



## Assessing the Effect of Electronic Billing Machine Invoicing On Value Added Tax Compliance in Rwanda (2015-2020). A Case of Musanze District Taxpayers

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DOI: [10.5281/zenodo.7396561](https://doi.org/10.5281/zenodo.7396561)

Submission Date: 20<sup>th</sup> Nov. 2022 | Published Date: 5<sup>th</sup> Dec. 2022

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### Abstract

The general objective of this study was to assess the effect Electronic Billing Machine invoicing on tax compliance in Rwanda particularly in Musanze district taxpayers. The study analyzes the three specific objectives as to analyze the perception of taxpayers on adoption of electronic billing machine in Musanze district, to analyze the level of value added tax compliance in Musanze district for the period of 2015 up to 2020 and to find out the relationship between using Electronic Billing Machine on invoicing and tax compliance. Both primary and secondary data were used in this study where questionnaires have been distributed to 100 respondents from target population of 669 of Musanze district taxpayers. Simple random techniques were used to select 100 taxpayers, questionnaires and documentation methods were used to collected data relating to this topic. Data analysis was done by using SPSS vision 20 and Microsoft excel. The findings on the perception of taxpayers on adoption of electronic billing machine invoicing among Musanze district taxpayers, the overall view of respondents on accuracy on reporting, simple and faster to use EBM, timely reporting, security concerns services, check statement and payment process services shows that majority of respondents was rated with high mean score of 4.49 which implies a strong evidence of the existence of the fact and standard deviation of 0.64 great than 0.5 which implies that respondents have heterogeneity perception on the use of electronic billing machine invoicing among Musanze district taxpayers. For tax compliance the overall view of respondents on the payment compliance was rated with a high score 4.07 which implies with a strong standard deviation equal to 0.56 which implies that respondents have the same view regarding to the level of payment compliance.

Also the study was confirmed that there is statistically significant relationship between use of Electronic Billing Machine in invoicing and tax compliance in Musanze district. This was confirmed with a correlation coefficient of ( $r=-0.731^*$ ,  $P\text{-value}=0.014<0.05$ ). The study concluded that increase of using Electronic billing machine invoicing helps the taxpayers to comply their tax and helps the taxpayers to reduce the conflicts among taxpayers and tax authority.

**Keywords:** taxpayers, tax compliance, EBM, invoicing

## INTRODUCTION

Many governments around the world have recently implemented Electronic Billing Machines (EBMs), which are devices that track business transactions in order to prevent tax evasion. These systems detect business transactions in order to combat VAT non-compliance (Steenbergen, 2017). A successful tax collection system is focused on the monitoring of all taxable transactions, often by the use of electronic devices, to avoid evasion of the state's interests and fiscal fraud. In the context of worldwide the first to use Electronic Fiscal Device (EFD) was the Italian administration in 1983(Peter & Patricio,2018). The Greek Tax Agency was the next tax administration to adopt fiscal devices in 1988 Kenya was the first adopter in Sub-Saharan Africa in 2005, and since then many others have followed including Tanzania, Ethiopia and most recently Rwanda and Malawi. South Korea has extended the scope of EFDs to all business. EFDs have therefore been an important and influential policy (Harelimana & Gayawira, 2020).

In Rwanda based on VAT law N° 37/2012 of 09/11/2012 in its article 24, every business registered for VAT have to provide a customer with a special certified receipt issued through Electronic Billing Machine for every sold good or service. New law is specifically designed to stop tax evasion, which is troubling even the richest countries around the world. Rwanda has decided to introduce legislation which will help businesses to keep their books properly and protect honest taxpayers from unfair competition (Eissa et al., 2014). In August 2013, the Rwandan government passed legislation requiring VAT-registered firms to provide customers with a certified Electronic Billing Machine (EBM) receipt for each sale. EBMs record and transmit all sales transaction data to the Rwanda Revenue Authority (RRA) in real time, enabling improved monitoring of firms' VAT obligations and, hence, compliance (Eissa et al., 2014). Rwanda has the goal to increase its social programs, and the money for them is coming from taxes (RRA, 2015).

If some people don't play their part, other would have to shoulder the extra burden. The electronic billing machine legislation sets ground for the rules of fair completion among the value added tax registered taxpayers. In time all firms must have and use active, verified, EBM machines (Eissa et al., 2014). However, the program is being rolled out in stages, with firms that must comply announced by intermittent public notices (with the exception of those awarded exemptions, as described below). By the end of all stages of notices, every registered business in Rwanda will be legally required to provide a certified EBM receipt for all sales; if a business does not have EBM installed by their assigned date, they will be due a large fine (Uwayezu & Mulyungi, 2019). The primary mission of the tax administration is to collect the tax revenues due and needed by the government, under the country's tax laws, without hindering economic activity. Tax administrations face a range of challenges in carrying out their mandate, including how to expand the tax base by constantly getting non-registrants and non-filers into compliance, how to enhance organization and management, how to control tax evasion, how to improve tax collection, and how to facilitate voluntary compliance (Gakwaya, 2015). The most difficult task for any tax administration is to achieve and sustain compliance. There is a lot of voluntary compliance. Improving VAT enforcement is one of the most important issues for developing countries' domestic revenue mobilization for two reasons: To begin with, VAT revenues outweigh all other tax revenue sources, so even minor changes have a significant effect. Second, the data collected to track VAT liability creates a paper trail that helps to support a case a revenue authority's ability to enforce tax compliance across all domestic tax types (Custers, 2019). All tax authorities have limited resources, far less than they require assuring compliance with each taxpayer's tax responsibilities. As a result, successful tax administration necessitates the collection of the tax in a manner that instills trust in taxpayers and proves that the system is functioning properly. As a result, tax officials must rely on a methodology to determine the most rudimentary tax rates resources allocation (Twesige et al., 2019). Their compliance, on the other hand, refers to how responsive people are to tax duties. According to studies, there is a substantial link between tax compliance and tax income. If this is the case, improving tax compliance is critical for revenue agencies (Richard, 2016). The general goal of this compliance improvement strategy is to make the compliance process easier by establishing an atmosphere where taxpayers will comply with their obligations through simple administrative procedures, systematic instruction, and a range of incentives to the greatest extent possible, tax obligations (RRA, 2020). The Compliance Improvement Plan for 2019-2020 will be divided into two parts: general compliance interventions and compliance interventions targeted to certain industries. Registration, filing, payment, and proper reporting will be the focus of our general compliance efforts. Taxpayer compliance is classified in two ways by several studies which are economic deterrence model and fiscal and social psychology model (RRA, 2015). The Economic Deterrence model is based on the idea that increasing the risk of being caught and punished will enhance compliance. Fiscal and social psychology models, on the other hand, look at taxpayers' attitudes and beliefs inductively in order to anticipate their behavior (RRA, 2020).

Rwanda Revenue Authority aims to ensure more efficient monitoring of retail business sales operations with their customers. The value added tax registered persons are obliged to use an invoice of electronic billing machine that generates invoices indicating the tax agreed by the tax administration. An electronic billing machine comprises two components, a certified invoicing (CIS) and Sales Data Controller (SDC). Besides combating tax evasion and corruption, electronic billing machines will provide a market balance and make equal business opportunities for every business (Peter, & Patricio, 2018). After the registration of using EBM in Rwanda all the reforms in Rwanda's tax base system were aimed at improving tax collections, administration, and above all tax compliance. In a bid to improve tax compliance, Rwanda revenue Authority (RRA) decide to opt for electronic tax management system which includes e-payment, e-filing and electronic tax education in order to improve on tax collection in the country (Ndaisenga, 2016). The development of Rwanda's tax base is becoming increasingly acknowledged as a key policy priority, since a rise in internal revenue sources enables the country to lessen its reliance on aid while also reducing the detrimental effects of taxes on externally traded goods. The electronic tax system, which includes a payment system, a mobile tax system, and an electronic billing machine system, encourages timely tax payment and lowers operational costs for both tax administration and clients (Ndaisenga, 2016). This research will be analyzed the effect of the using electronic billing machine in invoicing on tax compliance of retail businesses in Rwanda.

**a) Problem statement**

Based on the previous research conducted by the previous researcher with the commissioner for domestic taxes at Rwanda Revenue Authority, the electronic billing machine faces resistance of retail business in full payment of their taxes. The problems are that some retail businesses do not have electronic billing machine receipts to their clients, and others still use handwritten receipts. Furthermore, some retail businesses that use electronic billing machines report small amounts of money that are less than the amount paid by their customers (RRA, 2015).

This makes the work of Rwanda Revenue Authority challenging because without full participation from taxpayers in recording all of their sales in the electronic billing machine, and paying all their taxes as they fall due and paying all their taxes as they fall due, it can cause tax evasion and it is difficult for the tax authorities to trust all the tax declared from retail business taxpayers. It is in the light of these questions that the researcher was motivated to conduct a study on the effect of electronic billing machine invoicing on tax compliance in Rwanda (2015-2020).

**b) Objectives of the study****General objective**

The overall objective of this study is to assess the effect Electronic Billing Machine invoicing on tax compliance in Rwanda particularly in Musanze district.

**Specific objectives**

This research has three specific objectives as follows:

1. To analyze the perception of taxpayers on adoption of electronic billing machine in Musanze district.
2. To analyze the level of value added tax compliance in Musanze district for the period of 2015 up to 2020.
3. To find out the relationship between using Electronic Billing Machine on invoicing and tax compliance.

**c) Research hypothesis**

1.  $H_0$ : There is no statistically significant relationship between use of Electronic Billing Machine in invoicing and tax compliance in Musanze district.
2.  $H_1$ : There is statistically significant relationship between use of Electronic Billing Machine in invoicing and tax compliance in Musanze district

**THEORETICAL AND CONCEPTUAL FRAMEWORK**

This section provides a theoretical and conceptual framework of the literature that relates to the study variables.

**a) Theoretical review**

The theories which anchored this study include the following:

**Fiscal exchange theory**

The theory suggests that the presence of government expenditure may encourage tax compliance from the taxpayers. The notion of the availability of public goods and services being developed in proportion to the tax paid encourages tax compliance among society (Isa, 2006).

It suggested that government can increase tax compliance by providing goods and services that citizens prefer in more efficient and accessible manner, emphasizing that taxes are necessary for the receipt of government services. Accordingly, taxpayers are concerning with what they are getting in return for their tax payments in the form of public services. In this perspective, taxation and the provision of public goods or services become catalysts to taxpayer in compliant to the tax paid (Viljoen, 2012). This theory is more practical and acceptable because, it advocates individual willingness to comply without direct coercion. Furthermore, it saves the government money by reducing the government's collection costs as a result of enforcement actions. According to this view, regardless of how much the government or administrative authority adopts current tax collection technologies, the efficacy of tax revenue collection is determined by the government's public services offered to tax payers. Taxpayers are concerning with what they are getting in return for their tax payments in the form of public services. In this, perspective taxation and the provision of public goods or service became catalysts to taxpayer in compliant to the tax paid (Horn,2013). Therefore, it can be argued that introduction of EBMs in Rwanda can improve compliance of tax if the public service offered are not equivalent to the tax revenue collected. Because it encourages individual willingness to conform without direct force, this idea is more realistic and acceptable. Furthermore, it saves the government money by reducing the high collection expenses associated with enforcement actions. According to this view, regardless of how much the government or administrative authority adopts current tax collection technologies, the efficacy of tax/revenue collection is determined by the government's public services offered to tax payers (Twesige et al., 2019).

## Social influences theory

Human behavior in the area of taxation is influenced by social interaction in the same way as other forms of behavior. Compliance behavior towards the tax systems may therefore be affected by the behavior of an individual's reference groups such as relatives, neighbors, and friends. If a taxpayer knows many people in his group who evade taxes, his commitments to comply will decline. On the other hand, social relationships may also help motivate individuals to comply and shy away tax evasion behavior in fear of the social sanctions imposed once discovered (Twesige et al., 2019). This idea, to a significant extent, supports the fiscal exchange theory. It also stated that a society with a government that promotes good governance has a better probability of adhering to rules and orders, including tax laws, which could lead to a tax paying culture among society members. The implication of this idea is that when it comes to paying taxes, the behavior or culture of the society in question has a role. As a result, in order for the government to achieve "huge outcomes" in tax collection, tax collecting agencies must conduct aggressive tax compliance programs that aid in influencing community members' habits to become enthusiastic/keen about paying taxes (Twesige et al., 2019).

The implementation of EBMs can only be effective if it is a part of a comprehensive compliance improvement strategy that clearly identifies risks for the different segments of taxpayers and envisages implementing a set of measures to mitigate these risks. The deployment of fiscal devices alone cannot by itself achieve meaningful results, whether in terms of revenue gains or permanent compliance improvements. Another key conclusion from many studies is that the introduction of EBMs requires considerable effort, accompanied by associated costs both to the administration and to the affected taxpayers in addressing the requirements of the new rules. Once the devices are chosen and available, it is essential that appropriate arrangements be put in place for their installation, support, and maintenance (Peter & Patricia, 2019). Studies showed that, when these arrangements were not in place or were incomplete, the implementation of EBMs faced considerable problems. Proper consideration of these factors is essential for a successful implementation. More over EBMs appear to suffer from similar challenges as other regimes if there are no effective follow-up and enforcement measures. Absent effective compliance monitoring and enforcement, overall VAT compliance cannot be improved without EBMs (Peter & Patricia, 2019).

### b) Conceptual review

#### Electronic billing machine

Electronic tax system is the system that has been developed to replace the old manual system. It is a web-enabled and secure application system that provides a fully-integrated and automated solution for administration of domestic taxes. It enables taxpayer internet based PIN registration, returns filing, payment registration to allow for tax payments and status inquiries with real-time monitoring of accounts. According to Palmer (2015) electronic tax filing systems can be evaluated in terms of usability, design and performance including download delay, navigability, site content, interactivity, responsiveness, user satisfaction, the likelihood of return to the website and frequency of use computer-generated returns, transmitted electronically, generally are easier to process than paper returns; since the information on the forms doesn't have to be keyed in, number by number, by IRS staff into the Service's computers hence there is less chance of errors (Roy et al., 2015). RRA introduced the electronic billing machine (EBM), a mechanism that benefits both the taxpayer and collector. However, within the business community not everyone has yet understood the advantages of the system, and those skeptical entrepreneurs therefore look at it with a wary eye. That should not be the case, because they themselves stand to gain from it and using the best way to manage their daily businesses transactions (RRA, 2019).



**Figure\_2: Picture of EBM**

An Electronic Billing Machine comprises of two components, a Certified Invoicing System (CIS) and a Sales Data Controller (SDC). If businesses don't have electronic billing machine in place by the announced deadline, it could face a substantial fine. Upon the public announcement, every business registered for VAT will have to provide a customer with a receipt issued through electronic billing machine for every sold goods or service. The groups of taxpayers which must

Have a special device installed on its premises to record every sale will be announced by public notice, as installation will be carried out in phases. By the end of each phase, the law will apply to every newly businesses registered for VAT in Rwanda (Ndayisenga, 2016).

The VAT law No. 37/2012 of 09/11/2012, article 24 obliges all VAT registered taxpayers in Rwanda to acquire and use EBM to issue tax invoices to their customers on every transaction they make. Failure to comply is a tax crime that attracts penalties. Any businesses that carried out taxable activities exceeding annually turnover of twenty millions Rwf in the previous fiscal year or five millions Rwf in the last quarter is required to register for VAT within a period of seven days from the end of that year or quarter. Also motivated by the nature of businesses or for voluntary reasons, businesses below the above mentioned turnover may register for VAT. The use of EBM, which is in force in Rwanda since 2014 is not a new form of tax but a simplified and accurate method of collecting revenue. This system is meant to deal with evasion of revenue, help businesses to keep proper records, enhance revenue protection and protect honest taxpayers from unfair competition. It also helps to reduce the operative and administrative burdens of a businesses, while ensuring the highest security standards for safekeeping tax information (IMF, 2013). The study concluded that the introduction of EBM helped to the decreases of tax evasion and need to create enough awareness and strong regular audit flow up to get those fruit full benefit of using EBM. Electronic fiscal device had positively impacted on the businesses sector through improvements in tax collections save time in tax collection, reduces direct contact between tax collectors and hence minimize corruption. Consumer education was also recommended for improving awareness of the benefits of using EBM in tax compliance (IMF, 2013).

RRA introduced the use of electronic billing machines (EBMs) to facilitate businesses pay for their value added tax (VAT), increases taxpayer's compliance while reducing the tax collection cost that has always been a factor in developing economies. This was in line with the government's need to improve the collection and compliance of value added tax through the use of electronic billing machines that were introduced to all VAT registered taxpayers (Harelimana & Gayawira, 2020). An electronic billing machine is a portable device the size of smart phone. It comprises of two components, a sales data controller (SDC) and a certified invoicing system (CIS). The SDC is the data storing component of the EBM which can external or inbuilt, and is controlled by the CIS software. The SDC records every transaction received from the CIS and then ensures that an electronic signature is printed on the receipt. This signature is specific to every tax payer so that it can't be forged; it is verifiable by RRA officers using a special decryption tool unique to every installed SDC and simultaneously transmitted to the RRA database. The SDC can store data for up to ten years (Eissa et al., 2014). Certified Invoicing System (CIS) the electronic system designed for use in business for efficiency management controls, in areas of sales analysis and stock control system which fulfill the requirements specified by the Authority. Sales data controller (SDC) device connected to CIS used for processing and storing receipts monitors, records and signs all tax relevant transactions. Even if you are in the training mode, issuing preform invoices, printing copies, paying refunds, SDC will keep track of your activity and report only accurate tax liability whenever requested. It works with designed to provide secure storage for receipt information at the moment when a receipt is printed. It has the ability to apply a secure signature that identifies and provides proof of the legality of each receipt for all types of transactions. All receipts signed by SDC are instantly verifiable. Sales data controller helps in guaranteed increase of tax revenue, prevention of tax frauds evidence for TAX refund, improvement of audit method prevention of data manipulation and loosing audit material due to computer hardware failure or record theft, service intervention minimized, no additional training for audit officers necessary and data analysis in a uniform manner.(Eissa et al., 2014).

## Tax compliance

Tax compliance refers to taxpayers' decision to comply with tax laws and regulations by paying tax timely and accurately. Tax compliance is a major problem for many tax authorities. It is not an easy task to persuade taxpayers to comply with tax requirements even as the tax laws are not always precise in some respects. Taxpayers are inherently disposed to reducing their tax liability either through tax evasion or tax avoidance (Hasseldine et al., 2007). Tax compliance is the degree to which a taxpayer obliges to tax rules and regulations willingly without any use of force. Corroborating this, described tax remittance and compliance as taxpayers' willingness to comply with tax laws, declare the correct income, claim the correct deductions, relief and rebates and pay all taxes on time. Similarly, tax compliance and remittance mean the ability and willingness of taxpayers to comply with tax laws, declare the correct income in each year and pays the right amount of taxes on time(Wadesango et al., 2018). This implies that tax compliance and remittance is the taxpayers' ability and willingness to comply with tax laws that are determined by ethics, legal environment and other situational factors at a particular time and place (Alm et al., 2010).

This may give rise to incorrect filling of their tax returns and loss of revenue to the government. An unduly complex regulatory system and tax regime enforcement makes tax compliance unduly burdensome and often have a distortionary effect on the development some enterprises as they are tempted to change into forms that offer a lower tax burden or no tax burden, and as such results in a tax system that imposes high expenses on the society (Central et al., 2015) A poorly executed tax system also leads to low efficiency, high collection charges, and waste of time for taxpayers. Tax compliance can either be through voluntary tax compliance or involuntary tax compliance. Voluntary tax compliance

Involves obeying the tax laws without any state enforcement actions that leads to maximizing revenues because administration costs are low in both the economic and psychic sense. The government wastes little money and time in collecting the tax and tax payers suffer little alienation in parting with their money(Clifford Machogu & Jairus Amayi, 2013).

According to the neo classical economic view, people obey tax laws when it is in their interest to do so. Compliance results from the individual's rational choice aimed at maximizing individual outcome. Compliance builds an atmosphere of trust and corporation because a person feels that others are accounting in a reciprocal manner(Hasseldine *et al.*, 2007).

Assessment of April 2019 recommended RRA to always include all compliance activities in the annual compliance improvement plan. It is in this regard that in this fiscal year, the Compliance Improvement plan is including the general compliance interventions which will focus on the four core areas of tax compliance obligations, namely registration, filling, payment and accurate reporting. Data for the year 2018, were analyzed to identify the instances of non-compliance and identify most non-compliant sectors in all core areas of tax compliance, all taxpayer segments and all tax heads. Compliance in the context of tax administrations refers to the extent to which taxpayers and traders, along with intermediaries like practitioners and clearing agents fulfil their tax obligations. Compliance with tax laws in Rwanda typically means registering when required (businesses), filing returns on time, reporting complete and accurate information to determine tax liability, and paying all amounts owing when due (Steenbergen, 2017). Non-compliance occurs when any of these obligations are not met, for whatever reason. What does then tax compliance require? The tax legislation is comprehensive and complex, but from an overall point of view, the obligations of the taxpayers can be boiled down to the following four requirements. 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 (Improvement, 2020). 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 taxpayers have to pay taxes and duties at the specified time without RRA notice or request(Improvement, 2020).

## RESEARCH METHODOLOGY

### a) Research design

The research design is a master plan specifying the methods and procedures for collection and analyzing the needed information (Radhakrishnan, 2020). On this study a descriptive research design was used for the purpose of to establish and analyze the possible relationship subsisting between electronic billing machine invoicing and tax compliance. Also the study was use descriptive research design basing on both qualitative and quantitative approach. This is because quantitative research for data analysis procedure and summarizing large amounts of data such as graphs, table and or statistics that generate or uses numerical data. The quantitative method was used for to investigate the effects of Electronic billing machine invoicing on tax compliance in Rwanda while the qualitative data collection method on the other hand was investigate the extent to which the Electronic Billing Machine invoicing tax compliance in Rwanda.

### b) Population of the study and Sample size

In this research, the study population was all the of taxpayers of Muhoza sector which are 8,987 taxpayers in Musanze district with a target population of 669 who are using Electronic Billing Machine. From the target population of 669 taxpayers the sample selected using Yamane formula

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

Where: n= the sample size

N= the sample frame

E= the margin of error usually 10% or 5%. The research used 10% as level of significance

$$n = \frac{669}{1 + 669(0.1)^2} = 99.98 \approx 100$$

### c) Sampling techniques

The sampling technique is the process of taking a subject that is representative of the entire population. The sample must have sufficient size to warrant statistical analysis. The researcher prefers simple random technique. This technique was giving every element of target population equal chance to be selected.

#### d) Methods of data collection

To get this information the researcher went on field and collect raw data from the taxpayers of Musanze district. In this study, questionnaire was used to collect primary data. The primary data was based on the research objectives of the study. Secondary data is the data that is already in existence and found in published reports, books and internet (Saunders et al., 2007) and may be used by researcher for their studies. In this research, the secondary data was collected from reviewing existing from reports at RRA Musanze Branch

#### Data analysis

The research method is a set of propositions or rules bearing on how an economic reality is handled, on the way the pollster must proceed in order to build a theory aimed at explaining such or another aspect of the society. Data from different institutions was analyzed by using descriptive statistics and correlation analysis the Microsoft excels was considered. Finally, by obtaining the results in order to verify and test the research hypotheses, data was analyzed by using SPSS (Statistical package for social science) and State which was collected in the concerned institution.

#### a) The perception of taxpayers on adoption of electronic billing machine in Musanze district

The study sought to find out the appreciation of respondents on perception of Electronic billing machine invoicing in Musanze district. The data was analyzed by using mean score and standard deviation could be calculated to determine the importance of those variables.

Statement	Overall mean	Standard deviation
Accuracy in reporting	4.46	0.72
Simple and faster to use	4.45	0.74
Timely reporting	4.51	0.65
Security concerns services	4.5	0.63
Check statement	4.52	0.55
Payment process service	4.53	0.57

The overall view of respondents on accuracy in reporting was rated with very high mean score of 4.46 which implies a strong evidence of the existence of the fact and standard deviation 0.72 great than 0.5 which implies that respondents have heterogeneity perception on the use of Electronic billing machine on invoicing on accuracy in reporting. This was agreed by RRA,(2015)Electronic Billing Machines (EBMs) enable revenue authorities to monitor formal business transactions and thus offer the potential to improve VAT compliance. The EBMs are the powerful way to ensure small and medium enterprises accurately report on VAT liabilities, which may significantly improve domestic revenue mobilization in countries with high VAT non-compliance.

The overall view of respondents on EBM is simple and faster to use was rated with very high mean score of 4.45which implies a strong evidence of the existence of the fact and standard deviation 0.74 great than 0.5 which implies that [respondents have heterogeneity perception that it faster and easy to use EBM. Mpatswe,(2018)has supported the results of the study as he said that using Electronic Billing Machines is more advantageous than papers uses for declaration of VAT as it is faster and ease to use.

The overall view of respondents on security concern services was rated with very high mean score of 4.5which implies a strong evidence of the existence of the fact and standard deviation 0.63 great than 0.5 which implies that [respondents have heterogeneity perception that EBM helps in timely reporting. The result concur with Moore & Benbasatr, (2018), RRA successfully managed to save the taxpayer's time and the time of their officials with the adoption of EBM, hence a success. Electronic Billing Machines (EBMs) represent a potentially important tax administration initiative, aimed at improving VAT compliance by transmitting transaction records directly to the Rwanda Revenue Authority in real time. The use of Electronic Billing Machines ensures timely reporting.

The overall view of respondents on security concern service was rated with very high mean score of 4.46 which implies a strong evidence of the existence of the fact and standard deviation 0.72 great than 0.5 which implies that respondents have heterogeneity perception on the use of Electronic billing machine on invoicing on security concern services.

And this was agreed by RRA,( 2015) when you submit your taxes electronically, you trust your financial data to the security of your internet connection, or the network of the taxpayer. While most networks are secure, a hacker could intercept or retrieve ones' sensitive financial data and wreak havoc.

The overall view of check statement easily was rated with very high mean score of 4.52which implies a strong evidence of the existence of the fact and standard deviation 0.55 which implies that respondents have heterogeneity perception on the check statement easily. Also was confirmed by Steenbergen,( 2017) agreed that check for errors, fees

and any interest earned. EBM have used as a tool helped cut down time spent screening books of accounts and Auditors used to spend hours investigating and going over massive documentation, but with the EBM, audits are easily conducted and by using of Electronic Billing Machines RRA is now able to catch tax evaders with less effort.

The overall view of payment process service was rated with very high mean score of 4.52 which implies a strong evidence of the existence of the fact and standard deviation 0.55 which implies that respondents have heterogeneity perception on payment process service. The result supported by Apanasevic(2018), Electronic Billing Machine allows the process of payment service quicker by making sure that transactions are carried out enhance customer experience and improve business reputation. It focused on providers assist merchants and customers in carrying out a smooth transaction.

#### b) Perception of taxpayers on tax compliance in Musanze district

The study sought to find out the appreciation of respondents on their tax compliance in Musanze district. The data was analyzed by using mean score and standard deviation could be calculated to determine the importance of those variables.

Statement	Overall mean	Standard deviation
Reporting compliance	4.55	0.49
Filling or declaration compliance	3.81	0.65
Payment compliance	4.07	0.56

The overall view of respondents on the reporting compliance was rated with a high score 4.55 which implies with a strong standard deviation equal to 0.49 which implies that respondents have the same view regarding to the level of reporting compliance. This findings is consistent with RRA(2017), said that the aim of RRA in introducing EBM is to increase the registration of all taxpayers in the national database and the issuing of a national PIN for everybody. If the political will exists that all taxpayers or even all citizens should be registered under national PINs, incentives have to be created to encourage people to register with the national tax authorities. Compliance reporting is important for businesses that regularly deal with the collection and storage of people's personal and sensitive data. With regulatory requirements constantly changing, industry experts advise that compliance be integrated into business strategy and processes (Torgler, 2003).

The overall view of respondents on filling or declaration compliance was rated with a high score 3.81 which implies with a strong standard deviation equal to 0.65 which implies that respondents have the same view regarding to the level of filling or declaration compliance. Filing compliance is important because you will need to be in filing compliance before the IRS will work with you on payment arrangements if you owe the IRS(Dunnage, 2016).

The overall view of respondents on payment compliance was rated with a high score 4.07 which implies with a strong standard deviation equal to 0.56 which implies that respondents have the same view regarding to the level of payment compliance. Tax compliance should be declared and paid on time Improvement(2020).

#### Level of Value Added Tax revenue collected in Rwanda 2010 to 2020

Year	Value Added Tax (VAT) Customs.	Value Added Tax (VAT) domestic	Value Added Tax
2009/2010	51,707,134,697	75,764,721,249	127,471,855,946
2010 /2011	52,384,905,286	88,054,963,358	140,439,868,645
2011/2012	68,826,393,269	103,161,599,587	171,987,992,856
2012/2013	75,831,203,879	123,840,079,770	199,671,283,649
2013/2014	90,556,791,257	168,571,916,681	259,128,707,938
2014/2015	99,770,691,105	186,478,364,809	286,249,055,914
2015/2016	109,094,059,797	214,119,371,932	323,213,431,729
2016/2017	123,629,696,999	228,351,723,426	351,981,420,425
2017/2018	130,797,266,785	274,893,118,758	405,690,385,543
2018 /2019	150,848,722,758	307,866,544,912	458,715,267,670
2019/2020	149,618,589,614	341,915,583,171	491,534,172,786
2020/2021	163,811,964,801	367,617,379,678	531,429,344,479

Source; secondary data 2020 from RRA report

This table shows the collection of Value Added Tax before and after the adoption of EBM, the results fund after the analysis was shows that there is big difference between the value added tax collected before and after the adoption of EBM. From 2010up to 2013, the total value added tax of those years was 639,571,001,096 Rwf while from 2014 up to



202220 after the adoption of EBM the total value added tax collected was 2,848,813,078,546 Rwf, these total value added tax collected shows that there is higher difference between the value added tax collected before the adoption of EBM and the total value added tax collected after the adoption of EBM.

**c) Relationship between Electronic billing machine invoicing and tax compliance in Musanze district taxpayers**

Correlation coefficients are used in statistics to measure the strength and the direction of a linear relationship between two variables. The linear correlation coefficient in honor of its developer. Therefore, if the correlation value is positive the relationship between variables is said to be positive and vice-versa. After that the following task is to confirm whether the correlation is statistically significant or not. To this, two famous p-alphas (0.01 and 0.05) are used where calculated or tabulated p-value is compared to them. If the tabulated p-value is below to one among of them the relationship is said to be statistically significant and if it above the relationship is said to be not statistically significant and if it above the relationship is said to be not statistically significant. The results were presented and summarized in the table below.

**Table 16: correlation between electronic billing machine invoicing and value added tax compliance**

		Value added Tax compliance	Electronic Billing Machine invoicing
Value added tax compliance	Pearson Correlation	1.00	.731*
	Sig. (2-tailed)		.014
	N	100	100
Electronic billing machine invoicing	Pearson Correlation	.731*	1.00
	Sig. (2-tailed)	.014	
	N	100	100

From the table above findings show that there is high positive relationship between electronic billing machine invoicing and value added tax compliance in Musanze district taxpayers evidenced by a correlation coefficient between two variables of ( $r=0.731^*$ ,  $P\text{-value}=0.014<0.05$ ). This value indicates that correlation is significant at 0.05 level (2tailed). This implies that electronic billing machine invoicing may be the one of the factors that leads to improvement of tax compliance in Musanze district taxpayers. Based on decision rule stating that if the p-value is less than or equal 0.05 we say that the test statistic is significant at 5% and the probability of observing a result extreme as that observed solely due to chance, then the relationship between the independent and dependent variables is considered statistically significant. The p-value allows to rejecting the null hypothesis (There is no statistically significant relationship between use of Electronic Billing Machine in invoicing and tax compliance in Musanze district). This implies that improved electronic billing machine invoicing have great effect on the level of value added tax compliance particularly in Musanze district taxpayers. Nada conducted a research regarding the incidence and impact of EBM has a statistically and economically significant impact on VAT payments, raising these by average of 6.5 percent.

**Table 17: ANOVA**

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	.459	5	.459	10.214	.002 <sup>b</sup>
Residual	31.901	82	.326		
Total	32.360	87			

- Predictors: (Constant), Accuracy in reporting, simple and faster to use, timely reporting, security concern services, check statement and payment process service.
- Dependent Variable: value added tax compliance

The overall regression results as shown in the ANOVA table 22 indicates that the regression model is significant (F ratio= 10.214, probability level 0. 002a). This indicates that Accuracy in reporting, simple and faster to use, timely reporting, security concern services, check statement and payment process service depend on VAT compliance in Musanze district taxpayers.

Table 22 presents the results of Analysis of Variance (ANOVA) on usage of Electronic billing machine invoicing and VAT compliance. The ANOVA results for regression coefficient indicate that the significance of the F is 0.002 which is less than 0.05. This implies that there is a positive significant relationship between the adoption of EBM and VAT compliance and that the model is a good fit for the data.

The ANOVA test in Table 22 indicates that the significance of the P value 0.002 is less than 0.05, implying that null hypothesis is rejected, and alternative hypothesis accepted. It is concluded that there is statistically significant relationship between use of Electronic Billing Machine invoicing and tax compliance in Musanze district taxpayers.

**Table 18: coefficient**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	2.139	0.994		2.151	0.035
Accuracy in reporting	0.318	0.94	0.141	2.275	0.031
Simple and faster to use	0.342	0.113	0.353	3.032	0.003
Timely reporting	0.197	0.123	0.089	2.79	0.032
Security concerns services	0.244	0.101	0.052	2.435	0.045
Check statement easily	0.34	0.105	0.041	3.375	0
Payment process services	0.251	0.109	0.051	2.475	0.030

a. Dependent Variable: value added tax compliance

The Equation ( $Y = \beta_0 + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \beta_4x_4 + \beta_5x_5 + \beta_6x_6 + \epsilon$ )

$$Y = 2.139 + 0.320X_1 + 0.342X_2 + 0.197X_3 + 0.244X_4 + 0.340X_5 + 0.251X_6$$

The regression equation above has established that taking all factors into account (accuracy in reporting, simple and faster to use, timely reporting, security concern services, check statement easily, payment process services) constant at VAT compliance. The regression results that accuracy in reporting have significance influence in Value Added Tax compliance as indicated by  $\beta_1 = 0.318$ ,  $p = 0.031 < 0.05$ ,  $t = 2.275$ . The implication is that an increase one unit in accuracy in reporting would lead to an increase in Value Added Tax compliance by 0.318 units.

The regression results that simple and faster to use have significance influence in Value Added Tax compliance as indicated by  $\beta_2 = 0.342$ ,  $p = 0.003 < 0.18$ ,  $t = 3.032$ . The implication is that an increase one unit in simple and faster to use would lead to an increase in Value Added Tax compliance by 0.342 units.

The regression results that timely reporting have significance influence in Value Added Tax compliance as indicated by  $\beta_3 = 0.197$ ,  $p = 0.032 < 0.05$ ,  $t = 2.790$ . The implication is that an increase one unit in timely reporting would lead to an increase in Value Added Tax compliance by 0.197 units.

The regression results that security concerns services have significance influence in Value Added Tax compliance as indicated by  $\beta_4 = 0.244$ ,  $p = 0.045 < 0.05$ ,  $t = 2.435$ . The implication is that an increase one unit in security concern services would lead to an increase in Value Added Tax compliance by 0.244 units.

The regression results that check statement easily have significance influence in Value Added Tax compliance as indicated by  $\beta_5 = 0.340$ ,  $p = 0.000 < 0.05$ ,  $t = 3.375$ . The implication is that an increase one unit in check statement easily would lead to an increase in Value Added Tax compliance by 0.340 units.

The regression results that payment process services have significance influence in Value Added Tax compliance as indicated by  $\beta_6 = 0.251$ ,  $p = 0.030 < 0.05$ ,  $t = 2.475$ . The implication is that an increase one unit in accuracy in reporting would lead to an increase in Value Added Tax compliance by 0.251 units. The findings are in same line with Okello (2014) who said that the EBMs provides the means of increasing improvements on value added tax compliance.

## CONCLUSION AND RECOMMENDATIONS

### a) Conclusion

Regarding to the results obtained by analyzing the perception and use of electronic billing machine invoicing among Musanze district taxpayers. The research confirmed that respondents have heterogeneity perception on the use of electronic billing machine invoicing among Musanze district taxpayers this was rated with high mean score of 4.49 which implies a strong evidence of the existence of the fact and standard deviation of 0.64. Regarding the results obtained by analyzing the level of value added tax compliance in Musanze district (2015-2020). The overall view of respondents on the payment compliance was rated with a high score 4.07 which implies with a strong standard deviation equal to 0.56 which implies that respondents have the same view regarding to the level of payment compliance and the level of value added compliance is very considerable. On analyzing the relationship between electronic billing machine on invoicing and value added compliance the result found that there is significant relationship between use of Electronic Billing Machine on invoicing and value added tax compliance in Musanze district taxpayers and general in Rwanda.

## b) Recommendations

RRA should provide EBM should to different business enterprises across the country for easy accessible by customers, so that quick service and convenience is maintained hence improving tax compliance. At the same time constantly serviced should be ensured in order to provide reliability of the services and for to reduce erasure information on the hand written invoice.

Taxpayers must avoid the reporting of small amounts of money that are less than the amount paid by their customers.

To facilitate taxpayers in their e-taxation activities, the Rwanda revenue authority management should provide enough training on how to use electronic billing machine for effective tax compliance, particularly to those with low education level because they present a big number of taxpayers in business of goods.

Otherwise I encouraged Rwanda Revenue Authority especially Musanze branch and taxpayers for care, hard work and good services offered to the peoples.

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**CITE AS**

Marie G. UMUHOZA, Francois X. NIYIBIZI, & B. BIZIMANA. (2022). Assessing the Effect of Electronic Billing Machine Invoicing On Value Added Tax Compliance in Rwanda (2015-2020). A Case of Musanze District Taxpayers. *Global Journal of Research in Business Management*, 2(6), 228–239. <https://doi.org/10.5281/zenodo.7396561>