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Effect of Electronic Tax System on Tax Collection Performance in Rwanda: A Case of Musanze District (2018-2021)

Flora Catheline Hakorimana[1] & Dr. Daniel Twesige[2]
[1] Master of Accounting and Finance, University of Kigali, Rwanda
[2] Senior Lecturer, University of Kigali, Rwanda

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Abstract

This research evaluated the impact of the electronic tax system on tax collection performance in Musanze District, Rwanda. Specifically, this study aimed to examine the effect of electronic tax filing on tax collection performance in Musanze District; to evaluate the effect of electronic tax payment on tax collection performance in Musanze District and to determine the effect of electronic billing machines on tax collection performance in Musanze District. The study adopted a correlational research design. The target population included registered taxpayers in Musanze District. A sample of 100 respondents was selected by a simple random sampling technique. Data collection process involved structured questionnaires and documentary review. Data were analysed employing both descriptive and inferential statistical analyses. The response rate was 97%. The findings reveal a positive influence of electronic tax filing, electronic tax payment, and Electronic Billing Machines (EBMs) on tax collection performance, emphasizing their convenience, efficiency, and accuracy, which lead to reduced compliance costs, increased taxpayer compliance, and augmented government revenue collection. Correlation analyses demonstrate significant positive relationships between the adoption of electronic systems and tax collection performance, highlighting the potential for increased tax revenue as these systems gain popularity. However, concerns related to data security (Mean=3.82, SD.=0.595), limited familiarity (Mean=2.86, SD.=1.000), and personal usage issues (Mean=2.57, SD.=0.853) are evident, underscoring the need for awareness campaigns and user-friendly interfaces. Despite these challenges, the study emphasizes the potential of electronic tax systems to modernize tax submission, enhance efficiency, and promote voluntary compliance, contingent on addressing awareness and adoption barriers. Specifically, the findings regarding electronic tax filing indicate a strong correlation with tax collection performance ($r = 0.618$, $p = 0.039$). Electronic tax payment also exhibits a positive relationship with tax collection performance ($r = 0.764$, $p = 0.027$), although participants express some dissatisfaction with payment options (Mean=2.90) and perceived effectiveness in reducing tax evasion (Mean=2.75). Similarly, EBMs are shown to reduce collection time (Mean=4.36), improve tax data accuracy (Mean=4.27), and increase confidence in tax compliance (Mean=4.00), but respondents express moderate satisfaction with operational aspects (Mean=2.71) and transactional capacity (Mean=2.65). Findings indicated a positive and statistically significant linear relationship between electronic tax components and tax collection performance ($R = 0.759$, F-statistic=2.779, $p = 0.001$). Around 73.7% of tax collection performance variation is attributed to these variables (adjusted R square = 0.737).

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However, respondents express moderate satisfaction with payment options and effectiveness in reducing tax evasion. The study recommends focused awareness campaigns, user-friendly interfaces, enhanced data security measures, diverse payment options, targeted training, and collaborations with financial institutions for seamless integration.

Key words: *Electronic Tax System, Electronic Tax Filing, Electronic Tax Payment, Electronic Billing Machines, Tax Collection Performance.*

1. Introduction

In the majority of developing nations, including Rwanda, it has proven difficult to control taxes. Before 1994, Rwanda's tax collection performance was handled by the Department of Customs and Excise Duties, while the Ministry of Finance was in charge of collecting income taxes and inland revenues. The manual tax administration system, which was portrayed by low level of tax collection performance, delays, as well as inadequate record keeping, was to blame for the low-income level and the poor tax administration. As a result, Rwanda was unable to reach its budgetary goals. The issue persisted even after Rwanda Revenue Authority was established in November 1997. As tax revenues remain a sustainable source of financing for Rwanda's development, the electronic tax system comes to address the need to reduce the charge of processing and paying tax by taxpayers.

According to Kovacev (2019), a new global platform for tax management is being created resulting from the technical advancements brought on by the fourth industrial revolution, including the internet, machine learning, artificial intelligence, and robots. The manner of tax assessment, tax declaration, tax remittances and payments, and interactions between the taxpayer and the tax administrator have all transformed because of the digitization of the scheme.

Maisiba and Atambo (2016) provided an explanation of the electronic tax system, describing it as a computerized tax administration system specifically developed to manage various aspects of tax administration, encompassing tasks such as registration, assessment, return filing, and the handling of claims and refunds.Its intentional drive is to decrease, at the taxpayer's expense, compliance with tax regulations and legislation, increase tax collection performance, eliminate inefficiencies regarding the price of taxpayers' travel to tax offices to conduct business, and provide taxpayers with a framework that lowers their compliance costs.

The adoption of electronic tax system has a number of advantages, including but not limited to reasonable cost estimation, shortened travel distances to tax offices, meticulous record-keeping, easy access to records when needed, convenient preparation of tax and tax dues returns, and sharing trustworthy tax information between the administration and taxpaying citizens, which improves tax compliance (Mandari *et al.*, 2017).

Despite being implemented in Rwanda, the electronic tax system is still not well known by the general public, particularly small business owners. Few studies looked into how Rwanda's electronic tax system affected revenue collection in the Musanze District in particular. As far as the researcher is aware, since the adoption of the computerized tax system, it has not been proven in Rwanda whether the system has succeeded in maximizing tax collection performance or whether there is a direct correlation between the two. The relationship between the effort of many taxpayers using the electronic tax system and the rise in tax income in Rwanda has likewise remained unclear and ambiguous. The goal of this study is to evaluate how the electronic tax system has affected tax revenue collection in Rwanda, more specifically in the Musanze District.

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1.1. Objectives of the study

The general objective of the study is to assess the effect of the electronic tax system on tax collection performance in Rwanda.

Specifically, this study aims:

1. To examine the effect of electronic tax filing on tax collection performance in Musanze District.
2. To evaluate the effect of electronic tax payment on tax collection performance in Musanze District.
3. To determine the effect of electronic billing machines on tax collection performance in Musanze District.

1.2 Research Hypotheses

Considering the above research questions, the researcher tested the following null hypotheses (H_o):

a. H_{0a}: There is no significant effect of electronic tax filing on tax collection performance in Musanze District.
b. H_{0b}: There is no significant effect of electronic tax payment on tax collection performance in Musanze District.
c. H_{0c}: There is no significant effect of electronic billing machines on tax collection performance in Musanze District.

2. Literature review

2.1. Theoretical Review

This section reviews different theories in relation to the electronic tax system. Those theories are Motivational Model (MM), Fiscal Exchange theory, Theory of Reasoned Action (TRA), and Activity Theory (AT).

2.1.1. Motivation Model (MM)

According to Deci (1975), intrinsic motivation is any behavior that tends to pique a person's desire to feel capable and in control of their environment. If the person does not find satisfaction in the activity, this intrinsic motivation will diminish. Nevertheless, extrinsic motivation activities are linked to extrinsic rewards, which consequently correlate to the satisfaction of the primary drives for achieving the goal set. If there is no legal provision intended to stop tax avoidance or reduction, a taxpayer cannot be prevented from engaging in a legitimate transaction that, when carried out, reduces or avoids tax. Money, praise, social acceptance, or positive feedback for fitting into their social reference group are some examples of positive rewards.

The theory put forth by Deci (1975) on intrinsic and extrinsic motivation holds significant relevance to the study examining the impact of the electronic tax system on tax collection performance in Rwanda, specifically within Musanze District. Deci's notion of intrinsic motivation, which centers around an individual's desire for competence and self-determination, can be applied to understand how the electronic tax system may influence taxpayer behavior. As the system offers convenience and efficiency, taxpayers may perceive themselves as more

capable and empowered to meet their tax obligations. This study can delve into whether the electronic system fosters intrinsic motivation by enhancing taxpayers' sense of competence and autonomy, potentially influencing their compliance with tax regulations.

Deci's theory also explores extrinsic motivation, which refers to engaging in behaviors motivated by benefits from outside sources. In the context of the electronic tax system, extrinsic rewards such as time savings, reduced administrative burden, and the elimination of the need to queue at banks or tax offices could serve as incentives for taxpayers to adopt and embrace the system. Investigating the correlation between these extrinsic rewards and taxpayer satisfaction can provide insights into the system's effectiveness in motivating tax compliance. By examining how extrinsic motivation factors contribute to taxpayer behavior, this study can shed light on the role of the electronic tax system in influencing taxpayers' willingness to adhere to tax requirements.

Moreover, Deci's theory underscores the importance of enjoyment and satisfaction in maintaining intrinsic motivation. Applying this concept to the study, it becomes pertinent to assess whether the electronic tax system enhances taxpayers' overall enjoyment and satisfaction in fulfilling their tax responsibilities. If taxpayers find the electronic system enjoyable and satisfying to use, it could potentially bolster their intrinsic motivation, leading to increased compliance with tax regulations. By exploring the link between enjoyment, satisfaction, and intrinsic motivation within the context of the electronic tax system, this study can contribute valuable insights into the psychological factors driving taxpayer behavior in response to technological changes in tax collection performance methods.

2.1.2. Fiscal Exchange Theory

This theory holds that to persuade taxpayers to follow through, the government should invest money and offer services and products that are both easily accessible and freely available. The primary objective of taxpayers is to receive some sort of public benefit in exchange for their tax obligations. Horn (2013) said that the theory recognizes the fact that public expenditure enhances tax compliance. When a public good is made available that is correlated with the quantity of taxes paid, the community is more likely to make tax payments. Given this, the theory recognizes that taxation results from the delivery of public goods by the governing body.

The theory put forth has a lot to do with the research looking at how an electronic tax system affects tax collection performance in Rwanda. This approach emphasizes the significance of public spending on easily accessible and unrestricted services to promote tax compliance. According to the paper, putting in place an electronic tax system may be seen as a calculated step that would improve taxpayer services and reduce procedures. The study can provide information on whether such investments result in higher levels of taxpayer compliance by assessing how well the electronic system provides these updated services.

Furthermore, the theory's emphasis on the connection between public benefits and tax compliance resonates with the study's focus. Exploring how the electronic tax system facilitates transparency and accountability in the allocation of tax revenues for public goods and services could reveal insights into whether taxpayers perceive a direct correlation between their obligations and the benefits they receive. The current research provides valuable evidence regarding whether the electronic tax system enhances this link, subsequently affecting tax collection performance positively.

Additionally, the theory's recognition of public expenditures role in driving tax compliance holds relevance for the study. Through an analysis of the electronic tax system's impact on public expenditure management, the research can contribute to understanding whether increased efficiency and transparency in fund utilization lead to higher taxpayer trust and, consequently, significant tax collection performance.

2.1.3. Theory of Reasoned Action

The Theory of Reasoned Action (TRA) propounded by Fishbein and Ajzen in 1975 is one of the first ideas to explain computer usage and acceptance behavior. The TRA states that a person's attitude towards a behavior and their subjective norm of that behavior are what influence their intention to do that behavior (BI). A person's attitude is determined by their salient beliefs about the consequences of engaging in the behavior multiplied by their assessment of those consequences (A). The beliefs that were elicited from a representative sample of the population the most frequently can be used to determine salient beliefs.

The TRA offers significant relevance to the study focusing on the impact of the electronic tax system on tax collection performance in Rwanda, specifically within the Musanze District. TRA explains individuals' behaviour and acceptance of technology, making it an apt theoretical framework for this research. The study investigates how attitudes (A) and subjective norms (SN) shape behavioral intention (BI) regarding the adoption of the electronic tax system. Salient beliefs about the outcomes of using the system influence attitudes, while subjective norms are influenced by normative views and motivations to adhere to these expectations. The study identified the prevalent beliefs within the Musanze District population and assessed how perceptions of technology and norms have evolved, driving acceptance of the electronic tax system. In a nation like Rwanda, where technological adoption has undergone a transformative shift due to its economic benefits, understanding the dynamics of attitude and norm changes becomes crucial. This research aids in comprehending how these factors impact the willingness of individuals to adopt the electronic tax system, thereby contributing to the improvement of tax collection performance strategies in Rwanda, particularly in the Musanze District.

2.1.4. Activity Theory (AT)

Using the activity theory framework, networks of interconnected activity systems are examined and transformed (Hardman, 2005). The activity systems transform one condition into another; hence, they are considered to be the instruments of reorganization of activities (Engeström, 2015). The core components of an activity system encompass the subject, object, mediating tools, guidelines, community, and the division of labor. The subject is a person or thing (an actor or actors) whose viewpoint is being used to view an object (Daniels, 2004). The most common way that AT is used to study human behavior is from a needs-based and goal-oriented standpoint, i.e., that people are driven by needs and, as a result, have specific goals to pursue (Mlitwa, 2011).

Utilizing instruments to mediate human action is referred to as mediation (Vygotsky, 1978). The artifact that will be produced and altered throughout the course of the activity's development is the tool (Uden *et al.*, 2007). Rules are norms and regulations that could be tacit or overt but nonetheless have an impact on behavior (Engeström, 1999). The community stands for several organizations, protocols, and systems, including the labor division (Owen, 2008). Goal implementation in a multi-level and complex activity system, like the e-filing and payment processes, is difficult because it needs defined norms and standards across several

actors to be successful. While implicit rules could be vague and open to misunderstanding and manipulation, the worst-case scenario would be a total lack of rules or norms, along with no enforcement mechanisms.

Instead of a predictive theory, AT is a descriptive framework, a concept, and a theoretical approach or viewpoint (Mursu *et al.,* 2007). Most frequently, AT is utilized to investigate human behavior from a needs- and goal-based perspective (i.e., people are driven by needs and have particular goals to achieve) (Mlitwa, 2011). Since an activity is considered to be a factor that links the actions to the context, it acts as a fundamental analytical unit in activity theory (Engeström, 2015). "Activities without context are worthless" because human actions depend on their context for meaning (Mursu *et al.*, 2007).

The Activity Theory (AT) framework is highly relevant to a study examining the impact of an electronic tax system on tax collection performance in Rwanda's Musanze District. This framework provides a structured approach to understanding the complex dynamics involved in tax collection performance processes. It excels in revealing the interconnectedness of various systems, making it suitable for exploring the relationships between the Revenue Authority department, taxpayers, and the electronic tax system.

AT's concept of activities as transformative agents aligns with the study's goal of analyzing how electronic tax adoption reshapes established collection methods. It allows for a systematic examination of how this technological shift changes workflows, roles, and strategies. The emphasis on mediation and tools in AT is relevant to the study's investigation of information technology's role in facilitating interactions between authorities and taxpayers. It offers insight into how IT tools act as mediators, influencing communication channels and shaping the tax collection performance process. Moreover, the focus on rules and norms within AT is pertinent for examining the regulatory framework governing electronic tax filing and its impact on taxpayer behavior and compliance.

Considering the concept of community within AT is crucial for understanding collaborative efforts required for implementation. It helps analyze how various entities collaborate, share responsibilities, and contribute to effective tax revenue generation. AT's descriptive nature suits the study's aim of understanding the dynamics of electronic tax filing rather than predicting outcomes. Finally, AT's emphasis on contextual analysis is essential for accounting for local intricacies, cultural influences, and unique challenges in the Musanze District that may affect the electronic tax system's implementation and outcomes.

3. Research methodology

3.1 Research design

The research design is intended to provide an appropriate framework for a study. It determines how relevant information for a study was obtained (Bloomfield *et al*., 2019). This research had a correlational design. Correlational research contributes insights into complex phenomena, making it a valuable tool for generating predictions, informing decisions, and exploring relationships. A correlational design was employed.

3.2. Study population and sampling

Musanze Tax Center reported that there are 26,791 registered taxpayers in Musanze district as of July 2023. Therefore, the total population of this study comprises 26,791 taxpayers.

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The sample size was determined using the Yamane formula to calculate the sample size as follows:

$$n= \frac{N}{1+N(e)^2}$$

where: n= Desired Sample size, N= Study Population (N=26,791), e= Error margin

Depending on the characteristics of the study population, the level of precision varies. Given that the study population was 26,791 taxpayers from Musanze District and level of precision was 0.1 (10%) as the population is estimated to be normal. Henceforth, the following formula was applied where:

$$n= \frac{26791}{1+26791(0.1)^2}=99.628\sim100$$

Therefore, the total sample size was composed of 100 taxpayers from Musanze District.

The sample size was selected using Simple Random Sampling technique. However, to account for potential variations in electronic tax system usage across different sectors of Musanze District and for ease accessibility, four representative sectors were randomly selected in Musanze District: Muhoza, Cyuve, and Kimonyi and Gacaca sector. This approach ensures that the sample is a fair representation of all taxpayers using the electronic tax system, considering their location and other characteristics. It strikes a balance between simplicity and specificity, enhancing the overall quality and relevance of the research findings.

3.3. Data collection instruments

According to Kothari (2004), once a research problem and research design plan have been drafted, data collection can be launched. He defines data collection as the systematic gathering of information that addresses the research problem using various techniques. For the purpose of this study, structured questionnaires were the main data collection instruments. However, the tool was supplemented by a documentary checklist to gather secondary data. The subsequent subsections present a review of these tools and the rationale for their choice.

The researcher supplemented primary data with information derived from secondary sources through a comprehensive documentary review. By utilizing this method, the researcher aimed to critically assess materials related to the subject, thereby enhancing the depth of information available for the study. This strategy enables the extraction of valuable insights from existing literature and documents, contributing to a more thorough understanding of the research area. Incorporating secondary sources through documentary analysis enriched the research by augmenting the scope of data collection and broadening the perspectives considered in the investigation.

3.4. Data analysis

Collected data were subjected to a comprehensive analysis employing both descriptive and inferential statistical methods. Descriptive statistics were utilized to succinctly summarize and characterize the main features of the collected data. This will involve calculating measures such as means, which give an average value, frequency to highlight the occurrence of different responses, percentages to depict the distribution of categorical data, and standard deviations to indicate the dispersion of data points around the mean.

Inferential statistics were employed to draw broader conclusions and make predictions based on the collected data. This involves exploring relationships and associations between variables.

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Multiple Regression Analysis was employed to examine the influence of multiple independent variables on a single dependent variable.

The study used the following multiple regression model:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

Whereby Y =Tax collection performance (Measured as a proxy of Tax collected)
B_0= Constant
X_1 = electronic tax filing (Measured as a proxy of the Number of Registered Taxpayers)
X_2 = electronic tax payment (Measured as a proxy of the Number of transactions)
X_3= EBMs usage (Measured as a proxy of the Number of EBM users)
ε= error term
β_1, β_2, and β_3 represent regression coefficients.

Correlation Analysis was used to uncover the strength and direction of relationships between pairs of variables. This statistical method assesses how changes in one variable are associated with changes in another, providing insights into whether they move together or in opposite directions.

4. Research findings

Data were aggregated to form individual variables for each factor by calculating their respective means. Subsequently, a Pearson Correlation analysis and Multiple Regression Analysis was performed at a confidence interval of 90% and a significance level of 10%. Results are presented in the subsequent sections.

4.1. Correlation analysis

The correlation matrix provided below offers valuable insights into the intricate relationships among tax collection performance, electronic tax filing, electronic tax payment, and the adoption of Electronic Billing Machines (EBMs). The matrix serves to quantify the strength and direction of associations between these pivotal variables, shedding light on their interconnectedness.

Table 1: Correlation Matrix Results

Variables		Tax collection performance	Electronic tax filing	Electronic tax payment	EBMs Usage
Tax collection performance	Correlation	1			
	Sig. (2-tailed)				
	N	97			
Electronic tax filing	Correlation	.618**	1		
	Sig. (2-tailed)	.039			
	N	97	97		
Electronic tax payment	Correlation	.764**	0.523*	1	
	Sig. (2-tailed)	.027	.016		
	N	97	97	97	
EBMs Usage	Correlation	.522**	0.531**	0.754**	1
	Sig. (2-tailed)	.000	.014	.000	
	N	97	97	97	97

***** Significance at 0.1 level (2-tailed)***

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Table 1 indicates that tax collection performance demonstrates a positive correlation with each of the other variables. Tax collection performance is positively correlated with electronic tax filing ($r = 0.618$, $p = 0.039 < 0.1$), electronic tax payment ($r = 0.764$, $p = 0.027 < 0.1$), and EBMs ($r = 0.522$, $p = 0.00 < 0.1$). This suggests that as electronic tax filing, electronic tax payment, and EBMs increase, there is a tendency for tax collection performance to increase. These positive correlations underscore the potential benefits of electronic tax systems in contributing to more effective tax collection performance processes. Moreover, electronic tax filing is positively correlated with electronic tax payment ($r = 0.523$, $p = 0.016$) and EBMs ($r = 0.531$, $p = 0.014$). Electronic tax filing exhibits a positive correlation with electronic tax payment and EBMs, indicating that as organizations adopt electronic tax filing methods, there is a likelihood of a parallel embrace of electronic tax payment mechanisms and EBMs. This implies a mutual inclination towards modernized tax-related practices and technologies. Furthermore, the electronic tax payment is strongly positively correlated with EBMs ($r = 0.754$, $p < 0.1$). This robust positive correlation between electronic tax payments and EBMs emphasizes a strong linkage between these two electronic aspects. This implies that the adoption of electronic payment systems for taxes is closely intertwined with the utilization of electronic billing machines. This association could potentially signify a strategic alignment in leveraging electronic tools across different tax-related functionalities.

The strong positive correlations identified between tax collection performance and other variables, namely electronic tax filing, electronic tax payment, and EBMs, echo the insights gleaned from previous studies. Babatunde and Akinsanmi (2021) revealed that an electronic tax approach expanded the tax base, leading to consistent growth in cumulative taxpayers. Ajayi and Oyeniyi (2021) discussed electronic tax filing's influence on oil tax revenue, underscoring the impact of electronic solutions on tax collection performance. The positive correlations suggest a coherent alignment between electronic tax methods and enhanced tax collection performance. Moreover, the positive correlation between electronic tax filing and electronic tax payment resonates with the findings of Kimathi *et al*. (2019), who emphasized the influence of perceived usefulness and ease of use on user attitudes. The inclination for parallel adoption of electronic tax filing and payment suggests a collective shift toward embracing comprehensive electronic tax solutions. The strong correlation observed between electronic tax payment and EBMs echoes the sentiments of Steenburgen (2017), which highlighted the value of EBMs in combating tax evasion. The close relationship between electronic payment systems and the utilization of billing technologies underscores a strategic synergy in modernizing tax-related practices.

4.2. Regression Analysis

To delve deeper into the relationships between the variables under study, a regression analysis was conducted. Model summary, regression coefficients and analysis of variance results are presented in the subsequent tables.

Table 2: Model Summary

Model	R	R square	Adjusted R square	Std. Error of estimate
1	.759	.751	.737	.04420

a. ***Predictor(s):*** (Constant), electronic tax filing, electronic tax payment, EBMs usage

b. ***Dependent variable:*** Tax collection performance

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Table 2 shows that the correlation coefficient is R = 0.759. This indicates a strong, positive linear relationship between the electronic tax components and tax collection performance. Around 57.5% of the variation in tax collection performance can be attributed to the electronic tax system variables, as indicated by the coefficient of determination (R square) of 0.751. The adjusted R square value of 0.737, considering model complexity, implies that approximately 73.7% of the variability in tax collection performance is accurately accounted for by these variables. This underscores the significant positive impact of electronic tax filing, electronic tax payment, and EBMs on tax collection performance, with these electronic components explaining a substantial portion of the variance in tax collection performance outcomes.

Table 3: Analysis of Variance

Model	Sum of Squares	Degree of Freedoms	Mean Square	F	Sign.
Regression	9.014	3	3.005	2.779	0.001
Residual	101.65	94	1.081		
Total	10.664				

a. ***Predictor(s):*** (Constant), electronic tax filing, electronic tax payment, EBMs usage

b. ***Dependent variable:*** Tax collection performance

Table 3 results reveal a statistically significant relationship between the Electronic Tax System variables and tax collection performance. The F-statistic of 2.779, with a significance value of 0.001, indicates that the variation in tax collection performance explained by the Electronic Tax System variables is unlikely to occur by chance alone. The sum of squares attributed to regression (9.014) is larger than the sum of squares for the residual (101.65), suggesting that the model accounts for a substantial portion of the variability in tax collection performance. This further supports the notion that the Electronic Tax System variables have a meaningful impact on tax collection performance outcomes.

Table 4: Regression Coefficients

Predictors/Variables	Unstandardized coefficients		Standardized coefficients	t.	Sign.
	B	Std. error	Beta		
(Constant)	.459	.123		2.167	.006
electronic tax filing	.225	.142	.193	1.586	.022
electronic tax payments	.293	.171	.141	1.123	.009
EBMs	.778	.144	.639	5.385	.000

a. ***Predictor(s):*** (Constant), electronic tax filing, electronic tax payment, EBMs usage

b. ***Dependent variable:*** Tax collection performance

Table 4 show that the constant coefficient is 0.459. This indicates that the expected tax collection performance value is 0.459 when all independent variables are zero. This coefficient is statistically significant (Sign. = 0.006), suggesting that even without the electronic tax components, there is still a positive baseline tax collection performance. Table 4 also shows that the coefficient for electronic tax filing is 0.225. This indicates that a one-unit increase in electronic tax filing is associated with a 0.225 increase in tax collection performance other factors remaining constant. The standardized coefficient (Beta = 0.193) suggests that electronic

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tax filing has a positive impact on tax collection performance. The coefficient is statistically significant (Sign. = 0.022<0.1). Furthermore, the coefficient for electronic tax payment is 0.293. This implies that a one-unit increase in electronic tax payment corresponds to a 0.293 increase in tax collection performance. The standardized coefficient (Beta = 0.141) suggests a positive impact of electronic tax payment on tax collection performance. The coefficient is statistically significant (Sign. = 0.009<0.1). Table 4 also shows that the coefficient for EBMs is 0.778. This suggests that a one-unit increase in the adoption of EBMs leads to a substantial 0.778 increase in tax collection performance. The standardized coefficient (Beta = 0.639) signifies that EBMs have a notable positive impact on tax collection performance. The coefficient is highly statistically significant (Sign. 0.00< 0.1). These results suggest that all three electronic tax components - electronic tax filing, electronic tax payment, and EBMs - have positive and statistically significant impacts on tax collection performance. EBMs stand out with the highest coefficient, indicating a particularly strong influence. This aligns with the earlier findings that demonstrated the positive relationship between these electronic tax aspects and effective tax collection performance.

4.3. Hypotheses Testing

Based on the results and analysis provided, the stated hypotheses are verified as follows.

Table 5: Hypotheses Testing Results

Hypothesis	Regression Results	Interpretation
H0: There is no significant effect of electronic tax filing on tax collection performance in Musanze District.	Beta = 0.193 Sign. = 0.022, significant	Reject H0: There is a significant effect of electronic tax filing on tax collection performance
H_0: There is no significant effect of electronic tax payment on tax collection performance in Musanze District.	Beta = 0.141, Sign. = 0.009, significant	Reject H0. There is a significant effect of electronic tax payment on tax collection performance
H0: There is no significant effect of electronic billing machines on tax collection performance in Musanze District.	Beta = 0.639, Sign. = 0.00, highly significant	Reject H0: There is a significant effect of electronic billing machines on tax collection performance

5. Conclusion

The research findings shed light on the substantial positive impact of the electronic tax system components electronic tax filing, electronic tax payment, and Electronic Billing Machines (EBMs) on tax collection performance processes in Musanze District. The electronic tax filing system has proven to be a game-changer, as respondents widely acknowledge its convenience, efficiency, and accuracy. The system's contribution to reduced compliance costs, heightened taxpayer compliance, and increased government revenue underscores its effectiveness. Despite data security concerns, respondents recognize its role in improving tax collection performance processes, with a significant positive correlation observed between electronic tax filing and tax collection performance. Similarly, the electronic tax payment system has exhibited remarkable success in curbing tax fraud, expediting tax collection performance, and enhancing overall tax integrity. Its positive correlation with tax collection performance, combined with reduced errors and operational benefits, further validates its impact. However, addressing participants'

concerns about payment options, perceived effectiveness in tax evasion reduction, and limited personal usage remains crucial for optimal implementation.

Furthermore, the EBMs usage have emerged as efficient drivers, significantly reducing the turnaround time for tax collection performance, improving accuracy, and streamlining tax data recording. Their role in encouraging businesses to adopt better record-keeping practices is noteworthy. Confidence in their security and positive impact on tax compliance and revenue collection underscores their potential. Nevertheless, addressing challenges related to operational satisfaction, familiarity, and perceptions of tax evasion reduction is imperative to fully harness the benefits of EBMs. Collectively, these findings underscore the potential of technology-driven solutions in enhancing tax collection performance processes. The identified challenges, such as data security concerns, payment options, and familiarity, present opportunities for continuous improvement and strategic interventions. Efforts to enhance awareness, ensure user-friendly interfaces, and foster trust in data security was pivotal in maximizing the positive impacts of these electronic systems on tax collection performance efficiency, accuracy, and overall revenue generation in Musanze District.

6. Recommendations

- Musanze District in partnership with the Rwanda Revenue Authority (RRA) should implement comprehensive awareness campaigns to educate taxpayers, businesses, and stakeholders about the benefits, features, and usage of the electronic tax system components. These campaigns should emphasize data security measures, operational procedures, and the advantages of adopting electronic tax processes.
- Musanze District in partnership with RRA should enhance the user-friendliness of the electronic tax platforms, ensuring intuitive navigation, clear instructions, and accessible language options. User-friendly interfaces will encourage wider adoption among taxpayers and businesses, addressing concerns related to familiarity and utilization.
- RRA should strengthen data security measures within the electronic tax system to address respondents' data security concerns. Implement strong encryption protocols, multi-factor authentication, and regular security audits to instill confidence in users regarding the safety of their personal and financial information.

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