATA.

After reforms toll collection started experiencing a decrease from the month of January 2020 and faced a sharp decline the month of April 2020. This sharp decline can be explained by the devastating effect of Covid 19 which paralyzed most operations not only in the county but the country at large. As from May 2020, toll fee collection depicted a constant increase.

**Figure 4.9 Time series plots for toll fee reform (Combined).**
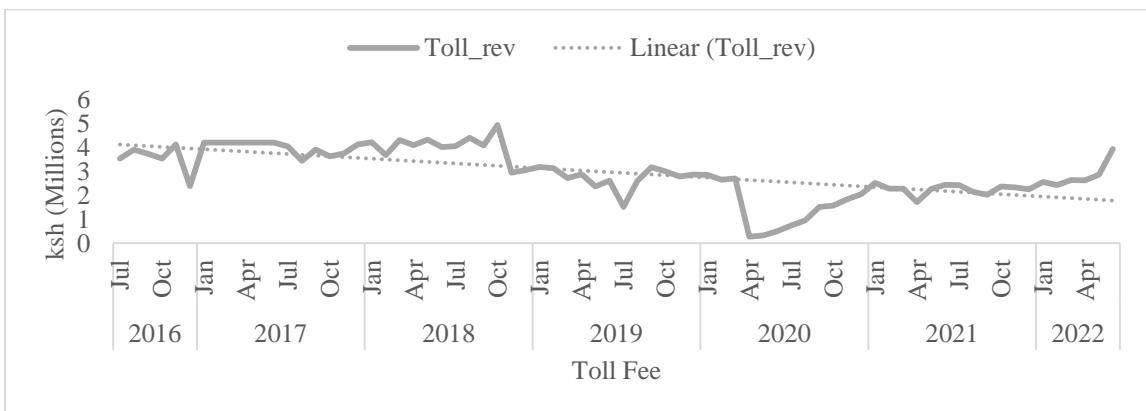


**Source:** Author's computation based on STATA.

From the above plots, it can be derived that toll fee revenue collection experienced the highest during the months before reforms as compared to the months after reforms. Before the reforms, PSV vehicles had to pay a certain amount at toll booths for every urban center that they approach leading to high collection per vehicle per day. After reforms led to the introduction of seasonal stickers which are paid monthly per vehicle at 3000 shillings. This led to low revenues collected per month per vehicle as compared to the amount the same vehicle could have paid before the reforms.

**Figure 4.10 Time series plots for PSRM system revenue reform (Before reforms).**
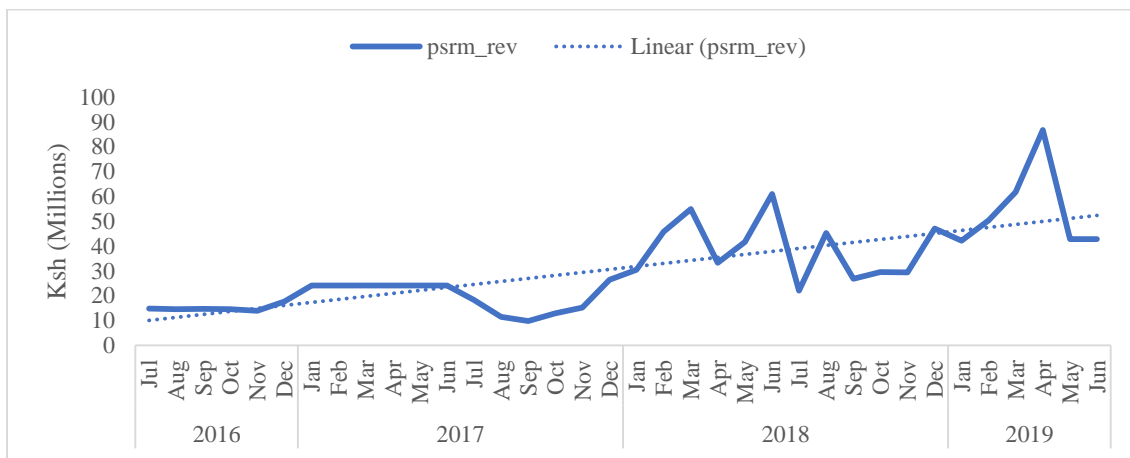


**Source:** Author's computation based on STATA.

The above figure shows a plot of PSRM system reform prior to the reforms. From the figure it is evident that PSRM was showing a consistent rise in performance and experienced a decline from the month of April 2019.

**Figure 4.11 Time series plots for PSRM system revenue reform (After reforms).**
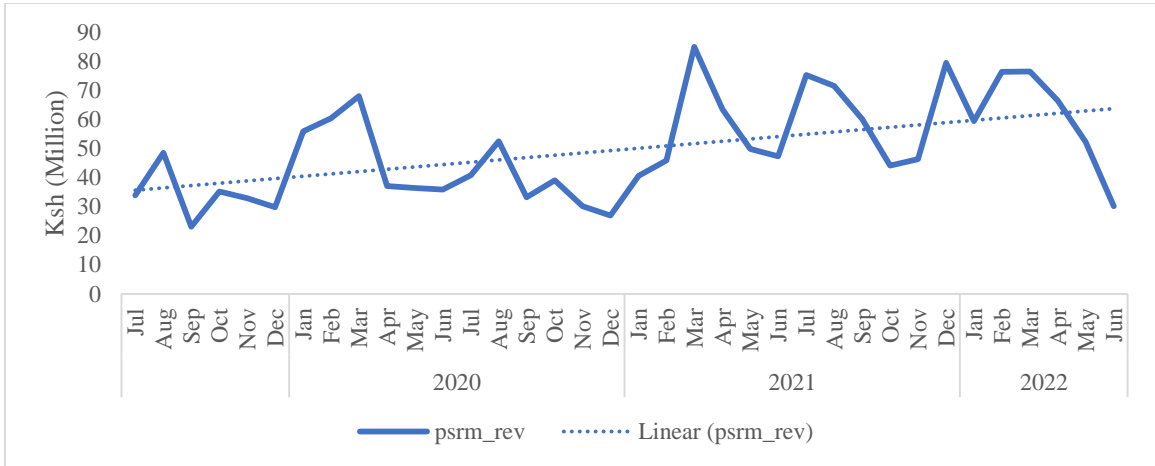


**Source:** Author's computation based on STATA.

Figure 4.11 shows a PSRM plot after reforms. From the plot it can be noted that PSRM revenue reform had an irregular pattern.

**Figure 4.12 Time series plots for PSRM system revenue reform (Combined).**
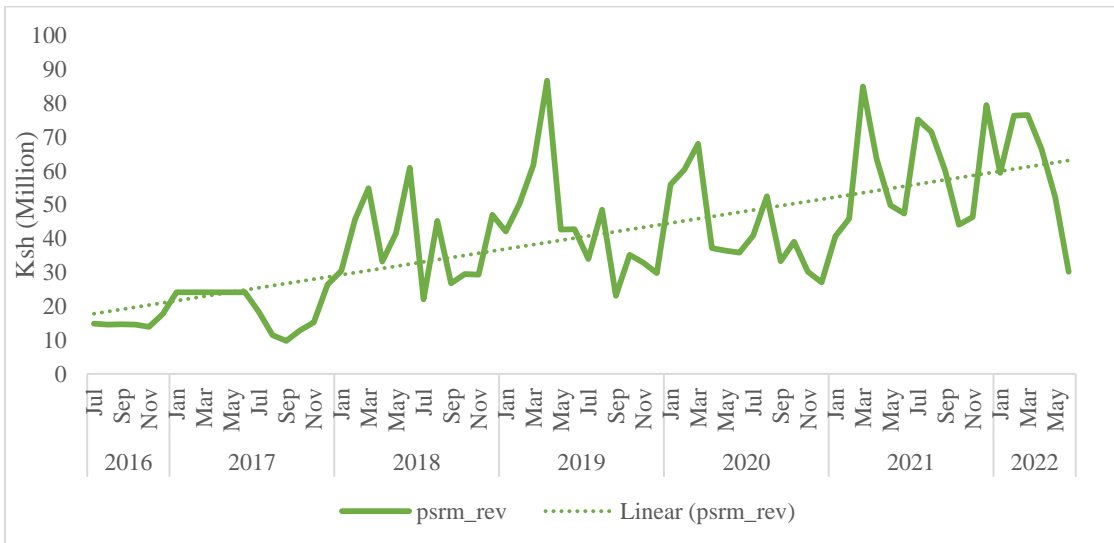


**Source**: Author's computation based on STATA.

PSRM system revenue reform is also depicting an inconsistent pattern. From the plots it is evident that revenue collection is at the peak in the months of January to April. This is due to high collections in structured revenue streams experienced in that period.

## 4.3 Correlation Analysis.

Correlation analysis is utilized in statistics to find out the magnitude and direction between one variable with the other. It is used to establish how strong the relationship might be. According to Emily James (2022), correlation is utilized for spotting designs inside datasets. A positive relationship result infers that both variables increase in association with each other, whereas a negative relationship implies that as one variable diminishes, the other increases. A relationship from +0.5 to +1 shows a strong positive relationship, which suggests they both increase at the same time. Additionally, a relationship from -0.5 to -1 indicates a strong negative relationship, which suggests as one variable increases, the other one reduces relatively. (Emily James, 2022).

**Table 4.2: Correlation Analysis Before reforms**

|  | **Tax Rev** | **Toll Fees** | **Park Fees** | **PSRM Fee** | **CPIL** |
|---|---|---|---|---|---|
| Tax Rev | 1 |  |  |  |  |
|  | 36 |  |  |  |  |
| Toll Fees | -0.193 | 1 |  |  |  |
|  | 0.2594 |  |  |  |  |
|  | 36 | 36 |  |  |  |
| Park Fees | 0.3762 | -0.3451 | 1 |  |  |
|  | 0.0238 | 0.0393 |  |  |  |
|  | 36 | 36 | 36 |  |  |
| PSRM Fee | 0.5052 | -0.1644 | 0.1494 | 1 |  |
|  | 0.0017 | 0.338 | 0.3844 |  |  |
|  | 36 | 36 | 36 | 36 |  |
| CPIL | 0.0212 | 0.0861 | 0.0275 | -0.1929 | -0.0801 |
|  | 0.9021 | 0.6178 | 0.8735 | 0.2597 | 0.6424 |
|  | 36 | 36 | 36 | 36 | 36 |

**Source:** Author's computation based on STATA

From table 4.2 it was found out that before the revenue reforms, revenue collection and toll fee had a correlation of (r = -0.193), weak negative, while revenue collection with parking fee had a relationship of (r =0.3762), moderate positive. Revenue collection performance and Public Sector Revenue Management (PSRM) had a correlation of (r = 0.5052), strong positive. Besides, revenue collection and Consumer Price Index had a correlation of (r =0.0212), weak positive.

**Table 4.3: Correlation Analysis After reforms**

|  | Tax Rev | Toll Fees | Park Fees | PSRM Fee | CPIL |
|---|---|---|---|---|---|
| Tax Rev | 1 | | | | |
| | 36 | | | | |
| Toll Fees | 0.4731 | 1 | | | |
| | 0.0036 | | | | |
| | 36 | 36 | | | |
| Park Fees | 0.4496 | 0.049 | 1 | | |
| | 0.0059 | 0.7765 | | | |
| | 36 | 36 | 36 | | |
| PSRM Fee | 0.6412 | 0.3038 | 0.2323 | 1 | |
| | 0.000 | 0.0717 | 0.1728 | | |
| | 36 | 36 | 36 | 36 | |
| CPIL | -0.2909 | -0.0603 | 0.1502 | -0.0056 | -0.0253 |
| | 0.0852 | 0.727 | 0.3818 | 0.974 | 0.8835 |
| | 36 | 36 | 36 | 36 | 36 |

**Source:** Author's computation based on STATA

Table 4.3 shows that after the reforms, revenue collection performance, and toll fee correlated (r = 0.4731), moderate positive while revenue collection performance and parking fee had a relationship of (r =0.4496), moderate positive, and revenue collection performance with Public Sector Revenue Management (PSRM) system correlated (r =0.6412) strong positive correlation. On the other hand, income collection and consumer price index had a relationship of (r = - 0.2909), weak negative. After reforms, there was an increase in correlation between revenue performance and toll fees, parking fees, and

PSRM while the relationship with Consumer Price Index reduced. This can be justified by the fact that, with the introduction of the new reforms, the amounts collected from toll, parking, and PSRM increased thus leading to an increase in the revenues collected. On the other hand, the consumer Price index increased with time implying that the cost of doing business became unbearable. High inflation rates lead to the closure of some businesses which negatively affects the revenues collected.

Table 4.4 shows the result of a consolidated correlation analysis of the variables. From the analysis, it is evident that revenue collection and toll fee had a relationship of (r = -0.1414), weak negative while revenue collection and parking fee correlated (r = +0.445), moderate positive. Additionally, revenue collection and PSRM correlated (r = +0.631), a strong positive. Revenue collection performance and CPI had a strong positive correlation (r = +0.6565), strongly positive. It was also noted that CPI with PSRM correlated (r =0.5297), strongly positive, and CPI and parking fee had a correlation of (r = 0.3532), weak positive. Finally, CPI and toll fee had a relationship of (r = -0.4718), a strong negative.

**Table 4.4: Consolidated Correlation Analysis**

|  | **Tax Rev** | **Toll Fees** | **Park Fees** | **PSRM Fee** | **CPIL** |
|---|---|---|---|---|---|
| Tax Rev | 1 | | | | |
|  | 72 | | | | |
| Toll Fees | -0.1414 | 1 | | | |
|  | 0.2361 | | | | |
|  | 72 | 72 | | | |
| Park Fees | 0.445 | -0.1609 | 1 | | |
|  | 0.0001 | 0.177 | | | |
|  | 72 | 72 | 72 | | |
| PSRM Fee | 0.631 | -0.1124 | 0.2663 | 1 | |
|  | 0.00 | 0.347 | 0.0237 | | |
|  | 72 | 72 | 72 | 72 | |
| CPIL | 0.6565 | -0.4718 | 0.3532 | 0.5297 | 1 |
|  | 0.000 | 0.000 | 0.0023 | 0.000 | |
|  | 72 | 72 | 72 | 72 | 72 |

**Source**: Author's computation based on STATA

**4.4 Pre-estimation Diagnostic tests**

**4.4.1 Normality Test**

Kothari (2004), stated that residuals/ error term should be ordinarily dispersed over a sample size. Brooks (2008) alludes that ordinariness tests are executed to assess whether the data set is ordinarily disseminated. Ordinary Least Squares (OLS) models assume that the error term is regularly dispersed at a mean of zero and steady variance. Jarque Bera test for ordinariness was utilized in the study to test for normality. From the test, Ho; residuals are regularly dispersed (distributed normally).

**Table 4.5: Normality Test**

| Stats | Revenue Collection Performance | Cashless Reform | PSRM | Toll Fee Reform | Inflation |
|---|---|---|---|---|---|
| Jargue-Bera | 3.997 | .4331 | 3.832 | 3.048 | 3.304 |
| Probability | .1356 | .8053 | .1472 | .2178 | .1916 |

**Source**: Author's computation based on STATA

From Table 4.5, shows the values of the Jarque Bera (JB) test with the respect p values used to check for ordinariness in the residuals. All the p values are greater than 5% meaning normality in the distribution of residuals thus we fail to dismiss the null hypothesis.

**4.4.2 Test for stationarity.**

According to Vijay Kumar (2021) a stationary arrangement is one whose measurable properties such as mean, covariance and standard deviation don't change with time. A non-stationary series is measured by the p value which should be less than 0.05 level of significance.

**Table 4.6: Dickey-Fuller unit Root Test At Levels**

| Augmented Dickey-Fuller test statistics Observations = 72 | | | | | | |
|---|---|---|---|---|---|---|
| Variables At Levels | t-statistics | Prob-Value | 1% critical Value | 5% critical Value | 10% critical Value | Conclusion |
| Revenue Collection Performance | 3.83 | 0.0026 | -3.551 | -2.913 | -2.592 | NonStationary |
| Cashless Reform | -3.705 | 0.004 | -3.551 | -2.913 | -2.592 | NonStationary |
| PSRM | -4.146 | 0.0008 | -3.551 | -2.913 | -2.592 | NonStationary |
| Toll Fee Reform | 3.701 | 0.0041 | -3.551 | -2.913 | -2.592 | NonStationary |
| Inflation | -4.615 | 0.0001 | -3.551 | -2.913 | -2.592 | NonStationary |

**Author's computation based on STATA**

Table 4.6 indicates the results of Augmented Dickey Fuller test of the series that was used to test for stationarity. From the above table it was noted that revenue collection performance had a p value for Z (t) = 0.0026< 0.05 meaning the variable is non-stationary. The results also showed that toll fee had a p value = 0.0041<0.05. Similarly, cashless reform had a probability figure of 0.0040<0.05, Public Sector Revenue Management system (PSRM) had a probability figure of Z (t) = 0.0008<0.05 and CPI's figure was p =0.0001 <0.05. The probability figures for cashless reform, (PSRM), toll fee and Consumer Price Index are less than 0.05 significance level, hence they have no unit roots and the null hypothesis we therefore fail to dismiss it.

**Table 4.7: Phillip Perron**

| Phillip Perron test statistics | | | | | | |
|---|---|---|---|---|---|---|
| Observations = 72 | | | | | | |
| Variables At Levels | t-statistics | Prob-Value | 1% critical Value | 5% critical Value | 10% critical Value | Conclusion |
| Revenue Collection Performance | -3.708 | 0.0040 | -3.551 | -2.913 | -2.592 | NonStationary |
| Cashless Reform | -3.693 | 0.0042 | -3.551 | -2.913 | -2.592 | NonStationary |
| PSRM | -4.135 | 0.0008 | -3.551 | -2.913 | -2.592 | NonStationary |
| Toll Fee Reform | -3.561 | 0.0066 | -3.551 | -2.913 | -2.592 | NonStationary |
| Inflation | -4.583 | 0.0001 | -3.551 | -2.913 | -2.592 | NonStationary |

**Author's computation based on STATA**

Table 4.7 indicates the results of Philip Perron test of the series that was used to test for stationary. From the above table it was noted that revenue collection performance had a p value for Z (t) = 0.0040< 0.05 meaning the variable is non-stationary. The results also showed that toll fee had p value = 0.0066<0, 05. Similarly, cashless reform has a probability value for Z (t) = 0.0042<0.05, Public Sector Revenue Management system (PSRM) has a probability value for Z (t) = 0.0008<0.05 and CPI has a probability value for Z (t) =0.0001 <0.05. From the findings, figures for cashless reform, (PSRM), toll fee and Consumer Price Index are less than 0.05 significance level, hence they have no unit roots and we therefore fail to reject the null hypothesis.

## 4.5 Regression Analysis.

Regression could be a conceptually straightforward strategy for exploring connections among factors (Ali & Chatterjee, 2006). The strategy is utilized to discover the relationship between the predicted variable (revenue performance) and the predictor

variables (cashless reform, toll fee and PSRM system). The researcher chose to use both univariate and multivariate regressions. The univariate analysis was done to check on the association between a single variable (reforms) and the subordinate variable (revenue performance). On the other hand, with the multivariate, the subordinate variable was regressed against all the combined autonomous variables to find out the impact of the reforms on revenue collection.

### 4.5.1 Univariate Analysis

### 4.5.1.1 Univariate for Cashless system.

Univariate analysis was done to find out the association between cashless system reform (parking and market fee) and total collection from revenue. Cashless analysis was done in the two periods (Before reforms and after reforms) to check on the significant effect of cashless reform on revenue collection performance.

**Table 4.8: Regression Model Summary for cashless reform (Before reforms).**

| Source | SS | Df | MS | Number of obs | = | 36 |
|--------|-----|-----|-----|---------------|---|-----|
| | | | | F(1, 34) | = | 5.6 |
| Model | 0.178711 | 1 | 0.178711 | Prob > F | = | 0.0238 |
| Residual | 1.084312 | 34 | 0.031892 | R-squared | = | 0.1415 |
| | | | | Adj R-squared | = | 0.1162 |
| Total | 1.26302 | 35 | 0.03609 | Root MSE | = | 0.17858 |

| Tax Rev | Coef. | Std. Err. | t | P>t | [95% Conf.Interval] | |
|---------|-------|-----------|-----|------|---------------------|-----|
| Cashless | 0.531361 | 0.224466 | 2.37 | 0.024 | 0.075191 | 0.987532 |
| _cons | 1.606344 | 0.041369 | 38.83 | 0.000 | 1.522272 | 1.690415 |

**Author's computation based on STATA.**

**Table 4.9: Regression Model Summary for cashless reform (After reforms).**

| Source | SS | Df | MS | Number of obs | = | 36 |
|--------|-----|-----|------|---------------|---|------|
| | | | | F(1, 34) | = | 8.61 |
| Model | 0.131509 | 1 | 0.131509 | Prob > F | = | 0.0059 |
| Residual | 0.519167 | 34 | 0.01527 | R-squared | = | 0.2021 |
| | | | | Adj R-squared | = | 0.1786 |
| Total | 0.650676 | 35 | 0.018591 | Root MSE | = | 0.12357 |

| Tax Rev | Coef. | Std. Err. | T | P>t | [95% Conf.Interval] | |
|---------|----------|-----------|-------|-------|---------|---------|
| Cashless | 0.254415 | 0.086692 | 2.93 | 0.006 | 0.078236 | 0.430595 |
| _cons | 1.723051 | 0.020703 | 83.23 | 0.000 | 1.680978 | 1.765123 |

**Source**: Author's computation based on STATA.

Regression models arrived at from the following tables are;

Before reforms

Rev.coll = 1.606344 + 0.531361 Cashless Reforms.

After reforms

Rev.coll = 1.723051 + 0.254415 Cashless Reforms

The R squared value from the model was 0.1415 and 0.2021 which implied that the model explained 14.15% and 20.21% of the variation in revenue collection performance before and after the reforms respectively. The increase in the R squared value after the reform implied that the reform had a significant effect on revenue collection performance. Before the reforms, the model is statistically significant, F= 5.6, p=0.024< 0.05 suggesting that the cashless system had a significant impact on revenue collection performance. Similarly, after reforms, the model is statistically significant, F=8.61, p=0.0059<0.05 thus the cashless system reform had a significant impact on revenue collection performance.

Before the reforms, cashless reform t =2.37, p =0.024 had a significant impact on revenue collection performance. After the reforms market fee, t =2.93, p =0.006 had a significant impact on revenue collection performance. From the analysis above the model had a t value of 2.93 and p =0.006<0.05 thus we reject the null hypothesis which stated that there is no statistically significant relationship between revenue collection performance and cashless system reform.

**Table 4.10: Two sample t test for the cashless system reform.**

**(Park Fees)**

| Group | Obs | Mean | Std. Err. | Std. Dev. | [95% Conf. Interval] | |
|---|---|---|---|---|---|---|
| 0 | 36 | 0.780858 | 0.04211 | 0.25266 | 0.69537 | 0.866346 |
| 1 | 36 | 1.096914 | 0.10833 | 0.649978 | 0.876993 | 1.316835 |
| Combined | 72 | 0.938886 | 0.060674 | 0.514834 | 0.817906 | 1.059866 |
| Diff | | -0.31606 | 0.116226 | | -0.54786 | -0.08425 |
| t= | -2.7193 | df= | 70 | Pr(T < t) = | 0.0041 | |

**Source**: Author's computation based on STATA.

**(Market Fees)**

| Group | Obs | Mean | Std. Err. | Std. Dev. | [95% Conf. Interval] | |
|---|---|---|---|---|---|---|
| 0 | 36 | 2.273183 | 0.100532 | 0.603193 | 2.069092 | 2.477274 |
| 1 | 36 | 1.635631 | 0.153034 | 0.918204 | 1.324955 | 1.946307 |
| Combined | 72 | 1.954407 | 0.098462 | 0.835476 | 1.75808 | 2.150734 |
| Diff | | 0.637552 | 0.183101 | | 0.272368 | 1.002737 |
| t= | 3.4820 | df= | 70 | Pr(T < t) = | 0.0004 | |

**Source**: Author's computation based on STATA.

The two-sample t-test was conducted to identify the significant difference between the two periods in the cashless reform. This was conducted to find out if the cashless system reform had a significant effect on revenue collection performance. The mean differences

were used to assess the impact cashless system reform had on revenue collection performance.

From the above tables before reforms market fee had a mean of Ksh 2.27 million and after reforms, it had a mean of Ksh1.64 million. Cashless system reform had no significant impact on market fee collection. On the other hand, parking fees had a mean of Ksh 0.781 million before reforms and Ksh 1.097 million after reforms implying that the cashless system had a significant impact on parking fees.

### 4.5.2 Univariate Linear Regression for Toll fees reform

Univariate analysis was conducted to find out the association between toll fee reform and revenue collection performance.

**Table 4.11: Regression Model Summary for Toll fee reform (Before reforms).**

| Source | SS | Df | MS | Number of obs | = | 36 |
|--------|-----|-----|-----|--------------|---|-----|
| | | | | $F(1, 34)$ | = | 1.32 |
| Model | 0.047041 | 1 | 0.047041 | Prob > F | = | 0.2594 |
| Residual | 1.215982 | 34 | 0.035764 | R-squared | = | 0.0372 |
| | | | | Adj R-squared | = | 0.0089 |
| Total | 1.263023 | 35 | 0.036086 | Root MSE | = | 0.18911 |

| Tax Rev | Coef. | Std. Err. | t | P>t | [95% Conf. Interval] | |
|---------|-------|-----------|---|-----|---------------------|---|
| Toll Fees | -0.4624 | 0.403181 | -1.15 | 0.259 | -1.28176 | 0.356967 |
| _cons | 1.799961 | 0.230294 | 7.82 | 0.000 | 1.331948 | 2.267975 |

Author's computation based on STATA

**Table 4.12: Regression Model Summary for Toll fee reform (After reforms).**

| Source | SS | Df | MS | | | |
|--------|-----|-----|-----|-----|-----|-----|
| | | | | Number of obs | = | 36 |
| | | | | F(1, 34) | = | 9.8 |
| Model | 0.145634 | 1 | 0.145634 | Prob > F | = | 0.0036 |
| Residual | 0.505041 | 34 | 0.014854 | R-squared | = | 0.2238 |
| | | | | Adj R-squared | = | 0.201 |
| Total | 0.650676 | 35 | 0.018591 | Root MSE | = | 0.12188 |

| Tax Rev | Coef. | Std. Err. | t | P>t | [95% Conf. Interval] | |
|---------|-------|-----------|-----|------|------------|----------|
| Toll Fees | 0.196455 | 0.062741 | 3.13 | 0.004 | 0.068949 | 0.323961 |
| _cons | 1.679691 | 0.023528 | 71.39 | 0.000 | 1.631876 | 1.727506 |

Author's computation based on STATA

Regression models arrived at from the above tables are;

Before reforms

Rev.coll = 1.799961 - 0.4624 toll fee

After reforms

Rev.coll = 1.679691+0.196455 toll fee

Before the reform, toll fees had a negative coefficient in the model simply because they experienced a lot of leakages and pilferages in the collection. This resulted in low revenues being reported. After the reform toll fee had a positive coefficient. Introduction of seasonal stickers sealed all the leakages and loopholes experienced in toll fee collection.   The R squared value from the model was 0.0372 and 0.2238 which implied that the model explained 3.72% and 22.38% of the variation in revenue collection performance before and after the reforms respectively. An increase in the R-squared value after the reforms indicated that toll fees had a significant impact on revenue collection performance. Before the reforms, the model was not statistically significant, F=

1.32 p=0.2594> 0.05. After reforms, the model was statistically significant, F= 9.8, p=0.0036<0.05 thus toll fee reform had a significant impact on revenue collection performance.

Toll fee reform had a t-value of 1.15 and a p-value of 0.259 before the reforms. The rule of thumb states that a $p > 0.05$ implies that there is no significant relationship between the variables. After the reforms toll fee had a t value of 3.13, p= 0.004, which had a significant impact on revenue collection performance. From the analysis after the reform, we fail to reject the null hypothesis which stated that there is no statistically significant relationship between revenue collection performance and toll fee reform.

**Table 4.13: Two sample t test for toll fee reform**

| Group | Obs | Mean | Std. Err. | Std. Dev. | [95% Conf. Interval] | |
|---|---|---|---|---|---|---|
| 0 | 36 | 3.736292 | 0.10421 | 0.625259 | 3.524735 | 3.947849 |
| 1 | 36 | 2.168123 | 0.135849 | 0.815096 | 1.892334 | 2.443912 |
| combined | 72 | 2.952207 | 0.126034 | 1.06943 | 2.700904 | 3.203511 |
| diff | | 1.568169 | 0.171216 | | 1.226691 | 1.909648 |
| t= | 9.1590 | df= | 70 | Pr(T < t) = | 0.0000 | |

Author's computation based on STATA

The significant difference between the two periods (before reforms) and after reforms was identified by the two-sample t test. The means from the model were used to inform if the toll fee adopted by Kakamega County had a significant impact on revenue collection performance. Before the reforms toll fee had a mean 3.74M while after the reforms the mean registered a significant drop to 2.17M. The drop in the means indicated that toll fee reform adopted by Kakamega County had no significant impact to revenue collection performance.

### 4.5.3 Univariate Linear Regression for PSRM reform.

A linear regression analysis was conducted between Public Sector Revenue Management system (PSRM) and revenue collection.

**Table 4.14: Regression Model Summary for PSRM system reform (Before reforms).**

| Source | SS | Df | MS | Number of obs | = | 36 |
|--------|----|----|----|--------------|---|-----|
|        |    |    |    | F(1, 34) | = | 11.65 |
| Model | 0.322297 | 1 | 0.322297 | Prob > F | = | 0.0017 |
| Residual | 0.940726 | 34 | 0.027668 | R-squared | = | 0.2552 |
|        |    |    |    | Adj R-squared | = | 0.2333 |
| Total | 1.263023 | 35 | 0.036086 | Root MSE | = | 0.16634 |

| Tax Rev | Coef. | Std. Err. | t | P>t | [95% Conf. Interval] | |
|---------|-------|-----------|---|-----|----------------------|--|
| PSRM | 0.347257 | 0.101746 | 3.41 | 0.002 | 0.140486 | 0.554029 |
| _cons | 1.012237 | 0.156617 | 6.46 | 0.000 | 0.693953 | 1.330521 |

**Source:** Author's computation based on STATA.

**Table 4.15: Regression Model Summary for PSRM system reform (After reforms).**

| Source | SS | Df | MS | Number of obs | = | 36 |
|--------|----|----|----|--------------|---|-----|
|        |    |    |    | F(1, 34) | = | 23.74 |
| Model | 0.267512 | 1 | 0.267512 | Prob > F | = | 0 |
| Residual | 0.383163 | 34 | 0.01127 | R-squared | = | 0.4111 |
|        |    |    |    | Adj R-squared | = | 0.3938 |
| Total | 0.650676 | 35 | 0.018591 | Root MSE | = | 0.10616 |

| Tax Rev | Coef. | Std. Err. | t | P>t | [95% Conf. Interval] | |
|---------|-------|-----------|---|-----|----------------------|--|
| PSRM Fee | .3581024 | .0735001 | 4.87 | 0.000 | .2087323 | .5074725 |
| _cons | 1.10024 | .1277924 | 8.61 | 0.000 | .8405351 | 1.359946 |

**Source**: Author's computation based on STATA.

The linear regression models derived from the above analyses include;

Before reforms

Rev.coll = 1.012237+0.347257PSRM

After reforms

Rev.coll = 1.10024+ 0.3581024PSRM

The R-squared values from the models were 0.2552 and 0.4111 which implied that the models explained 25.52% and 41.11% of the variation in revenue collection performance before and after the reforms respectively. Before the reforms, the model was statistically significant, F= 11.65, p=0.0017< 0.05 suggesting that PSRM system reform had a significant impact on revenue collection performance. Similarly, after reforms the model was statistically significant, F=23.74, p=0.00<0.05 thus PSRM system reform had a significant impact on revenue collection performance.

PSRM system reform had a t-value of 3.41 and a p-value of 0.00 before the reforms.

P < 0.05 thus PSRM system reform had a significant impact on revenue collection performance.  After the reforms, the PSRM system had a t value of 4.87, p= 0.00. After the reforms, the PSRM system reform had a significant impact on revenue collection performance. From the analysis above the model had a t value of 4.87 and p =0.00<0.05 thus we reject the null hypothesis which stated that there is no statistically significant relationship between revenue collection performance and PSRM system reform.

**Table 4.16: Two sample t test for PSRM system reform.**

| Group | Obs | Mean | Std. Err. | Std. Dev. | [95% Conf. Interval] | |
|-------|-----|------|-----------|-----------|----------------------|---|
| 0 | 36 | 31.17702 | 2.900523 | 17.40314 | 25.28865 | 37.06539 |
| 1 | 36 | 49.76066 | 2.834682 | 17.00809 | 44.00595 | 55.51537 |
| combined | 72 | 40.46884 | 2.295697 | 19.47963 | 35.89135 | 45.04633 |
| diff | | -18.5836 | 4.055669 | | -26.6724 | -10.4949 |
| t= | -4.5821 | df= | 70 | Pr(T < t) = | 0.0000 | |

**Source:** Author's computation based on STATA.

The two-sample test was conducted to identify the significant difference between the two periods in the PSRM system reform. The test was conducted to find out if the PSRM

system reform adopted by Kakamega County had a significant impact on revenue collection performance. The means between the two periods were calculated. Before the reforms, PSRM system reform had a mean of Ksh 31.17million and Ksh 49.76million after the reforms. Judging from the means there was a rise in revenue collection performance after PSRM reform was adopted.

## 4.6 Multivariate Analysis.

A multivariate regression analysis was carried out to assess the impact the county government reforms had on revenue collection performance.

**Table 4.17: OLS Model Before reforms.**

| Source | SS | Df | MS | Number of obs | = | 36 |
|--------|------|-----|---------|---------------|----|--------|
|        |      |     |         | F(3, 32)      | = | 5.69 |
| Model | 0.439276 | 3 | 0.146425 | Prob > F | = | 0.0031 |
| Residual | 0.823747 | 32 | 0.025742 | R-squared | = | 0.3478 |
|        |      |     |         | Adj R-squared | = | 0.2867 |
| Total | 1.26302 | 35 | 0.03609 | Root MSE | = | 0.16044 |

| Tax Rev | Coef. | Std. Err. | t | P>t | [95% Conf. Interval] | |
|---------|-------|-----------|------|-------|---------|---------|
| Toll Fees | -0.0314 | 0.367165 | -0.09 | 0.932 | -0.77929 | 0.716492 |
| Park Fees | 0.428363 | 0.215949 | 1.98 | 0.056 | -0.01151 | 0.868238 |
| PSRM Fee | 0.314626 | 0.099996 | 3.15 | 0.004 | 0.110941 | 0.518312 |
| _cons | 1.134269 | 0.2689 | 4.22 | 0.000 | 0.586538 | 1.682 |

**Source:** Author's computation based on STATA.

The OLS Model Before reforms established that the linear relationship between Revenue collection performance and the three predictor variables; cashless reforms, Public Sector Revenue Management (PSRM) system reform, and toll fee reform is positive and linear. The coefficient of determination ($R^2$) was 0.3478, and this shows that 34.78% of the variations in the revenue collection performance can be explained by the three predictor

variables in the study. From the ANOVA results the F test gave a value of $F(3,32)$ =5.69, $p < .05$, which was large enough to support the goodness of fit of the model in explaining the variation in the dependent variable.

From the coefficients, When Public Sector Revenue Management (PSRM) system reform and toll fee reform are controlled, cashless reforms with a beta of 0.428363 is at a statistically insignificant level implying that an increase in cashless reforms by a unit will result in insignificant (P>0.05) increase in revenue collection performance by 0.428363 units.

Further, when cashless reforms and toll fee reform are controlled, Public Sector Revenue Management (PSRM) system reform with a beta of 0.314626 is at a statistically significant level and is a good predictor of revenue collection performance implying that an increase in Public Sector Revenue Management (PSRM) system reform by a unit will result to significant (P<0.05) increase in revenue collection performance by 0.314626 units.

Lastly, when Public Sector Revenue Management (PSRM) system reform and cashless reforms are controlled, toll fee reform with a beta of -0.0314 is at a statistically insignificant level implying that an increase in toll fee reforms by a unit will result in insignificant (P>0.05) decrease in revenue collection performance by 0.0314 units.

The following models were derived;

Before reforms.

Revenue collection = 1.134269 + 0.428363park fee - 0.0314toll fee + 0.314626PSRM

**Table 4.18: OLS Model After reforms.**

| 2 | SS | Df | MS | Number of obs | = | 36 |
|---|----|----|----|---------------|---|----|
|   |    |    |    | F(3, 32) | = | 15.76 |
| Model | 0.387997 | 3 | 0.129332 | Prob > F | = | 0.000 |
| Residual | 0.262679 | 32 | 0.008209 | R-squared | = | 0.5963 |
|   |    |    |    | Adj R-squared | = | 0.5585 |
| Total | 0.650676 | 35 | 0.018591 | Root MSE | = | 0.0906 |

| Tax Rev | Coef. | Std. Err. | t | P>t | [95% Conf. Interval] | |
|---------|-------|-----------|---|-----|------|------|
| Toll Fees | 0.130527 | 0.048968 | 2.67 | 0.012 | 0.030783 | 0.23027 |
| Park Fees | 0.183883 | 0.065368 | 2.81 | 0.008 | 0.050733 | 0.317034 |
| PSRM Fee | 0.262622 | 0.067629 | 3.88 | 0.000 | 0.124865 | 0.400378 |
| _cons | 1.244422 | 0.115378 | 10.79 | 0.000 | 1.009405 | 1.479438 |

Author's computation based on STATA.

The results demonstrated that after the changes there was straight relationship between income collection and the three indicator factors; cashless system, Public Sector Revenue Management (PSRM) framework and toll reform is positive and straight. The coefficient of determination ($R^2$) was 0.5963, and this shows that 59.63% of the variations in the revenue collection can be clarified by the three indicator factors under research. The F statistic test F $(3,32)$ =15.76, p < .05, implied that the reforms were significant in explaining the amount of revenue collected. It also means that county government reforms are a useful predictor of revenue collection performance in Kakamega County, Kenya.

From the coefficients table Public Sector Revenue Management (PSRM) system reform, cashless reforms and toll fee reform carried positive and significant predictive value (P<0.05). From the coefficients, When Public Sector Revenue Management (PSRM) system reform and toll fee reform are controlled, cashless reforms with a beta of 0.184 is at statistically significant level implying that an increase in cashless reform by a unit will result to significant (P<0.05) increase in revenue collection performance by 0.184 units.

Further, when cashless reforms and toll fee reform are controlled, Public Sector Revenue Management (PSRM) system reform with a beta of 0. 263 is at measurably critical level and may be a great indicator of income collection inferring that an increase in (PSRM) framework by a unit will result to an increase in amounts of revenue collected by 0.263 units. Lastly, when Public Sector Revenue Management (PSRM) system reform and cashless reforms are controlled, toll fee reform with a beta of 0.131 is at measurably noteworthy level suggesting that a change in toll reform by a single unit will result to a change in the performance of revenue by 0.131 units.

Revenue collection = 1.244422 +0.183883park fee + 0.130527toll fee + 0.262622PSRM

## 4.7 Discussions as per objectives.

The common objective was to establish the association between the county government reforms (cashless reform, PSRM reform and toll fee reform) and revenue collection performance. From the examination, diagnostics test was conducted and there was a significant relationship between the reforms and County's collection. The model from the examination was;

Rev Coll = 1.244422 +0.183883$X_1$t + 0.130527$X_2$t+ 0.262622$X_3$t +$e_t$

Rev Coll = Revenue collection performance

$X_1$t= parking fee which represents the effect of the cashless reform in the model

$X_2$t = toll fee reform

$X_3$t =PSRM reform

e =the error term

t= time series data.

**4.7.1 Objective 1: Effect of cashless reform on revenue collection performance.**

Results from the descriptive analysis in table 4.1 showed that cashless reform had a mean of 1.1 million after reforms  as compared to a mean of 0.781 million before the reforms and a standard deviation of 0.650. Results from correlation analysis indicated that there is a moderate positive association between revenue and cashless reform of 0.4496. Regression results showed that cashless reform had a positive coefficient of 0.184 and two sample t-test values of t= 2.81, p= 0.08. The p-value of 0.008<0.05 meant that the cashless system had a significant impact on revenue collection performance. The coefficient of the cashless reform was positive implying that an increase in the cashless reform will lead to a rise in revenue collection performance. $\beta1 = 0.184$, the coefficient of 0.184 implies that an increase of the cashless reform by one million Kenyan shillings will lead to a rise of 0.184 million shillings in revenue collection performance in the short run. This relationship can be justified by the fact that the cashless system as a county reform was more of a digital framework for income collection. The modern method of revenue collection enhanced revenue collection by sealing the old and porous system of revenue collection.

Jeremy Srouji (2020), in his study, Computerized Payments, the cashless economy and money related consideration within the United Arab Emirates dives into how computerized installments have impacted income collection within the Gulf Cooperation

Council Countries together with the United Arab Emirates. Jeremy opines that despite a profound change and enhancement of their eco-systems and formalization of 'cashless economies', cash proceeds to overwhelm income installments. From his examination, Jeremy recommended that plans to extend advanced installments at the expense of cash may not be well–adapted to nations with huge levels of socio-economic imbalance. The study is different from the current one in that from his survey, Jeremy stated that computerized payments have no clear impact on income collection.

Besides, Severine Kessy (2020) in his paper, analyzed the part of e-payment on income collection in Kinondoni, Dar es Salaam, Tanzania. He utilized essential information which was examined by both clear insights and regressions. Discoveries from this survey revealed that e- installment impacted income collection by empowering the metropolitan to extend large compliance. The survey reverberates well with the current one that there's a noteworthy relationship between e-payment and income collection.

Tinka (2019) looked into the impact of collecting fare using the cashless method in a few selected African countries. He had an in-depth analysis of the matter amidst growing concerns about poor service being offered in the transport sector. The transport sector was experiencing a few challenges which had to be sorted out. One of the greatest milestones was transiting from the cash method of fare collection to the cashless method. In his survey, Tinka noted with concern that the cashless method experienced some challenges which made it difficult to address the current problems the transport sector was having. From his analysis, it was found that the cashless method of fare collection failed terribly in the selected countries due to the challenges experienced such as poor

infrastructural development. Tinka's survey is thus contrary to this study. The cashless method according to Tinka does not necessarily lead to increased collection of revenue.

Mugambi and Wanjohi (2018) surveyed the setbacks that hindered revenue management and collection systems in Kenya's counties. They concentrated on Meru County as their study area. They used questionnaires to source primary data about revenue collection within the county. From their survey, they found out that the new cashless method of payment enhanced the collection of revenue. Unstructured revenue such as market fees and parking were paid using mobile phones while land rate fees and other structured revenues were deposited directed into different bank accounts. Their study does concur with the one under research by confirming that the cashless method will improve and enhance income collection.

### 4.7.2. Objective 2: Effect of PSRM system reform on revenue collection performance.

Table 4.1 showed the results of descriptive analysis and it was noted that PSRM had an average value of 31.17 million before reforms and 49.8 million after reforms with a standard deviation of 17.4 million. The relationship between PSRM and revenue was inferred by the use of correlation analysis. The results indicated that PSRM had a strong positive correlation of 0.6412. Regression results showed that PSRM had a positive coefficient of 0.263 with two sample t-test values of; t = 3.88, p=0.00. Results from the model indicated that Public Sector Revenue Management (PSRM) system reform had a p-value of 0.000< 0.05. This meant that PSRM system reform has a significant effect on revenue collection performance. It can also be noted that PSRM system reform has a positive coefficient which means that there is a positive relationship between PSRM

system reform and revenue collection performance. $\beta3 = 0.263$, the coefficient implies that an increase in PSRM system reform by one million Kenyan shillings will concurrently lead to a 0.263 million shillings increase in revenue collection. This trend between the PSRM system and revenue collection performance can better be explained by the enhanced technology used in revenue collection thus improving revenue collection. All structured revenue streams were accounted for by use of the PSRM system through invoicing and receipting thus capturing a broader base of revenues to be collected. PSRM system was an improved technology that was put in place to enhance revenue collection and thus it improved revenue collection as expected.

Muthama Janet (2013) in her research, on the impacts of the modernization of revenue systems on taxes collection in Kenya showed that institutions are putting in place an exceedingly proactive use of modern technology to amplify adequacy and ampleness in their operations. The research was investigating the correlation between the use of modern technology and income collection at KRA concerning the Simba framework. The study utilized a research design that was descriptive and utilized data that was secondary. From the discoveries, it was apparent that the number of exchanges and taxes collected expanded after the execution of the Simba system. The findings from the research concur with the ones in the current study in a manner that modern technology has a positive relationship with the revenues collected.

Adenya and Muturi (2017), in their journal, looked at some of the factors which act as a hindrance to the collection of revenue in Kiambu County. Just like any other county, Kiambu was struggling to meet the revenue targets thus rendering service delivery a challenge to its locals. They settled on technology as one of the factors that warranted

research in their pursuit of setbacks to revenue collection. Kiambu County introduced the use of technology in the collection of revenue. From their analysis, Adenya and Muturi succinctly concluded that current technology has a positive impact on the amounts of revenue collected. Thus, their survey is in conjunction with the one under research in that new technology has positively impacted the collection of revenue.

Madegwa and Namusonge (2018), in their survey, looked into how automation has impacted to amounts of revenue collected in Trans Nzoia County. From their survey, they noted that there was a need for counties to enhance their source revenue to mitigate the growing expenditures on local authorities. They thus concentrated on automation and how it affected their source revenue. Their findings concluded that automation within Trans Nzoia impacted positively income collection in the county. Their study thus conforms to the fact that modern technology will always contribute positively to revenue collection.

### 4.7.3 Objective 3: Effect of toll fee on revenue collection performance.

Descriptive results in table 4.1 indicated that toll reform had an average value of 3.74 million before reforms and 2.17 million after reforms with a standard deviation of 0.815 million. The drop in the average value after the reform could best be explained by the fact that toll fee collection was among the major revenue streams that were mostly affected by the Covid 19 pandemic. Regression results showed that toll had a positive coefficient of 0.131 with a t-test value of t= 2.67, p= 0.012. Toll fee reform had a p-value of 0.012 <0.05 implying that toll fees had a significant relationship with revenue collection performance. From the model, it can be noted that toll fees had a positive coefficient

suggesting that an increment in toll reform positively impacted revenue collection performance. $\beta2 = 0.131$, the coefficient implies that if the toll fee increases by one million Kenyan shillings, revenue collection will increase by 0.131 million Kenyan shillings in the short run. This relationship can be justified by the fact that with toll fee reform, PSV seasonal stickers were introduced in the transport sector. The seasonal stickers enhanced revenue collection in that all the PSV vehicles plying within Kakamega County had to own a sticker at a fee for it to operate within the county.

Muraya Lilian (2019) in her research project aimed at determining the compliance rate in terms of taxes by the public transport sector. Some of the factors under study were; knowledge of taxation, costs associated with compliance, and non-compliance sanctions. Within her research, a cross-sectional design of the research was utilized. Essential information was collected by utilizing surveys. The information was summarized and analyzed by use of measurable instruments and parallel calculated regressions. Muraya concluded that noncompliance from the sector was high leading to low revenue collection. From the survey by Muraya Lilian, it is evident that the factors under review had an inverse relationship with revenue collection performance and thus do not concur with the current study. For improved revenue collection performance, she proposed that extreme fines ought to be forced on non-compliant open transport SACCOs, enhance capacity building through training programs among the public transport sector and KRA should ensure there is transparency and accountability during revenue collection.

Muchoki (2020), in her survey, looked into control mechanisms for enhancing income collection at the National Transport Safety Authority (NTSA). Muchoki used technology as one of the control mechanisms in determining the amount of income collection at

NTSA. She sought after primary data and she engaged top-notch managers at NTSA. From her survey, she concluded that control mechanisms such as the use of technology exponentially led to an increase in the income collected at the institution. The introduction of seasonal stickers by Kakamega County was one of the control mechanisms used to enhance the collection of tolls from the public transport sector. Thus, Muchoki's survey confirms that mechanisms such as technology and seasonal stickers will enhance revenue collection.

## 4.8 Moderating Effect of Inflation (CPI) on the relationship between County government reforms and revenue collection.

Inflation was used as a moderating variable and it was conceptualized into CPI. This section presents the findings of the moderating influence of inflation on the relationship between County government reforms and revenue collection performance. The study evaluated the moderating effect using hierarchical regression analysis as proposed by Baron and Kenny (1986). The author mentioned that testing the moderating impact involves three phases.

1. The first step involved determining the impact of exogenous variable on the endogenous variable.

2. Second step involved assessing the effect of exogenous variable and moderating/predictive variables on the dependent variable.

3. Test the impact of the independent variable, moderating variable and interactive term (product of exogenous and moderating variables) on the endogenous variable. In the third phase, a moderating impact occurs if the effect of interaction is significant.

**Table 4.19: Moderating Effect of Inflation. Before reforms (Model 1)**

| Source | SS | df | MS | Number of obs | = | 36 |
|---|---|---|---|---|---|---|
| | | | | $F(3, 32)$ | = | 5.69 |
| Model | 0.439276 | 3 | 0.146425 | Prob > F | = | 0.0031 |
| Residual | 0.823747 | 32 | 0.025742 | R-squared | = | 0.3478 |
| | | | | Adj R-squared | = | 0.2867 |
| Total | 1.263023 | 35 | 0.036086 | Root MSE | = | 0.16044 |
| **Tax Rev** | **Coef.** | **Std. Err.** | **T** | **P>t** | **[95% Conf. Interval]** | |
| Toll Fees | -0.0314 | 0.367165 | -0.09 | 0.932 | -0.77929 | 0.716492 |
| Park Fees | 0.428363 | 0.215949 | 1.98 | 0.056 | -0.01151 | 0.868238 |
| PSRM Fee | 0.314626 | 0.099996 | 3.15 | 0.004 | 0.110941 | 0.518312 |
| _cons | 1.134269 | 0.2689 | 4.22 | 0.000 | 0.586538 | 1.682 |

**Source**: Author's computation based on STATA.

In **Model 1,** exogenous variables were jointly found to have a positive and significant relationship with revenue collection performance (p=0.0031). The $R^2$ of 0.3478 was obtained in this model. This means that these variables explain 34.78% of variance in the dependent variable. Only Public Sector Revenue Management (PSRM) system reform had significant effect on revenue collection performance in Kakamega County (P=0.004)

**Table 4.20 Moderating Effect of Inflation. Before reforms (Model 2)**

| Source | SS | df | MS | Number of obs | = | 36 |
|---|---|---|---|---|---|---|
| | | | | $F(4, 31)$ | = | 4.4 |
| Model | 0.457446 | 4 | 0.114361 | Prob > F | = | 0.0062 |
| Residual | 0.805578 | 31 | 0.025986 | R-squared | = | 0.3622 |
| | | | | Adj R-squared | = | 0.2799 |
| Total | 1.263023 | 35 | 0.036086 | Root MSE | = | 0.1612 |
| **Tax Rev** | **Coef.** | **Std. Err.** | **T** | **P>t** | **[95% Conf. Interval]** | |
| Toll Fees | -0.03599 | 0.368944 | -0.10 | 0.923 | -0.78845 | 0.716478 |
| Park Fees | 0.459478 | 0.220139 | 2.09 | 0.045 | 0.010501 | 0.908454 |
| PSRM Fee | 0.318886 | 0.100599 | 3.17 | 0.003 | 0.113714 | 0.524059 |
| CPIL | 0.099563 | 0.11907 | 0.84 | 0.409 | -0.14328 | 0.342408 |
| _cons | 0.931785 | 0.362812 | 2.57 | 0.015 | 0.191825 | 1.671745 |

**Source**: Author's computation based on STATA.

Further, **Model 2**, the findings also showed that when inflation was added, the results obtained indicated that independent variables and the moderating variable were significantly and jointly related to revenue collection performance ($p<0.05$). The $R^2$ moved to 0.3622 (36.22%) from 0.3478 (34.78%) implying that an additional 0.0144 (1.44%) was added in the model. In regards to regression coefficient, Public Sector Revenue Management (PSRM) system reform maintained its significance level while toll fee reform also maintained its insignificant level. However, cashless reform was significant at P=0.045 while inflation was insignificant at P= 0.409

**Table 4.21: Moderating Effect of Inflation. Before reforms (Model 3)**

| Source | SS | Df | MS | Number of obs | = | 36 |
|---|---|---|---|---|---|---|
| | | | | F(7, 28) | = | 6.22 |
| Model | 0.768772 | 7 | 0.109825 | Prob > F | = | 0.0002 |
| Residual | 0.494251 | 28 | 0.017652 | R-squared | = | 0.6087 |
| | | | | Adj R-squared | = | 0.5108 |
| Total | 1.263023 | 35 | 0.036086 | Root MSE | = | 0.13286 |
| **Tax Rev** | **Coef.** | **Std. Err.** | **T** | **P>t** | **[95% Conf. Interval]** | |
| Toll Fees | 72.18814 | 18.90867 | 3.82 | 0.001 | 33.45549 | 110.9208 |
| Park Fees | 6.658369 | 19.24945 | 0.35 | 0.732 | -32.7724 | 46.08909 |
| PSRM Fee | -13.5462 | 7.351246 | -1.84 | 0.076 | -28.6045 | 1.512186 |
| CPIL | 11.4232 | 6.559442 | 1.74 | 0.093 | -2.0132 | 24.85961 |
| CashlessRef_Inf | -3.208 | 9.677903 | -0.33 | 0.743 | -23.0323 | 16.61628 |
| TollFeeRef_Inf | -36.2309 | 9.472631 | -3.82 | 0.001 | -55.6347 | -16.8271 |
| PSRMFeeRef_Inf | 6.990706 | 3.742311 | 1.87 | 0.072 | -0.67507 | 14.65648 |
| _cons | -21.7765 | 12.94012 | -1.68 | 0.104 | -48.2832 | 4.730099 |

**Source:** Author's computation based on STATA.

Finally, Model 3, to investigate how the inflation moderates the relationship between County government reforms and revenue collection performance, the interaction terms of the independent variables (specific variables) and the moderator (Inflation) were entered in the regression model. The resultant model indicated that interaction between County government reforms and inflation accounted for significantly 60.87%, ($R^2 = 0.6087$, p =

.0002). This meant that inflation had a noticeable effect on the association between County government reforms and revenue collection. Cashless reforms retained its significance level at P=0.001 while the remaining variables were insignificant at P>0.05. Interaction between toll fees reforms and inflation had a significance i.e. an increase in inflation will cause effect of toll fees reforms on revenue collection performance to decrease by 36.2309 ($\beta$=-36.2309, P=0.001). However, the same significance interaction was not reflected between cashless reforms and inflation as well as Public Sector Revenue Management (PSRM) system reform and inflation at P<0.05.

**Table 4.22: Moderating Effect of Inflation. After reforms (Model 1)**

| Source | SS | Df | MS | Number of obs | = | 36 |
|--------|-----|-----|-----|---------------|---|-----|
| | | | | F(3, 32) | = | 15.76 |
| Model | 0.387997 | 3 | 0.129332 | Prob > F | = | 0.000 |
| Residual | 0.262679 | 32 | 0.008209 | R-squared | = | 0.5963 |
| | | | | Adj R-squared | = | 0.5585 |
| Total | 0.650676 | 35 | 0.018591 | Root MSE | = | 0.0906 |
| **Tax Rev** | **Coef.** | **Std. Err.** | **T** | **P>t** | **[95% Conf. Interval]** | |
| Toll Fees | 0.130527 | 0.048968 | 2.67 | 0.012 | 0.030783 | 0.23027 |
| Park Fees | 0.183883 | 0.065368 | 2.81 | 0.008 | 0.050733 | 0.317034 |
| PSRM Fee | 0.262622 | 0.067629 | 3.88 | 0.000 | 0.124865 | 0.400378 |
| _cons | 1.244422 | 0.115378 | 10.79 | 0.000 | 1.009405 | 1.479438 |

**Source:** Author's computation based on STATA.

In **Model 1**, exogenous variables jointly had a positive and significant relationship with revenue collection performance (p=0.0000). The $R^2$ of 0.5963 was obtained in this model. In other terms, these variables explain 59.63% of variance in the dependent variable. All independent variables had significant positive effect on revenue collection performance in Kakamega County (P<0.05)

**Table 4.23 Moderating Effect of Inflation. After reforms (Model 2)**

| Source | SS | Df | MS | Number of obs | = | 36 |
|--------|-----|-----|------|----------------|---|------|
| | | | | F(4, 31) | = | 15.26 |
| Model | 0.431531 | 4 | 0.107883 | Prob > F | = | 0 |
| Residual | 0.219145 | 31 | 0.007069 | R-squared | = | 0.6632 |
| | | | | Adj R-squared | = | 0.6197 |
| Total | 0.650676 | 35 | 0.018591 | Root MSE | = | 0.08408 |
| **Tax Rev** | **Coef.** | **Std. Err.** | **T** | **P>t** | **[95% Conf. Interval]** | |
| Toll Fees | 0.124292 | 0.045511 | 2.73 | 0.010 | 0.031472 | 0.217113 |
| Park Fees | 0.183727 | 0.060661 | 3.03 | 0.005 | 0.060008 | 0.307447 |
| PSRM Fee | 0.26154 | 0.062762 | 4.17 | 0.000 | 0.133538 | 0.389543 |
| CPIL | -0.15351 | 0.061859 | -2.48 | 0.019 | -0.27967 | -0.02735 |
| _cons | 1.57066 | 0.169549 | 9.26 | 0.000 | 1.224863 | 1.916457 |

**Source**: Author's computation based on STATA.

In Model 2, the findings also showed that when inflation was added, the results obtained indicated that independent variables and the moderating variable were significantly and jointly related to revenue collection performance ($p<0.05$). The $R^2$ moved to 0.6632 (66.32%) from 0.5963 (59.63%) implying that an additional 0.067 (6.7%) was added in the model. In regards to regression coefficient, all the independent variables retained their positive significance level, the P value is less than 0.05. Inflation on the other hand had a negative and significant regression coefficient implying that an increase in inflation by one unit would results to a significant reduction in collection of revenue by 0.15351 units.

**Table 4.24: Moderating Effect of Inflation. After reforms (Model 3)**

| Source | SS | Df | MS | Number of obs | = | 36 |
|--------|-----|-----|-----|-----|-----|-----|
| | | | | F(7, 28) | = | 10 |
| Model | 0.46483 | 7 | 0.066404 | Prob > F | = | 0.000 |
| Residual | 0.185846 | 28 | 0.006637 | R-squared | = | 0.7144 |
| | | | | Adj R-squared | = | 0.643 |
| Total | 0.650676 | 35 | 0.018591 | Root MSE | = | 0.08147 |

| Tax Rev | Coef. | Std. Err. | T | P>t | [95% Conf. Interval] | |
|---------|-------|-----------|-----|-----|-----|-----|
| Toll Fees | 4.529377 | 2.665289 | 1.7 | 0.100 | -0.93022 | 9.988974 |
| Park Fees | 0.205887 | 0.066391 | 3.1 | 0.004 | 0.069891 | 0.341883 |
| PSRM Fee | 10.15292 | 5.778247 | 1.76 | 0.090 | -1.68329 | 21.98912 |
| CPIL | 7.985258 | 4.730522 | 1.69 | 0.103 | -1.70478 | 17.67529 |
| CashlessRef_Inf | -0.04257 | 0.027217 | -1.56 | 0.129 | -0.09832 | 0.013186 |
| TollFeeRef_Inf | -2.12551 | 1.003781 | -2.12 | 0.040 | -4.77815 | 0.527132 |
| PSRMFeeRef_Inf | -4.80809 | 1.802813 | -2.67 | 0.012 | -10.5494 | 0.933213 |
| _cons | -15.1573 | 9.743979 | -1.56 | 0.131 | -35.1169 | 4.802374 |

**Source:** Author's computation based on STATA.

Finally, Model 3, to investigate how the inflation moderates the relationship between County government reforms and revenue collection performance, the interaction terms of the independent variables (specific variables) and the moderator (Inflation) were entered in the regression model after the reforms. The resultant model indicated that interaction between County government reforms and inflation accounted for significantly 71.44%, ($R^2$ = 0.7144, p = .0000). Inflation as a moderator had a significant effect on the relationship between county government reforms and revenue collection. Cashless reform was insignificant since its p value was greater than 0.05 at 5 % level of significance. Interaction between toll fees reforms and inflation was significant. An increase in inflation will cause the effect of toll fee reform on revenue collection performance to decrease by 2.12551 ($\beta$=-2.12551, P=0.040). Similarly, interaction between Public Sector Revenue Management (PSRM) system reform and inflation was significant, an increase in inflation will cause the effect of Public Sector Revenue Management (PSRM) reform

on revenue collection performance to decrease by 4.80809 ($\beta$=-4.80809, P=0.012). However, the same significance interaction was not reflected between cashless reforms and inflation at $P<0.05$.

**4.9 Post Estimation Diagnostic Tests.**

**4.9.1 Test for Autocorrelation.**

There is presence of autocorrelation when there is an association of residuals and their immediate previous values. Additionally, Autocorrelation will occur if the error term in one period crosses to another period .The residual values in a linear regression model are supposed to be independent (Zack 2020). Autocorrelation in this model will be checked by use of Breusch-Godfrey serial correlation LM test. With the test, there should be no autocorrelation as per the null hypothesis; $H_0$ : $p>0.05$. Contrary, the alternative hypothesis was that there was presence of autocorrelation; $H_1$ : $p <0.05$. Results of Breusch- Godfrey Test will be shown in the table;

**Table 4.25: Breusch -Godfrey Test for Autocorrelation.**

| Breusch-Godfrey LM test for autocorrelation | | | |
|---|---|---|---|
| lags(p) | chi2 | | |
| | | Df | Prob > chi2 |
| 1 | 1.791 | | |
| | | 1 | 0.1808 |
| H0: no serial correlation | | | |

Source: Author's computation based on STATA.

The table above compared the likelihood of chi squared figure as 0.1808 which is more than 0.05 level of significance. On that regard we come up short to dismiss the null hypothesis that there's no autocorrelation in the data set. On the other hand we dismiss the alternative hypothesis.

**4.9.2 Test for Multicollinearity.**

Multicollinearity is the event of inter-correlations among two or more exogenous variables in an OLS model (Adam Hayes, 2020). Presence of multicollinearity in an information set can lead to less dependable outcomes about due to huge standard errors. VIF is utilized to test for multicollinearity within this research. With a VIF between 1 and 5 implies that the factors are moderately related and a VIF between 5and 10 implies that the factors are exceedingly related. The decision criterion to be used is that VIF<5 which means there is moderate multicollinearity. A VIF which is greater than 5 means that there is presence of high multicollinearity. Table 4.26 shows the test of Multicollinearity;

**Table 4.26: Variance Inflation Factor Test for Multicollinearity.**

| Variable | VIF | 1/VIF |
|----------|-----|-------|
| PSRM Fee | 1.16 | 0.860349 |
| Toll Fees | 1.1 | 0.907234 |
| Park Fees | 1.06 | 0.945531 |
| Mean VIF | 1.11 | |

Author's computation based on STATA.

Results above showed that the VIF for cashless reform is 1.19, toll fee reform is 1.38 and PSRM system reform is 1.17 respectively. The VIF values are all less than 5 implying lack of multicollinearity.

**4.9.3 Test for Normality of Residual.**

Ordinariness test was used to check for normality of the residuals in the regression model. The test for ordinariness was first tested by use of a graphical method as illustrated in the figure. The outcomes in the drawing show that residuals are ordinarily dispersed thus suitable to run the model to test for the variables.

**Figure 4.13: Test for Normality of Residual.**
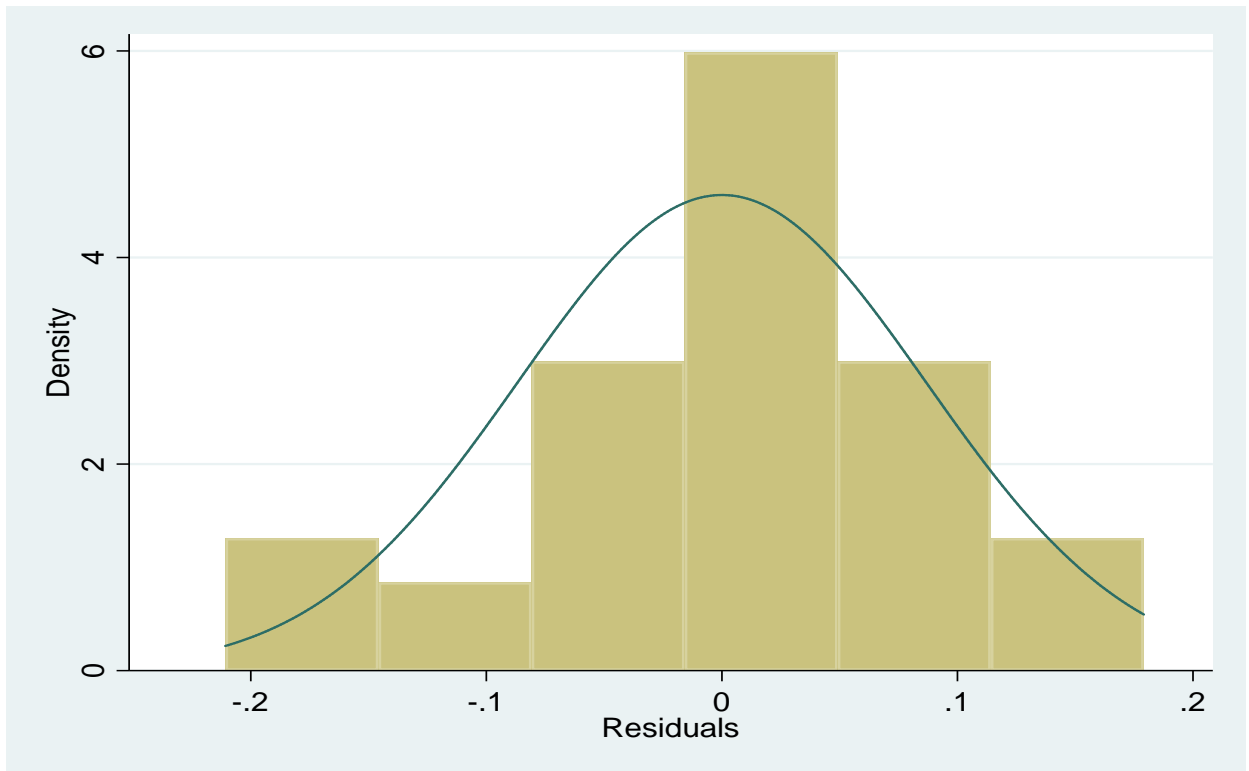


Author's computation based on STATA.

To further check whether the residuals are normally conveyed, the researcher employed the Jarque-Bera test which could be a more decisive test than the graphical review approach of testing for ordinariness. Rule of the thumb is that; H0>0.05 implying that there is normal distribution while Ha < 0.05 implying that there is no normal distribution.

**Table 4.27: Normality Test of Residuals**

| Variable | Observation | Jarque-Bera normality test: | Prob>chi2 |
|---|---|---|---|
| Residual | 72 | 1.709 | .4254 |

**Source:** Author's computation based on STATA.

Now that the probability value is more than 5%, the null hypothesis isn't rejected and in this way the conclusion is that the residuals have a normal distribution.

### 4.9.4 Heteroskedasticity

Ordinary least squares (OLS) assumption stipulates that the residuals should have a constant variance (i.e. they should be Homoscedastic). The results were confirmed using the Breusch-Pagan / Cook-Weisberg test for heteroskedasticity where the null hypothesis of the test of error terms have a constant variance (i.e. should be homoscedastic). The study failed to reject the null hypothesis since the P was greater than 0.05.

**Table 4.28: Breusch-Pagan / Cook-Weisberg test for heteroskedasticity**

| |
|---|
| Breusch-Pagan / Cook-Weisberg test for heteroskedasticity |
| Ho: Constant variance |
| Variables: fitted values of Tax Rev |
| chi2(1)　　=　　2.60 |
| Prob > chi2　=　0.1071 |

**Source:** Author's computation based on STATA.

# CHAPTER FIVE

# SUMMARY, CONCLUSIONS AND RECOMMMENDATIONS.

## 5.1 Introduction.

The chapter presented summary of key findings that were discussed in the previous chapter as per the study objectives. Systematically, the chapter then drew conclusions about the study and had recommendations on the objectives. Finally, the study finished by suggesting areas that needed further research.

## 5.2 Summary and Key Findings.

The major goal of the study was to check out the effect of County government reforms on revenue collection performance in Kakamega County, Kenya. The cashless reform, PSRM framework reform, and toll fee reform on revenue collection within Kakamega County were the main variables under investigation by the researcher. The suitable designs chosen by the researcher were descriptive, correlational, and causal-comparative to check on the relative effect of the reforms on revenue performance within Kakamega County. The standard deviation, minima, maxima, and mean were insightfully analyzed by descriptive statistics.

Descriptive statistics showed that the cashless system reform had a mean of Ksh 1.06 million and standard deviation of Kshs 0.64 million. PSRM reform on the other hand a mean of Ksh 49.76 million and standard deviation of Kshs 17. 0 million while toll fee reform had a mean of Ksh 2.17 million and standard deviation of Kshs 0.815 million. Correlation analysis after reforms indicated that toll fee reform had a positive moderate

correlation. Cashless reform under parking fees on the other hand had a moderate positive relationship.

PSRM system reform had a strong positive correlation. Consumer price index as a moderating variable had a weak negative correlation.

In the study, the assumption of linear regression models was conducted. Pre- estimation and post estimation diagnostic tests were conducted to check on the OLS assumptions. Pre estimation diagnostics tests conducted included the Jarque Bera test which was used to test for normality and the p values of the variables were greater than 0.05 implying normality of residuals. Augmented Dickey fuller (ADF) and Phillip Perron were used in the study to test for stationarity. From the tests, the variables had a p value which was less than 0.05 implying lack of unit roots.

Additionally the post estimation diagnostic tests were conducted in the study. Autocorrelation was tested by use of the Godfrey serial correlation LM test whose results showed a p valued greater than 0.05 confirming lack of autocorrelation. The VIF tested multicollinearity and all the values were less than 0.05 while Heteroskedasticity was tested by used Breush- Pagan test which confirmed that the model was homoscedastic. Finally the regression analysis was conducted in the study to find out the coefficients of the variables.

### 5.2.1 Cashless reform on revenue collection.

Cashless reform was measured using the market fee and parking fee in this research. From the analysis it can be noted that cashless reform correlated positively with revenue and had a value of 0.4496. In the regression model it was determined that the cashless

system reform had a positive coefficient. This implied that when cashless reform increases it will consequently have a positive effect on revenue collection performance. Cashless system reform had a coefficient of $\beta_1 = 0.184$. From the analysis the coefficient of 0.184 implied that when cashless system reform increases by one unit income collection execution will in this way increment by 0.184 units within the brief run. With p esteem of 0.008 which is less than 0.05, it appears that cashless framework change is measurably critical

### 5.2.2 Toll fee reform on revenue collection.

It is evident from the analysis that there is a positive association between toll fee and revenue collection. The model also indicated that there is a positive coefficient for toll fee implying that toll fee positively contributed on the amount collected within the county. The coefficient of $\beta_2 = 0.131$ inferred that a unit increment of toll will subsequently lead to 0.131 units increment in revenues collected within the County in the short run. A probability of 0.012 is less than 0.05 which implied significance of toll fee on revenues collected.

### 5.2.3 PSRM system reform on revenue collection.

PSRM system reform positively correlated with revenue collection performance, r =0.631. In the regression model it is evident that PSRM system reform had a positive coefficient. This implied that an increment in PSRM framework had a consequent positive effect on revenue collection. A positive coefficient of, $\beta_3 = 0.263$ for PSRM suggested that when PSRM reform changed by one unit, revenue collection subsequently will positively change by 0.263 units within the short run. This drift can be clarified by

the fact that PSRM framework is digitized modern method in which taxes were productively collected and accounted for. From the examination it was apparent that PSRM framework a probability value of 0.000 which is less than 0.05 inferring that PSRM reform was significant. In this way PSRM framework change had a significant impact on revenue collection.

### 5.2.4 Moderating effect of Inflation on revenue collection.

After the reforms, the discoveries demonstrated that the moderating effect of inflation had a negative coefficient on revenue collection as expected. The coefficient, $\beta4 = -0.154$, implies that when inflation has an increment by one unit, revenue collection performance will subsequently decrease by -0.154 units. This is so because inflation leads to a low purchasing power which in turn negatively affects business activities and growth within the county which affects revenue collection. After the changes the p estimate value was 0.019 which is less than 0.05 inferring that CPI was significant, p 0.012.

### 5.3 Conclusion.

From the study, it was revealed that cashless revenue reform had a significant positive effect on revenue collection performance. Thus, the null hypothesis that there was no statistically significant relationship between cashless system and revenue collection performance in Kakamega County was rejected. Second, the study revealed that PSRM system reform had a positive significant effect on revenue collection performance. The null hypothesis that there was no statistically significant relationship between PSRM system and revenue collection performance in Kakamega County was rejected. Additionally, toll fee reform had a significant positive effect on revenue collection

performance. We therefore reject the null hypothesis that stated, there was no statistically significant relationship between toll fee and revenue collection performance in Kakamega County. Finally, the study revealed that there was a significant moderating effect between inflation and County government reforms with revenue collection performance. We therefore reject the null hypothesis that there was no statistically significant relationship between the moderating effect of inflation on revenue collection performance in Kakamega County.

## 5.4 Recommendations.

From the study findings, it was evident that the County government reforms had a significant effect on revenue collection in the county. For financing key government projects such as investment in human capital, infrastructure, and provision of services to citizens, Kakamega County has to improve, enhance and efficiently collect revenue. The study recommends that Kakamega County should come up with other reforms that concentrate on the structured revenue streams such as property rates. These reforms will majorly concentrate on structured revenue streams such as property rates and they will subsequently improve the amounts of own source revenue collected.

The study findings revealed that cashless system reform had a significant positive effect on revenue collection performance. A cashless system enabled taxpayers to pay for their obligations in the comfort of their mobile phones. Challenges experienced in the collection of unstructured revenue streams such as parking and market fee were addressed by use of this system. To increase the amount of revenue collected, the study recommended that Kakamega County should embrace the use of the cashless system

when it comes to other revenue streams. A diversified revenue base that uses the cashless system will in turn improve the collection since most revenue collected will be accounted for. The risk of direct handling of revenue by the officers in charge of collection will thus be minimized. Civic education should also be carried out to enlighten the public on the new system to efficiently collect revenue.

From the findings, PSRM system reform had a significant positive effect on revenue collection. PSRM system, being a mode used for receipting and processing of structured revenue streams should be enhanced and improved to enable efficiency. The new system improved the amounts of structured revenue streams that were collected since it sealed most loopholes and leakages. PSRM addressed the ancient porous system which was characterized by revenue pilferages.  The study thus recommended that system providers should enhance and improve on the features of the new system used in handling the structured revenue streams. An increase in collection of the structured revenue streams will in turn lead to improved revenue collection performance within the County.

Furthermore, from the study it was worth noting that toll fee reform had a significant positive effect on revenue collection. The use of seasonal monthly stickers had enhanced toll fee collection within the County but at a slower rate. This trend was so because a good number of PSV vehicles evade to pay for the fee and operate the whole month without complying. The study recommended for severe sanctions on PSV vehicles that want to operate without complying with the required statutory fees. To improve toll fee collection, the county should come up with better methods such as mounting toll booths on highways which will ensure all the PSVs operating within Kakamega comply with the set aside statutory laws.

Finally, the study established that the moderating effect of inflation had a significant negative effect on revenue collection performance. Inflation negatively affected revenue collection performance since it reduced the purchasing power in the economy. With a low purchasing power, business activities and business growth were affected negatively leading to low revenue collection. The study recommended that the government should check on the level of inflation so that we have controlled inflation that does not negatively affect revenue collection.

## 5.5 Areas for Further Research.

The study was to evaluate the effect of County Government reforms on revenue collection performance in Kakamega County, Kenya. From the study, the researcher used only three county government reforms to determine their effect on revenue collection performance. Different reforms should be introduced to check out their effect on revenue collection performance.

The study carried out a comparative analysis between before reforms and after reforms within Kakamega County. A similar study can be done but carry out a comparative analysis between two counties and find out which county is doing better in revenue collection performance with the new reforms on board.

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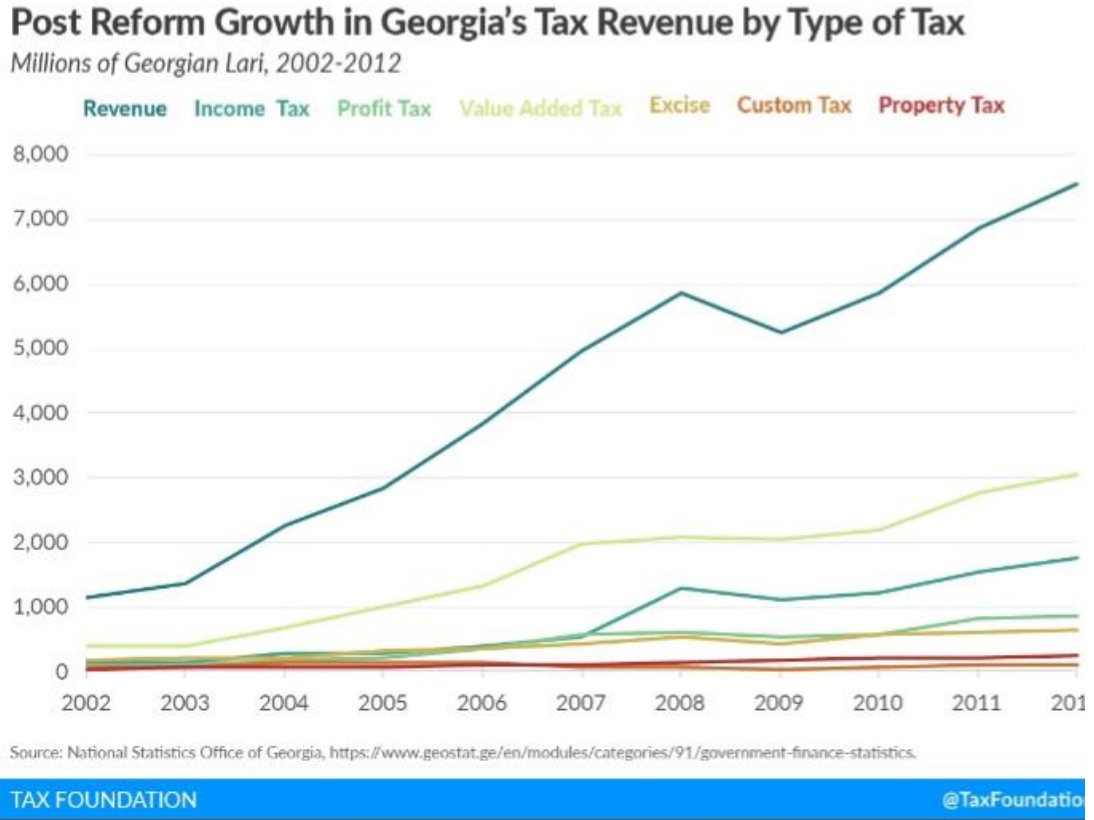
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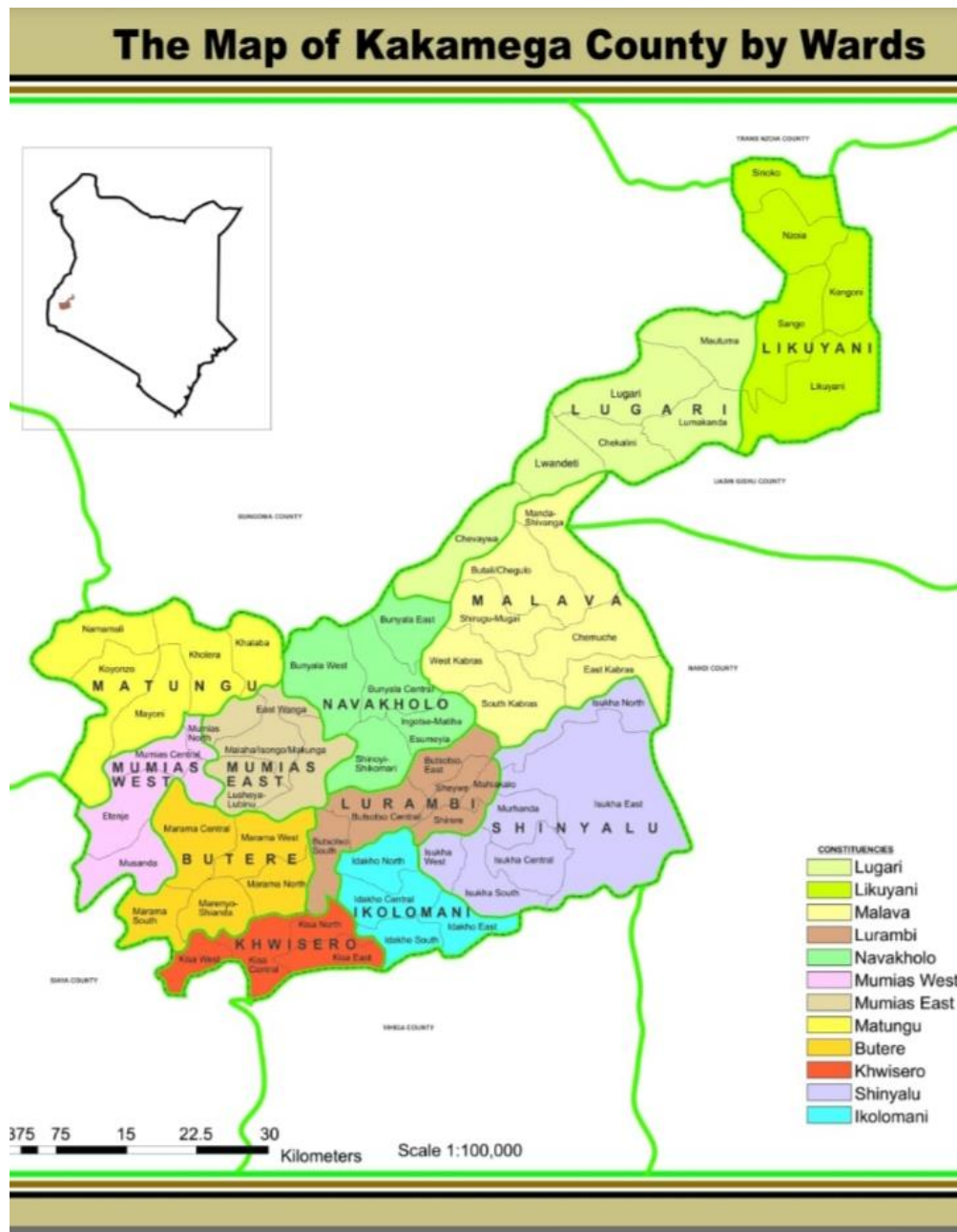
# APPENDICES

## APPENDIX I: Georgia's Post Reform Growth in Tax Revenue.

**Figure 1.1.1: Post Reform Growth in Georgia's Tax Revenue by Type of tax.**



## Post Reform Growth in Georgia's Tax Revenue by Type of Tax
*Millions of Georgian Lari, 2002-2012*

Revenue    Income Tax    Profit Tax    Value Added Tax    Excise    Custom Tax    Property Tax

Source: National Statistics Office of Georgia, https://www.geostat.ge/en/modules/categories/91/government-finance-statistics.

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**Figure 3.3.1: map of Kakamega County**



**Source:** kakamega.go.ke ( Kakamega county website

# APPENDIX III: MONTHLY DATA.

| Year | Month | Reforms | Rev-coll | Toll_rev | mark_fee | park_fee | psrm_rev | CPI |
|------|-------|---------|----------|----------|----------|----------|----------|-----|
| 2016 | Jul | 0 | 21.225949 | 3.537658 | 2.16405 | 0.64875 | 14.875491 | 87.26 |
| 2016 | Aug | 0 | 21.225949 | 3.91598 | 1.18341 | 0.54849 | 14.578069 | 87.33 |
| 2016 | Sep | 0 | 21.225949 | 3.73165 | 2.07405 | 0.76354 | 14.656709 | 87.63 |
| 2016 | Oct | 0 | 21.225949 | 3.537658 | 2.3157 | 0.79453 | 14.578061 | 88.17 |
| 2016 | Nov | 0 | 21.225949 | 4.12169 | 2.2652 | 0.9139 | 13.925159 | 88.8 |
| 2016 | Dec | 0 | 21.225949 | 2.381313 | 2.41724 | 0.8586 | 17.711976 | 89.48 |
| 2017 | Jan | 0 | 31.77688 | 4.211801 | 2.647862 | 0.763524 | 24.153692 | 90.37 |
| 2017 | Feb | 0 | 31.77688 | 4.211801 | 2.647862 | 0.763524 | 24.153692 | 91.93 |
| 2017 | Mar | 0 | 31.77688 | 4.211801 | 2.647862 | 0.763524 | 24.153692 | 93.46 |
| 2017 | Apr | 0 | 31.77688 | 4.211801 | 2.647862 | 0.763524 | 24.153692 | 95.13 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2017 | May | 0 | 31.77688 | 4.211801 | 2.647862 | 0.763524 | 24.153692 | 95.84 |
| 2017 | Jun | 0 | 31.77688 | 4.211801 | 2.647862 | 0.763524 | 24.153692 | 94.69 |
| 2017 | Jul | 0 | 25.335467 | 4.04486 | 2.418275 | 0.55838 | 18.313952 | 93.78 |
| 2017 | Aug | 0 | 17.045243 | 3.44803 | 1.71661 | 0.44489 | 11.435713 | 94.35 |
| 2017 | Sep | 0 | 16.711554 | 3.91573 | 2.35127 | 0.66898 | 9.775574 | 93.81 |
| 2017 | Oct | 0 | 18.879794 | 3.63165 | 1.96642 | 0.45933 | 12.822394 | 93.22 |
| 2017 | Nov | 0 | 21.569705 | 3.75239 | 2.09846 | 0.52725 | 15.191605 | 93 |
| 2017 | Dec | 0 | 33.183506 | 4.12169 | 2.06405 | 0.57686 | 26.420906 | 93.5 |
| 2018 | Jan | 0 | 37.713926 | 4.22018 | 2.1824 | 0.84688 | 30.464466 | 94.74 |
| 2018 | Feb | 0 | 52.026744 | 3.68018 | 2.060665 | 0.55554 | 45.730359 | 96.03 |
| 2018 | Mar | 0 | 62.328212 | 4.312355 | 2.41724 | 0.66575 | 54.932867 | 97.37 |
| 2018 | Apr | 0 | 40.124652 | 4.102994 | 2.14687 | 0.62854 | 33.246248 | 98.67 |
| 2018 | May | 0 | 48.836015 | 4.326635 | 2.29549 | 0.58997 | 41.62392 | 99.63 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2018 | Jun | 0 | 67.567358 | 4.02298 | 2.107165 | 0.4379 | 60.999313 | 98.74 |
| 2018 | Jul | 0 | 28.826785 | 4.06149 | 2.3118 | 0.44374 | 22.009755 | 97.86 |
| 2018 | Aug | 0 | 52.971077 | 4.40377 | 2.67402 | 0.69236 | 45.200927 | 98.16 |
| 2018 | Sep | 0 | 34.535132 | 4.08752 | 2.75894 | 0.94898 | 26.739692 | 99.16 |
| 2018 | Oct | 0 | 38.611609 | 4.9428 | 2.93655 | 1.24036 | 29.491899 | 98.38 |
| 2018 | Nov | 0 | 36.341969 | 2.95225 | 2.875244 | 1.15083 | 29.363645 | 98.2 |
| 2018 | Dec | 0 | 53.556192 | 3.0538 | 2.48981 | 0.99777 | 47.014812 | 98.84 |
| 2019 | Jan | 0 | 49.56945 | 3.1896 | 2.70114 | 1.60029 | 42.07842 | 99.19 |
| 2019 | Feb | 0 | 57.362737 | 3.14086 | 2.76899 | 1.13252 | 50.320367 | 100 |
| 2019 | Mar | 0 | 65.736287 | 2.7236 | 0.306924 | 0.97815 | 61.727613 | 101.54 |
| 2019 | Apr | 0 | 91.00584 | 2.8858 | 0.29422 | 1.11475 | 86.71107 | 102.34 |
| 2019 | May | 0 | 48.823734 | 2.3758 | 2.85689 | 0.85699 | 42.734054 | 103.11 |
| 2019 | Jun | 0 | 49.001586 | 2.6128 | 2.72833 | 0.88492 | 42.775536 | 103.52 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2019 | Jul | 1 | 36.540327 | 1.5119 | 0.84054 | 0.19485 | 33.993037 | 103.83 |
| 2019 | Aug | 1 | 55.399383 | 2.5969 | 3.60821 | 0.66658 | 48.527693 | 104.04 |
| 2019 | Sep | 1 | 31.441479 | 3.1702 | 4.18171 | 0.9761 | 23.113469 | 104.2 |
| 2019 | Oct | 1 | 42.656627 | 2.99716 | 3.69228 | 0.7529 | 35.214287 | 104.54 |
| 2019 | Nov | 1 | 39.436044 | 2.7841 | 3.01477 | 0.73485 | 32.902324 | 105.17 |
| 2019 | Dec | 1 | 35.917565 | 2.8719 | 2.48981 | 0.7071 | 29.848755 | 105.92 |
| 2020 | Jan | 1 | 62.295492 | 2.854 | 2.213255 | 1.22905 | 55.999187 | 106.51 |
| 2020 | Feb | 1 | 66.34396 | 2.6548 | 1.83109 | 1.4428 | 60.41527 | 107.17 |
| 2020 | Mar | 1 | 73.028806 | 2.7117 | 0.95138 | 1.32155 | 68.044176 | 107.47 |
| 2020 | Apr | 1 | 37.89917 | 0.2754 | 0.0688 | 0.3904 | 37.16457 | 108.49 |
| 2020 | May | 1 | 37.562533 | 0.3283 | 0.13237 | 0.65185 | 36.450013 | 108.6 |
| 2020 | Jun | 1 | 37.166818 | 0.499 | 0.24568 | 0.50715 | 35.914988 | 108.27 |
| 2020 | Jul | 1 | 42.899975 | 0.7373 | 0.54133 | 0.77205 | 40.849295 | 108.35 |

| 2020 | Aug | 1 | 56.414125 | 0.9492 | 1.912505 | 1.00995 | 52.54247 | 108.57 |
| 2020 | Sep | 1 | 37.59261 | 1.5197 | 1.94908 | 0.81965 | 33.30418 | 108.57 |
| 2020 | Oct | 1 | 43.82284 | 1.5729 | 2.210387 | 0.9604 | 39.079153 | 109.6 |
| 2020 | Nov | 1 | 35.399092 | 1.8346 | 2.17624 | 1.17345 | 30.214802 | 110.78 |
| 2020 | Dec | 1 | 32.153311 | 2.0474 | 1.959515 | 1.1045 | 27.041896 | 111.87 |
| 2021 | Jan | 1 | 47.584649 | 2.5223 | 1.77537 | 2.62915 | 40.657829 | 112.58 |
| 2021 | Feb | 1 | 51.866638 | 2.278 | 1.55785 | 2.11947 | 45.911318 | 113.36 |
| 2021 | Mar | 1 | 90.263571 | 2.2845 | 1.67016 | 1.30605 | 85.002861 | 113.81 |
| 2021 | Apr | 1 | 67.705509 | 1.7173 | 1.419435 | 1.06428 | 63.504494 | 114.75 |
| 2021 | May | 1 | 54.746093 | 2.2634 | 1.499097 | 1.13509 | 49.848506 | 114.98 |
| 2021 | Jun | 1 | 52.363385 | 2.44131 | 1.270245 | 1.24738 | 47.40445 | 115.11 |
| 2021 | Jul | 1 | 79.934225 | 2.4277 | 1.11842 | 1.10145 | 75.286655 | 115.45 |
| 2021 | Aug | 1 | 76.117834 | 2.1448 | 1.282118 | 1.13605 | 71.554866 | 115.71 |

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| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2021 | Sep | 1 | 64.229738 | 2.0282 | 1.1907 | 0.87775 | 60.133088 | 116.08 |
| 2021 | Oct | 1 | 48.553964 | 2.3774 | 1.34905 | 0.6739 | 44.153614 | 116.67 |
| 2021 | Nov | 1 | 50.720418 | 2.3362 | 1.318505 | 0.71763 | 46.348083 | 117.2 |
| 2021 | Dec | 1 | 83.569822 | 2.2576 | 1.278735 | 0.55743 | 79.476057 | 118.27 |
| 2022 | Jan | 1 | 65.811737 | 2.5576 | 1.180386 | 2.62145 | 59.452301 | 118.64 |
| 2022 | Feb | 1 | 83.155586 | 2.4284 | 1.24457 | 3.07805 | 76.404566 | 119.13 |
| 2022 | Mar | 1 | 83.103532 | 2.6435 | 1.90414 | 1.9896 | 76.566292 | 120.14 |
| 2022 | Apr | 1 | 71.2436 | 2.6255 | 1.511627 | 0.54485 | 66.561623 | 122.17 |
| 2022 | May | 1 | 57.080733 | 2.86155 | 1.18284 | 0.7491 | 52.287243 | 123.12 |
| 2022 | Jun | 1 | 35.786524 | 3.9407 | 1.110515 | 0.52505 | 30.210259 | 124.22 |

Note: 0 –Before reforms

After reforms.

# APPENDIX IV: APPROVAL OF RESEARCH

**MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)**

Tel:    056-30870                                              P.O Box 190
Fax:    056-30153                                              Kakamega – 50100
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Website: www.mmust.ac.ke

**Directorate of Postgraduate Studies**

**Ref:** MMU/COR: 509099                          15th September 2022

Mukhwaya Aberton Okoth
ECO/G/01-70072/2020,
P.O. Box 190-50100,
**KAKAMEGA.**

Dear, Mr. Okoth,

**RE: APPROVAL OF PROPOSAL**

I am pleased to inform you that the Directorate of Postgraduate Studies has considered and approved your Masters proposal entitled '***The Effect of Tax Policy Reforms on Revenue Collection Performance in Kakamega County, Kenya'*** and appointed the following as supervisors:
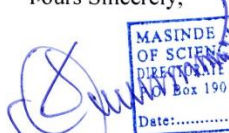
1. Dr. Ngala Consolata                    - SOBE, MMUST
2. Dr Angela Mungai                       - SOBE, MMUST

You are required to submit through your supervisor(s) progress reports every three months to the Director Postgraduate Studies. Such reports should be copied to the following: Chairman, School of Business and Economics Graduate Studies Committee and Chairperson, Economics Department. Kindly adhere to research ethics consideration in conducting research.

It is the policy and regulations of the University that you observe a deadline of two years from the date of registration to complete your Master's thesis. Do not hesitate to consult this office in case of any problem encountered in the course of your work.

We wish you the best in your research and hope the study will make original contribution to knowledge.

Yours Sincerely,

Prof. Stephen O. Odebero, PhD, FIEEP
**DIRECTOR, DIRECTORATE OF POSTGRADUATE STUDIES**

# APPENDIX V; RESEARCH PERMIT.