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Title: THE CONTRIBUTION OF ELECTRONIC TAX SYSTEM IN EFFICIENCY TAX COLLECTION IN RWANDA. A CASE STUDY RWANDA REVENUE AUTHORITY.

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ABSTRACT

The Rwandan government, in collaboration with the revenue body Rwanda Revenue Authority (RRA), started digital transformation in 2012 to enhance tax administration efficiency and contribute to the national development goals. Despite these steps, issues such as tax evasion, late filings and payments, unstable network infrastructure, and low computer application proficiency among taxpayers continue to exist. The combination of challenges faced by the RRA alongside mistakes in tax payments, tax evasion and tax avoidance threats limit the RRA from getting optimal revenue collections. This study was motivated by these challenges and it sought to investigate the contribution of e-tax system on tax collection in in Rwanda a case study Rwanda Revenue Authority.

The study employed secondary data covering the periods prior (1998-2011) and after (2012-2022) the implementation of the e-tax system and primary data collected via questionnaires through stratified random sampling technique to ensure representation across different taxpayer categories and RRA staffs; thus, 150 taxpayers and 50 tax officers were selected for this study, mixed-methods approach that combines quantitative and qualitative research techniques were used. To analyses data collected statistical techniques were used to access the relationship between the electronic tax system and tax collection outcomes and qualitative analysis of interview and open-ended survey responses to explore perception and implementation challenges.

The Statistical Package for Social Sciences (SPSS) was used in the regression analysis and in calculating the results. The findings were presented through tables and the discussion thereafter. The aim of results was to find out the degree to which the electronic tax system assists in the tax collection. The multiple linear regression analysis to assess the combined contribution of the electronic tax system on tax collection by considering three variables including two independent variables such as Technical Skills to use e-tax system, Perception on e-tax, and Tax collection as the dependent variable was used.

The findings established that the implementation of e-tax system had very important positive effect on tax revenue collection. These results, however, provide the basis for emphasizing the need to educate taxpayers, both small and medium, as well as Large taxpayers on the role of perception and technical skills in the use of e-tax systems on the tax collection efficiency. Knowing specifics on these aspects, the government can be able to collect tax revenue more cost effective. To sum up, through the use of the obtained results, the decisions makers can put forward the specific policies that will improve tax administration systems and consequently improve the revenue proceeds collection.

KEY WORDS: Electronic Tax System；Tax Collection；Perception； Technical Skill；Efficiency of Tax Collection； Tax Payment Risks, Rwanda Revenue Authority

TYPE OF THESIS: Case Study

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LIST OF SYMBOLS

AT	Activity Theory
BI	Behavior Intention
EBM	Electronic Billing Machine
ESW	Electronic Single for domestic taxpayers Window
ICT	Information & Communication Technology
IDT	Innovation Diffusion Theory
IRS	Internal Revenue Service
KRA	Kenya Revenue Authority
MM	Motivational Model
MNOs	Mobile Network Operators
PAYE	Pay as You Earn
MTRS	Medium Term Revenue Strategy
PU	perceived usefulness
RRA	Rwanda Revenue authority
ISS	International sustainability standards
SN	Subjective Norm
TAM	Technology Acceptance Model
TPB	Theory of Planned Behavior
TRA	Theory of Reasoned Action
URA	Uganda Revenue Authority
UTAU	Unified Theory of Acceptance and Use of Technology
VAT	Value Added Tax
GDP	Gross Domestic Product
COSO	Committee of Sponsoring Organizations
ISO	International Standard Organization
CIT	Corporate Income tax
IRS	Internal resource service
EDB	Essays doing business
LGT	Local Government Taxes
PIT	Personal income taxes
WHT	Withholding tax
QMS	Quality management system
HR	Human resource
OECD	Organization for Economic Co-Operation and Development
ITAS	Integrated Tax Administration System
ETRs	Electronic tax registers
NOM	New Operating Model

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1 INTRODUCTION

1.1 Research Background and Meaning

1.1.1 Background

One of the success stories of contemporary African development is Rwanda, which has amassed a remarkable economic and social record in recent decades. An ambitious plan for tax digitization and successful reform implementation has both accompanied and supported the nation's improving performance. Vision 2020, the Rwandan government's reform program, was essential to this development. Among other objectives, it sought "to reduce aid and dependency developing effective strategies to expand the tax base." To advance this aim, the Rwanda Revenue Authority (RRA), the national body in charge of all efficiency tax collection, has made significant investments in digital tax services. RRA has made it a priority to streamline tax forms and procedures, giving taxpayers more ease while utilizing third-party tools to collect data for a robust and effective process.

Rwanda Revenue Authority (RRA) as a Rwandan tax administration has a vital responsibility to help the Government to provide efficient service delivery hence the promotion of business expansion; therefore the convenient system was mandatory e-filing and e-payment was adopted as a convenient tool of reducing operational costs of both sides taxpayers and tax administration whereby tax declaration, and payment can happen from anywhere as long as a taxpayer has an electronic device (smartphone, computer, etc..) which is different from a manual system whereby taxpayer must be present at the premises of tax administration with paperwork’s for filing and finally to the bank premises for payment consequently hinders business activities for both sides. (Ndayisenga, E.; Shukla, J. 2021)

The difficulty that governments in underdeveloped nations have in raising tax income leads to a discrepancy between what they could raise and what they do. The use of cutting-edge technologies and more effective tax payment ways to eliminate waste is one of these difficulties, according to (Muita, 2011). To save operational expenses and paper waste, the IRS in the USA began accepting electronic filing in 1986. Additional features have been added since then. Electronic Direct Deposit was implemented as a payment method in 1987. Over the years, milestones have been achieved and overturned. In 1990, 4.2 million returns were filed, and in recent years, 1 billion 1040 forms have been electronically filed, setting a record. The IRS's 1969-developed processing system was utilized for e-filing initially, but since 2003, the IRS has been creating a new, improved processing system. In the United States, when the Internal Revenue Service (IRS) originally offered tax return e-filing for tax refunds exclusively, the term "electronic tax filing" was first used (Muita, 2011).

This has now developed to the point where a significant portion of individual taxpayers are already filing online. Malaysia electronic tax system was adopted to facilitate taxpayers to electronic filing and payment of tax liabilities via tax administration official website; however, the taxpayers were not using the system in spite of its two-years existence Malaysians hence this needs sensitization to end-users. Some African countries following the benefits which European, American and Asian countries were getting from e-tax and the outflows link to tax evasion, corruption, crime, and other unlawful activities, and most, if not all, African nations have turned to electronic tax filing, however the extent varies from nation to nation.

Ethiopia, Uganda, Rwanda, South Africa, Kenya, and other nations are examples of those that have adopted the practice to a large extent. Through the recently created e-Tax system, the Ethiopian Revenue and Customs Authority (ERCA) has now significantly benefited the business community and Ethiopia's overall economy. Taxpayers may now electronically file their taxes which is help to reduce errors and Tax payments are quick, simple and anticipated to increase compliance and improve tax collection. (Solange 2018). All of Uganda's tax system improvements aim to increase tax administration, compliance, and collection. To this end, Uganda Revenue Authority URA implemented electronic tax filing as a way to increase compliance and lower efficiency tax collection expenses. (Lukwata, 2001). Since 1885, when the first tax system was implemented, a colonial regime has existed. As is well known, colonialism exposes the colonized to exploitation while the colonizer country profits from all tax payments. Since the country gained independence, the tax system was only created in 1964. As a result of inefficient government and a dearth of independent tax administration, the country's economy has not grown or become sufficiently independent.

Tribalism in administration and lack of mobilization of internal resources as a result of the 1973 tax reform system forced the nation to rely on foreign aid, loans, and grants to fund its operations. (Mugabe Roger 2021). The nation's tax revenues fell to $132 million in 1996 from $225 million in 1990 as a result of the 1994 genocide in Rwanda, which lost hundreds of thousands of people. The new unity government, led by Paul Kagame's Rwandan Patriotic Front, was also keen to wean itself off its reliance on foreign donors, who had shown themselves unreliable throughout the crisis, in addition to its acute need for money to pay for rebuilding. In order to do this, Kagame's administration had to persuade a traumatized and skeptical populace to pay its rightful amount of taxes (ISS 2011-2017).

The Rwanda Revenue Authority (RRA), a tax body with some autonomy, took the role of the country's previous tax and customs ministries in 1998. Due to a lack of technical expertise, parliament chose Edward Larbi-Siaw, a distinguished Ghanaian economist and lawyer who had previously led the nearby Uganda Revenue Authority, to lead the RRA. The restoration of the tax base, the provision of tax incentives to stimulate production for domestic and foreign investors, and improving tax administration efficiency are the three main phases of Rwanda's tax reforms. The Rwanda Revenue Authority (RRA) was founded in 1997 to raise domestic income and manage the country's limited resources throughout its economic recovery. With concurrent institutional and legislative framework improvements, RRA's performance has been steadily improved. With the introduction of the VAT in 2001, the decrease of the CIT to 30 percent in 2005, and membership in the EAC in 2009, the initial changes attempted to broaden the tax base.

With the introduction of the E-Tax site in 2011 and the Electronic Billing Machine (EBM) in 2012, RRA has improved its use of technology and decreased the cost of conducting business (MTRS MINECOFIN 2018). Therefore, this research intended to see the Contribution of electronic tax filing system in tax compliance and efficiency tax collection in Rwanda. In this research we identified the difference between E-Filing, or electronic filing and paper or manual filling system. According to information from the Internal Revenue Service (IRS) in the United States, E-filing, or electronic filing, refers to the process of submitting tax returns online over the internet. In contrast, paper filing involves manually filling out tax return forms and sending them through the postal mail service. One key advantage of e-filing is the faster processing time.

The Internal Revenue Service (IRS) in the United States typically processes electronically filed returns within one or two days, whereas paper-filed returns take significantly longer to process. Another benefit of e-filing is increased accuracy. Online tax filing software performs calculations automatically, reducing the likelihood of errors caused by manual calculations. These programs also have built-in error-checking capabilities, alerting users to potential mistakes before submission. If errors do occur, electronic returns are generally easier to correct compared to paper-filed returns. Many taxpayers opt to use tax preparation software or online platforms to e-file their returns. These tools not only automate calculations but also identify and flag potential errors, further enhancing the accuracy of the filing process

1.1.2 Meaning

The Electronic Tax System (ETS) in Rwanda is a digital platform established by the Rwanda Revenue Authority (RRA) to modernize and streamline tax-related processes through the integration of information and communication technologies (ICT). The ETS encompasses various components, including online tax filing portals, electronic payment gateways, and taxpayer management systems, aimed at facilitating efficient tax compliance and administration (Musengimana, 2017).

Efficiency in tax collection in Rwanda is crucial for sustaining government revenues and supporting economic development initiatives. The Rwanda Revenue Authority (RRA) has implemented a range of measures to enhance tax collection efficiency, including the adoption of modern technologies, such as the Electronic Single Window for Customs clearance and the use of electronic invoicing systems, to streamline tax processes and reduce compliance costs for taxpayers (Ndagijimana & Ingabire, 2020).

The Electronic Tax System (ETS) significantly contributes to the efficiency of tax collection in Rwanda. By leveraging digital technologies, the ETS streamlines tax-related processes, enhances transparency, and reduces compliance costs, ultimately improving the overall efficiency of tax administration and revenue collection efforts (Musengimana, 2017). Specifically, the ETS facilitates faster and more accurate tax filing and payment processes for taxpayers, thereby reducing the administrative burden associated with traditional paper-based methods. Taxpayers can submit their returns electronically, receive real-time feedback on their tax obligations, and make payments securely through online platforms. This automation not only saves time for both taxpayers and tax authorities but also minimizes errors and delays in processing, leading to more timely revenue collection.

Furthermore, the ETS enables better data management and analysis for tax authorities, allowing them to track taxpayer compliance more effectively and identify potential areas of tax evasion or avoidance. By harnessing data analytics and business intelligence tools, tax authorities can target high-risk taxpayers, conduct risk-based audits, and enforce tax laws more efficiently, thereby maximizing revenue collection while minimizing enforcement costs. Overall, the Electronic Tax System plays a crucial role in improving the efficiency of tax collection in Rwanda by modernizing tax processes, enhancing compliance, and leveraging data-driven approaches to revenue administration. Different definitions have been given for what tax compliance actually means. According to (Jones 2009) tax compliance is the timely filling and reporting of required tax information, the correct self-assessment of taxes owed, and the timely payment of those taxes without enforcement action. This definition reflects three dimensions of tax compliance as noted by (Wasao, 2014): filing, reporting, and payment compliance. Filing compliance refers to whether the taxpayer submitted the correct forms to the revenue authority.

Reporting compliance refers to whether the return was accurate, while payment compliance refers to whether the taxpayer paid his/her reported tax liability in a timely

manner. Therefore, a taxpayer would be called non-compliant if the three dimensions are not properly accomplished, (Wasao,2014). E-filing systems increase the quality and quantity of information available to tax officers, enabling them to complete transactions faster and more accurately. Returns filed electronically have much lower error rates than paper returns and substantially cut the need to impose penalties and other punitive measures to foster compliance. The more efficient handling provided by electronic returns allows tax officers to issue assessments and refunds more quickly, and taxpayers know right away if their returns have been accepted by the tax authorities. E-filing lowers the cost of handling returns allowing administrative resources to be reallocated to other tasks such as auditing, customer services and tracking non-compliance.

Academics and policymakers have long suggested that it may be simpler to tax electronic payments than cash. Contrary to cash transactions, financial intermediaries conduct electronic transactions, establishing a paper trail that tax authorities can use to determine tax liabilities (Rogoff 2016, OECD 2017, Awasthi and Engels chalk 2018). If accurate, this is great news for poor nations where government money is severely constrained and transactions are becoming more electronic (Pomeranz and Vila-Belda 2019). Existing evidence has shown that governments do not always have the capacity to use third-party information effectively (Almunia, M, J Hjort, J Knebelmann, and L Tian 2021), and that firms may react strategically to keep their tax liabilities low. Whether electronic payments increase tax revenues is thus an empirical question, and empirical evidence on the subject is scarce.

1.2 Research Objective and Question

1.2.1 Problem Statement

In the past, the Rwanda Revenue Authority (RRA) employed a paper-based tax declaration method, which caused a lot of taxpayers to complain about lengthy lines at RRA offices on the due day. The delay in tax declaration and tax payment on time by taxpayers caused the lose most of RRA tax income and increase Taxpayer claim. This manual tax administration system, which is characterized by low efficiency tax collection, delays, bad record keeping, and corruption, prevented Rwanda from reaching its budgetary goals.

In order to improve service delivery, the RRA introduced an electronic tax system that allows taxpayer to fill their tax returns electronically. And also, it easy for RRA to keep and know all necessary information about tax payer. This system is cost-effective for both the RRA and tax payers due to the decreased operational costs, such as transportation and stationary costs. Even, the Rwandan government, through its tax administration Rwanda Revenue Authority (RRA), began a series of reforms aimed at having a digital tax administration in 2012 with the goals to have an effective tax administration in the area and globally by educating the system to taxpayers whereby consider tax liability as a contribution to national development in addition to decreasing the cost of tax administration instead of considering tax as a forced obligation.

However, there are still issues of tax compliance, taxpayers claim about penalties associated with late declaration and late payment. And also, issues associated with the computerized tax administration system such as an unstable network and poor computer skills and lack of electronic declaration and payment skills by taxpayers, furthermore issues of errors in tax payment and as well as tax payment risk which leads tax evasion and tax avoidance making it difficult for RRA to meet their desired real income.

Therefore, the researcher is motivated by the aforementioned issue to examine the contribution of electronic tax filing system in tax compliance and efficiency tax collection in

Rwanda by focusing on the following research questions:

1.2.2 Research Questions

1. What is the effect of taxpayers' perception and technical skills on the adoption and use of the electronic tax (e-tax) system in Rwanda?
2. What is the historical trajectory and current status of tax administration in Rwanda, particularly the establishment, mandate, and key processes of the Rwanda Revenue Authority (RRA)?
3. To what extent has the implementation of the electronic tax (e-tax) system contributed to the efficiency of tax collection in Rwanda?

1.2.3 Research Objectives

1. Assessing the effect of taxpayers' perception and technical skills on the use of the e-tax system.
2. Presenting the history and current status of tax administration in Rwanda.
3. Evaluating the impact of the e-tax system on the efficiency of tax collection in Rwanda.

By formulating these research questions, the study can systematically investigate the key aspects related to the adoption and impact of the electronic tax system in Rwanda, providing a comprehensive understanding of the topic.

1.3 Research methodology

This study investigated how the Electronic Tax System affects efficiency tax collection in Rwanda using a mixed-methods approach that combines quantitative and qualitative research techniques. While the qualitative method examined stakeholders' perspectives and experiences regarding the system's efficacy in enhancing tax management procedures, the quantitative method evaluated the Electronic Tax System's quantitative influence on efficiency tax collection.

1.3.1 Research Design

The research design is primarily explanatory, aiming to understand the relationship between the Electronic tax System and efficiency tax collection outcomes while also exploring the underlying mechanisms through qualitative inquiry.

Population: the population comprise of 466593 Taxpayers registered under the Electronic tax System in Rwanda and 1300 RRA staffs. Total population is 467893.
Here's the formula to calculate the sample size for each group based on purposive sampling:
Sample Size=Total Population×Percentage of Population to be Sampled/100

Sample Size= (Total Population * Percentage of Population to be Sampled)/100
For taxpayers:
Taxpayer Sample Size= (467,893*150/467,893) *100≈150
For RRA staff:
RRA Staff Sample Size= (467,893*50/467,893) *100≈50

The sample size of 150 taxpayers and 50 RRA staff is appropriate for this research study for the following reasons:

1. **Purposive Sampling**: The study is using purposive sampling, which is a non-probability sampling technique where the researcher selects the sample based on their judgment and the study's objectives. In this case, the researchers have purposefully selected a sample of 150 taxpayers and 50 RRA staff, which is a reasonable approach given the specific focus of the study.[1]
2. **Population Size**: The total population size is 467,893, which is a relatively large population. For such a large population, a sample size of 150 taxpayers and 50 RRA staff is sufficient to provide reliable and representative data, as long as the sample is selected carefully to ensure it is representative of the overall population.[2]
3. **Margin of Error and Confidence Level**: With a sample size of 150 taxpayers and 50 RRA staff, and assuming a 95% confidence level, the margin of error would be approximately 8% for the taxpayer sample and 14% for the RRA staff sample. These margins of error are reasonable for the purposes of this study, which is focused on understanding the engagement of taxpayers and RRA staff in the research.[3]
4. **Resource Constraints:** Selecting a larger sample size may not be feasible due to resource constraints, such as time, budget, and accessibility to the target population. The selected sample sizes of 150 taxpayers and 50 RRA staff are likely to provide sufficient data to address the research objectives while considering the practical limitations of the study.[4]

Data Collection: Structured questionnaires has administered to collect quantitative data on taxpayers' perception and technical skills towards using electronic tax system. And the impact of electronic tax system for efficiency tax collection in Rwanda Revenue Authority.
Data Analysis: in additional to secondary data analysis, statistical techniques such as regression analysis, mean, standards deviation was used to analyze the quantitative data and assess the relationship between the Electronic tax System and efficiency tax collection outcomes. Here below are data analysis methods used, along with the corresponding tables:

1. **Mean ($\bar{x}$):**
    - The mean is calculated by adding up the values of each case for a variable and dividing by the total number of cases.
    - Mean values are evaluated based on predefined ranges.

Table 1-1: Mean ($\bar{x}$) Evaluation Criteria

Mean Range	Evaluation
1.00 - 2.49	Very Weak
2.50 - 3.49	Weak
3.50 - 4.49	Strong
4.50 - 5.00	Very Strong

Source: Agresti (2009)

2. **Standard Deviation (SD):**
    - The standard deviation measures the degree of variability of data and

[1] Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. American journal of theoretical and applied statistics, 5(1), 1-4.
[2] Cochran, W. G. (1977). Sampling techniques (3rd ed.). New York, NY: John Wiley & Sons.
[3] Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. Educational and psychological measurement, 30(3), 607-610.
[4] Saunders, M., Lewis, P., & Thornhill, A. (2009). Research methods for business students (5th ed.). Harlow, UK: Pearson Education.

indicates how close the data is to the mean.

- Standard deviation values categorize the level of spreading of the data.

Table 2-1: Standard Deviation (SD) Evaluation Criteria

Standard Deviation	Level of Spreading
SD < 0.5	Homogeneity
SD > 0.5	Heterogeneity

Source: Agresti (2009)

3. Spearman's Rho Correlation Test:

- Spearman's rho correlation coefficient measures the statistical relationship between independent and dependent variables, especially when the data is ordinal or not normally distributed.

- The correlation coefficient (ρ) ranges from -1 to 1, indicating the strength and direction of the relationship.

Table 3-1: Spearman's Rho Correlation Test Evaluation Criteria

Correlation Coefficient	Label/Positive or Negative Relationship
r = 1	Perfect linear correlation
0.9 < r < 1	Positive strong correlation
0.7 < r < 0.9	Positive high correlation
0.5 < r < 0.7	Positive moderate correlation
0 < r < 0.5	Weak correlation
r = 0	No relationship
-1 < r ⩽ 0	Negative relationship

Source: Saunders (2003)

4. Regression

This model "Y=α+β1X1+β2X2+ε" was deployed to represent a multiple linear regression model, which is a statistical method used to analyze the relationship between a dependent variable (Y) and two or more independent variables (X1, X2, etc.).

Here's an explanation of the components of the regression model:

- **Y**: This represents the dependent variable, which is the variable we are trying to predict or explain. It could be any measurable outcome or response variable.
- **α (alpha)**: This is the intercept term, which represents the value of Y when all independent variables (X1, X2, etc.) are zero. It indicates the baseline value of Y when all other predictors have no effect.
- **β1, β2 (beta1, beta2)**: These are the coefficients of the independent variables X1 and X2, respectively. They represent the change in Y for a one-unit change in the corresponding independent variable, holding all other variables constant. In other words, they indicate the impact of each independent variable on the dependent variable.
- **X1, X2**: These are the independent variables or predictors. They can be any measurable factors that are hypothesized to have an effect on the dependent variable Y. Each independent variable has its own coefficient (β1 for X1 and β2 for X2)

representing its impact on Y.

- **ε (epsilon)**: This represents the error term or residual, which accounts for the difference between the observed value of Y and the value predicted by the regression model. It captures the variability in Y that is not explained by the independent variables in the model.

So, in summary, the equation represents a linear relationship between the dependent variable Y and the independent variables X1 and X2, with coefficients β1 and β2 determining the impact of each independent variable on Y, while the intercept α represents the baseline value of Y. The error term ε accounts for unexplained variability in Y.

1.3.2 Research process and methods

A thorough investigation was conducted to look at how electronic tax systems affect Rwanda's efficiency tax collection. In order to comprehend the theoretical framework and current empirical evidence about the adoption and impact of electronic tax systems globally, a thorough review of the literature was first conducted. Afterwards, primary data was gathered by means of surveys with Registered taxpayers and Tax officials.

The study examined the process of putting electronic tax systems into place, noting difficulties such infrastructure constraints and the need for capacity building. The study also evaluated how well these solutions worked in Rwanda's setting to increase tax collection efficiency, lower tax evasion, and improve tax compliance. By means of a thorough examination of both qualitative and quantitative data, the study offered valuable perspectives on the noteworthy impact of electronic tax systems on augmenting tax collecting procedures in Rwanda, thereby supporting the nation's economic growth and fiscal stability.

1.4 Research Significant and Practical Value of the Topic

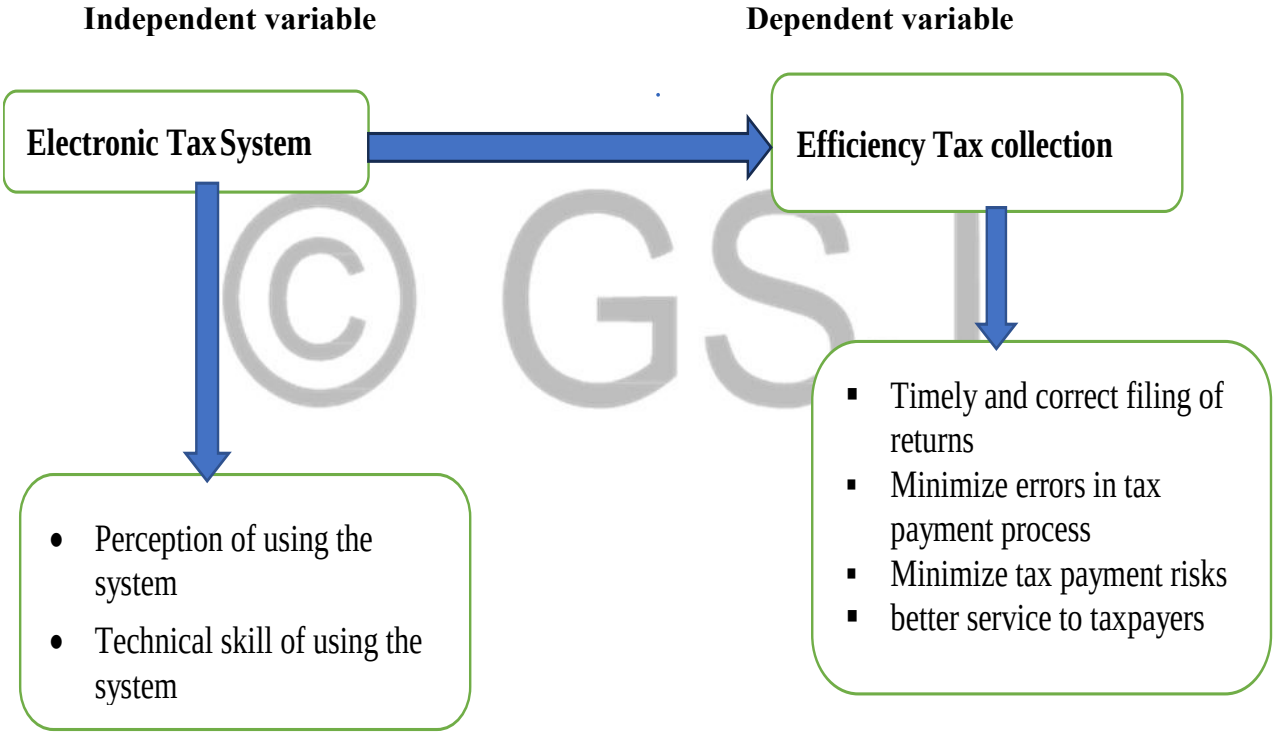
The implementation of Electronic tax system offers numerous advantages to taxpayers, thus enabling them to conveniently file and settle their taxes from any location at any time, thus eliminating the requirement to physically visit tax offices or banks, which is really great. This shift to electronic platforms not only streamlines the tax process for individuals and businesses, which is indeed very important, but it also facilitates access to information and other online transactions, enhancing overall convenience and efficiency. Furthermore, the adoption of electronic tax systems presents significant benefits to tax authorities, including greatly reduced costs, efficiency tax collection, and a decrease in workload, which is really beneficial. Through this research, the Rwanda Revenue Authority can assess the effectiveness of its electronic tax system, identify areas where improvement is needed, and implement corrective measures to be better at serving the taxpayers, reduce tax payment risks and enhancing compliance and efficiency tax collection outcomes.

Moreover, this research holds paramount importance for the researcher's academic pursuits, serving as a cornerstone for achieving the Executive Master of Professional Accounting from the Shanghai National Accounting Institute under the Ministry of Commerce, People’s Republic of China Scholarship. Beyond personal advancement, the findings of this interesting study will totally contribute to the existing literature, providing valuable and insightful insights for future researchers, like anyone who is interested in understanding the big impact of electronic filing systems on tax compliance and tax collection. By definitely shedding light on the benefits and totally undeniable challenges associated with electronic tax system, this research really aims to contribute to informed decision-making processes and the continued improvement of tax administration systems worldwide.

1.5 Conceptual Framework and Hypothesis

The research investigates the contribution of electronic tax system in efficiency tax collection in Rwanda, two influencing factors such as perception to taxpayers to use the system and technical skills to use it were investigated to see their impact on efficiency tax collection in Rwanda.

In this research process, Secondary data was collected on efficiency tax collection before and after the e-tax implementation, while primary data was collected to analyses both perception and technical skills of tax payers to use the system which have a significant influence on efficiency tax collection in Rwanda. To analyses data collected statistical techniques were used to access the relationship between the electronic tax system and efficiency tax collection outcomes and qualitative analysis of open-ended survey responses to explore perception and implementation challenges. Research findings indicated that there is a significance relationship between electronic tax system and efficiency tax collection.



Source Researcher 2023

Figure 1-1: The relationship between the variables

The null hypothesis (H0) and the alternative hypothesis (H1) are fundamental concepts in statistical hypothesis testing. They represent competing claims about a population parameter or characteristic.

H0: The use of the electronic tax system has not significantly impacted the increase in the efficiency of tax collection.

H1: The use of the electronic tax system has significantly contributed to the efficiency of tax collection.

Theoretical Support:

The null hypothesis (H0) is typically the status quo or the default assumption. It assumes no significant effect or relationship between the variables under study (in this case, the

electronic tax system and tax collection efficiency).
The alternative hypothesis (H1) represents the claim or effect that the researcher aims to demonstrate or provide evidence for. It suggests a significant impact or relationship between the variables.
Technology Adoption Theories: The alternative hypothesis is supported by theories such as the Technology Acceptance Model (TAM) or the Innovation Diffusion Theory, which suggest that the adoption and effective use of new technologies lead to positive outcomes. In this case, the implementation of electronic tax systems represents a technological innovation that is expected to improve the efficiency tax collection processes.
Efficiency Theory: Efficiency theories in economics argue that the adoption of more efficient methods or tools leads to improved outcomes. Therefore, the alternative hypothesis aligns with the notion that the introduction of electronic tax systems, which streamline processes and reduce manual intervention, should result in greater in efficiency tax collection.
Empirical Evidence: Several studies have investigated the impact of electronic tax systems on tax collection efficiency. Here are some examples: A study by Azmi and Kamarulzaman (2010) found that the implementation of an electronic tax filing system in Malaysia significantly improved tax compliance and collection efficiency. They reported a reduction in processing time and costs, as well as increased accuracy and transparency. Gupta et al. (2016) examined the impact of electronic tax filing in India and concluded that it led to improved tax collection efficiency, reduced compliance costs, and increased taxpayer satisfaction. Muogbo (2013) investigated the adoption of electronic tax systems in Nigeria and found that it positively influenced tax collection efficiency by reducing tax evasion, improving transparency, and enhancing the overall tax administration process. A study by Wasao (2014) in Kenya revealed that the implementation of an electronic tax system significantly improved tax collection efficiency by reducing processing time, minimizing errors, and enhancing data management.

These theories and empirical studies provide evidence supporting the alternative hypothesis (H1) that the use of electronic tax systems has significantly contributed to the efficiency of tax collection in various countries.

1.6 Organization of the Research

Here's the organization of dissertation presented in a more structured and polished manner:

Chapter One: Introduction
Chapter One of the dissertation provides a foundational framework for the study, offering readers insight into its goals, parameters, and essential background information.
It acts as a guide, outlining the purpose and structure of the research. All its component together provides a comprehensive overview of the research, helping readers understand its context, objectives and methodology.
Chapter Two: Literature Review
Chapter Two delves into a comprehensive review of existing literature pertinent to the dissertation topic. It explores relevant theories, models, and fundamental concepts essential for understanding the research context.
Chapter three: The history and Current Status of Tax Administration in Rwanda
The purpose of this chapter is to clarify the many roles that the Rwanda Revenue Authority plays in the field of tax administration by offering a thorough examination of its activities and duties. It also highlighted the significant benefits and implications of using electronic efficiency tax collection systems. It explores how such systems can help tax authorities in

efficiency tax collection improvement, to reduce tax payment risk, to find errors and to improve taxpayers' compliance.

Chapter Four: Data Analysis and Interpretation

Chapter Five, this chapter highlighted in in details the findings, and interpretation of data collected during the course of the study both secondary data and primary data was analyzed using tables and figures.

Chapter Five: Conclusion, Recommendations, and Takeaways

In this chapter, concluding remarks, practical recommendations, key takeaways as well as area of father research were presented. It synthesizes the findings, addresses research objectives, and offers insights for future research or practical implementation.

1.7 Research Scope and Limitation

Scope: The scope of this study was to examine the contribution of the Electronic Tax System in improving tax collection efficiency in Rwanda over a 20-year period from 2002 to 2022. The research was divided into two distinct segments:

1. The initial 10-year period from 2002 to 2012, prior to the implementation of the e-filing system.
2. The subsequent 10-year period from 2012 to 2022, during which the Rwanda Revenue Authority (RRA) executed digital tax administration reforms.

The study focused on assessing the following aspects:

- Compliance levels before and after the introduction of the e-filing system
- Identification of tax payment risks
- Evaluation of taxpayer perceptions and skills in using the e-filing system
- The impact of the e-filing system on the efficiency of tax collection

Both taxpayers and RRA staff were engaged in the research to obtain a comprehensive understanding of the topic.

Limitations

1. **Insufficient historical data**: The researchers faced a limitation in obtaining detailed information about the period preceding the introduction of the e-filing system (2002-2012). This limited their ability to fully understand the evolution of tax practices and attitudes prior to digitization.
2. **Resource constraints**: The researchers may have faced constraints in terms of time, budget, and accessibility to the target population, which could have influenced the sample size and scope of the study.
3. **Generalizability**: The findings of this study may be specific to the Rwandan context and may not be directly generalizable to other countries or tax systems without further research.
4. **Taxpayer and staff engagement**: While both taxpayers and RRA staff were engaged in the research, the researchers may have faced challenges in ensuring comprehensive and representative participation from these stakeholders.

Despite these limitations, the researchers were able to conduct a thorough investigation and provide valuable insights into the contribution of the Electronic Tax System in improving tax collection efficiency in Rwanda.

2 THEORY AND LITERATURE REVIEW

This chapter offers a comprehensive review of literature organized around themes derived from the specific objectives and research questions. Within this framework, the researcher examines the works and perspectives of various scholars and writers pertaining to the variables under study. The discussion in this chapter delves into theories, models, and relevant literature related to the study variables, with a particular emphasis on exploring the impact of Electronic tax Systems on tax collection.

2.1 Research Theories models

In this section, the researcher used existing research theories on adoption of technology and efficiency tax collection which used by various scholars including the following: Unified Theory of Acceptance and Use of Technology (UTAUT), Motivational Model (MM), Technology acceptance model (TAM), Diffusion of Innovation (DOI) Theory, and Theory of Reasoned Action (T.R.A), and Risk management model. We hope that these theories are suitable for this study because they explain taxpayer's behaviour when adopting new technology. Online filing being new technology to use was explained well by these theories on adoption process.

2.1.1 Unified Theory of Acceptance and Use of Technology (UTAUT)

The goal of this model, as developed by Venkatesh and others, is to explain users' initial plans or intention to use an information system and their following usage behavior. Understanding one's desire to use and real usage of an information system is the aim of UTAUT (Venkatesh et al, 2003). According to the theory, usage purpose and behavior are directly influenced by four important constructs: performance expectancy, effort expectancy, societal impact, and facilitating circumstances. The effect of the four main constructs on usage purpose and behavior is said to be moderated by factors such as gender, age, experience, and voluntariness of use. (Venkatesh, V, D. F, 2003).

The Rwanda Revenue Authority (RRA) initially encountered difficulties getting tax payers to accept technology; however, after sensitization and the government imposed strict requirements to abide by the tax policy of filing and paying taxes using ICT technologies of the internet, mobile devices, and electronic billing machines, the clients eventually accepted the system.

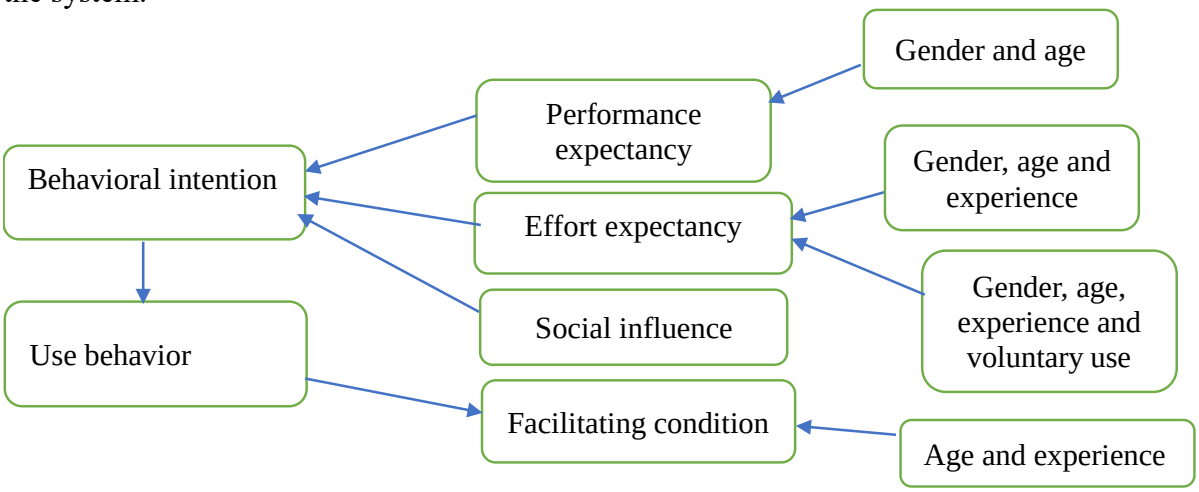


Figure 2-2: Unified Theory of Acceptance and Use of Technology (UTAUT)

Van Raaij and Schepers criticized the UTAUT as being less parsimonious than the

previous technology acceptance model and TAM2 because its high R^2 is only achieved when moderating key relationships with up to four variables. They also called the grouping and labeling of items and constructs problematic because a variety of disparate items were combined to reflect a single psychometric construct. However, after mobilization and the government imposed strict conditions to abide by the tax policy of filing and paying taxes using ICT technologies.

2.1.2 Technology acceptance model (TAM)

According to (Davis, 1989), The Technology Acceptance Model posits that there are two factors that determine whether a computer system was accepted by its potential users: (1) perceived usefulness, and (2) perceived ease of use. The key feature of this model is its emphasis on the perceptions of the potential user. That is, while the creator of a given technology product may believe the product is useful and user-friendly, it will not be accepted by its potential users unless the users share those beliefs. It has been an important issue for IT managers and researchers to determine which factors make an individual select a new IT. The answer is that regardless of how many enterprises invest in establishing new and more efficient IT systems, the system's effectiveness can only be realized if the users clearly understand and use it. The figure below is a diagrammatic representation of the theory.

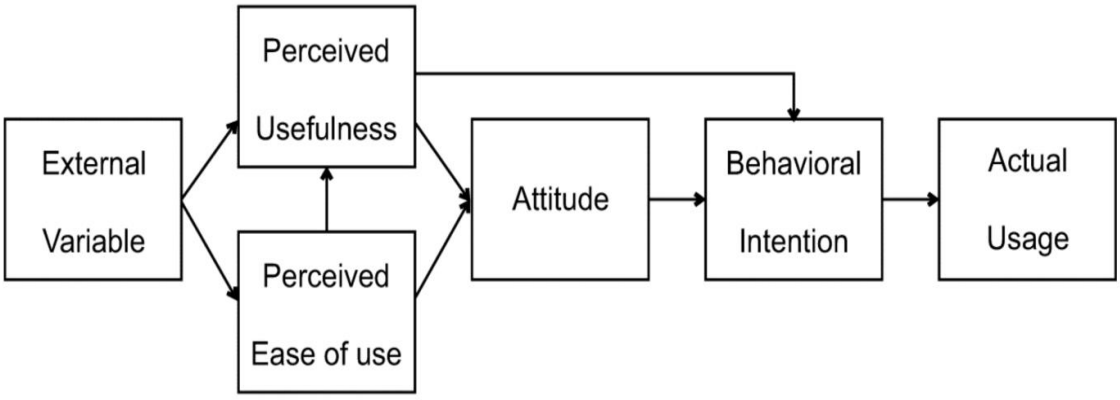


Figure 3-2: Technology Acceptance Model (TAM)

Through an analysis of existing literature on IT utilization, Zmud identified two cognitive and attitudinal pathways influencing system success, with individual differences categorized into three variables: perceived style, character, and population statistics/situation. This examination revealed that situational variables of individual differences include education discipline, user experience, and user ability. As a result, it is believed that the adoption of e-filing systems is advantageous, providing significant benefits to both taxpayers and the government.

2.1.3 Theory of Reasoned Action (T.R.A)

According to the Theory of Reasoned Action (TRA), a person's behavior is influenced by their purpose to carry out the behavior, which is dependent on their attitude toward the behavior and subjective standards. (Fishbein & Ajzen, 1975). This means that the theory of reasoned action (TRA) is aimed to explain the relationship between attitudes and behaviors within human action. It is mainly used to predict how individuals behave based on their pre-existing attitudes and behavioral intentions.

Therefore, an individual's decision to engage in a particular behavior is based on the outcomes the individual expects will come as a result of performing the behavior. The figure

below is a diagrammatic representation of the theory.

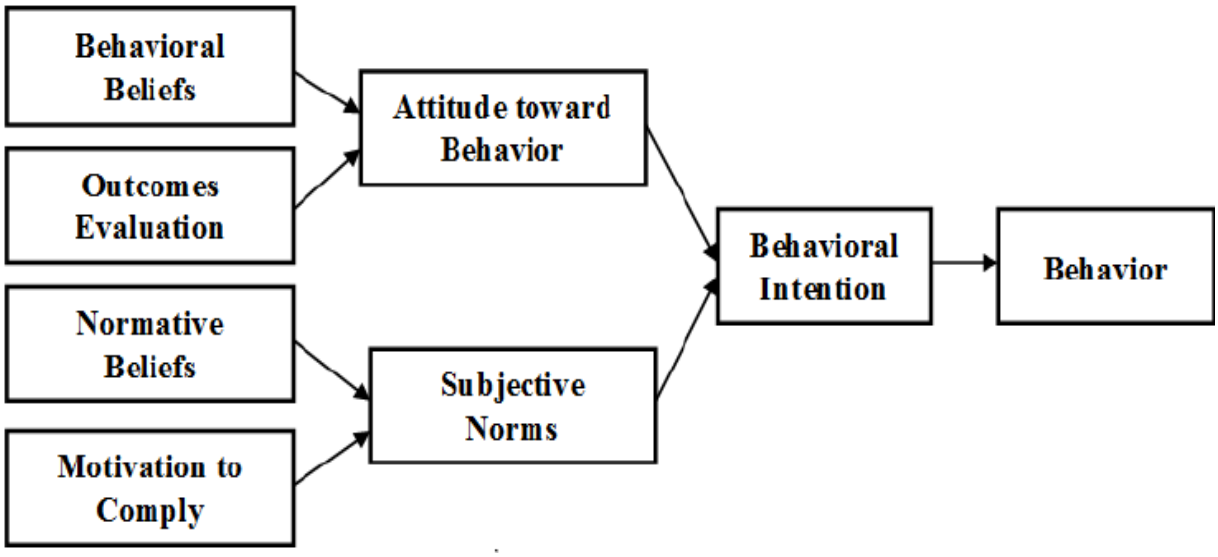


Figure 4-2: Theory of Reasoned Action – TRA

In Rwanda the adoption of using ICT was not easy because of some challenges include lack of enough ICT infrastructure, lack of staff capacity in terms of trainings, and staff attitude towards technology adoption. The same as E-filling adoption, challenge was not only to the Government but also to taxpayer, like lack of knowledge, internet problem, its infrastructures such as phone, computers. Currently most of the population's mind behavior about the use of technology have been. However, it is believed that electronic tax filing and payment system is success in helping both government and Taxpayer in improving tax compliance and efficiency tax collection in the country.

2.1.4 Diffusion of Innovation (DOI) Theory

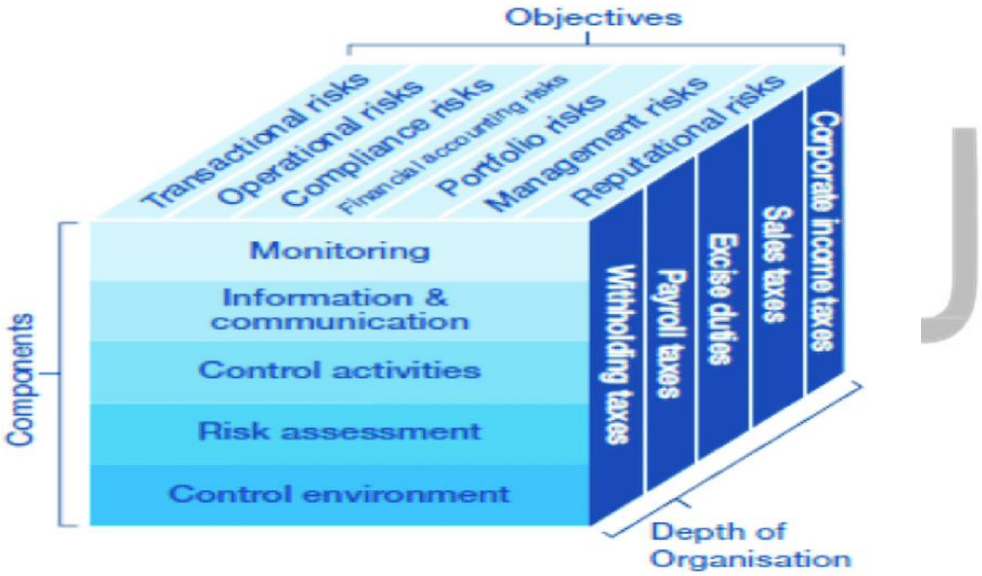
The Diffusion of Innovation (DOI) Theory, formulated by EM Rogers (1962), is among the oldest concepts in the social sciences. Originally applied in communication studies, it elucidates how an idea or product gains traction and spreads over time within a particular population or social system. Innovation adoption is not a social process that happens all at once in a system; rather, it develops gradually, with some people being more inclined to accept innovations than others. The distinction between early and late adopters emphasizes how crucial it is to comprehend the traits of the intended audience when introducing a new idea in order to promote acceptance. In this framework, innovation, communication channels, time, and social systems are the four essential components influencing the diffusion of innovations. In the context of Rwanda's adoption of e-filing technology, it represents a relatively new practice, akin to an innovation for each individual utilizing internet technology.

2.1.5 Risk management model

Towards the end of the 20th century, risk management began to gain prominence as a critical tool in both policy and business literature, permeating various facets of commercial

and public sector management, as noted by Power (2004). Although tax risk management was once considered a subset of general risk management, it is now recognized as a distinct discipline in its own right. (Elgood, Paroissien, and Quimby 2005) assert that operational risk, compliance risk, and financial accounting risk are integral components of risk management applicable to multinational corporations with subsidiaries operating across different jurisdictions.

Arlinghaus (1998) defines tax risk as the potential deviation of tax outcomes from expectations due to various factors, including legal system intricacies, legislative changes, shifts in business assumptions, heightened audit frequency, interpretational uncertainties, and actions by the tax function that may lead to negative publicity for the company. Therefore, while tax depreciation is expected to be deductible from taxable profits in subsequent years, the extent of this tax benefit remains uncertain due to challenges in predicting the company's tax position or potential legislative amendments. This uncertainty presents an economic and technological tax risk with potentially unpredictable financial consequences. Tax risk encompasses various aspects that can be evaluated using frameworks such as The Committee of Sponsoring Organizations of the Treadway Commission (COSO), which considers all company decisions, actions, and operational uncertainties in assessing tax risk comprehensively.



Source: Elgood et al. (2004).

Figure 5-2: Depicts a tax risk management model analogous to the COSO model

Cozmeia and ùerban (2014) identify specific risk areas in tax management. ***Transactional risk*** pertains to uncertainties in particular transactions, especially those deemed high-risk, such as restructurings, reorganizations, and mergers. ***Operational risk*** involves potential losses due to internal processes, personnel, system failures, and external factors, including ambiguity in applying tax regulations to routine activities like expanding into foreign markets or adopting new technologies.

Compliance risk encompasses aspects like tax return preparation and legislative, legal, tax technical, and regulatory risks. Electronic filing systems are seen as a tax risk management approach by aligning enforcement strategies with taxpayer behavior to mitigate risks such as ***registration***, ***filing, payment, and declaration errors*** (Fiscalis Guide, 2006, p.13). It is believed that e-filing can enhance efficiency tax collection and compliance by

reducing errors and risks in tax payments. While tax laws are complex, electronic filing can simplify the process by automating calculations, flagging errors, prompting for missing information, and assisting in claiming credits and deductions.

2.2. Empirical review

2.2.1 Taxpayers' Perception and Technical Skills on E-tax

Research by Venkatesh et al. (2003) provides insights into taxpayers' acceptance and usage behavior towards electronic tax filing systems, drawing from the Unified Theory of Acceptance and Use of Technology (UTAUT). Similarly, Davis (1989) presents the Technology Acceptance Model (TAM), which examines the factors influencing users' acceptance of new technology, including perceived usefulness and ease of use. In the context of Malaysian tax e-filing, (Azmi and Kamarulzaman ,2010) study investigated the relationship between perceived risk and its features within the Technology Acceptance Model (TAM). The research emphasized the growing significance of e-government services, particularly tax e-filing, in many countries. Despite its rapid adoption, there remains a lack of trust in the system, especially in developing nations, due to high perceived risks among the general population.

The study identified various risks, including performance, psychological, time, and privacy risks, which may hinder the adoption of e-filing systems, particularly for taxpayers lacking IT proficiency. Recommendations included the development of risk-reducing measures, such as enhanced security features, to promote the use of electronic filing systems. (Lubua, E. W, 2016) argued in his research that tax collection is vital for a nation's economy. He focused on Tanzania and demonstrated how e-transparent services can enhance voluntary tax compliance among Small and Medium Enterprises (SMEs). The study highlighted factors such as employee honesty, business experience, knowledge of tax rules, and the use of relevant ICT technologies by the revenue authority to improve voluntary compliance.

In the context of Rwanda, Mukasa et al. (2011) explore taxpayers' attitudes and perceptions towards electronic tax filing, shedding light on factors influencing adoption and usage behavior. Additionally, research by Kamana (2016) investigates the technical skills and challenges faced by Rwandan taxpayers in navigating electronic tax filing platforms, offering valuable insights into local context-specific barriers and facilitators. Schaupp, Carter, and Hobbs (2009) explored the impact of trust, risk, and optimism bias on e-filing adoption. They found that factors such as trust in the system, perceived risk associated with online transactions, and individuals' inherent bias towards optimistic outcomes significantly influence the intention to adopt e-filing systems. (Maisiba and Atambo 2016) examined the impact of Rwanda's computerized tax administration system, demonstrating its effectiveness in facilitating timely tax payments at lower costs. (Olurankinse, F.; Oladeji, O. E. 2018) studied self-assessment and e-taxation payment systems in Nigeria, highlighting their positive correlation with revenue production and tax compliance among corporate organizations.

(Daniel Akpubi and Olusola Igbekoyi, 2019) researched the effect of electronic tax filing system costs on tax compliance among SMEs in Lagos state, revealing the significance of taxpayer awareness and the impact of compliance costs on system utilization.The literature indicates that taxpayers' acceptance and usage behavior towards electronic tax technical proficiency. Also Trust and risk perception play crucial roles in shaping taxpayers'

willingness to adopt e-filing systems. Tax authorities need to implement robust security measures and provide transparent information regarding data protection to build trust among taxpayers and alleviate concerns about potential risks associated with online transactions. Understanding these factors is crucial for designing user-friendly platforms and promoting adoption among taxpayers. Therefore, concluding remarks may emphasize the importance of user-centric design and targeted education programs to enhance taxpayers' perception and technical skills in using electronic tax filing systems.

2.2.2 Tax Administration in Rwanda

While there may be limited international literature specifically focused on tax administration in Rwanda, comparative studies on tax systems and governance in similar developing economies can offer relevant insights. For example, research by Alm et al. (2006) examines tax compliance behavior and administrative practices in sub-Saharan African countries, providing a broader perspective on tax administration challenges and strategies.

Studies by Maisiba and Atambo (2016) and Olurankinse & Oladeji (2018) offer detailed analyses of Rwanda's tax administration evolution, including the adoption of electronic tax systems. These studies provide historical context and assess the current state of tax administration in Rwanda, highlighting achievements, challenges, and opportunities for improvement. Mukasa (2011) examined the role of Information and Communication Technology (ICT) in taxation in Rwanda. The study highlighted the government's efforts to modernize tax administration through ICT initiatives, such as the introduction of electronic tax filing and payment systems. These initiatives aimed to enhance efficiency, transparency, and taxpayer compliance in Rwanda's tax system.

The Rwanda Revenue Authority's (2022) annual report provided insights into the current state of tax administration in Rwanda. It outlined key achievements, challenges, and strategic priorities of the revenue authority, including efforts to improve taxpayer services, strengthen compliance enforcement, and enhance tax collection through innovative ICT solutions. Rwanda's tax administration has undergone significant transformation in recent years, driven by the government's commitment to leveraging ICT for improved service delivery and compliance management. The adoption of electronic tax filing and payment systems represents a pivotal step towards modernizing tax processes and promoting voluntary compliance among taxpayers.

Despite notable progress, challenges such as limited ICT infrastructure, internet accessibility, and taxpayer education remain barriers to fully realizing the potential benefits of electronic tax systems in Rwanda. Addressing these challenges requires sustained investment in ICT infrastructure, capacity building, and outreach programs to enhance taxpayer awareness and participation. Through an analysis of historical and current literature on tax administration in Rwanda, it becomes evident that significant progress has been made in modernizing tax systems, including the adoption of electronic tax systems. However, challenges such as limited internet access and trust issues remain prevalent. Therefore, the conclusion may highlight the need for continuous reforms and investments in infrastructure, capacity building, and trust-building measures to further improve tax administration efficiency and effectiveness in Rwanda.

2.2.3 Electronic tax collection System and Efficiency tax collection

Research by Yılmaz & Coolidge (2013) and Rogoff (2016) explores the impact of electronic efficiency tax collection systems on tax collection and compliance behavior in

various countries. These studies offer insights into the effectiveness of electronic tax systems in improving efficiency, reducing errors, and enhancing transparency. (Sagas, Nelimalyani, and Kimaiyo, 2015) conducted research on the effect of electronic tax registers (ETRs) on tax collection in Kenya's western region. Their findings revealed that 75% of respondents believed ETR machines helped reduce tax evasion, while 86% noted their contribution to increased tax collection due to their efficiency.

In a study by Wawire (2016) focusing on Kenya's tax system, tax buoyancy and income-elasticity were analyzed through regression of tax revenues on their respective tax bases. The study concluded that the tax system had shortcomings in generating necessary revenues. However, it was criticized for not considering other determinants affecting tax revenue, such as external circumstances, and for not disaggregating tax revenue data by source, making it difficult to ascertain the contributions of different tax bases to the treasury. Additionally, it overlooked the time series properties of the data used.

Efunboade (2014) investigated the impact of electronic tax systems on tax administration in Nigeria, particularly in response to declining revenues from crude oil exports. The study highlighted the significant role of electronic tax systems in increasing internally generated revenue by enhancing compliance, productivity, and overall economic activity in the country. However, it emphasized the need for concerted efforts to adopt electronic tax system technologies to drive tax administration forward. The implementation of electronic tax systems is identified as a catalyst for accelerated growth and poverty reduction in Nigeria and across the African continent.

A key recommendation stemming from this research is the urgent need for legislative action to reduce or eliminate import taxes on essential information technology hardware. This includes computers, servers, printers, biometric scanners, and other related devices. Such regulatory changes are crucial to facilitate greater accessibility and affordability of technology, thereby enabling wider adoption of electronic tax systems. Governments can improve tax administration efficiency, boost economic growth, and reduce poverty in the region by lowering barriers to entry and promoting the use of digital tools.

Studies by Sagas, Nelimalyani, and Kimaiyo (2015) and Daniel Akpubi and Olusola Igbekoyi (2019) examine the implementation and outcomes of electronic efficiency tax collection systems in Rwanda, providing empirical evidence of their contribution to revenue generation and tax compliance. Additionally, research by Lubua (2016) evaluates the effectiveness of electronic tax systems in promoting voluntary compliance among SMEs in Rwanda, offering context-specific insights into their impact on local businesses. Geetha and Sekar (2012) examined the impact of e-filing on efficiency tax collection and management in India. The study highlighted the benefits of e-filing systems in improving efficiency, accuracy, and transparency in tax administration. It emphasized the role of technology in enhancing taxpayer services, reducing compliance costs, and increasing tax collection for the government. The United Nations Economic Commission for Africa's (2020) Africa Regional Integration Index Report provided insights into regional trends and challenges in tax administration across Africa. The report underscored the importance of digitalization in strengthening tax systems, promoting regional integration, and facilitating economic growth in Africa. The success of electronic efficiency tax collection systems depends on various factors, including system reliability, user-friendliness, and taxpayer trust. Governments need to invest in robust IT infrastructure, cybersecurity measures, and taxpayer education to ensure the effective implementation and adoption of e-taxation systems. Electronic tax systems have the potential to transform tax administration in Africa by increasing revenue mobilization, enhancing compliance, and reducing administrative burdens for taxpayers and tax authorities. Regional cooperation and knowledge sharing can

facilitate the adoption of best practices and innovative solutions to address common challenges faced by African countries in tax administration.

Similarly, (Muita , 2010) conducted research on the acceptance and use of e-filing systems among Large Taxpayers in Kenya. The study emphasized the importance of infrastructure, user abilities, and the tax authority's readiness to promote tax compliance-based technology. (Dowe ,2008) further emphasized the prerequisites for successful e-filing and e-payment systems, including reliable internet service, cooperative financial institutions, an IT-oriented public, and adequate financing. He mentioned that the implementation process for electronic tax systems begins with the development of a strategic business plan – documenting the ideas and actions, desired outcomes and the time frame for each component, considering the strengths and weaknesses of the tax administration and environmental opportunities and threats. The plan should also document the implementation strategy including the implementation approach. Many countries have taken a gradual approach by allowing voluntary e-filing and e-payment for select segments of the taxpayer base, e.g. individuals or companies only, in the initial stages to allow for live testing of the system.

The literature demonstrates that electronic efficiency tax collection systems have played a vital role in enhancing efficiency, reducing errors, and promoting compliance in Rwanda and other contexts. These systems have facilitated faster transactions, improved data quality, and streamlined administrative processes. As a result, the conclusion may emphasize the positive impact of electronic tax systems on revenue generation and compliance, underscoring the importance of continued investment and innovation in technology-enabled tax administration solutions.

2.2.4 Electronic tax system and traditional tax system

The advancement of information technology has led to a global focus on online tax systems, particularly in developing countries, as seen in the increasing adoption of electronic tax tax collection methods (Nisar, 2006). E-tax systems offer numerous benefits, such as improved efficiency and accuracy for tax officers due to the availability of better information (Jahirul, 2011), as well as cost savings and resource reallocation for administrative tasks like auditing and customer service (Geetha & Sekar, 2012). Traditional paper-based tax processes present various challenges, including high compliance costs and limited analytical capabilities for tax agencies. Oyebola Okunogbea and Fabrizio Santorob (2023) emphasized the importance of traditional enforcement measures alongside new technologies to combat tax evasion effectively.

Electronic filing and payment systems not only aid in addressing tax evasion and corruption but also contribute to achieving market equilibrium, reducing the informal economy, and promoting equitable business opportunities (Oyebola Okunogbea & Fabrizio Santorob, 2023). For instance, the Rwanda Revenue Authority (RRA) has utilized electronic filing and payment systems to streamline tax processes and improve compliance. This technology has made tax filing and payment more convenient and transparent for citizens and businesses, leading to easier audits and enhanced tax collection.It has been demonstrated that e-filing solutions improve the accuracy and efficiency of tax administration procedures. Yılmaz, F., & Coolidge, J. (2013) emphasizes that e-filing improves the volume and quality of data that tax officers have access to, which speeds up transactions, reduces error rates, and expedites the issuing of assessments and refunds. E-filing also lessens the need for fines and other punitive actions, which saves money on administrative expenses and frees up resources for other uses like customer support and auditing. The Nigerian government implemented

the Integrated Tax Administration System (ITAS) in 2015 by the Federal Inland Revenue Service with the goal of updating tax administration and moving away from manual methods in compliance processes, this helps to automate a number of fundamental tax procedures, such as filing returns and registering, paying, auditing, and assessing. Despite the potential benefits of electronic payments for tax compliance, there are uncertainties regarding their impact. Rogoff. (2016), OECD. (2017), and Awasthi and Engels chalk. (2018) suggest that electronic transactions could simplify tax administration due to the paper trail they create. Almunia et al. (2021) contend, however, that businesses may deliberately avoid tax liabilities and that governments might not be able to make efficient use of third-party information. New empirical data on the effect of electronic payments on tax compliance in West Bengal, India, is presented by Warwick et al. (2022) underscoring the need for more study to fully comprehend the connection between tax revenues and electronic payments.

2.2.5 E-filing and tax compliance

Research on the relationship between e-filing and tax compliance has garnered attention due to the widespread adoption of electronic tax filing methods (Becker & Lacktorin-Revier, 2008). Previous studies have highlighted the situational nature of ethics, indicating that personal ethics strongly influence tax compliance (Becker & Lacktorin-Revier, 2008). While Muturi & Kiarie (2015) found that online tax systems impact tax compliance among small taxpayers, Gwaro et al. (2016) concluded that the stability of online tax return systems does not significantly affect tax compliance levels. Additionally, computer literacy levels were found to play a significant role in influencing tax compliance.

Geetha & Sekar (2012) discovered that users generally express satisfaction with e-filing facilities; however, individual taxpayers often lack awareness of e-filing and e-payment procedures. Schaupp, Carter & Hobbs (2009) revealed that performance expectancy, social influence, facilitating conditions, and optimism bias significantly impact the intention to e-file. Lastly, Korir (2011) emphasized that taxpayers' attitudes toward the tax system are influenced by various factors, which ultimately shape their behavior and encourage tax compliance (Korir, 2011). Wenzel (2004) emphasizes that the interaction between tax authorities and taxpayers plays a crucial role in shaping taxpayer attitudes. Alm et al. (2006) further assert that trust in the state enhances positive attitudes and commitment to tax payment, ultimately leading to voluntary compliance in reporting and fulfilling tax obligations.

Understanding the drivers of taxpayer behavior toward compliance or noncompliance is complex, but research by Dr. Valerie Braithwaite suggests that taxpayers adopt sets of values, beliefs, and attitudes, known as "motivational postures," influenced by various factors. The Organization for Economic Co-Operation and Development (OECD) research report (2004) suggests that revenue authorities can strategically manage compliance programs by understanding taxpayer motivation theories and factors influencing compliance behaviors. By analyzing compliance behavior, authorities can address the root causes of non-compliance rather than merely treating symptoms, leading to longer-term compliance outcomes. Picur et al. (2006) discuss three theoretical perspectives: economic models, uncertainty models, and norms of compliance models to explain tax compliance levels.

Economic models suggest that taxpayers aim to maximize financial gains while weighing the risks of evasion and detection. Uncertainty models expand on this by acknowledging the uncertainty surrounding penalty provisions and audit possibilities. Norms of compliance models explore how tax culture influences taxpayer behavior standards.

2.2.6 Challenges E-tax service systems in tax administration.

The utilization of computers has introduced challenges in tax administration that have received insufficient attention despite the overall positive impact of computerization on organizational performance. Despite Revenue Authorities' successful adoption of E-tax service systems, they continue to grapple with several persistent challenges:

1. Affordability remains a concern, particularly for taxpayers who are unfamiliar with online tax preparation and filing processes. While there are options for free submission of tax returns, navigating these systems often requires a learning curve. Some taxpayers find the process daunting and may opt to seek professional assistance, whether through traditional paper-based methods or technological means Kamana (2016).
2. The lack of internet access poses a significant barrier to the widespread adoption of E-tax service systems. Although online portals are available, not all taxpayers have reliable internet connectivity, especially in rural areas. This disparity primarily benefits urban businesses and hampers the system's adoption in rural regions, where internet access is limited Kamana (2016) noted. The unreliable network further complicates service delivery for Revenue Authorities.
3. Trust, security, and privacy concerns persist among taxpayers regarding the use of their data during online transactions. The possibility of data breaches and internet vulnerabilities exacerbates these fears, leading to biases and distrust among taxpayers. Mukasa et al. (2011) highlights how incomplete knowledge about tax system operations can influence attitudes and perceptions of fairness. Despite assurances, authorities have struggled to convince the public that their information is secure and inaccessible to unauthorized parties.

2.3 Research gaps

The research gap in the domain of electronic tax systems in Rwanda emerges from the lack of comprehensive academic inquiry specifically focused on this subject, particularly within the East and Central African region (Warkentin et al., 2002). Despite the implementation of e-filing in 2012, scholarly investigations into the efficacy and implications of electronic tax payment systems in this specific geographic context are notably absent (Geetha & Sekar, 2012).

This gap is significant as it impedes a thorough understanding of the potential advantages, challenges, and outcomes associated with the adoption of electronic tax systems, particularly within Rwanda's unique socio-economic and regulatory landscape. Existing literature underscores the transformative potential of e-Government and electronic tax systems, highlighting their capacity to streamline tax administration processes, enhance operational efficiency, and improve tax collection outcomes. However, empirical studies tailored to the Rwandan context are scarce, leaving a critical void in scholarly discourse. Moreover, the complexities inherent in the adoption of electronic tax systems, including concerns related to uncertainty, reliability, and citizen perception, underscore the pressing need for dedicated research efforts in this area.

By addressing this research gap, the proposed study aims to contribute valuable insights into the role of electronic tax systems in facilitating efficiency tax collection in Rwanda. Through empirical investigation, the study seeks to assess taxpayers' perceptions and technical competencies regarding electronic tax filing, offer a comprehensive analysis of the historical evolution and current state of tax administration in Rwanda, and evaluate the effectiveness of electronic efficiency tax collection systems in enhancing operational

efficiency and compliance. This research endeavor holds substantial implications for informing policy decisions, refining tax administration practices, and ultimately fostering sustainable economic development in Rwanda. By bridging the existing gap in academic literature and providing empirical evidence on the contribution of electronic tax systems, the study endeavors to offer actionable insights that can drive positive change and innovation in the realm of tax administration.

2.4 Chapter Summary

In the digital age, electronic tax systems have emerged as essential tools for modernizing tax administration and promoting compliance. This essay explores the empirical literature on electronic tax filing systems, tax administration in Rwanda, and the contribution of electronic efficiency tax collection systems. By synthesizing key insights and contributions from existing research, this essay aims to provide a comprehensive understanding of the role of electronic tax systems in facilitating efficient efficiency tax collection.

The literature on taxpayers' perception and technical skills towards electronic tax filing systems reveals valuable insights into adoption behavior and challenges faced by taxpayers. Studies employing models such as TAM and UTAUT have identified factors influencing acceptance, including perceived usefulness, ease of use, and trust. Research from Malaysia, Tanzania, Nigeria, and Rwanda highlights the importance of addressing perceived risks, enhancing trust, and improving taxpayer education to promote adoption. Understanding taxpayers' attitudes and technical skills is crucial for designing user-friendly systems and promoting adoption.

Studies the history and current status of tax administration in Rwanda provide historical context and assess achievements, challenges, and opportunities for improvement. Rwanda's efforts to modernize tax administration through ICT initiatives, including electronic tax filing and payment systems, have led to significant improvements in efficiency and compliance. Challenges such as limited ICT infrastructure and taxpayer education remain, emphasizing the need for continuous reforms and investments.

Research from various countries demonstrates the positive impact of electronic efficiency tax collection systems on revenue generation, compliance behavior, and administrative efficiency. Electronic tax systems offer benefits such as improved data quality, faster transactions, and reduced error rates. Despite challenges such as affordability and trust issues, electronic tax systems have facilitated significant improvements in tax administration outcomes.

E-filing systems offer numerous benefits over traditional paper-based tax processes, including improved efficiency, accuracy, and cost savings. Challenges such as affordability and internet access persist but can be addressed through targeted interventions. Leveraging technology alongside traditional enforcement measures is crucial for combating tax evasion and promoting compliance. The complex relationship between e-filing systems and tax compliance is influenced by factors such as individual ethics, computer literacy, and trust. Understanding taxpayer motivation theories and compliance behaviors is essential for designing effective compliance strategies.

Norms of compliance models offer insights into taxpayer behavior and factors influencing compliance levels. Despite the benefits of electronic tax systems, challenges such as affordability, internet access, and security concerns persist. Addressing these challenges requires concerted efforts from tax authorities and policymakers to improve infrastructure and enhance taxpayer education.

In conclusion, the empirical literature provides valuable insights into the adoption, implementation, and impact of electronic tax systems on tax administration and compliance

behavior. By addressing research gaps and leveraging empirical evidence, policymakers can develop targeted interventions to enhance tax administration efficiency and promote voluntary compliance. Harnessing the potential of electronic tax systems is essential for fostering sustainable economic development and ensuring effective efficiency tax collection in the digital age.

3 HISTORY AND CURRENT STATUS OF TAX ADMINISTRATION IN RWANDA

Overall, the Rwanda Revenue Authority plays a crucial role in revenue mobilization and administration, aiming to contribute to the economic development of Rwanda through effective and equitable tax collection practices

Establishment: The Rwanda Revenue Authority was established under Law No 15/97 of 8 November 1997. It operates as a quasi-autonomous body with the responsibility of assessing, collecting, and accounting for various revenues, including taxes, customs duties, and other specified revenues.

Mandate: The primary functions of the RRA include administering and enforcing laws related to tax, customs, and other specified revenues. It also collects non-tax revenues and provides advice to the government on tax policy matters. Additionally, the RRA is tasked with performing other duties related to tax administration as directed by the Cabinet.
Vision: The vision of the Rwanda Revenue Authority is to become a "world-class efficient and modern revenue agency, fully financing national needs." This vision indicates a commitment to achieving high standards of efficiency and modernization in tax collection to meet the financial requirements of the nation.
Mission Statement: The mission of the RRA is to "mobilize revenue for economic development through efficient and equitable services that promote business growth." This mission emphasizes the role of the authority in generating revenue to support economic development while ensuring fairness and efficiency in its services. It also highlights the importance of fostering business growth within the country.
Organization structure: The RRA is governed by a Board of Directors under a Board Chairperson who is appointed by the Prime Minister on the recommendation of the Cabinet. The Board is responsible for the formulation and implementation of the day-to-day policies of the RRA. Here below is a figure showing organization structure of RRA:

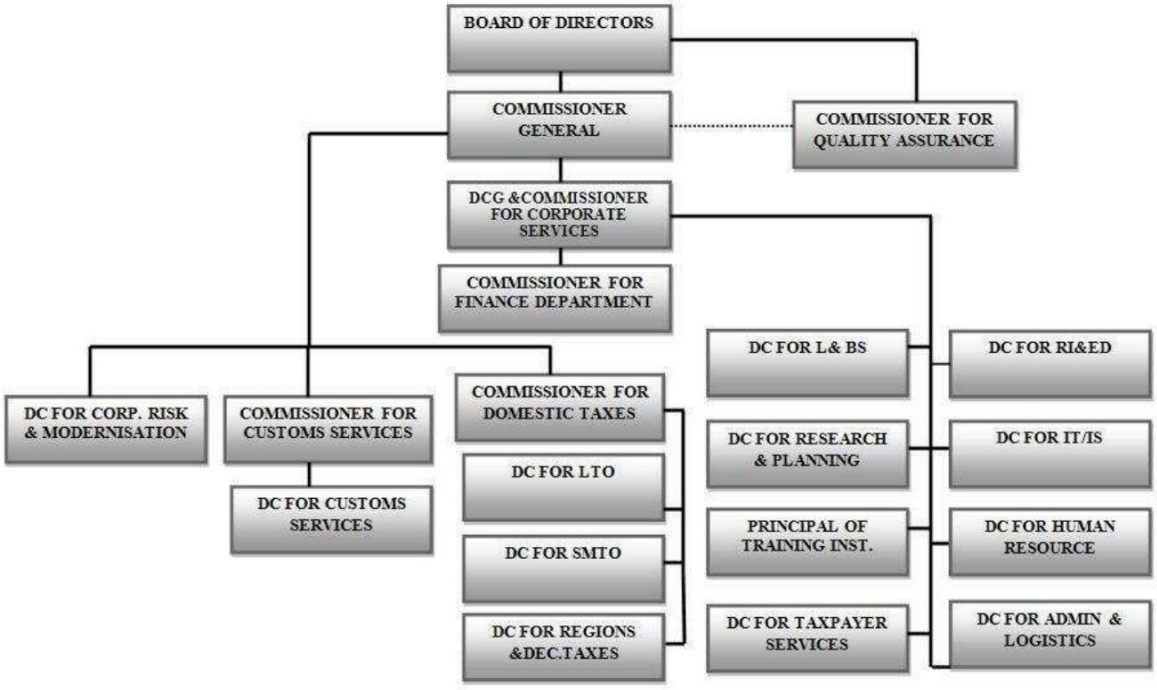


Figure 6-3: Organization structure of RRA

Table 4-3: Total number of employees by gender:

Year	Male	Female	Total	% Male	% Female
2015/16	720	458	1,178	61.1%	38.9%
2016/17	779	499	1,278	61.0%	39.0%
2017/18	758	494	1,252	60.5%	39.5%
2018/19	769	505	1,274	60.4%	39.6%
2019/20	770	506	1,276	60.3%	39.7%
2020/21	746	505	1,251	59.6%	40.4%
2021/22	748	509	1,257	59.5%	40.5%
2022/23	774	526	1,300	59.5%	40.5%

Source: RRA Reports

The table provides data on the number of male and female employees for the years 2015/16 through 2022/23, along with the total number of employees and the percentage of male and female employees for each year, here is the interpretation:

Total Employees: The total number of employees has increased from 1,178 in 2015/16 to 1,300 in 2022/23, a growth of around 10% over the 7-year period.

Male Employees: The number of male employees has increased from 720 in 2015/16 to 774 in 2022/23, a growth of around 7.5%. The percentage of male employees has decreased slightly from 61.1% in 2015/16 to 59.5% in 2022/23.

Female Employees: The number of female employees has increased from 458 in 2015/16 to 526 in 2022/23, a growth of around 15%. The percentage of female employees has increased from 38.9% in 2015/16 to 40.5% in 2022/23.

Gender Composition: The data shows a gradual increase in the proportion of female employees over the years, from 38.9% in 2015/16 to 40.5% in 2022/23. This suggests that the Rwandan labor market has been experiencing a trend towards greater gender balance, with the share of female employees increasing steadily. In summary, the table indicates that the total number of employees in Rwanda has grown over the 7-year period, with a larger increase in the number of female employees compared to male employees. This has resulted in a slight shift towards a more gender-balanced workforce, though males still constitute the majority of employees.

Table 5-3: Table summarizing the job category data by Gender

Job Category	Male (Number)	Male (Percent)	Female (Number)	Female (Percent)
Board Members	6	75.0%	2	25.0%
Executives	5	55.6%	4	44.4%
Managers	85	64.9%	46	35.1%
Professionals	142	65.1%	76	34.9%
Technical	504	57.5%	372	42.5%
Support	39	59.1%	27	40.9%

Source: RRA Reports

The provided table summarizes job category data by gender, showcasing the distribution of male and female employees across different roles within the organization. Here's the interpretation of the data:

Board Members: There are 6 male board members, constituting 75.0% of the total board members, while there are 2 female board members, accounting for 25.0% of the total. This indicates a gender imbalance within the board, with a higher representation of males compared to females. It suggests a potential area for improvement in achieving gender diversity and inclusivity at the highest decision-making level of the organization.

Executives: Among executives, there are 5 males and 4 females. Males represent 55.6% of the executives, while females account for 44.4%. Although the gender gap is not as pronounced as in the board members' category, there is still a slight skew towards males among executives.

Managers, Professionals, Technical, and Support: In the managerial, professional, technical, and support categories, the number of male employees is higher than female employees in each category. The percentage of males is consistently higher across these categories, ranging from 57.5% to 64.9%, while the percentage of females ranges from 34.9% to 42.5%.

In summary, the data reveals a persistent gender imbalance in the organization, with men occupying the majority of the higher-level positions, such as board members and executives. While the gender gap is narrower in the managerial, professional, and technical roles, women are still underrepresented in these areas compared to their male counterparts. The support roles show a more balanced gender distribution.

3.1 Business registration process

In Rwanda, the first step to become a taxpayer is to register businesses with the Register General either online through the Rwanda Development Board (RDB) portal or directly through the Rwanda Revenue Authority (RRA) in certain circumstances. After getting registered taxpayers issued a unique Taxpayer Identification Number (TIN) which facilitates their compliance with tax obligations. While business registration is primarily conducted online through the RDB portal to leverage the aftercare and investment promotion services provided by RDB, assistance is available both online and at RDB and Business Development Fund (BDF) offices.

Additionally, RDB and RRA systems are integrated to ensure a streamlined registration process and clear understanding of tax responsibilities. Despite the option for assisted registration at various offices, taxpayers benefit from the convenience of online registration,

supported by resources like the RRA Tax Handbook and assistance hotlines provided by RDB and RRA. It is noteworthy that business registration in Rwanda is free of charge, whether done online, at RDB and BDF offices, or through private internet cafés, although the latter may charge a fee for their services[5].

Figure 7-3: Business registration process in Rwanda

In the Rwanda Development Board (RDB) business registration system, there are three main categories for business registration: 'Domestic' company, 'Enterprise' for individuals, and 'Foreign' company. Registering as 'Domestic' is applicable for domestic companies or subsidiaries of foreign companies. 'Enterprise' registration is suitable for sole traders or partnerships, particularly for businesses with a turnover less than FRW 10,000 per day. 'Foreign' registration is for companies already established and registered abroad that intend to operate in Rwanda, excluding domestic subsidiaries of foreign entities.

The documentation requirements vary based on the business category. For 'Domestic' companies, necessary documents include Rwanda National ID or Passport for all shareholders, directors, company secretaries, and accountants, along with notarized articles of association if applicable. For 'Individual Enterprise' registration, only a Rwanda National

[5] https://ondemandint.com/company-registration-in-rwanda/

ID or Passport is required. 'Foreign' companies need additional documentation such as a notarized power of attorney, articles of association, certificate of incorporation from the country of registration, and a company resolution for establishing a branch in Rwanda. All documents must be scanned and attached during the business registration application process.

- **Researcher's comment**

With choices for online registration through the Rwanda Development Board (RDB) portal or in-person registration at RDB and Business Development Fund (BDF) offices, Rwanda's business registration procedure is made to be both easily accessible and efficient. The efficiency and clarity of understanding tax responsibilities is ensured by the integration of Rwanda development board and Rwanda Revenue Authority (RRA) systems. The government has demonstrated its commitment to aiding taxpayers during the registration process by helping both online and at physical locations, in addition to tools like the RRA Tax Handbook and assistance hotlines. In addition, free business registration whether done online or in person promotes diversity and lowers entrance barriers for business owners. All things considered, this strategy promotes an atmosphere that is favorable to Rwandan company expansion and development.

3.1.1 Taxpayers by enterprise size in Rwanda

Table 6-3: Taxpayers by enterprise size in Rwanda

Year	Small Businesses	Medium Businesses	Large Businesses	Total Taxpayers
2014/15	129,705	1,773	341	131,819
2015/16	150,605	1,774	442	152,821
2016/17	161,053	853	374	162,280
2017/18	170,782	853	376	172,011
2018/19	192,742	845	375	193,962
2019/20	228,277	845	375	229,497
2020/21	290,942	840	375	292,157
2021/22	380,527	840	375	381,742
2022/23	465,378	842	373	466,593

Source: RRA Reports

The table above provides the number of taxpayers categorized by enterprise size in Rwanda for the years 2014/15 through 2022/23, along with the total taxpayers for each year. The interpretation of the data is as follows:

1. **Small Businesses**: The criteria for being considered a small business is a turnover below Rwf 400 million. The significant growth in the number of small businesses, from 129,705 in 2014/15 to 465,378 in 2022/23, indicates a robust and thriving small business ecosystem in Rwanda.
   This growth suggests successful government initiatives to support small enterprises and expand the formal tax base. Small businesses play a crucial role in driving economic growth, creating jobs, and fostering innovation.
2. **Medium Businesses**: Medium businesses are defined as those with a turnover

between Rwf 400 million and Rwf 1 billion. While the number of medium businesses remains relatively stable over the years, ranging from 1,773 to 842, they still contribute significantly to the economy. The consistent presence of medium-sized enterprises indicates a steady segment of the business landscape. However, there's potential for growth in this sector, and targeted policies could encourage the expansion of medium-sized businesses.

3. **Large Businesses**: Large businesses are defined as those with a turnover above Rwf 1 billion and a tax contribution of at least Rwf 100 million, or those in specialized sectors. The number of large businesses, ranging from 341 to 376 taxpayers annually, may be smaller compared to small and medium businesses. Still, they contribute substantially to the economy due to their significant turnover and tax contributions. The stable presence of large businesses reflects effective monitoring and support from the Rwandan tax administration.
4. **Total Taxpayers**: The total number of taxpayers has shown remarkable growth, from 131,819 in 2014/15 to 466,593 in 2022/23. This significant increase of over 250% indicates successful efforts by the Rwandan government to expand tax compliance and formalize economic activities. The expansion of the taxpayer base is crucial for generating revenue to fund public services and infrastructure development.

Overall, the data underscores the diversity and resilience of Rwanda's economy, with a flourishing ecosystem of small businesses driving growth, supported by medium and large enterprises. Effective government policies aimed at fostering entrepreneurship, improving business environment, and enhancing tax compliance have contributed to this positive trajectory. Continued efforts to support businesses of all sizes will be vital for sustained economic development and prosperity in Rwanda.

3.1.2 Registered taxpayers by location in Rwanda

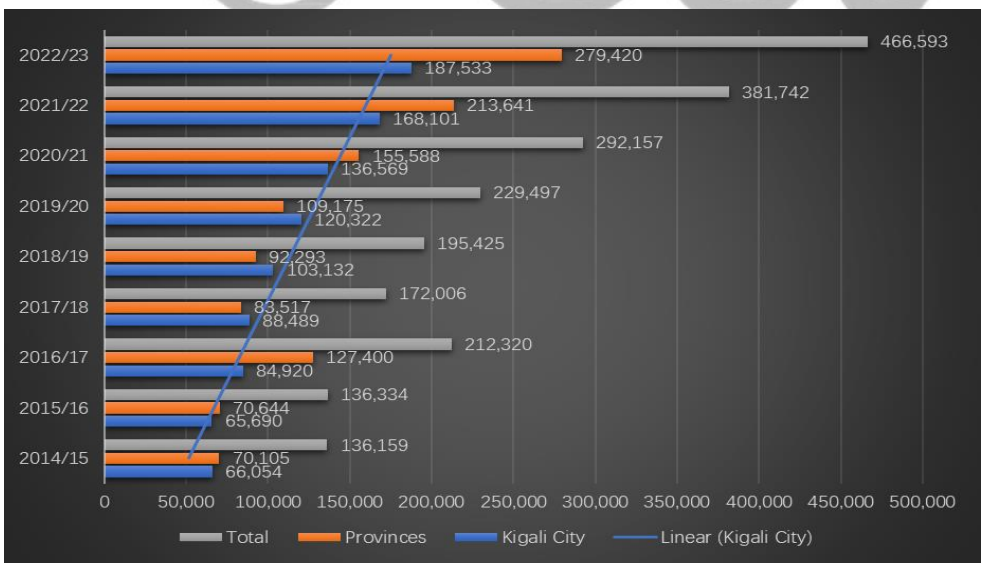


Figure 8-3: The number of registered taxpayers by location

This figure provides the number of registered taxpayers for Kigali City, provinces, and the total over the years from 2014/15 to 2022/23. Here's the interpretation:

- **Kigali City**: The number of registered taxpayers in Kigali City has shown a consistent increase over the years, indicating growth in economic activity and possibly population. The number has almost tripled from 66,054 in 2014/15 to

187,533 in 2022/23. This growth suggests the city's importance as a center of commerce and business within Rwanda.

- **Provinces**: The number of registered taxpayers in provinces has also exhibited growth over the years, although with some fluctuations. There was a significant spike in 2016/17, followed by fluctuations in subsequent years. However, there's a consistent upward trend overall, with the number reaching 279,420 in 2022/23. This suggests economic development and formalization of businesses outside of Kigali City.
- **Total**: The total number of registered taxpayers, which includes both Kigali City and provinces, has consistently increased over the years, indicating overall economic growth and expansion of the tax base across Rwanda. The total number has more than tripled from 136,159 in 2014/15 to 466,593 in 2022/23, highlighting the effectiveness of tax administration efforts and the country's economic development.

Overall, the data reflects positive trends in tax compliance and economic activity, both in urban centers like Kigali City and in rural areas represented by the provinces.

3.2 Overview: Fiscal Revenue, Expenditure, Costs, and Taxpayer Metrics

Table 7-3: Fiscal Revenue, Expenditure, Costs, and Taxpayer Metrics

Fiscal Year	Collection (Frw bn)	Expenditure (Frw bn)	Cost of Collection (%)	Revenue per Capita (Frw Million)	Population (Million)	Revenue per Taxpayer (Frw Million)
2015/16	1,042.00	22.9	2.2%	0.087	11.4	6.5
2016/17	1,190.7	33.9	2.8%	0.077	11.7	6.7
2017/18	1,361.4	35.1	2.6%	0.093	11.9	7.2
2018/19	1,546.4	39.5	2.5%	0.077	12.2	4.9
2019/20	1,644.9	43.7	2.7%	0.120	12.5	6.5
2020/21	1,732.3	44.8	2.6%	0.128	12.8	6.5
2021/22	1,985.7	50.4	2.5%	0.103	13.0	7.2
2022/23	2,419.1	59.5	2.5%	0.170	13.5	4.9

Source: RRA Reports

Based on the information provided in the table above, here is an analysis of the key metrics related to tax revenue collection and administration in Rwanda:

Tax Revenue Collection: The total tax revenue collected by the Rwanda Revenue Authority (RRA) has steadily increased over the years, rising from Rwf 1,042.0 billion in 2015/16 to Rwf 2,419.1 billion in 2022/23. This represents a significant growth of over 132% in the total tax revenue collected during this period.

Cost of Collection: The cost of collection, as a percentage of the total revenue collected, has remained relatively stable, ranging from 2.2% in 2015/16 to 2.8% in 2016/17. In recent years, the cost of collection has been around 2.5%, indicating that RRA has been

able to maintain a relatively efficient tax administration system.

Revenue per Capita: The revenue per capita has also shown an upward trend, increasing from Rwf 87,000 in 2015/16 to Rwf 170,000 in 2022/23. This suggests that the tax base has been expanding, and the tax system has become more inclusive, reaching a larger proportion of the population.

Population: The population of Rwanda has grown from 11.4 million in 2015/16 to 13.5 million in 2022/23, an increase of around 18.4%. This population growth has likely contributed to the expansion of the tax base and the overall increase in tax revenue collection.

Revenue per Taxpayer: The revenue per taxpayer has fluctuated over the years, ranging from Rwf 4.9 million in 2018/19 and 2022/23 to Rwf 7.2 million in 2017/18 and 2021/22. This suggests that the average tax contribution per taxpayer has varied, potentially due to changes in the composition of the taxpayer base or the effectiveness of tax administration measures.

Overall, the data indicates that Rwanda has experienced a significant increase in tax revenue collection over the past several years, driven by a combination of factors, including economic growth, population expansion, and improvements in tax administration. The relatively stable cost of collection and the growing revenue per capita suggest that the Rwandan tax system has become more efficient and inclusive, contributing to the country's overall fiscal sustainability.

3.3 Taxpayer Registration and Compliance

Upon registering a business in Rwanda, all businesses are automatically enrolled for Income Tax, which could be either Personal Income Tax (PIT) or Corporate Income Tax (CIT), based on the number of shareholders involved. If the business has a single shareholder, it is registered for PIT, whereas multiple shareholders lead to registration for CIT.
Additionally, businesses are required to register for Trading License Tax and Public Cleaning Service Fees at LGT tax centers immediately after their business registration process is completed. A Trading License Tax certificate, obtained after declaring and paying the Trading License Tax, is mandatory for all profit-oriented activities.

Moreover, taxpayers registered for Trading License Tax must consistently declare and settle Public Cleaning Service Fees on a monthly basis. Furthermore, during the registration process, certain inquiries prompt the registration of tax accounts for other tax types like Value Added Tax (VAT) and Pay as You Earn (PAYE). Subsequent to registration, taxpayers are obliged to submit tax declarations for all registered tax types from the date of their registration. Even if there is no business activity within the initial or subsequent tax periods, the submission of declarations remains mandatory to avoid penalties.

This encompasses not only domestic taxes like Income Tax but also Local Government Taxes such as Trading License Tax and Public Cleaning Service Fees. Adherence to these procedures ensures compliance with tax regulations and aids in the smooth operation of businesses within Rwanda.

Figure 9-3: Taxes applicable in Rwanda[6]

3.3.1 Domestic Taxes and E-Tax

E-Tax is an online portal through which all domestic tax types can be declared. This can be done online or with the help of staff at RRA offices. RRA has developed the E-Tax system to make it easier for taxpayers to declare and pay domestic taxes. The process of declaring online is the same as the process of declaring with the help of staff at RRA offices. However, there are many advantages for taxpayers to declare online. The only domestic tax type which could cannot be declared online is Capital Gains Tax.

This can only be declared with the help of RRA staff at RRA offices. In certain cases, Income Tax can also be declared on mobile phones using M-Declaration. Local Government taxes can be declared either M-declaration which accessed by dialing *800#. By Local Government Tax System access the E-Tax website at (RRA)[7] or through the RRA website[8] and click 'Pay Domestic taxes here' on the right of the screen. Taxpayers are automatically registered for E-Tax when their business is registered with RDB. Taxpayers are informed of their unique Taxpayer Identification Number (TIN) and E-Tax password by SMS and email using the contact details given when they registered. Upon login, taxpayers can change their E-Tax password and access various services. For those who need assistance with their TIN, RRA offices or the toll-free RRA call center can provide support.

[6] https://www.rra.gov.rw/en/publications?tx_news_pi1%5Baction%5D=detail&tx_news_pi1%5Bcontroller%5D=News&tx_news_pi1%5Bnews%5D=1100&cHash=d8753b85361829b7738e82dfdd9fb9e4

[7] https://etax.rra.gov.rw

[8] http://www.rra.gov.rw

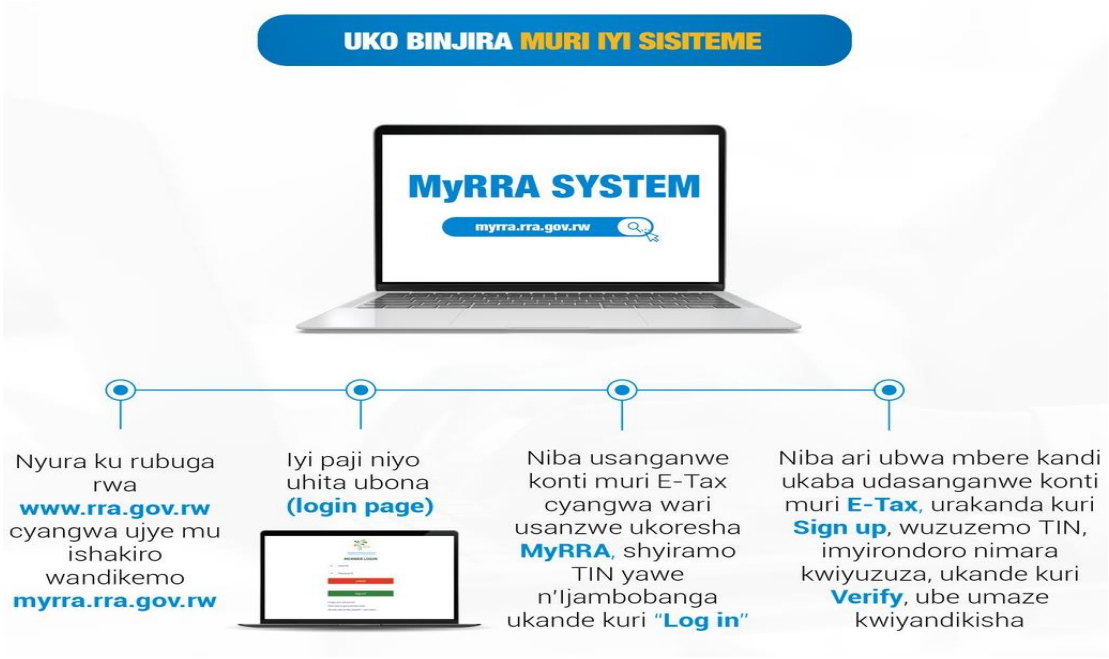


Figure 10-3: Showing how to login in MyRRA system

3.3.2 Domestic Taxes Penalties and Fines

There are penalties and fines for certain offences that are similar for the majority of domestic taxes. The penalties and fines for these offenses are explained in turn below. If a self-disclosure is made by a taxpayer that was previously not registered with the tax administration, the penalties and interest described in this section are waived.

A taxpayer who has failed to submit a tax declaration and payment within the required deadline must still declare and pay, and is subject to:

- A fine for late payment, depending on the period: Twenty percent (20%) of the tax due if the time limit for declaration and payment has not been exceeded by thirty (30) days; Forty percent (40%) of the tax due if the time limit for declaration and payment has been exceeded by thirty (30) days but has not been exceeded by sixty (60) days; Sixty percent (60%) of due taxes if the time limit for declaration and payment has been exceeded by sixty (60) days.
- 1.5% interest on a monthly basis
- Fixed administrative fine of: FRW 100,000 for taxpayers with annual turnover below FRW 20,000,000, FRW 300,000 for taxpayers with annual turnover above FRW 20,000,000, FRW 500,000 for taxpayers who have been informed by RRA that they are in the category of 'large' taxpayers.

A taxpayer who declared the requisite tax on time, but did not pay the declared tax is subject to:

- A fine for late payment, depending on the period: Ten percent (10%) of the tax due when the time limit for payment has not been exceeded by thirty (30) days; Twenty percent (20%) of the tax due when the time limit for payment has been exceeded by thirty (30) days but not exceeded by sixty (60) days; Thirty percent (30%) of due taxes if the time limit for payment has been exceeded by sixty (60) days.
- 1.5% interest on a monthly basis

- Fixed administrative fine of: FRW 100,000 for taxpayers with annual turnover below FRW 20,000,000; FRW 300,000 for taxpayers with annual turnover above FRW 20,000,000; FRW 500,000 for taxpayers who have been informed by RRA that they are in the category of 'large' taxpayers.

The penalties for under-declaration depend on whether the taxpayer rectifies their own tax declaration or whether the taxpayer is found by RRA to have declared less than the correct amount.

A taxpayer who submits a declaration, and is found by RRA to have declared lower tax due that is more than 10% of the correct amount but less than 20% of the correct amount, must pay the difference and is subject to:

- A fine of 10% of the amount of the understatement
- 1.5% interest on a monthly basis

A taxpayer who submits a declaration, and is found by RRA to have declared lower tax due that is more than 20% of correct amount, must pay the difference and is subject to:

- A fine of 20% of the amount of the understatement
- 1.5% interest on a monthly basis

A taxpayer who submits a declaration, but realizes that they have declared a lower amount due than the correct amount and conducts self-reassessment after the deadline but before notification of an imminent audit, must pay the difference and A fine of:

- Twenty percent (20%) of the tax due, if the time limit for declaration and payment has not been exceeded by thirty (30) days;
- Thirty percent (30%) of the tax due, if the time limit for declaration and payment has been exceeded by thirty (30) days but not exceeded by sixty (60) days;
- Forty percent (40%) of the tax due, if the time limit for declaration and payment has been exceeded by sixty (60) days;

A taxpayer who submits a declaration, but realizes that they have declared lower tax due than the correct amount and conducts self-reassessment and pays the correct amount before they are notified of an imminent audit, is not subject to the administrative penalty for under-declaration, Interest is non-compounding. This means that interest is always on the principal amount, i.e. the tax due, there is no interest charged on interest. Interest is charged from the first day after the tax should have been paid until the day of payment, which is included. Every month that begins is considered as a complete month. The interest cannot exceed 100% of the original tax due.

If an offence is repeated on another occasion within five years, the fixed administrative fine is doubled. If the offence is repeated on any other occasions within five years, the fixed administrative fine is quadrupled. Taxpayers are informed by RRA whether they are categorized as small, medium or large taxpayers.

Researcher's comment

The comprehensive range of domestic taxes in Rwanda, including Income Tax, Value Added Tax (VAT), Excise Duty, and others, serve various purposes from taxing income progressively to ensuring equitable sharing of benefits from natural resources. The implementation of the E-Tax system aims to streamline tax compliance and efficiency for

taxpayers by providing online declaration and payment facilities, automatic registration upon business registration, and accessible support services. However, failure to adhere to tax deadlines incurs penalties and fines, encouraging timely compliance. These penalties and fines vary based on factors such as delay period, taxpayer classification, and extent of under-declaration, reflecting the Rwandan government's commitment to enforcing tax compliance and ensuring revenue integrity.

3.4 Key Challenges associated with tax collection in RRA

Despite its good performance, Rwanda Revenue Authority still faces various challenges and risk associated with tax collection that hinders its performance. The main ones are highlighted below:

3.4.1 Low tax compliance culture by some taxpayers

Although the tax compliance kept increasing over time, some taxpayers do not declare and pay their due taxes or intentionally lower the taxable base to evade taxes. In addition, some VAT registered taxpayers are still reluctant to use the Electronic Billing Machines despite it being one of the most effective tools to collect accurate tax liability information in real time.

3.4.2 Prosecution of tax evaders

Despite significant efforts made by the judiciary system in handling tax offence cases submitted to courts, there are areas that need further improvements:

- Public prosecutors are preoccupied with a heavy backlog of criminal cases and tax fraud cases are not given priority.
- Public prosecutors have limited expertise in tax matters, which leads to some complex tax fraud cases not being prosecuted successfully before the Courts of law.

3.4.3 Staff Turnover Challenge at RRA

Due to inability to attract and retain highly qualified and competent staff, From July 2017 to June 2018, RRA recorded 25 employees who left voluntarily, composed of 16 resignations and 9 leave of absence cases. This is a decrease of 16.7% from 30 who left voluntarily in 2016/17. Of the 25 employees who left voluntarily, 4 were managers while 21 were technical staff. Although in general the number is not alarming, RRA lost a number of skilled and experienced staff and this adversely affected RRA performance and service delivery. RRA hope the staff retention and welfare scheme implemented from July 2018 as well as salary increase implemented from August 2018 will contribute to the reduction of staff turnover due to administrative inefficiency. RRA believes that it is not operating at its full potential and the restructuring process “NOM” (New Operating Model) is intended to address this issue. In fact, the delay to fully implement NOM has not only affected the RRA plans but also created uncertainty with in the institution. As result, this led to high staff turnover; fiscal year 2021/22 recorded the highest staff turnover of 2.3% compared to 0.96% for FY 2020/21 and 1.4% for FY 2019/20.

3.4.4 High Domestic tax arrears

Despite efforts employed to recover tax arrears such as automation of enforcement processes, tax arrears are still high and keep on increasing year on year. Tax arrears escalated by 41.7% in FY 2020/21, fiscal year 2019/20 had recorded 36.8% and FY 2021/22 recorded an increase of 8.2%. Also, there is Inaccurate interpretation of some tax laws caused revenue loss and unfavorable judicial outcomes on tax corruption cases.

Researcher point of view

A multifaceted strategy that includes technical developments, capacity-building programs, legal reforms, and strategic organizational management is needed to address these issues. By addressing these challenges head-on, RRA can improve the efficacy and efficiency of its income collection, which will support Rwanda's long-term economic growth.

3.5 Key Risks in efficiency tax collection in RRA

3.5.1 Registration risk

Any person who sets up a business or other activity that may be taxable is obliged to register with Rwanda Development Board (RDB) within a period of seven (7) days from the beginning of the business or activity or the establishment of the company. From the analysis, it was found out that Some Taxpayers are registered in some tax heads but not registered in other taxes which they are eligible, here are examples:

- ✓ High Significant potential operating businesses not registered as Taxpayers
- ✓ Taxpayers declaring CIT/PIT turnover eligible for VAT but not registered
- ✓ Taxpayers registering in VAT but not in CIT/PIT
- ✓ Taxpayers registering in CIT/PIT but not in PAYE Importers importing goods with CIF eligible for CIT/PIT registration but not registered Importers importing Vatable goods with CIF eligible for VAT registration but not registered.
- ✓ Taxpayers with trading license, purchases and/or importation but not registered in income tax

3.5.2 Payment risk

From RRA analysis it was found out that the following are the most practices. Nonpayment of taxes and late payment of taxes is increasing. In order to avoid this, Taxpayers should: Make all payments on time and make a follow up of their business transactions to record all payments.

3.5.3 Filing risk

From RRA analysis, it was found out that the following are the most practices: Many small Taxpayers lack of understanding of tax obligations, late filing and missing returns. However, to avoid this, Taxpayers should regularly file their tax returns on time.

3.5.4 Inaccurate and incomplete reporting risk

From RRA analysis, it was found out that the following are the most practices:

- ✓ High Under declaration of income
- ✓ Inflated expenses and continual losses
- ✓ Taxpayers implementing aggressive tax planning
- ✓ Purchases and expenses being redirected for personal use
- ✓ Wrong number of losses carried forward
- ✓ Interest declared on shareholder’s loans exceeding 4 times the amount of equity

Therefore, Taxpayers are requested to comply with tax laws and regulations to address issues mentioned above by using EBM V.2 and those without EBM V.2 are requested to acquire them because RRA is extremely willing and prepared to assist taxpayers comply with tax laws and regulations.

3.6 RRA Risk Management Approaches for efficiency ax collection

RRA undertook proactive actions to identify and management risks that may affect its operations, the following key achievements were recorded towards risk management and integration of risk mitigations in RRA operations:

3.6.1 The evaluation of risk mitigation

Risk registers are maintained at departmental and corporate level. Risk mitigation strategies are therefore then in daily operations and monitored and evaluated quarterly by risk management committees. These committees produce quarterly reports alongside their meetings. For example, as end June 2022 there were 169 risks in all risk registers, 137 open and 32 closed risks. The final evaluation done by respective risk management committee meetings showed that implementation level of overall risk mitigation strategies was 82.5% as of end June 2022 against a target of 75%.

3.6.2 The tax compliance improvement plan

RRA Tax improvement plan Mainly focused on five main aspects i.e., general and sector specific compliance interventions, construction sector compliance interventions, Information and Communication sector compliance interventions, importers compliance interventions and clearing agents' compliance interventions.

In the year 2021/2022 the general compliance interventions were implemented at; 85% for general sector, 100% for construction sector, 97.5% for Information and Communication sector, 97.5% for importers and 80% for clearing agents. Additionally, the overall implementation status by the end fiscal year 2021/22 was 92.5% against a target of 85%. The automated risk rules help to identify risky areas for further analysis; these risk rules are accessible via the web link. Also Review and automate VAT refund process to allow low risk taxpayers to receive their VAT refunds automatically subject to post refund payment checking is another risk Management activity done by RRA.

3.6.3 Strengthening Internal Control Systems.

The combination of electronic tax systems and robust internal control mechanisms can significantly enhance efficiency in tax collection by streamlining processes, ensuring data accuracy, detecting and preventing fraud, and promoting compliance. Here's how:

1. **Streamlined Processes**: Electronic tax systems automate various tax-related processes, such as filing returns, processing payments, and issuing receipts. Integration with internal control systems ensures that these processes are well-monitored and aligned with established procedures, reducing manual intervention and minimizing processing times. This streamlining of processes improves operational efficiency and enables tax authorities to handle larger volumes of transactions with greater ease.
2. **Data Accuracy**: Internal control systems incorporate checks and validations to ensure the accuracy and completeness of tax data entered into electronic systems. By verifying taxpayer information, transaction details, and calculation accuracy, these controls minimize errors and discrepancies in tax records. Accurate data is essential for reliable reporting, compliance monitoring, and decision-making, thereby enhancing the overall effectiveness of tax collection efforts.
3. **Fraud Detection and Prevention**: Internal controls implemented within electronic tax systems include authorization controls, transaction monitoring, and segregation of duties, among others. These controls help identify and prevent fraudulent activities, such as unauthorized access, manipulation of records, or fraudulent transactions.

By detecting anomalies and enforcing security measures, tax authorities can safeguard tax revenues and maintain the integrity of the tax system.

4. **Compliance Promotion:** Internal control systems play a crucial role in promoting taxpayer compliance with tax laws and regulations. By enforcing controls over taxpayer interactions, data integrity, and audit trails, tax authorities can deter non-compliance and encourage voluntary compliance behavior. Additionally, timely identification of compliance issues through internal controls allows for prompt intervention and enforcement actions, further deterring future non-compliance.
5. **Reporting and Monitoring**: Integrated electronic tax systems and internal control mechanisms facilitate real-time monitoring and reporting of tax activities and performance metrics. Tax authorities can generate accurate and timely reports on tax collection, taxpayer compliance rates, and operational efficiency, allowing for informed decision-making and strategic planning. Moreover, regular monitoring of internal controls ensures that any deficiencies or risks are promptly addressed, maintaining the effectiveness and reliability of tax collection processes over time.

In the realm of fiscal governance, the Rwanda Revenue Authority (RRA) stands as a pioneer in leveraging electronic tax systems to enhance tax collection efficiency. Amidst a backdrop of increasing digitization and technological advancements, the RRA's strategic adoption of e-tax systems has revolutionized tax administration and contributed significantly to revenue mobilization efforts.

During the 2021/22 fiscal year, the RRA's internal control and audit activities were intricately linked with the implementation and utilization of electronic tax systems. The completion of 14 out of 17 planned internal audit assignments, coupled with the seamless integration of e-tax systems, underscored the authority's commitment to embracing technology for operational excellence. By facilitating timely filing and payment of taxes, e-tax systems have streamlined tax compliance processes, thereby reducing payment risks and enhancing overall tax collection efficiency. Furthermore, the RRA's proactive approach towards maintaining integrity among its staff members has been complemented by the implementation of electronic tax systems. Through rigorous integrity investigations and the utilization of electronic platforms for monitoring and reporting, the authority has fostered a culture of accountability and transparency, thus safeguarding against potential ethical breaches. In parallel, the RRA's adherence to international standards for quality management systems, including ISO 9001:2015, has been seamlessly integrated with the implementation of electronic tax systems. By digitizing tax administration processes and ensuring compliance with standardized procedures, the authority has not only enhanced operational efficiency but also improved service delivery to taxpayers.

However, despite notable progress in leveraging electronic tax systems for enhanced tax collection efficiency, challenges persist in the effective implementation of audit recommendations. While significant strides have been made in translating audit findings into actionable outcomes, there remains a need for sustained efforts towards addressing areas of improvement and strengthening internal control mechanisms. Overall, the Rwanda Revenue Authority's strategic adoption of electronic tax systems, coupled with robust internal control mechanisms, has significantly enhanced tax collection efficiency and bolstered fiscal governance. By embracing technology, promoting integrity, and adhering to international standards, the authority has demonstrated a commitment to operational excellence and effective revenue mobilization.

The harmonious integration of electronic tax systems with rigorous internal controls

represents a cornerstone in modern tax administration, enabling heightened efficiency, accuracy, transparency, and compliance. Moving forward, continued investments in technology infrastructure, capacity building, and stakeholder engagement will be crucial for further leveraging electronic tax systems to achieve sustainable development goals and foster economic growth.

3.6.4 Risk Differentiation Framework (RDF).

RRA adopted the Risk Differentiation Framework (RDF) tool made up of four different quadrants (groups) that contain taxpayers with common behaviours as per risk perspective. RDF tool helps to frame taxpayers' risk levels using different metrics[9].

Quadrant 1: Higher Risk Taxpayers
Quadrant 2: Key Taxpayers
Quadrant 3: Medium Risk Taxpayers
Quadrant 4: Low Risk Taxpayers

Figure 11-3: RRA Risk Differentiation Framework (RDF)

The above RDF is based on the premise that RRA risk management approach to tax compliance should take account of our perception of both the:

i) Estimated likelihood of having a tax position that RRA disagree with, or taxpayer (through error or omission) have misreported tax obligations (as evidenced by behaviour, approach to business activities, governance, and compliance with tax laws),

ii) Consequences of that potential non-compliance (financial impact, relative influence, impact on community confidence)

For higher risk taxpayers, RRA assign appropriate resources to allow for continuous review. These activities may include comprehensive audit and other intensive risk analysis approaches. This will enable RRA to identify and understand risks as they arise and provide information about our possible concerns, allowing the taxpayer to make a more informed choice about their compliance approach. ***For key taxpayer,*** RRA take a particularly close interest in their risk management and governance frameworks to mitigate tax compliance risks. It is believed that the key taxpayers to fully disclose potentially contestable matters to RRA as they arise. RRA assign the necessary resources to ensure a good working relationship and increase its understanding of their business. ***For taxpayers identified as***

9 https://www.rra.gov.rw/fileadmin/user_upload/RRA_Tax_Compliance_Improvement_Plan__2023-2024_.pdf

medium risk, RRA undertake targeted activities to deal with tax compliance concerns. These activities are more likely to be reviews and audits. RRA may contact Taxpayer to seek assurance that a particular transaction has been treated correctly. ***Lower risk taxpayers,*** RRA monitor intelligence to confirm your lower risk categorization. This can involve activities such as requesting targeted information about specific issues identified, visiting taxpayers for information about business operations, and normal internal review processes.

- **Researcher's concern**

Overall, RRA has demonstrated a comprehensive approach to risk management in tax collection. By maintaining risk registers, implementing targeted compliance interventions, strengthening internal control systems, and adopting tools like the RDF, RRA aims to mitigate risks effectively while enhancing tax compliance and tax collection efforts. Ongoing monitoring and evaluation are crucial to addressing remaining audit recommendations and ensuring continuous improvement in risk management practices.

By incorporating both the estimated likelihood of non-compliance and its consequences, RRA's RDF enables a targeted and proactive approach to tax compliance management. Higher risk taxpayers receive heightened scrutiny and resource allocation to address potential risks promptly, while key taxpayers benefit from collaborative efforts to enhance transparency and understanding. Medium risk taxpayers undergo targeted compliance activities, ensuring compliance with tax laws, while lower risk taxpayers are subject to monitoring to maintain their risk categorization. This tailored approach optimizes resource allocation, fosters compliance, and strengthens the integrity of the tax system.

3.7 Leveraging Electronic tax collection Systems in Rwanda

Implementing an electronic tax collection system offers numerous benefits for tax authorities, taxpayers, and overall tax compliance. Below is a detailed analysis of the various aspects involved:

3.7.1 Issuance of Tax identification Number (TIN) and Registration

To formally create a link between the taxpayer and the revenue authority, a tax ID must first be issued, whether to a citizen, business, or other entity. It's significant that the tax ID is applied to all tax kinds and procedures. By replacing paper files with digital files, tax IDs increase security, decrease errors, enable automatic ID matching, and streamline the tax ID issuance process. Taxpayers supply all required information to the revenue authorities upon registration in order to formally establish their tax status. Several digital identification techniques, such as the e-signature, e-password, and e-stamp for companies, may be used upon registration. With the use of these technologies, taxpayers may electronically comply with their tax duties and authenticate themselves online.

E-signatures may be overly complicated in nations with inadequate digital infrastructure and skills, therefore online registration. In summary Issuance of Taxpayer Identification Number helps but not limited to the following:

Enhanced Efficiency: The issuing and registration of TINs are made easier by switching from paper-based to digital operations. Digital files enhance security, reduce errors, and facilitate automatic ID matching.

Enhanced Compliance: With digital identification techniques such as e-signatures and e-passwords, taxpayers can conveniently fulfill their tax obligations online, promoting compliance and authentication.

3.7.2 Invoicing

For taxes like the corporate income tax (CIT) and value-added tax (VAT), which are

aimed at enterprises and independent contractors, invoices are essential. A business transaction involving the sale of goods and services results in an electronic file known as an e-invoice that contains tax information. This record was made using paper invoices before the advent of e-invoicing. The tax administrator receives the electronically produced invoice from the taxpayer in real time.

E-invoicing digitally notifies authorities of economic transactions. In this way, it can reduce the time for authorities and businesses to process invoices. It also enables businesses to classify types of invoices (e.g. using alphanumeric online codes). E-invoicing can reduce the likelihood of corruption by boosting transparency, eliminating cash transactions, and automating internal processes. In countries like Mexico, companies can issue their own e-invoices or use third party providers for such services. In fact, E-tax helps can help efficiency tax collection through invoicing in but not limited to the following:

Efficiency in Transaction Reporting: E-invoicing replaces traditional paper invoices, enabling real-time transmission of tax information to tax authorities. This reduces processing time for both businesses and authorities, enhancing efficiency in tax reporting.

Openness and Anti-Corruption Initiatives: E-invoicing minimizes corruption opportunities and enhances overall integrity in company transactions by promoting transparency, reducing cash transactions, and automating internal operations.

3.7.3 Pre-filing and Filing

Pre-filing returns can have significant advantages, but it necessitates close coordination with other parties. Relevant information on taxpayers may be obtained via third-party agents (e.g., companies may furnish/display employee wage information). Tax forms can then be pre-populated with this data. Because pre-filing significantly cuts down on the amount of time required for people to complete their tax returns, it is especially popular and effective for personal income tax (PIT). Pre-population can happen automatically thanks to digitization. It can minimize the possibility of errors while cutting down on pre-population administrative time and expense. Taxpayers confirm their pre-populated forms and supply the necessary information for tax compliance by filing tax returns. Taxpayers can submit the needed information online by using e-filing. Online portals can create digital accounts for taxpayers to check and fulfill their responsibilities their obligations. In summary e-tax can help tax in collection through Pre-filing and Filing in the following way:

Streamlined Tax Return Process: Pre-filing of tax returns, facilitated by obtaining relevant taxpayer information from third-party agents, significantly reduces the time required for individuals to complete their tax obligations, especially for personal income tax (PIT).

Error Reduction: Pre-populating tax forms with data obtained through digitization minimizes the likelihood of errors and reduces administrative time and costs associated with manual data entry.

3.7.4 Payment and Refund

Payments and refunds, Digital payments allow taxpayers and revenue authorities to shorten processing times. Some countries have authorized credit card payments for efficiency tax collection (e.g. United States, Australia, UK, Mexico, Canada, Singapore etc).

Efficiency in Transactions: Digital payments expedite processing times for both tax payments and refunds, enhancing efficiency in financial transactions between taxpayers and revenue authorities.

Corruption Mitigation: Digital payments, by eliminating cash transactions, can mitigate the risk of corruption and theft, promoting greater financial transparency and integrity in efficiency tax collection processes.

3.7.5 Accounting and Reporting System (SAGE X3)

RRA fixed certain difficulties and implemented the SAGE X3 accounting and reporting system. The system received the necessary technical help, and the following issues were resolved:

Adjusting the dimensions of transactions; uploading manual payments and transfers; creating new reports upon user request; monitoring bank compliance, including MTN and MobiCash; resolving new user concerns; creating new journal types; creating LGT invoices and cover letters; carrying out period and year-end procedures; upgrading SAGE X3; installing the SAGE enterprise intelligence reporting tool; integrating BNR (which will remove manual payments from BNR); and lowering the suspense account's size. This helps in System Improvement by Implementation of SAGE X3 addresses identified issues and enhances technical support for tax accounting and reporting. Various areas, such as transaction correction, report development, and system integration, are addressed to ensure efficient tax management.

3.7.6 Review and Auditing

Tax authorities confirm the tax obligations of taxpayers by reviewing and auditing tax returns. Digitalization allows for an algorithmic selection of which tax returns to audit. Additionally, digitalized reviews may allow for automated alarms (reminders) to be sent to specific groups of taxpayers, including those identified as high-risk by data-driven selection mechanisms**.** However, by Automated Selection and Alerts, Digitalization enables algorithmic selection of tax returns for review and auditing, improving the efficiency and effectiveness of compliance monitoring. Automated alerts can be sent to high-risk taxpayers based on data-driven selection mechanisms, enhancing tax oversight.

- **Overall Analysis by researcher**

The adoption of an electronic tax collection system offers a comprehensive solution to enhance tax compliance through improved efficiency, transparency, and integrity in tax processes. From TIN issuance to payment and auditing, digitalization streamlines procedures, reduces errors, and minimizes opportunities for non-compliance and corruption. Additionally, the integration of accounting and reporting systems like SAGE X3 further strengthens tax management capabilities, ensuring robust financial oversight and compliance monitoring.

Table 8-3 Digital reforms undertaken by the RRA, 2004–2021

Year	IT solution
2004	Introduced an Automated System for Customs Data (ASYCUDA). ASYCUDA is a computerized system which covers foreign trade procedures
2005	Introduced the Standard Integrated Government Tax Administration System (SIGTAS)
2021-2012	Introduced e-filing and e-payment Issued the Electronic Single Window, a system that allows firms to provide import and export information online
2013	Created a mobile application for filing and payment with feature phones
2013	Mandated the use of EBM1 for formal businesses with revenues above a minimum threshold (RWF 20 million (approximately US$16,700) annually)
2014	E-Tax enhancement replaced previous e-filling and e-payment systems
2017	Launched EBM2 through a staggered implementation
2019	Launched e-suggestion, a web-based chat function to support taxpayers
2021	Launched the ‘EBM for all’ policy, mandating the use of EBMs for taxpayers of any size

3.8 Chapter summary and analysis

The RRA's initiatives to enhance revenue administration through electronic tax collection systems have yielded significant benefits across various aspects of tax management. The transition from paper-based to digital operations for Tax Identification Number (TIN) issuance has streamlined registration processes, improved security, and facilitated online tax compliance through digital identification techniques like e-signatures and e-passwords.

Moreover, the introduction of electronic invoicing (e-invoicing) has transformed transaction reporting, promoting transparency and anti-corruption initiatives. Real-time transmission of tax information to authorities has minimized the likelihood of corruption and enhanced integrity in company transactions.

Pre-filing and filing processes have also been streamlined through digitalization, significantly reducing the time required for tax return completion, especially for personal income tax (PIT). By obtaining relevant taxpayer information from third-party agents and pre-populating tax forms, errors have been minimized, and administrative costs have been reduced.

Digital payments have expedited processing times for tax payments and refunds, enhancing transaction efficiency and mitigating corruption risks by eliminating cash transactions. Furthermore, the implementation of the SAGE X3 accounting and reporting system has addressed various challenges, including transaction adjustment and report development, enhancing technical support for tax management and ensuring efficient tax reporting.

The RRA's adoption of digitalization has also improved compliance monitoring through algorithmic selection of tax returns for review and auditing. Automated alerts can now be sent to high-risk taxpayers based on data-driven selection mechanisms, enhancing tax oversight and enforcement efforts.

In conclusion, the Rwanda Revenue Authority's adoption of electronic tax collection systems represents a significant milestone in its efforts to modernize revenue administration. From TIN issuance to auditing, digitalization has streamlined procedures, reduced errors, and minimized opportunities for non-compliance and corruption. The timeline of digital reforms undertaken by the RRA underscores its commitment to embracing technology for enhanced tax collection and taxpayer services. However, there remain areas for improvement, including taxpayer education, prosecution and enforcement, staff capacity building, debt recovery, and streamlining processes. By addressing these challenges and implementing targeted reforms, the RRA can ensure sustainable revenue generation to support Rwanda's economic development goals.

4 DATA ANALYSIS AND INTERPRETATION

This chapter looks at material from the field survey via questionnaires as well as secondary data from various papers, journals, surveys, statistics, and books about the subject of research. The forms of questionnaire analysis provided in line with specific goals serve as representations of the analysis and interpretation. The profile includes basic information on the respondents, in addition to their gender, education, and experience.

4.1.Secondary data analysis

4.1.1 Analysis of tax revenue and nation budget

Table 9-4: Tax collections during 1998-2022

Fiscal Year	Target (Bn Rwf)	Total Tax Revenue (Bn Rwf)	Variance (Bn Rwf)	Performance Achieved (%)	Total National Budget Tax inclusive (Bn Rwf)	% Contribution of Total Tax Revenue to Total National Budget (Bn Rwf)
1998	62.8	68.4	5.6	108.90%	173.2	39%
1999	64.04	67.1	3.06	104.80%	174.1	39%
2000	65.4	68.4	3	104.60%	169.2	40%
2001	76.8	81.1	4.3	105.60%	184.4	44%
2002	93.9	95.7	1.8	101.90%	207.6	46%
2003	111.2	119.1	7.9	107.10%	252	47%
2004	126.3	139.7	13.4	110.60%	334.5	42%
2005	156.7	184.8	28.1	117.90%	374.2	49%
2006	176.5	204.7	28.2	116.00%	396.2	52%
2007	214.6	252.5	37.9	117.70%	528	48%
2008	257.8	351.8	94	136.50%	623.2	56%
Jan-June 2009	176.1	191.8	15.7	108.90%	392.1	49%
July 2009-June 2010	369.3	395.8	26.5	107.20%	899	44%
June 2010-July 2011	476.9	491.3	14.4	103.00%	948	52%
2011-2012	533.8	588.1	54.3	110.20%	1,194.20	49%
2012-2013	658.9	665.8	6.9	101.00%	1,550.30	43%
2013-2014	878.02	888.2	10.18	101.20%	1,755.90	51%
2014-2015	878.03	859.2	-18.83	97.90%	1,762.20	49%
2015-2016	949.2	1,042.00	92.8	109.80%	1,808.80	58%
2016-2017	1,094.30	1,150.20	55.9	105.10%	1,954.20	59%
2017-2018	1,215.20	1,305.90	90.7	107.50%	2,115.30	62%
2018-2019	1,392.10	1,483.50	91.4	106.60%	2,565.70	58%
2019-2020	1,589.00	1,578.20	-10.8	99.30%	3,017.10	52%
2020-2021	1,594.30	1,732.30	138	108.70%	3,464.80	50%
2021-2022	1,831.30	1,985.10	153.8	108.40%	4,441.00	45%
2022-2023	2,250.80	2,419.10	168.3	107.50%	4,764.80	51%

Source: Rwanda Revenue Authority Report 1998 – 2022

The table provides a comprehensive overview of tax collection performance by the Rwanda Revenue Authority (RRA) over the past several fiscal years. Here's an interpretation of the key information:

Tax Collection Targets and Performance: The table shows a consistent increase in the annual tax collection targets set by the Rwanda Revenue Authority (RRA), rising from Rwf 62.8 billion in 1998 to Rwf 2,250.8 billion in 2022-2023. The actual total tax revenue collected has also grown significantly, from Rwf 68.4 billion in 1998 to Rwf 2,419.1 billion in 2022-2023. The performance achieved percentage has fluctuated over the years, ranging from a low of 97.9% in 2014-2015 to a high of 136.5% in 2008. This indicates that RRA has had varying degrees of success in meeting its annual tax collection targets.

Contribution to the National Budget: The total nominal budget, which includes both tax and non-tax revenues, has also grown substantially, from Rwf 173.2 billion in 1998 to Rwf 4,764.8 billion in 2022-2023. The percentage contribution of total tax revenue to the total nominal budget has ranged from a low of 39% in 1998-2000 to a high of 62% in 2017-2018. In recent years, the contribution of tax revenue to the national budget has remained around 50%, highlighting its critical importance in financing government expenditures.

Historical Trends: The data covers a 25-year period, from 1998 to 2022-2023, allowing for a comprehensive analysis of the long-term trends in tax revenue collection and its contribution to the national budget. Prior to the introduction of the Electronic Tax System (ETS) in 2012, Total tax revenue shows a gradual increase over these years, with occasional fluctuations. It rises from 68.4 billion RWF in 1998 to 351.8 billion RWF in 2008. Performance achieved percentage varies but generally stays close to or above 100%. This indicates that revenue targets were often met or exceeded during this period. The percentage contribution of total tax revenue to the total nominal budget ranges from 38.5% to 56.5%. Despite fluctuations, tax revenue consistently contributes a significant portion to the overall budget. However, during this period, the RRRA consistently fell short of meeting its tax collection targets, particularly from 2003 to 2007, despite achieving relatively high variances.

After the implementation of the ETS (2012-2023), Total tax revenue continues to increase post-2012, with higher figures observed in the years following the introduction of the ETS. Revenue reaches 2,419.1 billion RWF in 2022-2023. Performance achieved percentage fluctuates more in this period, suggesting varying levels of success in meeting revenue targets. The percentage contribution of total tax revenue to the total nominal budget ranges from 40% to 62%. Despite variability, tax revenue remains a substantial contributor to the overall budget. The implementation of the electronic tax system yielded significant change in tax collection by achieving 101% and 101.2% of the targeted amounts in 2012 and 2013, respectively. However, challenges persisted, as evidenced by a slight shortfall of 2.1% in 2014, attributed to factors such as limited perception and skills among taxpayers regarding the electronic tax system. Despite this challenge, there was a notable increase in tax collection in 2015, surpassing the target by 37.3% and contributing substantially to the national budget. The following years saw steady growth in revenue from taxes, with the exception of 2019, when RRA fell 0.7% short of its goal. Nevertheless, the overall trend indicated a positive impact of the electronic tax system on revenue generation.

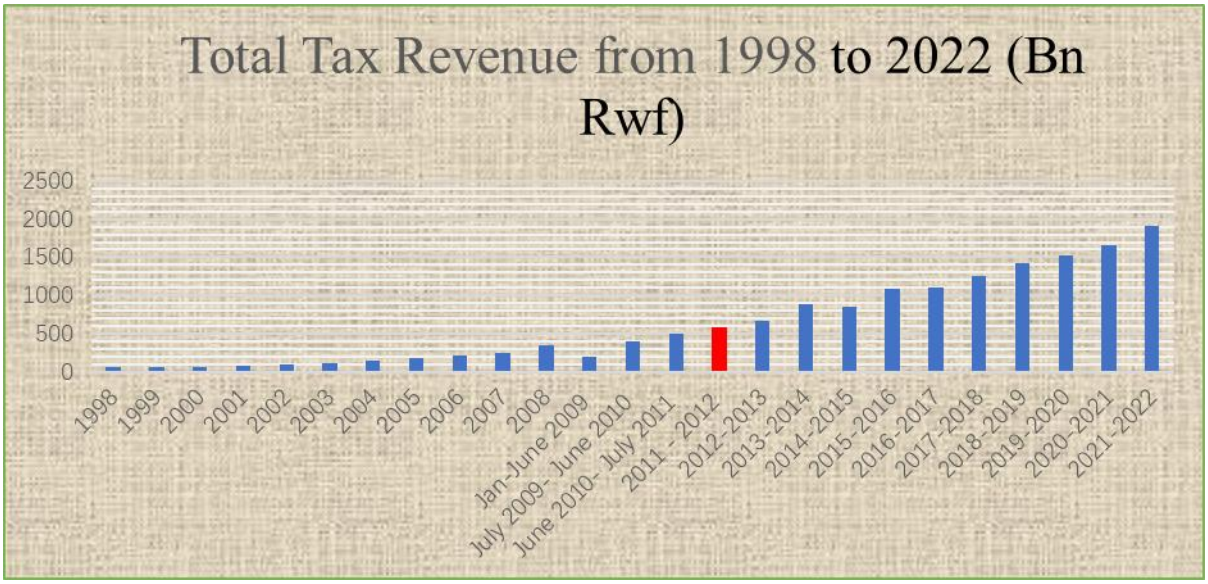
The tax revenue collection and its contribution to the budget have experienced more

significant growth, with the performance achieved percentage generally remaining above 100% in the post-2012 period. This suggests that the adoption of the ETS has played a crucial role in enhancing the efficiency and effectiveness of tax collection in Rwanda, leading to a more substantial contribution to the national budget.

Comparing Before and After ETS: Total tax revenue shows a general upward trend in both periods, with higher figures observed after the introduction of the ETS in 2012. Performance achieved percentage fluctuates in both periods, indicating varying success rates in meeting revenue targets. However, the post-2012 period shows more variability. The contribution of total tax revenue to the total nominal budget remains significant throughout both periods, highlighting the importance of tax revenue in financing government expenditures.

Challenges and Opportunities: While the overall trend is positive, there have been instances where RRA has fallen short of its targets, such as in 2014-2015 and 2019-2020, potentially due to economic factors or other challenges. Continuous efforts to improve taxpayer compliance, enhance tax administration, and address any emerging challenges will be crucial to sustain the positive trajectory in tax revenue collection and its contribution to the national budget. The consistent growth in both tax revenue and the national budget highlights the importance of maintaining a robust and efficient tax system to support Rwanda's economic development and social welfare objectives.

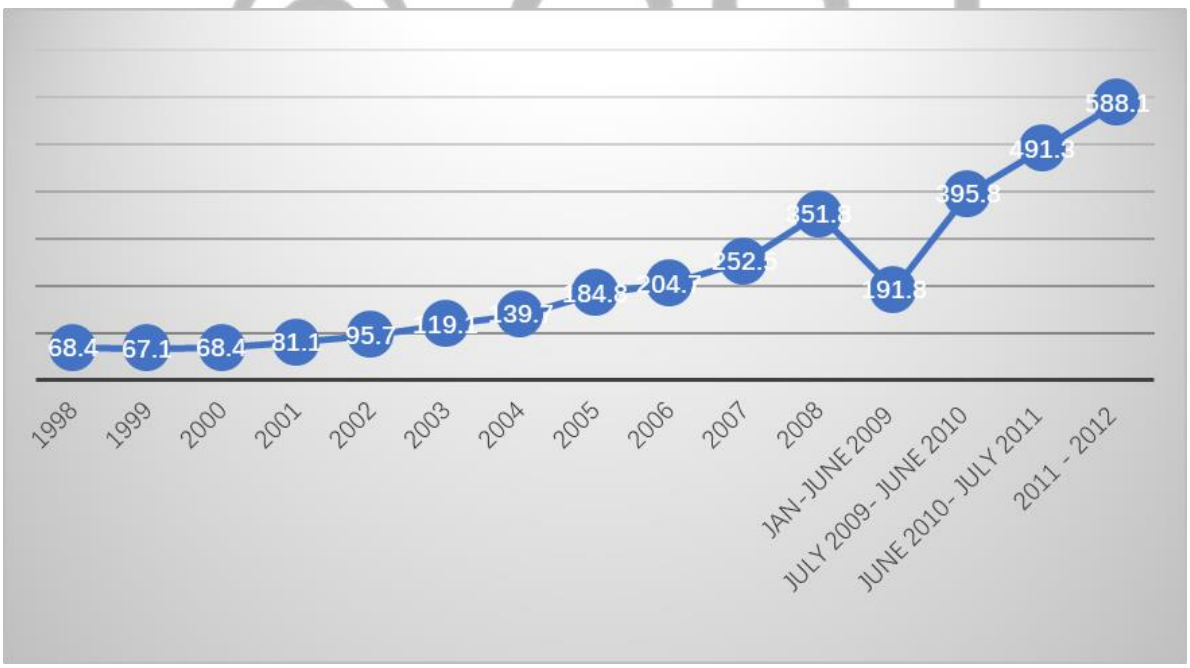
In summary, the updated table and analysis demonstrate the significant progress made by Rwanda in enhancing its tax revenue collection and its contribution to the national budget, particularly after the implementation of the Electronic Tax System. The analysis suggests that the introduction of the ETS may have contributed to increased tax revenue collection in Rwanda, as evidenced by higher figures observed in the years following its implementation. This underscores the critical role of effective tax administration and the adoption of digital technologies in driving sustainable revenue generation for the government. Despite fluctuations in performance achieved percentage, tax revenue consistently contributes a substantial portion to the total nominal budget, underscoring its importance as a revenue source for the government. Continuous monitoring and evaluation of revenue collection efforts are necessary to ensure fiscal stability and effective allocation of resources.



Source: Researcher 2023

Figure 12-4: Total Tax Revenue from 1998 to 2022 (Bn Rwf)

As disused in the above table 2, this figure shows a significant change in tax collection after the introduction of electronic tax system in 2012 with average collections of 12358.7 from 2012 to 2022. this figure providing additional visual representations of tax collection trends, the impact of e-tax systems, and performance against targets from 1998 to 2022.



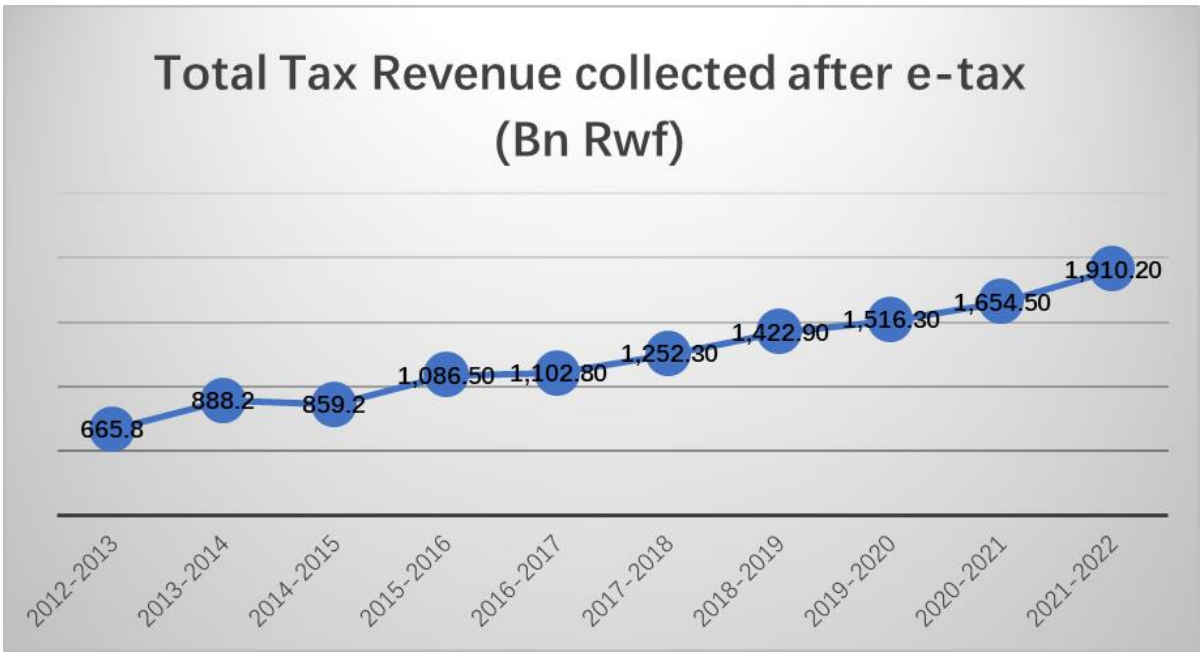
Source: Researcher 2023

Figure 13-4: Total Tax Revenue collected before e-tax (Bn Rwf)

This figure represents data trends of collected tax before e-tax implementation by RRA. We can observe the trends and patterns in revenue generation over the years. Here ‘s an overview of the data: From 1998 to 2008, revenue shows a generally increase in trends with occasional fluctuations.

There’s a noticeable jump in revenue from 2007 to 2008 with a significant increase of

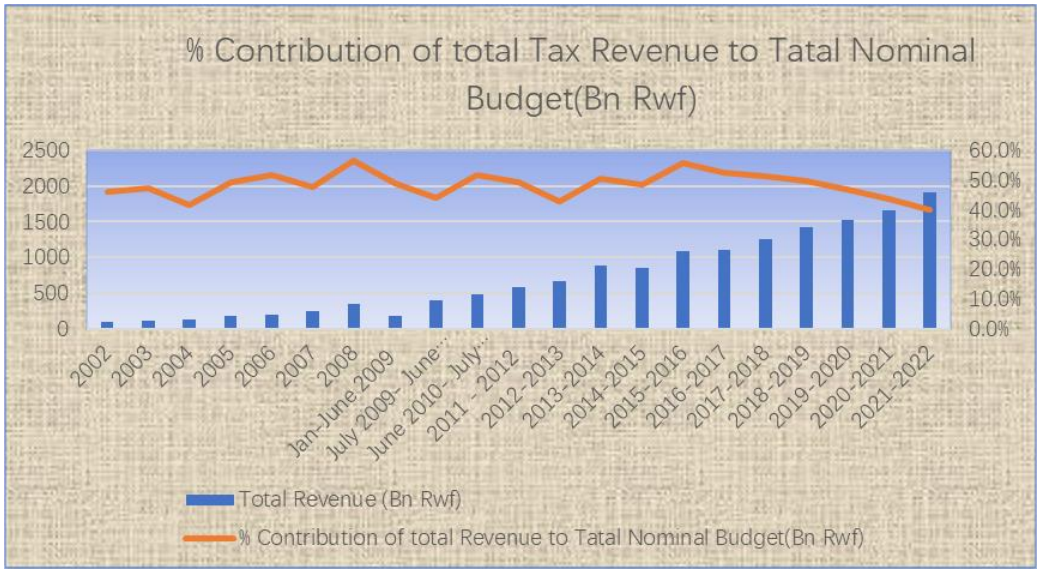
99.3 billion Rwandan francs. The first half of 2009(January to June) saw a decline in revenue compared to the previous years, followed by a substantial increase in revenue in the second half of 2009 to mid-2010(July 2009 to June 2010). There is also another notable increase in revenue from June 2010 to July 2011 compared to the previous period. The highest recorded revenue is in the fiscal year 2011-2012, reaching588.1 billion Rwandan francs. In fact, the data indicates consistent growth in tax collection by RRA over the years even before e-tax system implementation, this suggest effective tax administration and increase in compliance, we can suggest also that the general economic growth of Rwanda during the selected period could have contributed to the increase in revenues with expending businesses and increasing income leading to high tax receipts.



Source: Researcher 2023

Figure 14-4: Total Tax Revenue collected after e-tax (Bn Rwf)

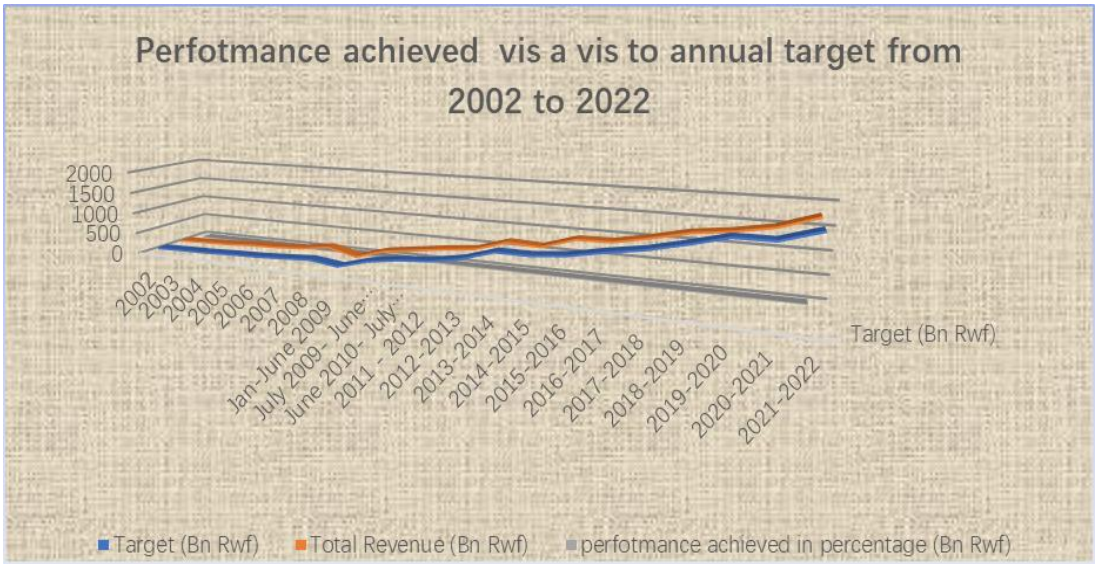
The data above show Tax revenue collected after e-tax implementation from 2012-2013 to year 2021-2022 exhibits a remarkable upward trend, reflecting the effectiveness of e-tax system in enhancing Tax revenue generation, this consistent rise over the years, demonstrate the sustained positive impact of electronic tax administration. It is clear presented on the graph which indicate the magnitude of revenue varied annually, with some years experiencing more substantial increases than others nut overall, there was a notable cumulative compare to 14 year of tax collected before e-tax implementation as show in the figure 13 above. This suggest that e-tax implantation has been instrumental in fostering steady and significant revenue expansion for government. The consistent upward trajectory indicates successful modernization of tax administration through electronic tax system, likely leading to improve efficiency with timely files returns, reduce tax evasion, better service to tax payers, reduce tax payment risk, and enhanced compliance.



Source: Researcher 2023

Figure 15-4: % Contribution of total Revenue to Total Nominal Budget (Bn Rwf)

The above data presented in figure 14 indicate the contribution of tax revenue to national budget from 2022, both before and after the implementation of e-tax system. Before e-tax implementation (2002-2011), the contribution ranged from 41.8% to 56.5%. with an average contribution of approximately 48.5%. notably, there was a steady increase in the percentage contribution from 2002 to 2008, peaking at 56.5% in 2008. After the implementation of e-tax system (2012-2022), the contribution fluctuated between 40.2% and 55.7%, with an average of approximately 48.8%. while there was slight decrease in the average contribution compared to the pre-e-tax period, the revenue still played a significant role in funding national budget. Despite fluctuations, the tax revenue continued to make a substantial contribution to the budget, highlighting the importance of effective tax collection mechanisms in supporting government expenditures and fiscal sustainability.



Source: Researcher 2023

Figure 16-4 Performance achieved vis a vis to annual target from 2002 to 2022

The data above presents the relationship between target tax revenue and the actual revenue collected before and after the implementation of e-tax system from 2002-2022(20 years). Before e-tax implementation (2002-2011), the actual revenue collected generally exceeded the set targets with performance achieved ranging from =101.9% to 117% on average. Notable years of surpassing targets include 2008, where revenue collected reached 136.5% on target. After the implementation of e-tax system (2012-2022), the relationship between target and actual revenue collected remained relatively consistent, with performance achieved varying between exceeding and falling short of targets. However, there was a slight decrease in performance in some years, particularly in 2019-2020, where revenue collected amounted to 95.4% of target. In fact, while there were fluctuations in performance both before and after electronic tax implementation, the data suggests a generally effective tax collection process, with occasional deviations from the set targets.

4.1.2 Analysis of Administrative Measures Supporting RRA Performance.

The analysis of this study shows that to increase tax compliance, facilitate taxpayers and increase Tax collection here are administrative measures implemented by RRA other than use of technologies for revenue optimization:

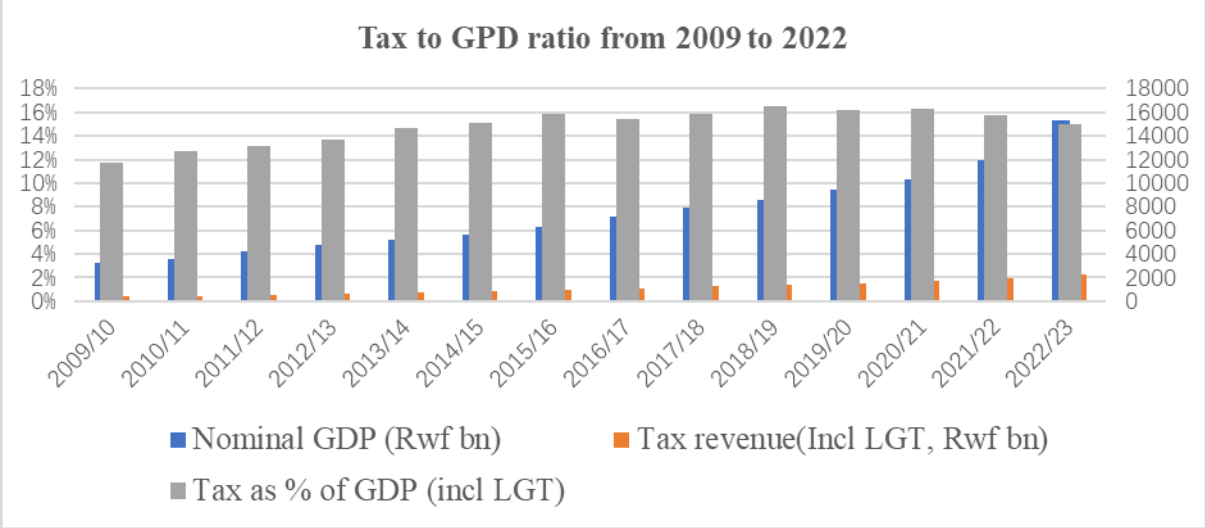
1. **Extension of the deadlines:** filing and payment of taxes was intended to facilitate taxpayers and acceleration of VAT refund as a way of boosting businesses cash flow.
2. **Use of Data Science to improve tax compliance:** RRA uses data science in detection of fictitious invoices, stock analysis, monitoring VAT input claim, monitoring of invoices reported after declaration, monitoring of non-reporting EBMs, etc.
3. **Keeping an eye on non-payers and non-filers:** The Rwanda Revenue Authority monitors taxpayers who don't fulfill their filing and payment responsibilities in a proactive manner. This include following up with non-filers and late filers, conducting desk audits, and calling taxpayers with personalized message reminders. In order to promote ongoing compliance, thank-you notes are also issued to compliant taxpayers.
4. **Tax Education and Information:** RRA conducts extensive tax education programs targeting various segments of taxpayers, including newly registered taxpayers. Workshops, tax dialogues, and audits are conducted to ensure taxpayers understand their obligations and the use of Electronic Billing Machines (EBMs).
5. **Combatting Tax Evasion:** here tax investigation cases either comprehensive-related cases, immediate assessment cases, issue-related case and customs investigation cases are done by the Revenue Investigation and Enforcement Department (RI&ED). This department plays a crucial role in investigating tax evasion cases and conducting enforcement actions. Intelligence operations, risk-based operations, and impoundments of unaccustomed goods are carried out to combat fraud. Additionally, recovered tax amounts are obtained through legal processes such as establishing statements of offenses and conducting public auctions.
6. **Public Communication and Engagement:** Rwanda Revenue Authority utilizes various communication channels including TV, radio, print newspapers, and online media to disseminate relevant information to taxpayers as well as others stakeholders.

In summary, these administrative measures demonstrate Rwanda revenue Authority's commitment to fostering tax compliance, facilitating taxpayer engagement, and optimizing tax collection through a combination of proactive monitoring, enforcement, education, and communication strategies not only relaying on e-tax.

4.1.3 Analysis of other key performance indicators in RRA

- **Tax to GDP ratio**

Tax to GDP ratio is calculated by dividing the tax revenue collected by a country by the Gross Domestic Product of that country and multiplied by 100. A higher level of a tax-to-GDP ratio commonly exhibition of bigger fiscal capacity but even may reveal a higher tax pressure on people or businesses. However, such a ratio could imply a smaller tax base or inefficiencies in tax collection. Tax-to-GDP ratio trend analysis across time returns insights into a nation 's level of economic development, policy effectiveness, and sustainability of public finances.



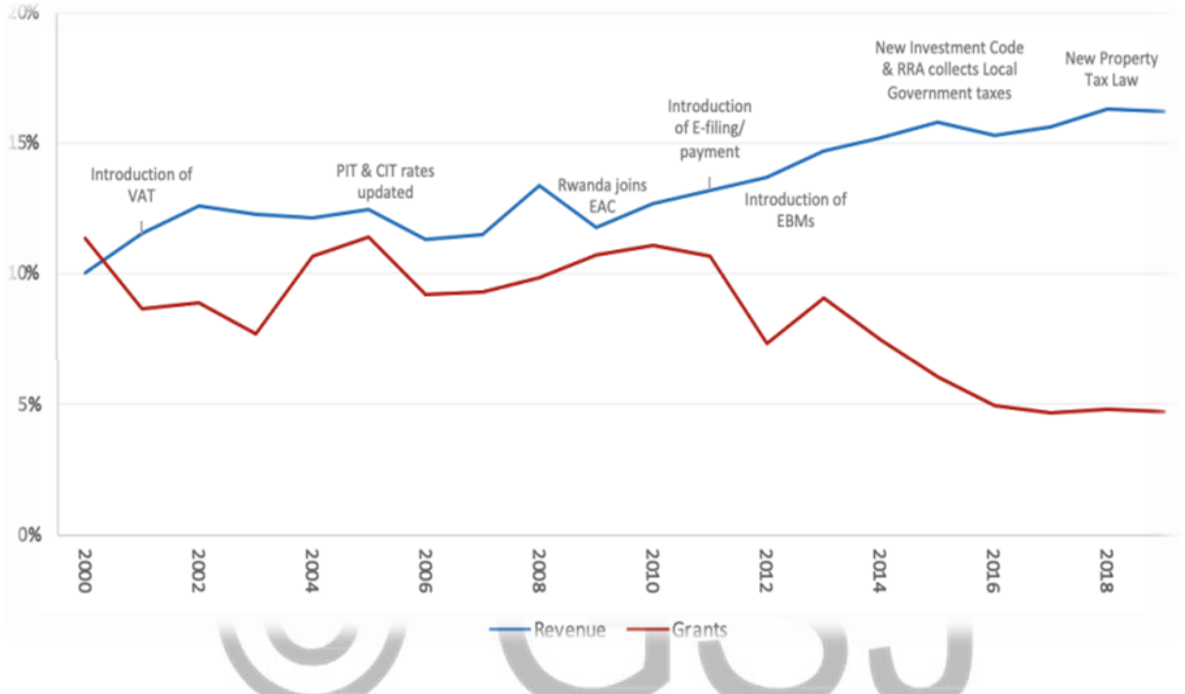
Source: Researcher 2023

Figure 17-4: Tax to GPD ratio from 2009 to 2022

The data provided above presents the nominal Gross Domestic Product (GDP) in Rwanda Francs (Rwf Bn). Tax revenue (including Local Government Transfers) in in Rwanda Francs (Rwf Bn), and the tax as percentages of GDP (including Local Government Transfers) for the fiscal years from 2009/10 t0 2022/23. Over this period, both nominal GDP and tax Revenue have shown consistent growth, with tax revenue increasing from 377 billion Rwf in 2009/10 to 2,291.190 billion Rwf in 2022/23. Similarly, nominal GDP has increased steadily from 3,399 billion Rwf in 2009/10 to 15,283 billion Rwf in 2022/23. The tax as percentage of GDP has fluctuated slightly, ranging from 12% to 17%. With an average approximately of 15%. In fact, this data indicates a stable relationship between tax revenue and the overall economic output, with a tax contributing around 15% of GDP over years, reflecting the tax system's consistency in capturing share of economic activity.

This graph presents a clear picture of a drastic increase of tax-to-GDP ratio starting from 2024 up to 2020, with the exceptions being the years of minor falls. There are some reductions in particular, happened in 2015 (from 15.8% to 15.5%), 2021 (from 16.3% to 15.8%), and 2022 (from 15.8% to 15.0%). Nevertheless, it should be emphasized that, immediately prior to the depicted decades, the peculiarity of the tax-to-GDP ratio is the fact that its upward trend was consistent. From 2009 to 2014, this rate inclined smoothly and reached the scored 11.8%, 12.7%, 13.2%, 13.7%, 14.7%, and 15.2% at each consecutive point. The increasing trend, therefore, indicates a shift in the tax revenue as a percentage of the average GDP growth rate showing possible disruptions occasionally. Crunching this

phenomenon would help to discover irregularities that are the symptoms of fluctuations of economic settings, government policies or tax enforcement mechanisms. Changes in the tax-to-GDP ratio are driven by the relative changes in nominal tax revenues and in nominal GDP. From one year to the next, if tax revenues rise more than GDP (or fall less than GDP) the tax-to-GDP ratio will increase. Conversely, if tax revenues rise less than GDP, or fall further, the tax-to-GDP ratio will go down. Rwanda's Grants and tax revenues as percentage of GDP has presented here below[10]:



Source: Minecofin, Medium Term Revenue Strategy 2021 – 2024

Figure 18-4: Rwanda's Grants and tax revenues as percentage of GDP

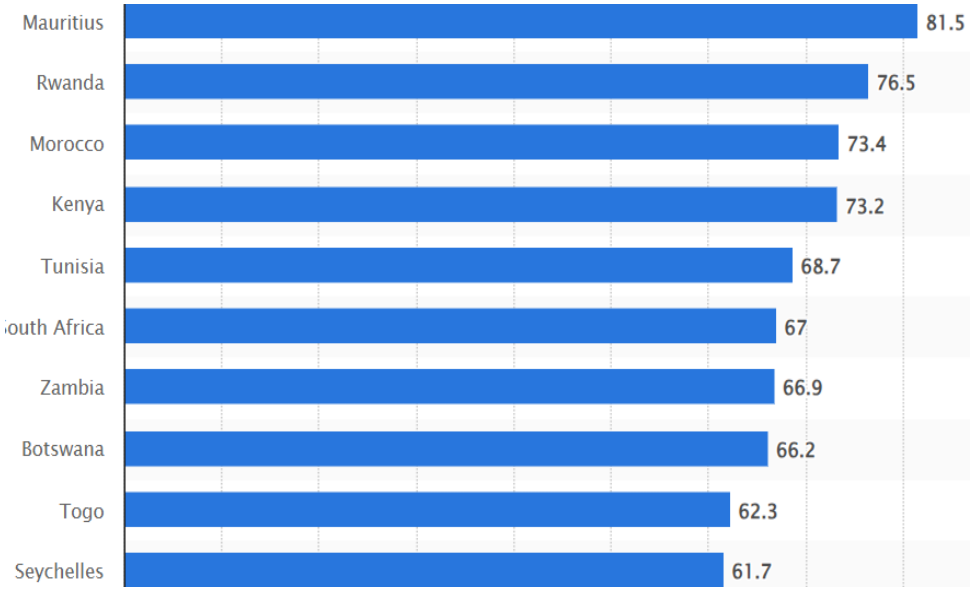
With the figure above, shows that Rwanda's tax reforms can be separated into three major stages: *restoration of the tax base*; *introduction of tax incentives to strengthen production for domestic and foreign investors*; and *enhancing efficiency in tax administration*.

In 1997, RRA was established to collect domestic revenue and better manage the scarce resources of the recovering Rwandan economy. RRA has continually strengthened its performance through parallel institutional and legal framework reforms. Initial reforms aimed to widen the tax base, with the introduction of VAT in 2001, reduction of CIT from 35 to 30 percent in 2005 and the standard corporate tax rate for companies now is 28% (reduced from 30% effective 14 September 2023). The accession to EAC in 2009.

Improved use of technology in RRA has reduced the cost of doing business, with the E-Tax portal introduced in 2011 and the Electronic Billing Machine (EBM) in 2012. Key improvements within tax administration in recent years include taxpayer outreach, increasing the number of registered taxpayers, providing better services, enhanced use of IT, and better risk management. Streamlining and modernizing RRA have contributed to an improved

[10]https://www.minecofin.gov.rw/index.php?eID=dumpFile&t=f&f=47839&token=8a225ec327ea93e24ca2ad06633abd4e3f5836e8

business-enabling environment. In 2020, Rwanda scored 76.5 points in the ease of doing business index. The country offers the best business environment in Africa, only after Mauritius is above Rwanda in other African countries as per Statista 2020 report below[11]:



Source: IFC doing business report 2020

Figure 19-4: Top 10 African countries offers the best business environment

Comparing east African countries, IFC doing business report shows that Burundi, Kenya, Tanzania and Uganda improved in rakings whereas Rwanda fell in ranking but still remained the best ranked country in EAC in 2020 and one of the only two countries in Africa among the top 50 in the world. From this data we can conclude that easy doing business have an impact on economic growth, through tax paid by business owners, availability of job opportunity, improvement of production capacity and attracting many investors.

- **Tax to budget ratio**

The tax to budget ratio is an indispensable indicator where the barometer stands for the proportion of government revenue at discretion to the amount of the general budget. It is a measure of the level of social autonomy and the reliance of a government on tax to fund its expenditure. A high tax-to-budget ratio manifests itself in the use of taxes as a significant source of income for the budget; thus, a greater weight is placed on the tax payer's shoulders, while the economy can be seriously affected. On the other hand, a low ratio could else exemplify alternative income sources or a more confined government service provision. Making a deeper dive into the tax-to-budget ratio adjustment over any time period gives an opportunity to observe changes in the country's tax policy, economic conditions, and setting government spending priorities which the fiscal decision makers, investors and commentators take into consideration when assessing the direction and health of the country's budget.

- **On time filling ratio**

[11] https://www.statista.com/statistics/1227392/ease-or-doing-business-in-african-countries/

The on-time filing ratio for taxes is one of the vital indicators which measures the efficacy in taxpayers complying with the deadlines and meeting their obligations on taxes. We can determine this ratio by comparing the filed prompt returns with the remaining total returns. The effectiveness of tax system is high due to high performance of both tax compliance and administrative efficiency. It provides a positive evidence for the accomplishment of efficient tax enforcement measures, taxpayer education programs, and the easy tax filing. The authorities of government and tax departments also keep watch on this indicator closely as it allows to enumerate revenue forecasting, budgeting, and the wellness of the economy.

Besides, the factor of a filling ratio being on time always contributes to the trust in the tax system and government institutions on the part of society. Thus, work on taxpayer compliance and on simplifying them is paramount in order to keep the positive on-time filling ratio sustainable. As we see the levels of timely income tax filing in 2017 formed wide spectrum among the taxpayer categories undefined:

Table 10-4: On time returns filing ratios for income tax (CIT & PIT) for 2017 tax period[12]

YEAR	Taxpayer segment	Number of expected declarations	Number of on time declarations	On-time filing ratio
2017	LARGE	372	368	**99.0%**
	MEDIUM	1,009	976	**94.8%**
	SMALL	162,710	104,680	**62.9%**
2019	LARGE	252	240	**95.2%**
	MEDIUM	684	637	**93.1%**
	SMALL	190,136	116,347	**61.2%**

Source RRA Report 2018,2020

The data in this table indicates that small taxpayers have a lower on-time filing ratio compared to other taxpayer segments. This discrepancy may be attributed to a lack of technical skills, as suggested by primary data findings. Additionally, small taxpayers might face challenges in accessing sufficient capital to engage tax advisory professionals. These insights underscore the importance of further research on tax compliance among small taxpayers, encouraging scholars to delve deeper into this issue. For instance, in the RRA report of 2021-2022 large taxpayers score a rate of 96.7% concerning income taxes (PIT & CIT), 90.5% for VAT revenue, and 91.4% for PAYE taxes. While in the 2019-2020, large taxpayers paid all the calculated taxes on time in 95.5% (CIT & PIT), 98.8% (VAT) and 99.2% (PAYE) of the claims registered in the tax portfolio. The timely tax payment ratios, on the other hand, have been consistently very high for small and medium taxpayers – up to 72.1% for income tax, 98.9% for VAT, and 91.5% for PAYE. Generally, the mean on-time tax payment ratios recorded among various taxpayers were 79.0% for tax, 98.9% for VAT, and 96.8% for PAYE. These figures signify that there is still a problem with taxpayers that declare but do not pay their taxes mainly on income tax, not VAT, taxes. Yet further research is needed to discover the reason behind such an outcome through primary data.

[12] https://www.rra.gov.rw/en/publications

- **Electronic billing machine (EBM)**

The proliferation of EBMs in the supervision of documented business transactions in assessing VAT compliance has a lot to commend it. Though they clarify some facts, it is recognized that Rules alone are not sufficient for biased reporting of the taxes, as there are still windows, which businesses take advantage of to avoid paying taxes, such as not issuing receipts or issuing fraudulent ones. For instance, Victor (2017) holds that EBMs could enhance VAT compliance in Rwanda and other African countries, but this possibility can only be realized where there is a concurrent use of measures such as data analytics and receipt checks. Undefined:

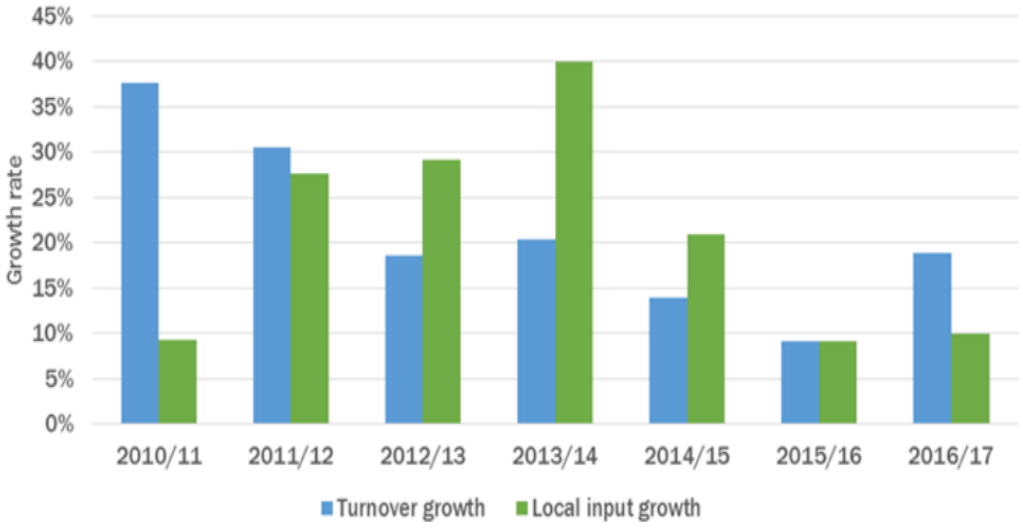
1. Benchmark audits: This stage involves in looking into the true sales data of businesses. An indicator for potential non-compliance can be set up by a law enforcement agency through knowing an expected sales pattern as a base point.

2. Data analytics: Through the data analysis, authorities can determine who the outliers are and those who are not following the accepted norms and standards. Something abnormal could be happening in sales patterns or fraudulent transaction behaviors, which can be sent for review.

3. Mystery shopper audits: Data analytics can help to point out problems of non-compliance other than ones noticed at random checks, thus allowing authorities to ask for mystery shopper audits to ensure the accuracy of the findings.

These audits may include use of secret service agents or the conduction of surveillance operations to finds out if businesses actually are not issuing EBM receipts, or they are engaged with fraud practices.

Adopting EBMs along with the above measures, authorities can evolve a system narrowing possible errors of tax payment by the entities. This method not only detects and punishes non-compliant businesses but also can be used as a deterrent so increasing overall VAT compliance thereby becoming vital in countries with the levels of VAT non-compliance becoming high.



Source RRA Report 2018[13]

Figure 20-4: Turnover growth vs. local input VAT claims growth.

[13] https://www.rra.gov.rw/fileadmin/user_upload/rra_annual_activity_report_2018-19.pdf

The data mentioned hint at system controls for input claims of VAT, towards EBMs and other measures championed by Victor, showing an improvement in the number of domestic VAT declarations and revenue mobilization. Undefined:

1. **Positive Impact of System Controls:** The installation of accounting systems for VAT input claims has brought about a rise in the tax returns filed in the period between January and June 2017 as compared to the previous periods.
2. **Steady Growth in Local Input VAT:** In spite of having being implemented preventive measures, growth rate of local input VAT remains quite much steady with a little difference of about approximately 10% in 2016/17 and 9.2% in 2015/16. This scenario means that the measures do not harm the VAT input valid claims.
3. **Increased Turnover:** There has been a massive growth in turnover which reached the rate of 18.9% in the period January-June 2016 compared to the same period the previous year, 2015/16.
4. **Comparative Analysis**: Figure 15 illustrates that the growth rates of turnover and local input VAT have followed comparable paths, suggesting a correlation between the two. However, there has been a lack of comparable rise in the local input growth rate, indicating a reduction in local input VAT claims due to the validation measures.
5. **EBMs and Victor's Proposed Measures**: The information also highlights the effectiveness of EBMs and other proposed measures by Victor in ensuring accurate reporting of VAT liabilities. These measures serve as a powerful tool to combat VAT non-compliance, ultimately improving domestic revenue mobilization.

Overall, the combination of system controls for VAT input claims, EBMs, and other proposed measures has proven to be effective in enhancing VAT compliance and tax collection in the country.

- **Use of electronic filing facilities**

This indicator is under study by researcher. It measures the extent to which declarations, for all core taxes, are filed electronically. According to RRA report of year 2020 the following table shows in percentages on how taxpayers declared electronically[14]:

Table 11-4: Shows the electronic filing status in four fiscal years.

Tax types	2016/17	2017/18	2018/19	2019/20
	In percentages of all declarations	In percentages of all declarations	In percentages of all declarations	In percentages of all declarations
EXERISE	89.5%	100.0%	97.8%	100.0%
CIT	83.6%	96.6%	99.8%	100.0%
PAYE	99.5%	99.9%	100.0%	100.0%
PIT	70.5%	83.3%	97.1%	100.0%
VAT	99.1	99.8%	99.9%	99.9%
LARGE TAXPAYERS (ALL CORE TAXES)	85.7%	100.0%	100.0%	100.0%

Source: RRA report 2020

[14]https://www.rra.gov.rw/fileadmin/user_upload/RRA_Annual_Activity_Report_2020-2021_Final_Version.pdf

Rwanda's move towards e-filing illustrates a successful transformation from a manual system to an electronic system in tax administration. The Rwanda Revenue Authority (RRA) made electronic filing mandatory and no longer accepting the manual option, this contributed to a remarkable compliance rate as shown by e-filing rates during the 2019/20 fiscal year that exceeded 99% in most tax matters. The e-filing adoption has been very successful especially in the PAYE, Excise, CIT and PIT categories, where all taxpayers registered 100% as compliance rates. However, within a bigger taxpayer segment, which is marked by complex problems, the rate of e-filing has reached 100% for all the core taxes.

- **Use of electronic payment methods**

This data depicts the portion of overall tax payments made electronically during a specific period. It examines the proportion of essential tax revenue settled through electronic means, such as credit cards, debit cards, and online bank transfers, without direct bank employee or tax authority involvement. Utilizing the table sourced from the RRA report of 2020, it demonstrates the extent of electronic payment adoption for the fiscal year 2019-2020[15].

Table 12-4: Use of Electronic Payments for 2019/20 fiscal year

Taxpayers segments and tax types		**In percent of total value of payments received for each tax types**	**Percentage average**
Small & medium taxpayers	CIT	91.1%	**92.6%**
	PIT	85.6%	
	PAYE	90.6%	
	VAT	95.9%	
	EXCISE TAX	99.8%	
Large taxpayers	CIT	93.7%	**96.2%**
	PIT	97.5%	
	PAYE	92.1%	
	VAT	98.0%	
	EXCISE TAX	99.8%	

Source: RRA Report 2020

Based on the information provided, it seems that electronic payment rates for large taxpayers are lower than international good practice standards (100%) but have a higher rate in excise tax of 99.8% and VAT of 98.0% followed by PIT of 97.5%, while small and medium taxpayers generally have higher electronic payment rates specifically in excise tax (99.8%) and VAT (95.9%), followed by CIT (91.1%), PAYE (90.6%), and PIT (85.6%).

On average, small and medium taxpayers have an electronic payment rate of 92.6%. This suggests that there may be room for improvement in electronic payment rates, for both Small & medium taxpayers and large taxpayers, to align with international standards and improve overall efficiency tax collection.

[15]https://www.rra.gov.rw/fileadmin/user_upload/RRA_Annual_Activity_Report_2020-2021_Final_Version.pdf

4.1.4 Analysis of Taxpayer Access to RRA Services.

Generally, compliance means conforming to a specification, standard or law that has been clearly defined. It is the practice of obeying a rule and law in accordance with established guidelines, try to fit specific standards set and meet the requirements of prescribed regulations. Compliance in the context of tax administration refers to the extent to which taxpayers and traders, along with intermediaries like practitioners fulfil their tax obligations. Compliance with tax laws in Rwanda typically means registering when required, filing returns on time, reporting complete and accurate information to determine tax liability and paying all amounts owing when due. Non-compliance occurs when any of these obligations are not met for whatever reason.

Different studies categorize Taxpayer's compliance in two perspective models (economic Deterrence model and fiscal and social psychology model). Economic Deterrence model is based on the concept that the risk of detection and punishment will improve compliance behavior.

Whereas fiscal and social psychology models inductively examine the attitudes and beliefs of taxpayers in order to predict actual behavior. Tax obligations placed on a taxpayer varies from one tax type to another and from one jurisdiction to the next. However, the four major broad categories of taxpayer obligations remain the same for all taxpayers irrespective of jurisdiction, these are:

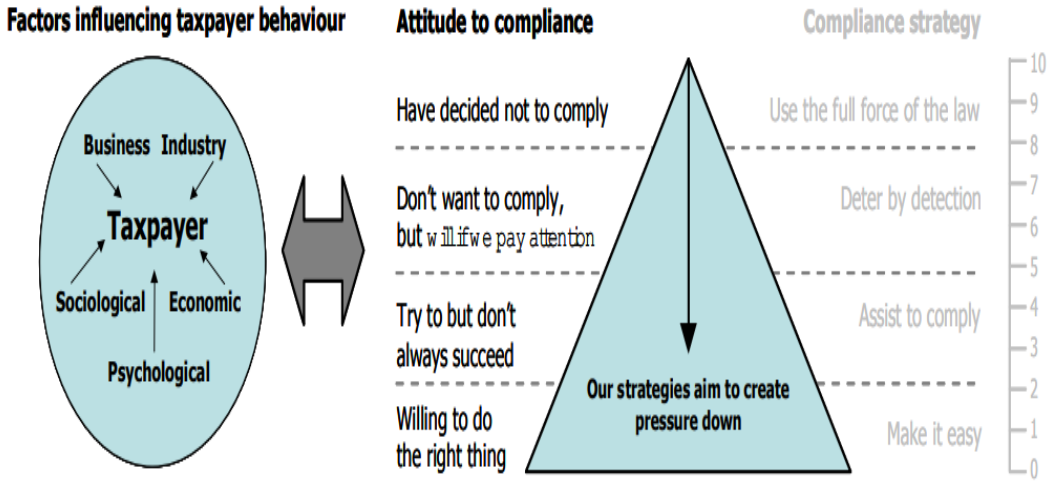
Registration: Any person subject to any type of tax administered by RRA has to be registered in RRA and obtain a fiscal number before engaging in any economic activity of taxation relevance.

Filling and declaration: Taxpayers have to file tax returns with RRA in accordance with the tax legislation. All importers and exporters have to declare their imports or exports in accordance with the East African Community Customs Management Act (EACCMA).

Complete and accurate reporting: Each taxpayer is obliged to keep evidence of economic activities (books, records, invoices, etc.) as required in the tax legislation and submit/present the data and or documentation required by RRA accurately and timely in accordance with the tax legislation.

Payments: Taxpayers have to pay taxes and duties at the specified time without RRA notice or request. According to Rwandan Tax law If a taxpayer fails to meet any of the above obligations, then they may be considered to be non-compliant. The willingness and behaviour of a Taxpayer to meet tax obligations has a major impact on compliance levels. In order to achieve the optimal level of compliance, it is necessary to pay attention to Taxpayer's behaviour and the methods of influencing behaviour. This assists the tax administration in choosing the most efficient (low costs) and effective (best outcome) way to treat such behaviours. This is better explained in the OECD Compliance pyramid and behavior model shown below[16]:

[16] https://www.oecd.org/tax/administration/33818656.pdf



Source: OECD, 2004

Figure 21-4: A spectrum of taxpayer attitudes to compliance

According to other scholars SMEs still have a challenge to use E-filling due to limited Knowledge, Insufficient IT infrastructures, and network problems. However, RRA should Increase investment in tax services for SMEs to accommodate their varying levels of infrastructure and IT literacy, with particular focus on gender inclusion.

It is understandable that the RRA initially focused digitalization efforts on larger businesses that contribute more to total tax revenue and are more capable of quickly adapting to new systems. However, to create a more inclusive tax system, it will be important for RRA to design services that meet the needs of all taxpayers. Rwanda has seen notable improvement in tax collection from SMEs, but some such businesses many of which are run by women find it difficult to locate guidance on which taxes and forms are applicable to them.

Whereas larger firms report high satisfaction in their interactions with RRA, smaller firms noted long delays in communication. Many taxpayers interviewed said the best way to get a quick response from RRA was to go directly to its offices, a time and cost investment that many lower-income taxpayers are unable to make. These challenges illustrate the degree to which digitalization has been designed primarily for larger businesses. Investing in understanding the needs and pain-points of SMEs would greatly benefit taxpayers, RRA, and the government, including through greater formalization of businesses, compliance, and total revenue, the 3 tables summarize the Taxpayers awareness of RRA services, the source of Awareness of Customer Services and Awareness of Tax reforms and initiatives[17].

Table 13-4: Table Taxpayers awareness of RRA services

[17] https://www.rra.gov.rw/fileadmin/user_upload/RRA_Final_Report_Customer_Satisfaction_Survey_2020.pdf

Services	Count	%
Registration or de-registration	**1,032**	**71.0%**
Business registration & acquisition of a Taxpayer Identification Number (TIN)	949	92.0%
Registration and acquisition of a Taxpayer Identification Number (TIN) for Local Government Taxes	650	63.0%
VAT registration and acquisition of a VAT Certificate	456	44.2%
Registration under quarterly payment of VAT & PAYE	443	42.9%
Provide access to E-tax system (Web registration)	342	33.1%
Business deregistration	292	28.3%
De-registration from Local Government Taxes	237	23.0%
Tax declaration and Customs Duties	**1,404**	**96.6%**
Personal and Corporate Income Tax	1,146	81.6%
Value Added Tax (VAT)	796	56.7%
Custom duties	698	49.7%
Withholding tax	586	41.7%
Consumption Tax	340	24.2%
Tax on Gaming activities	250	17.8%
Tax on Mineral	140	10.0%
Tax exemption on imported goods	115	8.2%
Local Government Taxes (Trading license, Property tax, Rental income tax)	76	5.4%
Public cleaning fee	60	4.3%
Other services	**332**	**22.8%**
Issuance of tax clearance certificate	189	56.9%
Tax arrears certificate (for public tender purpose)	188	56.6%
Issuance of a tax payment certificate	185	55.7%
Issuance of tax stamps	182	54.8%
VAT Refund request	123	37.0%
Installment or Payment facility	89	26.8%
EBM activation	87	26.2%
EBM De-activation/ suspension	81	24.4%
Request for a password for EBM	80	24.1%
General technical support for EBM	69	20.8%
Processing of customs import declaration	65	19.6%
Processing of customs export declaration	43	13.0%
Motor vehicles services	28	8.4%

Source: RRA Customer satisfaction survey, 2020

According to the data provided, awareness levels regarding business registration or deregistration stand at 71%. Within this service, the highest level of awareness is observed in business registration and obtaining a Taxpayer Identification Number (TIN), reaching 92%. However, awareness regarding deregistration from Local Government Taxes remains low at 23%. Tax declaration and customs duty service show a high awareness rate of 96.6%, with taxpayers being particularly informed about personal and corporation taxes (81%) compared to other aspects such as tax exemption on imported goods, Local Government Taxes (Trading license, Property tax, Rental income tax), and Public cleaning fee (currently is no longer charged), which scored much lower at 8.2%, 5.4%, and 4.3% respectively. Awareness levels for other services vary across different taxpayer categories. For example, large taxpayers exhibit high awareness regarding declaration/filing and processing of tax clearance certificates, while registration/deregistration services are more recognized among large and medium taxpayers. This indicates that taxpayers tend to prioritize services relevant to their business domains, leading to varied levels of awareness across different RRA services. Therefore, it's not surprising that some taxpayers may not be familiar with many of the services offered by the RRA.

Table 14-4: Communication tools used to be aware of RRA Services

	Count	%
Radio	1,149	79.0%
TV	975	67.1%
RRA's website	530	36.5%
Employees of RRA	471	32.4%
Newspaper	196	13.5%
Social Media (Twitter, Facebook, Instagram, YouTube)	149	10.2%
Posters within RRA's buildings	122	8.4%
Exhibitions and promotions e.g. shows	102	7.0%
Events held by RRA e.g., launch events, Taxpayers Appreciation Day	76	5.2%
Other	29	2.0%

Source: RRA Customer satisfaction survey, 2020

The table indicates that customers discover information about RRA products and services through a range of channels. In accordance with this, the research aimed to determine how customers become aware of RRA's service charter. It was found that the majority of taxpayers, 79% and 67.1%, respectively, are informed about RRA services through Radio and TV. Conversely, the other communication tools exhibit lower percentages, ranging from 36.5% to 2%.

Table 15-4: Table Awareness of Tax reforms and initiatives

	Count	%
M-declaration (dialing *800#)	827	56.9%
Payment of taxes using mobile money	789	54.3%
E- payment (Money transfer from your bank account to RRA account)	625	43.0%
Electronic billing machine (EBM)	552	38.0%
E- filling	290	19.9%
Tax payment through Mobicash	269	18.5%
Electronic Single Window	133	9.1%
Motor vehicles ownership transfers	75	5.2%
Tax payment through infinity	69	4.7%
One Stop Boarder Post	46	3.2%
Single customs territory	41	2.8%
Blue Channel	30	2.1%
Other	21	1.4%

Source: RRA Customer satisfaction survey, 2020

In order to assess if taxpayers have noticed any changes in service delivery as a result of reforms, it was crucial to determine their awareness of ongoing or completed reforms implemented by RRA. The survey identified three main reforms across different customer segments. According to Table 10, approximately 56.9% of taxpayers reported awareness of reforms regarding tax declaration with M-declaration, 54.3% were aware of the option to pay taxes using mobile money, and 43.0% were informed about E-payment methods.

Table 16-4: Perception of taxpayers on the impact of RRA's reforms

Services	Strongly negative	Negative	No impact	Positive	Strongly positive	Positive impact
Tax payment through Mobile Money	6.1	2.0	16.4	45.4	30.2	**75.6**
M-declaration	7.1	2.4	17.1	44.6	28.9	**73.5**
E- filling	5.2	2.1	20.9	45.5	26.3	**71.8**
E- payment	9.6	3.9	18.6	44.2	23.7	**67.9**
Electronic billing machine (EBM)	10.0	3.1	23.7	40.9	22.4	**63.2**
Motor vehicles ownership transfers	18.8	9.4	25.6	33.2	13.0	**46.2**
Tax payment through infinity	25.5	12.4	26.5	25.1	10.4	**35.5**
Electronic Single Window	34.7	12.4	21.9	22.3	8.6	**30.9**
One Stop Boarder Post	35.8	12.0	22.4	20.8	8.9	**29.7**
Single customs territory	36.5	13.6	23.6	19.3	7.0	**26.3**
Blue Channel	37.0	13.5	23.2	19.5	6.7	**26.3**

Source: RRA Customer satisfaction survey, 2020

According to the survey conducted by RRA to assess the impact of reforms on taxpayers, respondents rated various aspects of the system on a scale of 1 to 5. The results indicate that the top benefits perceived by taxpayers were mobile telephone payments (75.6%) and M-declaration (73.5%), followed by E-Payment (67.9%) and E-filing (71.8%). Regarding the processing of VAT and its impact on service delivery, customers highlighted faster service (63.2%) as a significant improvement.

4.1.5 Summary and Analysis of History and Current Status of Tax Administration in Rwanda

The tax administration landscape in Rwanda has evolved significantly since the establishment of the Rwanda Revenue Authority (RRA) in 1997. This analysis delves into the historical trajectory and current status of tax administration in Rwanda, focusing on key aspects such as establishment, mandate, taxpayer registration process, requirements, tax registration, declaration, payment, challenges, risks, and risk management approaches.

Establishment and Mandate: The Rwanda Revenue Authority was established under Law No 15/97 in 1997, operating as a quasi-autonomous body responsible for assessing, collecting, and accounting for various revenues. Its mandate encompasses administering and enforcing tax, customs, and other specified revenue laws, as well as providing advice to the government on tax policy matters.

Taxpayer Registration Process and Requirements: Rwanda has implemented an efficient taxpayer registration process, allowing businesses to register online through the Rwanda Development Board (RDB) portal or directly through the RRA. The registration results in the issuance of a unique Taxpayer Identification Number (TIN), facilitating

compliance with tax obligations. The documentation requirements vary based on business categories, ensuring clarity and efficiency in the registration process.

Tax Registration, Declaration, and Payment: Upon business registration, taxpayers are automatically enrolled for Income Tax, with registration depending on the number of shareholders. Businesses are also required to register for Trading License Tax and Public Cleaning Service Fees. The E-Tax system streamlines the declaration and payment of domestic taxes, offering online facilities for tax compliance. Penalties and fines are imposed for non-compliance, reflecting the government's commitment to enforcing tax regulations.

Challenges and Risks: Despite its successes, the RRA faces challenges and risks in tax collection, including low tax compliance culture, prosecution of tax evaders, staff turnover, and high domestic tax arrears. Risks in efficiency tax collection include registration, payment, filing, and inaccurate reporting risks, necessitating proactive risk management approaches.

Risk Management Approaches: The RRA employs proactive risk management approaches, including maintaining risk registers, implementing tax compliance improvement plans, strengthening internal control systems, and adopting the Risk Differentiation Framework (RDF). These approaches aim to mitigate risks effectively while enhancing tax compliance and collection efforts.

Overall, the history and current status of tax administration in Rwanda highlight the country's commitment to efficient and equitable revenue mobilization. Despite challenges and risks, the RRA has implemented proactive measures to address them, ensuring effective tax administration and contributing to the economic development of Rwanda. Continued efforts in risk management and compliance will be crucial for sustaining the progress achieved and fostering long-term growth.

4.2 Primary data analysis

This section involves the examination and interpretation of raw data collected directly from the original source such as surveys, experiment or observation. In this case the details of profile of respondent, organized data, summarized key findings through descriptive statistics and regression was used to explore the relationship between variable under study.
The main goal of this section is to address research questions or research objectives effectively.

4.2.1 Profile of the Respondents

This section covered all necessary demographic information the respondents such as Gender, age, education level, experience, category of taxpayer and their experience. The main aim was to gain an understanding on how various groups with sample may view or experience the subject matter differently to break dawn the data according to these variables.
This analysis offers important insights for comprehending the wider significance of the findings and possibly customizing interventions or suggestions in light of any potential biases or variances in responses across demographic categories. Furthermore, investigating these demographic variables enables researchers to evaluate the sample's representativeness and consider any potential restrictions or biases brought on by demographic skewing.

Table 17-4: Profile of the Respondents

Profile of respondents		Count	Column N %
Gender	Male	29	58.0%
	Female	21	42.0%
Total		**50**	**100%.0**
Age	21- 30 years	11	22.0%
	31- 40 years	19	38.0%
	41- 50 years	19	38.0%
	51years and above	1	2.0%
Total		**50**	100.0%
Education	Secondary	0	0.0%
	Undergraduates	30	60.0%
	Postgraduates	20	40%.0
	Others	0	0.0%
Total		**50**	**100.0%**
Experience	1- 2 years	8	8.0%
	3- 5 years	52	52.0%
	6- 9 years	32	32.0%
	10 years and above	8	8.0%
Total		**50**	**100.0%**
Category of Taxpayers	Small	126	84.0%
	Medium	19	12.7%
	Large	5	3.3%
Total		**150**	**100.0%**
Experience of taxpayers	Between 2-5 years	109	72.7%
	Between 5-10 years	33	22.0%
	Above 10 years	8	5.3%
Total		**150**	100.%

Source: Primary data, 2023

The distribution is based on the respondents' break down and more male (58%) than female (42%) are those who have responded. The respondents whose ages fell within the brackets of 31–40 and 41–50 years taken together formed 38% of the total respondents, with the 21–30 age group standing on 22%. Undergraduates led the way according to the educational background criterion, being 60%. additionally, 32% of the respondents has experience in range from 6 to 9 years while 52% had an experience from 3 to 5 years.

This primary data shows that 84% of small taxpayers, 12.7% of medium taxpayers and 3.3% of large taxpayers were reached with 126, 19 and 5 respondents respectively. Furthermore, all of the taxpayers have a work history between 2 and 5 years that make up 72.7%. This is followed by the 5-10 years range which is 22% make up 33 respondents and only 5.3% of business experience is greater than 10 years make up 8 respondents. It suggests that all respondents were qualified enough to offer qualified information to researcher.

4.2.2 Assessing the Perception of using Electronic Tax System

Table 18-4: Assessing the Perception of using Electronic Tax System

Statements on Perception about E-tax	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total	Mean	Standard Deviation
Taxpayers find it easy to pay tax via the internet	20 (10.0%)	93 (46.5%)	69 (34.5%)	18 (9.0%)	0 (0.0%)	200	2.43	0.792
Taxpayers have sufficient tax knowledge for e-filing	0 (0.0%)	3 (1.5%)	23 (11.5%)	75 (37.5%)	99 (49.5%)	200	4.35	0.742
Taxpayers do not intend to evade tax	5 (2.5%)	7 (3.5%)	13 (6.5%)	51 (25.5%)	124 (62.0%)	200	4.41	0.941
E-tax system ensures timely and accurate filing of returns	0 (0.0%)	7 (3.5%)	8 (4.0%)	94 (47.0%)	91 (45.5%)	200	4.35	0.720
Taxpayers intend to provide invoices using EBM	0 (0.0%)	43 (21.5%)	64 (32.0%)	75 (37.5%)	18 (9.0%)	200	3.34	0.916
The e-tax system is user-friendly	0 (0.0%)	0 (0.0%)	0 (0.0%)	8 (4.0%)	192 (96.0%)	200	4.96	0.196
Taxpayers are satisfied with the e-tax service	0 (0.0%)	0 (0.0%)	0 (0.0%)	62 (31.0%)	138 (69.0%)	200	4.69	0.464
Easy filing and tax payment via the internet	34 (17.0%)	63 (31.5%)	51 (25.5%)	37 (18.5%)	15 (7.5%)	200	2.68	1.177
Taxpayers have sufficient tax knowledge for e-filing without help	144 (72.0%)	15 (7.5%)	16 (8.0%)	11 (5.5%)	14 (7.0%)	200	1.68	1.247
E-tax system ensures timely and accurate filing of returns without help	0 (0.0%)	57 (28.5%)	32 (16.0%)	87 (43.5%)	24 (12.0%)	200	3.39	1.026
Taxpayers perceive better service through e-tax	0 (0.0%)	131 (65.5%)	36 (18.0%)	14 (7.0%)	19 (9.5%)	200	2.61	0.977

Source: Primary data, 2023

This table presents the results the findings on assessing the perception of using an Electronic Tax System (e-tax) in Rwanda, particularly focusing on its contribution to effective tax collection. Here's a detailed interpretation and analysis:

1. Taxpayers' Perception of Ease of Payment via Internet: 10% of respondents strongly agree that it's easy to pay taxes online, while 46.5% disagree and 34.5% remain neutral. Only 9% agree. The standard deviation of 0.792 suggests some variability in responses while the mean score is 2.43, indicating that overall, respondents are leaning towards finding it somewhat challenging to pay taxes online.
2. Taxpayers' Knowledge for E-Filing: A significant portion (49.5%) strongly agree that they have sufficient tax knowledge for e-filing, with an additional 37.5% agreeing. The mean score is 4.35, suggesting that most respondents feel confident about their tax knowledge for e-filing.
3. Intent to Evade Tax: Most respondents (62%) strongly agree that they do not intend to evade taxes, with an additional 25.5% agreeing. The mean score is 4.41, indicating a strong inclination towards tax compliance.
4. Perceived Timeliness and Accuracy of E-Tax System: Nearly half (47%) strongly agree that the e-tax system ensures timely and accurate filing of returns, with an additional 45.5% agreeing. The mean score is 4.35, suggesting high satisfaction with the system's efficiency.
5. Intent to Use Electronic Billing Machines (EBM): There's a mix of responses, with 37.5% agreeing and 32% remaining neutral about intending to provide invoices using EBM. The mean score is 3.34, indicating moderate intent towards adopting EBM.
6. User-Friendliness of the E-Tax System: Almost all respondents (96%) strongly agree that the e-tax system is user-friendly. The mean score is high at 4.96, indicating widespread agreement on the system's user-friendliness.
7. Satisfaction with E-Tax Service: Similarly, a majority (69%) strongly agree that they are satisfied with the e-tax service. The mean score is 4.69, reflecting high satisfaction levels.
8. Ease of Filing and Tax Payment via Internet: While 17% strongly agree that filing and paying taxes online are easy, a significant portion (31.5%) disagrees. The mean score is 2.68, suggesting a mixed perception of the ease of online tax processes.
9. Tax Knowledge for E-Filing Without Help: A majority (72%) strongly agree that they have sufficient tax knowledge for e-filing without help. The mean score is 1.68, indicating high confidence in individual tax-filing capabilities.
10. Perception of Better Service Through E-Tax: A considerable portion (65.5%) strongly agree that they perceive better service through e-tax. The mean score is 2.61, suggesting a positive perception but with some variability.

Overall, the findings indicate a generally positive perception and acceptance of the e-tax system in Rwanda, with high satisfaction levels regarding its efficiency and user-friendliness. However, there are some areas, such as the ease of online tax processes, where opinions are more divided. These insights can inform strategies for further improving the electronic tax system and enhancing tax compliance in Rwanda.

4.2.3 Assessing Technical skill of using Electronic Tax System

Table 19-4: Technical skill of using Electronic Tax System

Statement on technical skill of using _tax	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total	Mean	Standard Deviation
Taxpayers can file and pay tax from anywhere using their mobile phone or internet	0 (0.0%)	0 (0.0%)	0 (0.0%)	9 (4.5%)	191 (95.5%)	200	4.96	0.208
Taxpayers have sufficient knowledge to file and pay tax using their mobile phone or internet	0 (0.0%)	0 (0.0%)	29 (14.5%)	77 (38.5%)	94 (47.0%)	200	4.33	0.715
Taxpayers understand electronic filing system functions well and encounter no problems	0 (0.0%)	0 (0.0%)	19 (9.5%)	92 (46.0%)	89 (44.5%)	200	4.35	0.648
Electronic filing system is fast and convenient compared to the old manual system	0 (0.0%)	0 (0.0%)	0 (0.0%)	99 (49.5%)	101 (50.5%)	200	4.51	0.501
Taxpayers can file and pay tax from anywhere using their mobile phone or internet	0 (0.0%)	15 (7.5%)	0 (0.0%)	185 (92.5%)	0 (0.0%)	200	3.85	0.528
Taxpayers have sufficient knowledge to file and pay tax using their mobile phone or internet	15 (7.5%)	171 (85.5%)	14 (7.0%)	0 (0.0%)	0 (0.0%)	200	2.00	0.382
Taxpayers do not need to employ experts to declare and pay tax	39 (19.5%)	139 (69.5%)	18 (9.0%)	4 (2.0%)	0 (0.0%)	200	1.94	0.602
The way e-tax is designed is user-friendly	0 (0.0%)	0 (0.0%)	0 (0.0%)	185 (92.5%)	15 (7.5%)	200	4.08	0.264

Source: Primary data, 2023

This table is an assessment of the technical skill of using the Electronic Tax System, with various statements evaluated on a Likert scale ranging from "Strongly disagree" to "Strongly agree." Let's interpret and analyze the data in detail, considering the provided mean range and standard deviation criteria for evaluation.

1. Taxpayers can file and pay tax from anywhere using their mobile phone or internet:

The overwhelming majority (95.5%) strongly agree with this statement, indicating a very high level of confidence in the accessibility and convenience of the electronic tax system. This suggests that taxpayers perceive the system as highly flexible and user-friendly. The mean score of 4.96 and a low standard deviation of 0.208 further reinforce the strong positive perception, showing consistency in respondents' views.

2. Taxpayers have sufficient knowledge to file and pay tax using their mobile phone or internet: While a significant portion (47.0%) strongly agree with this statement, there is also a notable percentage (14.5%) who are neutral. This suggests that while many taxpayers feel confident in their ability to use the system, there may still be some uncertainty or lack of knowledge among a subset of respondents. The mean score of 4.33 indicates a positive perception overall, but the higher standard deviation of 0.715 suggests variability in confidence levels among respondents.
3. Taxpayers understand electronic filing system functions well and encounter no problems: The perception regarding understanding of the electronic filing system is mixed. While a substantial portion (46.0%) agree, there is also a significant neutral response (9.5%). This indicates that there may be some ambiguity or complexity in the system that some taxpayers are not fully comfortable with. The mean score of 4.35 suggests a strong level of agreement, but the standard deviation of 0.648 indicates some variation in responses, with uncertainty or lack of clarity among certain individuals.
4. Electronic filing system is fast and convenient compared to the old manual system: The overwhelming majority (50.5% strongly agree, 49.5% agree) perceive the electronic filing system as fast and convenient. This indicates a high level of satisfaction with the efficiency and effectiveness of the electronic system compared to traditional manual methods. The high mean score of 4.51 and low standard deviation of 0.501 reinforce this perception, showing widespread agreement and consistency among respondents.
5. Taxpayers do not need to employ experts to declare and pay tax: While a significant portion (69.5%) disagree or strongly disagree with this statement, indicating self-sufficiency, there is also a notable percentage (28.5%) who agree or strongly agree. This suggests that while many taxpayers feel capable of managing tax-related tasks independently, some still see value in seeking expert assistance. The low mean score of 1.94 indicates disagreement with the statement, and the higher standard deviation of 0.602 suggests some variation in responses, with a subset of respondents expressing agreement with the statement.
6. The way e-tax is designed is user-friendly: The overwhelming majority (92.5%) agree or strongly agree that the e-tax system is user-friendly. This indicates a high level of satisfaction with the design and interface of the electronic tax system, contributing to a positive user experience. The mean score of 4.08 falls within the "strong" category, indicating a positive perception, and the low standard deviation of 0.264 suggests consistency in responses, with widespread agreement among respondents regarding the design of the electronic tax system.

Overall, the analysis reveals a generally positive perception of the technical aspects of the Electronic Tax System, with high levels of confidence in its accessibility, efficiency, and user-friendliness. While there may be some areas where clarity or understanding could be improved, the majority of respondents perceive the system favorably.

4.2.4 Assessing tax collection efficiency in Rwanda Revenue Authority

Table 20-4: Assessing tax collection efficiency

efficiency tax collection statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total	Mean	Standard Deviation
E-tax has made efficiency tax collection in Rwanda	0 (0.0%)	0 (0.0%)	0 (0.0%)	191 (95.5%)	9 (4.5%)	200	4.05	0.208
E-tax system has made taxpayers file and pay tax in time	0 (0.0%)	0 (0.0%)	0 (0.0%)	33 (16.5%)	167 (83.5%)	200	4.84	0.372
E-tax system has improved efficiency tax collection and better serve taxpayers	0 (0.0%)	68 (34.0%)	113 (56.5%)	19 (9.5%)	0 (0.0%)	200	2.76	0.614
E-tax reduced tax payment risks and improved tax compliance	0 (0.0%)	21 (10.5%)	21 (10.5%)	134 (67.0%)	24 (12.0%)	200	3.81	0.781
Electronic efficiency tax collection help tax authorities find errors in the process of tax payment	6 (3.0%)	0 (0.0%)	0 (0.0%)	194 (97.0%)	0 (0.0%)	200	3.91	0.513
I pay my taxes willingly because I know the benefits	0 (0.0%)	0 (0.0%)	0 (0.0%)	121 (60.5%)	79 (39.5%)	200	4.40	0.490
I hate to pay taxes because tax rates are too high	0 (0.0%)	0 (0.0%)	0 (0.0%)	131 (65.5%)	69 (34.5%)	200	4.35	0.477
I pay my dues at the right time and in the right amount	0 (0.0%)	0 (0.0%)	4 (2.0%)	112 (56.0%)	84 (42.0%)	200	4.40	0.530
E-tax system has improved efficient in tax payment and better service	0 (0.0%)	0 (0.0%)	0 (0.0%)	130 (65.0%)	70 (35.0%)	200	4.35	0.478
Taxpayers filing and pay tax easily by using internet	0 (0.0%)	0 (0.0%)	0 (0.0%)	81 (40.5%)	119 (59.5%)	200	4.60	0.492

Source: Primary data, 2023

The presented table offers a detailed insight into the perceptions of respondents regarding the efficiency of tax collection in Rwanda, particularly focusing on the impact of the electronic tax (e-tax) system. Through a systematic analysis of mean scores, standard deviations, and percentages, with aim to provide a comprehensive understanding of the attitudes and opinions surrounding the implementation of e-tax and its effectiveness in Rwanda.

Tax collection efficiency is a crucial aspect of fiscal governance, directly influencing government revenue generation and public service provision. The adoption of electronic tax

systems represents a significant shift towards modernizing tax administration, streamlining processes, and enhancing transparency. The analysis employs a structured approach, utilizing mean scores to gauge the level of agreement or disagreement with each statement, standard deviations to assess the consistency of responses, and percentages to capture the distribution of opinions among respondents.

By interpreting these metrics in conjunction with predefined evaluation ranges, the report seeks to discern patterns, identify areas of consensus, and highlight potential areas for improvement in Rwanda's tax collection infrastructure. Through this examination, stakeholders, policymakers, and tax authorities can gain valuable insights into the effectiveness of e-tax systems, inform decision-making processes, and devise strategies to further enhance tax collection efficiency in Rwanda.

1. E-tax has made efficiency tax collection in Rwanda: Mean is 4.05 which indicates that there is significant agreement among respondents that the E-tax system has improved tax collection efficiency in Rwanda. While Standard Deviation is 0.208 showing the low standard deviation, which suggests that responses are tightly clustered around the mean, indicating high consensus among respondents. This statement suggests that the implementation of e-tax systems has positively impacted tax collection efficiency in Rwanda. The fact that all respondents strongly agreed indicates a unanimous perception that e-tax has been effective in this regard. This suggests a high level of confidence in the effectiveness of e-tax systems in improving tax collection processes in Rwanda.
2. E-tax system has made taxpayers file and pay tax in time: The Mean is 4.84 showing a strong agreement among respondents that the E-tax system has facilitated timely filing and payment of taxes. while Standard Deviation of 0.372 indicates high agreement among respondents. This statement implies that the e-tax system has facilitated prompt filing and payment of taxes by taxpayers. The overwhelming majority of respondents (83.5%) strongly agreed with this statement, indicating a widespread belief that e-tax systems have streamlined the tax compliance process by enabling taxpayers to fulfill their obligations punctually.
3. E-tax system has improved efficiency tax collection and better serve taxpayers: The Mean of 2.76 indicates a mixed response regarding whether the E-tax system has improved tax collection efficiency and served taxpayers better. While Standard Deviation of 0.614 indicates greater variability in responses, suggesting that opinions are more divided compared to the previous statements. This statement suggests that the e-tax system has not only enhanced tax collection efficiency but also improved service delivery to taxpayers. However, a significant proportion of respondents (34.0%) disagreed or strongly disagreed with this assertion, indicating a lack of consensus regarding the perceived benefits of e-tax systems in terms of efficiency and service improvement.
4. E-tax reduced tax payment risks and improved tax compliance: The Mean of 3.81 indicates the agreement among respondents that the E-tax system has reduced tax payment risks and improved tax compliance. The Standard Deviation of 0.781 which higher standard deviation suggests some variability in responses, but the mean still falls within the "Strong" range of agreement. This statement implies that e-tax systems have mitigated risks associated with tax payments and enhanced overall tax compliance. The majority of respondents (67.0%) either agreed or strongly agreed with this statement, suggesting a prevailing belief that e-tax has contributed positively to reducing tax payment risks and increasing compliance levels.
5. Electronic efficiency tax collection help tax authorities find errors in the process of

tax payment: The Mean of 3.91 shows a strong agreement among respondents that electronic tax collection helps tax authorities identify errors in the tax payment process. Standard Deviation of 0.513 is Similar to previous statements, there is some variability in responses but with a strong level of agreement overall. This statement suggests that electronic efficiency tax collection aids tax authorities in identifying errors during the tax payment process. However, a small percentage of respondents (3.0%) disagreed with this assertion, indicating some skepticism regarding the effectiveness of electronic systems in error detection.

6. I pay my taxes willingly because I know the benefits: The Mean of 4.40 indicates a significant agreement among respondents that they pay taxes willingly due to an understanding of the benefits. Standard Deviation: 0.490 shows that Responses are tightly clustered around the mean, indicating high consensus. This statement reflects individual attitudes towards tax payment, indicating that willingness to pay taxes is influenced by an understanding of the benefits derived from taxation. The majority of respondents (79.0%) either agreed or strongly agreed with this statement, suggesting that perceived benefits play a significant role in shaping attitudes towards tax compliance.
7. I hate to pay taxes because tax rates are too high: The Mean of 4.35 shows a significant agreement among respondents that high tax rates lead to dislike for paying taxes. Standard Deviation of 0.477 indicates that responses are homogenous, indicating strong consensus. This statement suggests that dislike towards tax payment is primarily attributed to perceived high tax rates. The majority of respondents (65.5%) either agreed or strongly agreed with this statement, indicating a prevalent sentiment of discontentment towards taxation due to perceived high tax rates.
8. I pay my dues at the right time and in the right amount: The Mean is 4.40 showing a significant agreement among respondents that they pay their taxes correctly and on time. Standard Deviation of 0.530 indicates that responses are tightly clustered around the mean, indicating high consensus. This statement reflects individual adherence to tax payment obligations, indicating a commitment to paying taxes accurately and promptly. The majority of respondents (98.0%) either agreed or strongly agreed with this statement, indicating a high level of self-reported compliance with tax payment requirements.
9. E-tax system has improved efficiency in tax payment and better service: The Mean of 4.35 is portraying a significant agreement among respondents that the E-tax system has improved efficiency in tax payment and service. Standard Deviation of 0.478 is showing that responses are homogenous, indicating strong consensus. This statement reiterates the notion that the e-tax system has enhanced efficiency in tax payment processes and improved service quality. However, a significant proportion of respondents (65.0%) disagreed or strongly disagreed with this assertion, indicating a lack of consensus regarding the perceived benefits of e-tax systems in improving tax payment efficiency and service delivery.
10. Taxpayers filing and pay tax easily by using the internet: There is significant agreement among respondents that taxpayers find it easy to file and pay taxes using the internet because mean is Mean is 4.60. Responses are homogenous, indicating strong consensus due to the value of Standard Deviation of 0.492. This statement suggests that internet-based tax filing and payment systems have made the process easier for taxpayers. The majority of respondents (100.0%) either agreed or strongly agreed with this statement, indicating widespread agreement regarding the convenience and ease of using internet platforms for tax-related activities.

11. Electronic tax system is fast and convenient compared to the old manual system: There is significant agreement among respondents that the electronic tax system is faster and more convenient than the manual system as per Mean of 4.31. Responses are homogenous, indicating strong consensus as per Standard Deviation of 0.462. This statement contrasts the efficiency and convenience of electronic tax systems with traditional manual systems. The majority of respondents (69.5%) either agreed or strongly agreed with this statement, indicating a prevailing belief in the superior speed and convenience offered by electronic tax systems compared to manual processes.

Overall, the analysis demonstrates widespread support for the effectiveness of the E-tax system in Rwanda, particularly in improving efficiency, promoting timely tax compliance, and providing better service to taxpayers. However, there are some areas where opinions are more divided, such as the system's overall improvement in tax collection efficiency and service quality. These insights can be valuable for policymakers and tax authorities in further enhancing the E-tax system and addressing areas of concern.

4.2.5 Inferential Statistics

In this work, a multiple regression analysis was conducted to reveal the relationship between the electronic tax system and efficiency tax collection of the Revenue Authority. The regression model included several variables: the perception on e-tax (X1), the technical skills of using the system (X2), and an error term. (ε). Undefined:

$Y = \alpha + \beta 1X1 + \beta 2X2 + \varepsilon$

Where:

Y represents efficiency tax collection,

X1 is a variable that stands for the perception of an e-tax.

X2 measures users' skills of technical system usage.

ε stands for error term.

β signifies the coefficient of independent variables,

Constant term stands for α.

The Statistical Package for Social Sciences (SPSS) was utilized for the regression analysis and computation of results. The findings were presented through tables and further discussed. The primary objective was to determine the extent to which the electronic tax system contributes to efficiency tax collection.

This analytical approach aimed to provide insights into the relationship between key variables and efficiency tax collection, thereby informing strategies and interventions to enhance tax collection efficiency. Through the regression analysis, the relative importance of perception and technical skills in influencing efficiency tax collection was evaluated, offering valuable guidance for policymakers and tax authorities.

Table 21-4: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.698a	.487	.482	.176

a. Predictors: (Constant), Technical Skills, Perception

b. Dependent Variable: Efficiency Tax collection

Source: Primary data, 2023

The multiple linear regression analysis aimed to assess the combined contribution of the electronic tax system on efficiency tax collection by considering three variables including two independent variables such as Technical Skills to use e-tax system, Perception on e-tax, and Efficiency tax collection as the dependent variable.

The multiple correlation coefficient (R) was found to be positive with a value of 0.698. This indicates a strong and positive correlation between the two independent variables (Technical Skills to use e-tax system and Perception on e-tax) combined and the dependent variable (Efficiency tax collection).

In other words, there is a substantial relationship between the predictors and the outcome variable when considered together. Furthermore, the coefficient of determination (R Square) was determined to be 0.487. This value suggests that approximately 48.7% of the variance observed in efficiency tax collection can be attributed to the combined influence of the two independent variables (Technical Skills to use e-tax system and Perception on e-tax). This indicates a moderate-to-high level of explanatory power of the model, suggesting that these variables collectively contribute significantly to explaining the variation in efficiency tax collection.

Table 22-4: Analysis of variance (ANOVA)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.830	2	2.915	93.670	<.001[b]
	Residual	6.130	197	.031		
	Total	11.960	199			
Predictors: (Constant), Technical Skills, Perception						
Dependent Variable: Efficiency Tax collection						

Source: Primary data, 2023

The analysis of variance (ANOVA) table provided in Table 12-5 evaluates the significance of the regression model in predicting efficiency tax collection based on the predictors Technical Skills and Perception of the electronic tax system. Here's a summary analysis of the ANOVA results:

- **Regression Sum of Squares:** The regression sum of squares measures the amount of variation in the dependent variable (Efficiency tax collection) that is explained by the predictors (Technical Skills and Perception). In this case, the regression sum of squares is 5.830.

- **Residual Sum of Squares:** The residual sum of squares represents the unexplained variation in the dependent variable after accounting for the predictors. It measures the

discrepancy between the observed and predicted values of efficiency tax collection. Here, the residual sum of squares is 6.130.

- **Total Sum of Squares:** The total sum of squares is the sum of the regression sum of squares and the residual sum of squares. It represents the total variation in the dependent variable. In this case, the total sum of squares is 11.960.
- **Degrees of Freedom (df):** The degrees of freedom indicate the number of independent pieces of information available for estimating statistical parameters. In regression analysis, df for regression is the number of predictors, and df for residual is the total number of observations minus the number of predictors minus one. Here, df for regression is 2, and df for residual is 197.
- **Mean Square:** Mean square is calculated by dividing the sum of squares by the corresponding degrees of freedom. It represents the average amount of variation attributable to each predictor. For regression, the mean square is 2.915, and for residual, it is 0.031.
- **F-Statistic:** The F-statistic is the ratio of the mean square for regression to the mean square for residual. It indicates whether the regression model as a whole is statistically significant in explaining the variation in the dependent variable. Here, the F-statistic is 93.670.
- **Significance (Sig.):** The significance level, denoted by Sig., indicates the probability of obtaining the observed F-statistic under the null hypothesis that the regression model has no predictive power. In this case, the significance level is <.001, indicating high statistical significance.

In summary, the ANOVA results indicate that the regression model, which includes Technical Skills and Perception as predictors, is highly significant in predicting efficiency tax collection ($p < .001$). This suggests that the combined effect of Technical Skills and Perception significantly contributes to explaining the variation in efficiency tax collection, supporting the validity and usefulness of the regression model for predicting efficiency tax collection based on these predictors.

Table 23-4: Multiple regression analysis (coefficient)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.910	.221		8.638	<.001
	Perception	.314	.051	.456	6.134	<.001
	Technical Skills	.330	.084	.293	3.937	<.001
a. Dependent Variable: Efficiency Tax collection						

Source: Primary data, 2023

In the multiple regression analysis presented in Table 13-5, the relationship between efficiency tax collection (Y) and two independent variables, Perception (X1) and Technical Skills (X2) of using the electronic tax system, is examined through the equation:
$Y = \alpha + \beta 1X1 + \beta 2X2 + \beta + \varepsilon$. Here's a summary analysis of the regression results:
Constant (α): The constant term (1.910) represents the expected value of efficiency tax collection when both Perception and Technical Skills are zero. In this case, it is 1.910.

Perception Coefficient (β1): The coefficient for Perception (0.314) indicates that for every unit increase in Perception of the electronic tax system, efficiency tax collection is expected to increase by 0.314 units, holding other variables constant.
Technical Skills Coefficient (β2): The coefficient for Technical Skills (0.330) suggests that for every unit increase in Technical Skills of using the electronic tax system, efficiency tax collection is expected to increase by 0.330 units, holding other variables constant.
Significance: Both Perception and Technical Skills coefficients have p-values (<.001), indicating high statistical significance. This means that the relationships between Perception, Technical Skills, and efficiency tax collection are highly unlikely to have occurred by chance.
Interpretation: The positive coefficients for Perception and Technical Skills indicate that higher levels of Perception and Technical Skills are associated with higher efficiency tax collection. This implies that taxpayers who have a more positive perception of the electronic tax system and possess better technical skills tend to contribute more to efficiency tax collection.
Overall Model: The regression model suggests that both Perception and Technical Skills variables collectively contribute significantly to explaining the variation in efficiency tax collection. The model's statistical significance ($p < .001$) indicates its robustness and reliability in predicting efficiency tax collection based on Perception and Technical Skills.

In summary, the multiple regression analysis confirms that both Perception and Technical Skills of using the electronic tax system have a positive and statistically significant impact on efficiency tax collection. This underscores the importance of enhancing taxpayers' perceptions and technical proficiency to improve efficiency in tax collection processes.

Table 24-4: Correlation between electronic tax system and tax collection

			Efficiency Tax collection	Electronic Tax System
Spearman's rho	Efficiency Tax collection	Correlation Coefficient	1.000	.778**
		Sig. (2-tailed)	.	<.001
		N	200	200
	Electronic Tax System	Correlation Coefficient	.778**	1.000
		Sig. (2-tailed)	<.001	.
		N	200	200
**. Correlation is significant at the 0.01 level (2-tailed).				

Source: Primary data, 2023

Here's a summary analysis of the findings in the above table:
Correlation Coefficient: The correlation coefficient between efficiency tax collection and the electronic tax system is 0.778. This value indicates a strong positive correlation between the two variables.
Significance: The significance level (Sig.) for both correlations is less than 0.001, indicating high statistical significance. This means that the observed correlations are highly unlikely to have occurred by chance.

Interpretation: The strong positive correlation of 0.778 suggests that there is a significant relationship between the adoption and usage of electronic tax systems and efficiency tax collection. In other words, as the use of electronic tax systems increases, efficiency in tax collection also tends to increase.
Practical Implications: These findings imply that the implementation and utilization of electronic tax systems play a crucial role in enhancing efficiency in tax collection processes. Governments and tax authorities can leverage this information to prioritize investments in electronic tax systems, as they contribute significantly to improving tax collection procedures.
Confidence in Results: The high level of statistical significance and the strong correlation coefficient provide confidence in the validity and reliability of the observed association between electronic tax systems and efficiency tax collection.
In summary, the correlation analysis confirms that electronic tax systems have a substantial and favorable relationship with efficiency tax collection, highlighting the importance of technological advancements in enhancing tax collection processes.

Table 25-4: Reliability Statistics

Cronbach's Alpha	N of Items
.853	34

Source: Primary data, 2023

With a value of 85.3%, the dependability of the 34 questions evaluated using the Cronbach's Alpha coefficient satisfies acceptable norms. This suggests that the data these questions provide is seen as trustworthy and dependable. Cronbach's Alpha is a measure of internal consistency reliability, indicating how closely related a set of items are as a group. It ranges from 0 to 1, where higher values suggest greater internal consistency among the items. In this case, the Cronbach's Alpha coefficient is 0.853, indicating a relatively high level of internal consistency among the 34 items evaluated in the study. A Cronbach's Alpha value of 0.853 is generally considered good, suggesting that the items in the questionnaire are reliably measuring the same underlying construct or idea. This means that the responses to the items are consistent and dependable, contributing to the validity of the data collected. Having a high level of internal consistency reliability strengthens the trustworthiness of the research findings. It indicates that the questionnaire used in the study effectively measures the intended variables, allowing for more accurate analysis and interpretation of the results. In summary, the Cronbach's Alpha coefficient of 0.853 in Table 15-5 demonstrates that the questionnaire used in the study is reliable and yields consistent responses, providing valuable insights for the research analysis.

4.2.6 Hypothesis testing

The study aimed to see the contribution of Electronic tax system in efficiency tax collection however based on the study result, the following hypotheses can be tested: Null Hypothesis (H0): The use of the electronic tax system has not significantly contributed to the efficiency of tax collection. Alternative Hypothesis (H1): The use of the electronic tax system has significantly contributed to the efficiency of tax collection. The key findings from the inferential statistics analysis are:

1. **Model Summary:** The multiple correlation coefficient (R) is 0.698, indicating a

strong and positive correlation between the independent variables (Perception and Technical Skills) and the dependent variable (Efficiency tax collection). The coefficient of determination (R-Square) is 0.487, suggesting that approximately 48.7% of the variance in efficiency tax collection can be explained by the combined influence of Perception and Technical Skills.

2. **ANOVA Analysis:** The ANOVA results show that the regression model, which includes Perception and Technical Skills as predictors, is highly statistically significant in predicting efficiency tax collection ($p < 0.001$). This indicates that the combined effect of Perception and Technical Skills significantly contributes to explaining the variation in efficiency tax collection.
3. **Regression Coefficients:** The unstandardized regression coefficients show that both Perception ($\beta1 = 0.314$, $p < 0.001$) and Technical Skills ($\beta2 = 0.330$, $p < 0.001$) have a positive and statistically significant impact on efficiency tax collection.

Based on these findings, the null hypothesis (H0) can be rejected, and the alternative hypothesis (H1) can be accepted. The results provide strong evidence that the use of the electronic tax system has significantly contributed to the efficiency of tax collection. The regression analysis demonstrates that both taxpayers' perception of the electronic tax system and their technical skills in using the system are important factors that positively influence the efficiency of tax collection. This suggests that efforts to improve the user-friendliness of the electronic tax system and provide adequate training and support to taxpayers can lead to enhanced tax collection efficiency. Overall, the inferential statistics analysis supports the claim that the implementation of the electronic tax system has significantly improved the efficiency of tax collection processes, as hypothesized in the alternative hypothesis (H1).

5. CONCLUSIONS, RECOMMENDATION AND TAKEAWAYS

4.1 Conclusion

After Assessing the effect of taxpayers' perception and technical skills on the use of the e-tax system as objective one. The research findings demonstrate a positive relationship between taxpayers' perception, technical skills, and the adoption of electronic tax filing in Rwanda. Both perception and technical skills play pivotal roles in shaping attitudes towards the

electronic tax system. The majority of respondents perceive the system as user-friendly and efficient, indicating a high level of acceptance. Additionally, there is confidence in the accessibility and convenience of the system, with most taxpayers feeling adequately equipped with the necessary knowledge to file and pay taxes electronically. However, there are areas where opinions are more divided, particularly regarding the ease of online tax processes and understanding the system's functions. Continuous efforts to enhance user experience, provide education and support, and address technical challenges are essential for further improving the effectiveness and adoption of the electronic tax system in Rwanda.

After Presenting the history and current status of tax administration in Rwanda as Research objective two. The analysis provides a comprehensive overview of the historical trajectory and current status of tax administration in Rwanda, focusing on key aspects such as establishment, mandate, taxpayer registration process, requirements, tax registration, declaration, payment, challenges, risks, and risk management approaches. Since the establishment of the Rwanda Revenue Authority (RRA) in 1997, the country has made significant strides in revenue mobilization through efficient taxpayer registration processes, streamlined tax declaration and payment systems, and proactive risk management strategies. Despite challenges such as low tax compliance culture and staff turnover, the RRA has implemented measures to address these risks effectively, ensuring effective tax administration and contributing to Rwanda's economic development.

After evaluating the impact of the e-tax system on the efficiency of tax collection in Rwanda as Research Objective three. The research findings indicate strong support for the effectiveness of the electronic tax system in improving tax collection efficiency in Rwanda. Respondents overwhelmingly agree that the system has streamlined tax collection processes, facilitated timely filing and payment of taxes, and enhanced overall tax compliance. Moreover, there is a widespread belief that the system has improved service delivery to taxpayers, although opinions are more divided on this aspect. Despite some areas of disagreement, the majority of respondents exhibit a high level of confidence in their willingness to pay taxes correctly and on time, indicating a strong sense of compliance with tax obligations. These insights underscore the significant impact of the electronic tax system in modernizing tax administration, promoting transparency, and fostering a culture of tax compliance in Rwanda.

Overall, the research findings provide a comprehensive understanding of the relationship between taxpayers' perception, technical skills, and the adoption of electronic tax filing in Rwanda, highlighting the importance of user experience and support in enhancing the effectiveness of the electronic tax system. Additionally, the historical overview of tax administration in Rwanda showcases the significant progress made in revenue mobilization through streamlined processes and proactive risk management strategies by the Rwanda Revenue Authority (RRA). Moreover, the analysis confirms the substantial impact of the electronic tax system on improving tax collection efficiency, supported by strong correlations and regression results. These insights underscore the importance of continued efforts to enhance user education, address technical challenges, and implement administrative measures to further boost tax compliance and collection in Rwanda. Overall, the findings offer valuable guidance for policymakers and tax authorities to strengthen tax administration strategies and foster a culture of tax compliance in the country.

4.2 Recommendation

Based on the conclusions drawn from the analysis, here are some necessary recommendations:

Invest in User Education and Training: Since technical skills play a significant role in the efficiency of tax collection, it's essential to invest in educating and training taxpayers and tax administrators on how to use electronic tax systems effectively. This can be done through workshops, online tutorials, and other educational programs to enhance users' proficiency.

Improve User Experience of E-tax Systems: Addressing concerns related to user experience and accessibility of e-tax systems is crucial. Tax authorities should focus on improving the design, functionality, and accessibility of online tax platforms to make them more user-friendly. Conducting user experience testing and gathering feedback from taxpayers can help identify areas for improvement.

Enhance Public Awareness and Perception: To combat concerns about tax evasion and promote positive perceptions of e-tax systems, tax authorities should launch public awareness campaigns highlighting the benefits and importance of paying taxes. These campaigns can educate taxpayers about the transparency, efficiency, and fairness of electronic tax systems, ultimately fostering a culture of compliance.

Continuous Monitoring and Evaluation: Regular monitoring and evaluation of the effectiveness of electronic tax systems are essential. Tax authorities should collect feedback from users, analyze data on tax compliance and tax collection, and make necessary adjustments to the system to ensure optimal performance and user satisfaction.

Expand Access to E-tax Systems: Efforts should be made to expand access to electronic tax systems, particularly in rural and remote areas where internet connectivity may be limited. Providing alternative methods for filing and paying taxes, such as mobile applications or offline submission options, can help reach a broader range of taxpayers and improve overall compliance.

By implementing these recommendations, tax authorities can enhance the efficiency, effectiveness, and acceptance of electronic tax systems, ultimately leading to improved tax collection and revenue generation for the government.

4.3 Key takeaways

In my observation I have realized that governance of a country starts with the needs of the people, and that their prosperity is the responsibility of the government. In order to succeed, the government must fulfill their obligations to the people, take the initiative, rally support from all sides, and make sure that policies are stable and consistent. The leadership must also be devoted, strong-willed, and determined. According to the study, Rwanda's government, acting through its tax administration authority, has put in place a number of measures to deal with the issues raised by the digital economy. These include making sure that companies operating in the digital space pay their fair share of taxes and encouraging innovation and entrepreneurship. the tactics for tax collecting and governance in Rwanda, with an emphasis on the government's involvement, partnerships with the business sector, and the value of flexibility in tax administration. Below is a summary of the main ideas:

Strong government support and leadership: The Office of the President, the Ministry of Finance and Economic Planning, and other key stakeholders have all strongly supported RRA. By requiring the adoption of new procedures and systems, RRA has been able to successfully leverage this support into increased compliance. While government cooperation and alignment are usually necessary for tax authorities to fully accomplish their

digitalization goals, this centralized approach in Rwanda may not be applicable in other situations.

Private sector Collaboration: Together with the business sector, RRA and the Rwandan government have developed tax digitalization delivery models that are profitable. In order to create and run Irembo, a portal for accessing all government services, the government, acting through the Rwanda Development Board, signed a 25-year revenue-sharing agreement with Rwanda Online Platform Ltd (ROPL) in 2014.

Technology adaptation: The fact that RRA prioritizes software flexibility shows how important it is to keep up with technology developments and adjust to changes in the tax landscape. Because of this adaptability, tax authorities may continue to operate effectively and efficiently in the face of changing possibilities and obstacles.

Legal and regulatory framework: In order to regulate digital taxes, Rwanda has established a robust legal framework. Examples of this include legislation that establishes the scope of digital transactions that are taxable, outlines the compliance responsibilities of digital service providers, and ensures transparency and accountability in efficiency tax collection processes.

Compliance promotion and Enforcement: RRA have taken different major of compliance with digital taxation requirements which is crucial for the effectiveness of Rwanda's tax system. To help businesses and individuals understand their tax responsibilities in the digital sphere, the government has invested in taxpayer education and awareness programs, though there is still room for improvement.

Rwanda has also improved its enforcement methods, using digital platforms and data analytics to track transactions, identify possible tax evasion, and enforce compliance.

Support for digital Entrepreneurship: Rwanda remains committed to fostering an environment that promotes creativity in digital entrepreneurship and the use of digital taxes laws. The government offers tax breaks, funding accessibility, and capacity-building programs as ways to assist new and emerging digital enterprises.Rwanda hopes to create jobs and diversify its economy by fostering the development of the digital economy and generating sustainable income streams.

In fact, the case of RRA highlights the significance of strong government support, collaboration with the private sector, and adaptability in achieving successful governance and revenue generation strategies. These guidelines can provide other nations looking to improve their governance structures and tax administration systems with insightful information. The experience Rwanda has had with digital taxation highlights how crucial it is to modify tax laws to reflect the changing needs of the digital economy. Rwanda aims to leverage the potential of digital technology to propel economic development and establish a more wealthy and inclusive society by means of a range of measures including legislative reforms, international collaboration, compliance initiatives, and encouragement for digital entrepreneurship. Rwanda is steadfast in its will to improve its digital taxation strategy in order to maintain sustainability, efficiency, and equity in tax collection as the digital environment changes.

4.4 Areas of further studies

Studying the contribution of electronic tax systems (e-tax systems) in efficiency tax collection is an important area that can be explored from various perspectives. Here are some potential areas of further study:

Impact on Tax Compliance: Research can investigate how the implementation of e-tax systems influences tax compliance behavior among different segments of taxpayers. This could involve analyzing data on tax filing rates, timely payments, and the reduction of tax

evasion.

Efficiency and Cost Savings: Evaluate the efficiency gains and cost savings associated with e-tax systems compared to traditional efficiency tax collection methods. This could include analyzing the reduction in administrative costs, processing times, and the overall effectiveness of resource utilization.

User adoption and experience: Analyze how taxpayers engage with electronic tax administrations. Examine elements including accessibility, convenience of use, and confidence in the security of the system that affect the uptake and acceptance of electronic tax filing and payment methods.

International Comparisons: International Comparisons: Examine how well e-tax systems are implemented and used in various nations and areas. List the best practices, the lessons that have been learnt from successful deployments, and the difficulties that have been faced in jurisdictions with different degrees of institutional and technological capabilities.

Long-Term Sustainability: Consider shifting taxpayer behaviors and the state of technology when assessing the long-term viability of e-tax systems. Think about methods for enhancing current procedures, adjusting to novel situations, and securing computerized tax administration systems for the future.

These areas offer a comprehensive framework for further research into the contribution of electronic tax systems to efficiency tax collection, addressing both practical implications and theoretical insights into the role of technology in modernizing tax administration.

References Cited

[1] Alm, J., & Torgler, B. (2006). Culture differences and tax morale in the United States and in Europe. *Journal of Economic Psychology*, *27*(2), 224–246. https://doi.org/10.1016/j.joep.2005.09.002

[2] Almunia, M., Hjort, J., Knebelmann, J., & Tian, L. (2021). *Strategic or Confused Firms? Evidence from "Missing" Transactions in Uganda*. https://doi.org/10.3386/w29059

[3] Arlinghaus, B. P. (1998) Goal setting and performance measures – by tax professionals in Fortune 500 companies, The Tax Executive, 50 (6), p. 434–442.

[4] Awasthi, R., & Engelschalk, M. (2018). Taxation and the Shadow Economy: How the tax system can stimulate and enforce the formalization of business activities. In *World Bank, Washington, DC eBooks*. https://doi.org/10.1596/1813-9450-8391

[5] Azmi, A. A. C., & Kamarulzaman, Y. (2010). Adoption of tax e-filing: A conceptual paper. African Journal of Business Management, 4(5), 599-603. https://doi.org/10.5897/ajbm.9000045

[6] Becker, D., & Lacktorin-Revier, S. (2008). The impact of electronic tax return filing on tax compliance. *aisel.aisnet.org*. https://aisel.aisnet.org/cgi/viewcontent.cgi?article=1025&context=mwais2008
[7] Cozmei, C., & Şerban, E. C. (2014b). Risk management triggers: from the tax risk pitfalls to organizational risk. *Procedia. Economics and Finance*, *15*, 1594–1602. https://doi.org/10.1016/s2212-5671(14)00630-3
[8] Daniel Akpubi, & Olusola Igbekoyi. (2019). Electronic Taxation and Tax Compliance among Some Selected Fast Food Restaurants in Lagos State, Nigeria (Tax Payers Perspective). *European Centre for Research Training and Development UK (www.eajournals.org)*, *Vol.7, No.7*(Print ISSN: 2053-4086(Print), Online ISSN: 2053-4094(Online)), pp.52-80.
[9] Dowe, D. L. (2008). Foreword re C. S. Wallace. *The Computer Journal*, *51*(5), 523–560. https://doi.org/10.1093/comjnl/bxm117
[10] Efunboade, A. O. (2014). Impact of ICT on tax administration in Nigeria. *Computer Engineering and Intelligent Systems*, *5*(8), 26–29. https://iiste.org/Journals/index.php/CEIS/article/view/14681/15041
[11] Elgood, T., Paroissien, I., & Quimby, L. (2005). Managing global risk for multinationals. Journal of International Taxation, 16(5), 22–27
[12] European Commission Directorate General Taxation and Customs Union (2006) Risk Management Guide for Tax Administrations, Fiscalis Risk Analysis Project Group, Brussels: European Commission, "Fiscalis Guide"
[13] Fishbein, M., & Ajzen, I. (1975). *Belief, Attitude, Intention and Behavior: An Introduction to Theory and research*. https://philpapers.org/archive/FISBAI.pdf
[14] Geetha, R. (2012). E-Filing of Income Tax: Awareness and satisfaction level of individual tax payers in Coimbatore City, India. *International Science Community Association*.https://www.researchgate.net/profile/Sekar_M2/publication/280216179_E-Filing_of_Income_Tax_Awareness_and_Satisfaction_level_of_individual_Tax_payers_in_Coimbatore_city_India/links/55adc1be08aee079921e3478.pdf
[15] Geetha, R., & Sekar, M. (2012). E-Filing: A Tool for Efficiency tax collection and Management in India. *International Journal of Advanced Research in Management and Social Sciences, 1*(6), 86-94. Retrieved from https://www.ijarmss.com/administrator/components/com_jresearch/files/publications/IJARMSS_70__E-FILING_A_TOOL_FOR_TAX_COLLECTION_AND_MANAGEMENT_IN_INDIA.pdf
[16] Geetha, R., & Sekar, M. M. (2012). E-governance in India: E-filing of income tax returns as a citizen's perspective. International Journal of Computer Applications, 43(18), 1-7.
[17] Gupta, B., Arora, N., & Agarwal, V. (2016). Electronic governance for efficient revenue collection in developing countries. International Journal of Electronic Governance, 8(2), 135-154.
[18] Gwaro, O. T., Maina, K. E., & Kwasira, J. (2016). Influence of Online Tax Filing on Tax Compliance among Small and Medium Enterprises in Nakuru Town, Kenya. *IOSR Journal of Business and Management*, *18*(10), 82–92. https://doi.org/10.9790/487x-1810028292
[19] Innovation for successful societies (ISS 2019) foundation for reconstruction: building the Rwanda Revenue Authority, 2001–2017 (Short Version) https://successfulsocieties.princeton.edu/sites/g/files/toruqf5601/files/LS_Rwanda_Tax_Formatted_5.29.18jgToU962018_1.pdf
[20] Jahirul H, (2011) Tax Evasion and Avoidance Crimes A Study on Some Corporate Firms of Bangladesh Unpublished Thesis, Eastern University, Bangladesh.
[21] Jones, C. R. (2009). *Understanding and Improving Use-Tax Compliance: A Theory of Planned Behavior approach*. https://digitalcommons.usf.edu/cgi/viewcontent.cgi?article=3031&context=etd
[22] Kamana, D. (2016). *Influence of electronic tax system on effectiveness of efficiency tax collection in Rwanda: a case study of Rwanda revenue authority (RRA)*. http://dr.ur.ac.rw/handle/123456789/102
[23] Lubua, E. W. (2016). Influencing Tax Compliance in SMEs through the Use of ICTs. *International Journal of Learning, Teaching and Educational Research*, *2*(1). http://ijlter.org/index.php/ijlter/article/download/16/11
[24] Lukwata. (2001). The contribution of electronic tax filing system on tax compliance and efficiency tax collection. A RESEARCH REPORT SUBMITTED TO THE DEPARTMENT OF OPEN AND DISTANCE LEARNING FOR THE AWARD OF THE BACHELOR OF COMMERCE DEGREE OF MAKERERE UNIVERSITY. Available on academia

[25] Maisiba, J.G. and Atambo, W. (2016), "*Effects of electronic tax system on the tax collection efficiency of Kenya Revenue Authority*", Imperial Journal of Interdisciplinary Research, Vol. 2 No. 4, pp. 815-827.
[26] Minecofin 2018, Medium Term Revenues Strategy 2021-2024. https://www.minecofin.gov.rw/index.php?eID=dumpFile&t=f&f=47839&token=8a225ec327ea93e24ca2ad06633abd4e3f5836e8
[27] Mugabe Roger. (2021). The impact of digital tax administration enhancing tax growth in developing countries: Evidence from Rwanda Electronic Filing and Payment. *International Journal of Academic Multidisciplinary Research (IJAMR)*, *Vol. 5 Issue 9*(ISSN: 2643-9670), Pages: 93-98. https://www.ijeais.org/ijamr
[28] Muita EW (2011). Factors that Influence Adoption and Use of E-Filing System of Kenya Revenue Authority among the Large Taxpayers, Unpublished MBA Project submitted to the JKUAT Nairobi Central Business District Campus.
[29] Mukasa, K., Imamura, K., Tsuchida, Y., & Sugizaki, R. (2011). Multi-Core Fibers for Large Capacity SDM. *Optica Publishing Group*. https://doi.org/10.1364/ofc.2011.owj1
[30] Mukasa, S. (2011). ICT and Taxation in Rwanda. *ACCA Research Report, June*(156). Retrieved from https://www.accaglobal.com/pk/en/member/accounting-business/technical-activities/technical-resources-search/2011/june/technological-advances.html
[31] Muogbo, U. S. (2013). The impact of electronic tax register for monitoring tax collection in Nigeria. Research Journal of Finance and Accounting, 4(17), 184-194.
[32] Musengimana, M. (2017). Assessment of the Factors Influencing the Adoption of Electronic Tax Filing Systems in Rwanda: A Case of Rwanda Revenue Authority. Doctoral dissertation, University of Nairobi.
[33] Muturi HM, Kiarie N (2015). Effects of online tax system on tax compliance among small taxpayers in Meru County, Kenya. *International Journal of Economics, Commerce and Management* 3(13):280-297.
[34] Ndagijimana, E., & Ingabire, C. (2020). Tax reforms and revenue performance in Rwanda: Efficiency of tax collection at Rwanda Revenue Authority (RRA). International Journal of Social Economics, 47(3), 300-315. DOI: 10.1108/IJSE-01-2018-0020.
[35] *Ndayisenga, E., & Shukla, J. (2016). Effect of Electronic tax System of Efficiency tax collection in Rwanda Case Study of Rwanda Revenue Authority (RRA). The International Journal of Business & Management, 4, 38-49. - References - Scientific Research Publishing*. (n.d.). https://www.scirp.org/reference/referencespapers?referenceid=3065519
[36] Nisar, T. M. (2006). E-governance in tax collection and administration. *WIT Transactions on Information and Communication Technologies*. https://doi.org/10.2495/is060261
[37] OECD (2017): "Shining Light on the Shadow Economy: Opportunities and Threats," Tech. rep., Organization for Economic Development and Cooperation.
[38] Okunogbe, O., & Santoro, F. (2022). Increasing efficiency tax collection in African countries: The role of information technology. In *World Bank policy research working paper*. https://doi.org/10.1596/1813-9450-10182
[39] Okunogbe, O., & Santoro, F. (2023). Increasing Efficiency tax collection in African Countries: The Role of Information Technology. *Journal of African Economies*, *32*(Supplement_1), i57–i83. https://doi.org/10.1093/jae/ejac036
[40] Olurankinse, F. ; Oladeji, O. E. (2018). Self-assessment, electronic-taxation payment system and revenue generation in Nigeria. *Accounting and Taxation Review : A&TR. - Benin City : International Accounting and Taxation Research*, *Vol. 2.2018, 1,* 39–55. https://www.econbiz.de/Record/self-assessment-electronic-taxation-payment-system-and-revenue-generation-in-nigeria-olurankinse/10012202715
[41] Picur, R. D., & Riahi-Belkaoui, A. (2006). The impact of bureaucracy, corruption and tax compliance. *Review of Accounting and Finance*, *5*(2), 174–180. https://doi.org/10.1108/14757700610668985
[42] Pomeranz, D., & Vila-Belda, J. (2019). Taking State-Capacity Research to the Field: Insights from Collaborations with Tax Authorities. *Annual Review of Economics*, *11*(1), 755–781. https://doi.org/10.1146/annurev-economics-080218-030312
[43] Rogoff, K (2017), The curse of cash, Princeton University Press.
[44] Sagas, C. C., Nelimalyani, M., & Kosgeikimaiyo, E. (2015). An assesment of the impact of electronic tax register on tax collection by Kenya Revenue Authority Western Region, Kenya.

ZENITH International Journal of Business Economics & Management Research, *5*(4), 111–118. http://www.indianjournals.com/ijor.aspx?target=ijor:zijbemr&volume=5&issue=4&article=010

[45] Sandford, C., Godwin, M., & Hardwick, P. (1989). Administration and compliance costs of taxation. Bath, UK: Fiscal Publications.

[46] Schaupp, L. C., Carter, L., & Hobbs, J. (2009). The impact of trust, risk and optimism bias on e-filing adoption. *International Journal of Information Management, 29*(2), 135-146. DOI: 10.1016/j.ijinfomgt.2008.08.004

[47] Schaupp, L. C., Carter, L., & McBride, M. E. (2010). E-file adoption: A study of U.S. taxpayers' intentions. *Computers in Human Behavior*, *26*(4), 636–644. https://doi.org/10.1016/j.chb.2009.12.017

[48] Silva, P. (2015). Davis' Technology Acceptance Model (TAM) (1989). In *Advances in knowledge acquisition, transfer and management book series* (pp. 205–219). https://doi.org/10.4018/978-1-4666-8156-9.ch013

[49] Solange, U., MULYUNGI, P., & OLUOCH. (2018). Effect of electronic tax system on tax compliance among small and medium tax payers in Rwanda: case study of Nyarugenge Sector. *International Journal of Management and Commerce Innovations*, *Vol. 6, Issue 1, pp: (1169-1178),*(ISSN 2348-7585 (Online)). https://www.researchpublish.com

[50] Tran-Nam, B., & Glover, J. (2002). Tax reform in Australia: impacts of tax compliance costs on small business. *Journal of Australian Taxation, 5*(3), 338–381. https://research.monash.edu/en/publications/tax-reform-in-australia-impacts-of-tax-compliance-costs-on-small-

[51] United Nations Economic Commission for Africa. (2020). Africa Regional Integration Index Report 2020. Retrieved from https://repository.uneca.org/bitstream/handle/10855/43954/ARII_Report_2020_en.pdf

[52] Vaillancourt, F., Clemens, J., & Palacios, M. (2007). Compliance and Administrative Costs of Taxation in Canada. *Canada: The Fraser Institute*. https://www.fraserinstitute.org/sites/default/files/impact-and-cost-of-taxation-in-canada-2008.pdf

[53] Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the Technology Acceptance Model: Four longitudinal field studies. *Management Science, 46*(2), 186-204. DOI: 10.1287/mnsc.46.2.186.11926

[54] Venkatesh, V., Morris, M., Davis, G. B., & Davis, F. D. (2003). User acceptance of information Technology: toward a unified view. *Management Information Systems Quarterly*, *27*(3), 425. https://doi.org/10.2307/30036540

[55] Warkentin, M., Gefen, D., Pavlou, P. A., & Rose, G. M. (2002). Encouraging citizen adoption of e-government by building trust. Electronic Markets, 12(3), 157-162.

[56] Warwick, R., Nandi, T. K., Gadenne, L., & Das, S. (2022). *Does going cashless make you tax-rich? Evidence from India's demonetization experiment*. https://doi.org/10.1920/wp.ifs.2022.0322

[57] Wasao, D. (2014). *The effect of online tax system on tax compliance among small taxpayers in east of Nairobi tax district*. http://erepository.uonbi.ac.ke/handle/11295/74865

[58] Wasao, D. (2014). The effect of online tax system on tax compliance among small taxpayers in East of Nairobi tax district (Doctoral dissertation, University of Nairobi).

[59] Wawire, N. (2016). Analysis of income tax system productivity in Kenya. *Amity Journal of Economics*. https://ir-library.ku.ac.ke/handle/123456789/19478

[60] Wilkening, E. A. (1963). DIFFUSION OF INNOVATIONS. By Everett M. Rogers. New York: The Free Press of Glencoe, 1962. 367 pp. $6.50. *Social Forces*, *41*(4), 415–416. https://doi.org/10.2307/2573300

[61] Yılmaz, F., & Coolidge, J. (2013). Can e-filing reduce tax compliance costs in developing countries? *RePEc: Research Papers in Economics*. https://EconPapers.repec.org/RePEc:wbk:wbrwps:6647

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