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Impact of Electronic Billing Machine (EBM) on Vat Compliance among Small and Medium Sized -Enterprises in Rwanda

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Abstract- This study aimed at assessing the impact of Electronic billing machine on VAT compliance on Small and Medium -Size Enterprises in Rwanda. The main challenge in the administration of Value Added Tax (VAT) in many countries, has mainly been tax evasion by non-issuance of tax invoices especially by small to medium taxpayers. Electronic Billing Machines (EBMs) enable revenue authorities to monitor formal business transactions and thus offer the potential to improve VAT compliance, however, because firms can choose not to issue receipts or issue false receipts, EBMs have limited benefits to VAT collections.

Descriptive method was used to collect data, data gathered was analyzed, interpreted and presented. A sample size of 159 people grouped into Medium taxpayers, Small taxpayers and staff of RRA Musanzestation was randomly selected from a population of 709 VAT registered taxpayers located in Tax centre of Musanze. Primary and secondary data was used in this research.

Given the findings of this study, there is positive relationship between the adoption of mandatory usage of EBMs and VAT compliance indicators with a correlation coefficient of 0.586.

Keywords: *electronic billing machine (EBM), vat compliance, small and medium size enterprises.*

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Strictly as per the compliance and regulations of:

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Given the findings of this study, there is positive relationship between the adoption of mandatory usage of EBMs and VAT compliance indicators with a correlation coefficient of 0.586.It was established that after the adoption of EBMs, late filing and non-filing rate of VAT has reduced by 14% and 20% respectively, timely payment of VAT liabilities has increased by 20%, reporting of sales has increased by 737 %, VAT collections were increased by 732 % and voluntary VAT registration has increased by 346 %.

To improve VAT compliance through EBMs. RRA is recommended to come up with plan integrating EBMs within broader tax compliance frameworks that create the environment which will best ensure taxpayers' voluntarily compliance.

Keywords: electronic billing machine (EBM), vat compliance, small and medium size enterprises.

I. Introduction

Generally, the rationale for imposing taxes in any country is derived from the government responsibilities of providing social and economic goods and services such as public goods, redistribution of income and wealth, social and economic welfare, and economic stability (Herman *et al*., 2017).

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. In pursuing their mission, tax administrations face a number of challenges, including how to broaden the tax base by continually bringing non-registrants and non-filers into compliance, strengthening organization and management, controlling tax evasion, improving tax collection, and facilitating voluntary compliance. The greatest challenge for any tax administration is achieving and maintaining a high degree of voluntary compliance (Peter and Patricia, 2015).

Improving VAT compliance is one of the most critical issues for domestic revenue mobilization in developing countries for two reasons: Firstly, VAT revenues tend to dwarf all other tax revenue streams, so that even small improvements have relatively large impacts. Secondly, the data generated to observe VAT liability generates a paper-trail that strengthens a revenue authority's ability to enforce tax compliance across all domestic tax types (IGC, 2017).

Many governments around the world have recently introduced Electronic Billing Machine (EBM). These devices aim to combat non-compliance with VAT by monitoring business transactions (IGC, 2017). A good tax collection system is based on the recording of all transactions that are subject to taxation, sometimes via the use of electronic devices that would prevent eluding the State's interests and committing fiscal fraud (Bostan and Popescu, 2017).

In the context of worldwide the first to use Electronic Fiscal Device (EFD) was the Italian administration in 1983. The Greek tax agency was the next tax administration to adopt fiscal devices in 1988 (Peter and Patricia, 2015). 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 (IGC, 2017). The Table 1 presents an overview of the roll-out of EFDs for a selection of countries:

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Table 1: Overview of the roll-out of EFDs for a selection of countries

Country	Year	Type of EFD	Scope
First Generation			
Greece	1988	SDC	All VAT registered
Bulgaria	1993	SDC	All VAT registered
Moldova	1993	SDC	All VAT registered
Brazil (State level)	1994	SDC	All Sales Tax registered
Argentina	1995	SDC	All VAT registered
Romania	2000	SDC	All VAT registered
Mexico	2000	SDC	All VAT registered
Montenegro	2001	SDC	All VAT registered
Second Generation			
South Korea	2005	SDC + GPRS	All businesses
Paraguay	2008	SDC + GPRS	Sector VAT registered
Sweden	2010	SDC + GPRS	All VAT registered
Third Generation			
Chile	2003	SDC + GPRS + CIS	All VAT registered
Kenya	2005	SDC + GPRS + CIS	All VAT registered
Ethiopia	2008	SDC + GPRS + CIS	All VAT registered
Dominican Republic	2009	SDC + GPRS + CIS	All VAT registered
Tanzania	2010	SDC + GPRS + CIS	All VAT registered
Kosovo	2012	SDC + GPRS + CIS	All VAT registered
Panama	2012	SDC + GPRS + CIS	All VAT registered
Rwanda	2013	SDC + GPRS + CIS	All VAT registered
Hungary	2014	SDC + GPRS + CIS	All VAT registered
Malawi	2015	SDC + GPRS + CIS	All VAT registered

Source: Adapted from Casey and Castro, 2015.

In August 2013, Rwanda adopted a new law that stated that all businesses registered for VAT must provide customers, at each sale, a certified VAT receipt generated by a third-generation EFD: the Electronic Billing Machine, which contains a Sales Data Controller (SDC) with GPRS and a Certified Invoicing System (CIS) all working together. This must be purchased from a Rwanda Revenue Authority (RRA)-approved vendor and activated by the RRA (IGC, 2017). The findings of the study of Internal Growth Center in Rwanda showed that on average, the introduction of EBMs resulted in a VAT increase of 5.4 percent. This was relatively little, and much lower than expected by the Rwandan Revenue Authority (IGC, 2017).

Tanzania Revenue Authority (TRA) has recorded an increase in Value Added Tax (VAT) under the use of EFDs. Despite the fact that the revenue collection has increased following the introduction of the EFDs, the system is lacking support from business operators in the country-raising unsolved grievance between business operators regarding the use of EFDs. All over the country business operators have been conducting several demonstrations and/or strikes to oppose the use of FEDs. The users of these devises has been complained for the high cost of obtaining them, insecurity which leads to the lack of trust and other financial reasons (Mohammed, 2014).

The introduction of fiscal devices presents opportunities for the tax administration to rethink its approach to business processes, not only by automating the collection of information, but also by leveraging the new arrangements to improve compliance approaches and strategies. Another area affecting the use and deployment of EFDs is the constant evolution of the technology involved, both in terms of cost reduction and improved performance of the devices. The emergence of new technologies is a constant challenge to established views on fiscal devices. Several countries approached for the survey indicated that after studying the effectiveness, costs, and administrative requirements of EFDs, they had decided that other technologies, in particular e-invoicing, would be more cost-effective (Peter and Patricia, 2015).

Another key conclusion of many researchers the introduction of EFDs requires considerable effort and is accompanied by associated costs both to the administration in identifying the technology, selecting the devices, overseeing their deployment. Once the devices are chosen and available, it is essential that appropriate arrangements be put in place for their installation, support, and maintenance. Proper consideration of these factors is essential for a successful implementation. Moreover, EFDs 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, with or without EFDs .

II. Objectives

The general objective of this study is to analyze the contribution of electronic billing machine (EBM) on VAT compliance on small and medium -size enterprises in Rwanda. Specifically:

1. To determine the level of compliance activities namely tax education, frequency of audit and tax advisory visits, on VAT compliance.
2. To assess the impact of the adoption of EBM on VAT compliance.
3. To establish measures to improve the use of EBM in enhancement of VAT compliance.

III. Literature Review

Trivedi*et al.* (2005) explain the reason why taxpayers comply by two classes of theories. First, the economic based theories, which emphasize incentives. This theory suggests that taxpayer "play audit lottery". They make calculation of the economic consequences of different compliance alternatives (such as whether to or not to evade tax), the probabilities of detection and the consequences there of, and then choose the alternative for the desired level of risk. In contrast, the second class of theories assumes that psychological factors including moral and ethical concerns are also important to taxpayers and so taxpayers may comply even where the risk of audit is low. Economic theories generally call for increased audit and penalties as the solution to compliance. However, the policy prescription of psychological theories leads to emphasize on changing individuals attitude towards the tax system by increasing its perceived fairness and making it easy to comply with the tax low through such measures as superior website information, increased telephone assistance and appropriate information technology.

The impact of fines on tax compliance do not provide a clear picture on the relation between fines and tax compliance (Fischer *et al*., 1992). Keeping constant the expected value of a tax but changing audit probabilities and fines for non-compliance, it showed that compliance increased significantly with higher fines, but not with higher audit probabilities. Punitive penalties makes tax evasion more costly for the taxpayer hence leading to the reduction of tax evasion. Research studies show that more punitive fines and penalties can result in more tax avoidance (Kirchler, 2007). Deterrence is effective when there is a combination of eff ective imposition of fines and frequent audits to detect cases of noncompliance.

Mascagni *et al*., (2016) found that sending a 'reminder' by either letter, email or text message, of a firm's upcoming tax obligations all had a strong and significant effect on firms' payment of Corporate Income Tax. Applying such an approach to EBM receipt issuing could offer a powerful means to improve EBM receipt issuing compliance. Any such an intervention will require the establishment of a strong data analytics programme, which can reliably identify 'irregular' patterns of receipt issuing. On this basis, it could send out automated text messages to firms to 'remind' them of suspicious behaviour. For instance, taxpayers could be informed that the revenue authority has noticed a large drop in receipt issuing and requested to clarify if there is anything wrong with the EBM device; it could be asked for a voluntary quarterly VAT revision based on suspicious tax declarations (fake receipts) or suspicious price patterns.

In his study, Wanjiku (2011) did a study on the impact of ETRs on the duration of VAT audit in Kenya. This study findings indicate that the use of ETRs contribute significantly in reducing the VAT audit time in the studied population in Kenya (Wanjiku, 2011).The research findings suggest that the use of ETRs machines among VAT registered taxpayers in the study areas does indeed contribute in a positive and significant way to improving the compliance attitude and efficient tax administration in the study area.

Chenge (2010) conducted a study on the impact of ETR on VAT compliance among classified hotels found in the capital, Nairobi. He found out that the introduction of these machines result in the VAT compliance level through increasing the level of declared VAT liability among the studied classified hotels (Chenge, 2010).

Ikasu (2014) studied the challenges facing the implementation of using EFD in tax collection in Tanzania. The major findings of the study were; it had been indicated that EFD system had a lot of challenges which hinder the implementation of using the machine though the system enhanced tax collection in business premises in Tanzania. Those challenges include regular break down, fairness of tax estimated from tax payers, lack of education on the use of EFDs machines, maintenance of machines and under pricing of tax from traders.

Current trends in tax administration modernization suggest there may be more effective ways to achieve voluntary compliance, particularly through the adoption of compliance improvement models. It is clear that technology in and of itself will not change behavior. The implementation of EFDs 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 EFDs 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. Studies showed that, when these arrangements were not in place or were incomplete, the implementation of EFDs faced considerable problems. Proper consideration of these factors is essential for a successful implementation. Moreover EFDs 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, with or without EFDs (Peter and Patricia, 2015).

IV. Methodology

This section describes the methodology that was used in the study.

a) Research design

This study adopted a descriptive survey. Descriptive survey research design is a scientific method which involved observing and describing the behavior of a subject without influencing it in any way (Cooper & Schindler, 2008). It employed both quantitative and qualitative approaches. The study engaged a descriptive, cross sectional and correlational research designs. It engaged correlation design to establish the relationship between electronic billing machine (EBM) and VAT compliance on small and medium -size enterprises in Rwanda.

b) Population and sampling techniques

The population in this study will limit to 709 who are taxpayers and staffs of RRA Musanze tax station, Musanze Branch irrespective of structure, age, sex and any other conditions. The target population was taxpayers of RRA Musanze station.

In this research, the sample has been calculated by using the formula of Slovin, with confidence level of 93% and a permissible error of 7%. The sample size for this study has been determined using the formula of (Slovin, 1960). The formula is used to calculate the sample size (n) given the population size (N) and a margin of $\mathrm{n} = \frac{\mathrm{N}}{(1+\mathrm{N}e^2)}$.

Error (e). It is computed as:

In this research N= 709 taking the confidence level of 93% that is with a permissible error of 7%, e=0.07. Therefore, the sample size was calculated as the following;

$$n = \frac{N}{(1+Ne^2)} = \frac{709}{1+(709*0.07^2)} = 158.6 \cong 159 \ respondents$$

The size of the corrected sample was equal to 159 respondents to present 709 entire population, are VAT traders register and RRA Musanze staff.

➢ Sampling frame

The sampling frame is any material or device used to obtain observational access to the finite population of interest. It must be possible with the aid of the frame to identify and establish contact with selected elements either by telephone, visit, questionnaire, etc. (Kakooza, 1996). The sampling frame is comprehensive list of all the sampling units from which a sample can be selected.

Table 2: Number of taxpayers according to their categories

Group	Total taxpayers	Sample
Small taxpayers	688	154
Medium taxpayers	21	5
Total	709	159

Source: Primary data, 2018

The table 2 shows the number of taxpayers according to their categories, 245 are small taxpayers, 281 medium taxpayers and 183 large taxpayers. Then for every categories there are some persons means sample which was taken to represent every categories, for small taxpayers is 55, 63 for medium taxpayers and 41 for large taxpayers.

c) Research Instruments

In this research two main sources of information will be used; these are primary and secondary data.

➢ Questionnaires

For this study, both open and closed ended questions were used and addressed to respondents.

The questionnaire has been addressed to a sample of taxpayers registered in VAT Musanze station where a member responded the question pre-prepared.

➢ Interview

In this study, semi structured interview was used to the staff of RRA Musanze station that they have freely expressed their views and objectively.

➢ Documentation

Documentary technique has enabled the researcher to collect data from different sources of secondary data: RRA reports, thesis of the other researcher related to our study.

d) Validity and reliability

Validity helped to ensure that the questionnaires represented the content, they were appropriate for the sample and that the questionnaires were comprehensive enough to collect all the information needed to address the purpose and goals of the study. Test-re-test method was used. During the study, a randomly selected sample of proprietors of RRA"s was given questionnaires to fill.

e) Ethical Considerations

This research endeavored to obtain an informed consent from the respondents before undertaking to collect data from the field. Objectives of the research were explained and made known to the respondents so as to solicit their informed consent. High level of confidentiality on the information provided by respondents through interview or questionnaires was maintained.

V. Results Discussion

The following tables shows the results obtained through the survey conducted on tax payers Musanze station.

a) Impact of mandatory usage of EBM on VAT compliance

This part is composed of results obtained on mandatory usage of EBM on VAT compliance indicators namely timely filing of VAT returns, timely payment of VAT liabilities, accurate reporting in VAT declaration and voluntary VAT registration .

Table 3: Impact of EBM on timely filing of VAT declaration after the adoption of EBM

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	119	74.8	74.8	74.8
	Agree	29	18.2	18.2	93.1
	strongly disagree	6	3.8	3.8	96.9
	Disagree	5	3.1	3.1	100.0
	Total	159	100.0	100.0	

Source: Primary data, 2019

According to the results in table above, which shows the impact of EBM on timely filing of VAT declaration after the adoption of EBM, 74.8% of all respondents strongly agree with the positive impact of EBM on timely filing of VAT after the adoption of EBM, 18.2% agree and other 3.8% strongly disagree and that means 3.1% of all respondents disagree with the positive impact of EBM on timely filing of VAT declaration after the adoption of EBM. There is positive impact of EBM on timely filing of VAT declaration after the adoption of EBM.

Table 4: Impact of EBM on timely payment of VAT liabilities after the adoption of EBM

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	126	79.2	79.2	79.2
	Agree	21	13.2	13.2	92.5
	Strongly disagree	3	1.9	1.9	94.3
	Disagree	9	5.7	5.7	100.0
	Total	159	100.0	100.0	

Source: Primary data, 2019

According to the results in table above, which shows the impact of EBM on timely payment of VAT declaration after the adoption of EBM, 79.2% of all respondents strongly agree with the positive impact of EBM on timely payment of VAT liabilities after the adoption of EBM, 13.2% agree and other 1.9% strongly disagree the last one means 5.7% of all respondents disagree with the positive impact of EBM on timely payment of VAT liabilities after the adoption of EBM. Means that the adoptions of EBM have a strong positive impact on VAT liabilities.

Table 5: Impact of EBM on reporting of VAT salesafter the adoption of EBM

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	127	79.9	79.9	79.9
	Agree	16	10.1	10.1	89.9
	Strongly disagree	8	5.0	5.0	95.0
	Disagree	8	5.0	5.0	100.0
	Total	159	100.0	100.0	

Source: Primary data, 2019

Through the results obtained in the table, 79.9% of all respondents strongly agree that there is a positive impact of EBM on reporting of VAT sales after the adoption of EBM, 10.1% agree, 5.0% strongly disagree and other 5.0% of all respondents disagree. These results explain that there positive impact of EBM on reporting VAT sales after the adoption of EBM.

Table 6: Iimpact of EBM on VAT collected by RRA after the adoption of EBM

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	108	67.9	67.9	67.9
	Agree	46	28.9	28.9	96.9
	Strongly disagree	3	1.9	1.9	98.7
	Disagree	2	1.3	1.3	100.0
	Total	159	100.0	100.0	

Source: Primary data, 2019

Table 10 shows that 67.9% of all respondents strongly agree with positive impact of E BM on VAT paid after the adoption of EBM, 28.9% Agree with that, 1.9% strongly disagree and only 1.3% disagree with the positive impact of EBM on VAT paid after the adoption of EBM. This result confirmed that there is positive impact of EMB on VAT paid after the adoption of EBM.

Table 7: Impact of EBM on voluntary VAT registration after the adoption of EBM

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	111	69.8	69.8	69.8
	Agree	16	10.1	10.1	79.9
	Strongly disagree	24	15.1	15.1	95.0
	Disagree	8	5.0	5.0	100.0
	Total	159	100.0	100.0	

Source: Primary data, 2019

Table 11 shows the impact of EBM on voluntary VAT registration after the adoption of EBM; 69.8% of all respondents strongly agree with the positive impact of EBM on voluntary VAT registration after the adoption of EBM, 10.1% agree, 15.1% strongly disagree and 5% disagree with the positive impact of EBM on VAT registration after the adoption of EBM. This result confirmed that there is strongly relationship between impact of EBM on VAT registration before and after the adoption of EBM.

b) The impact other compliance activities conducted by RRA on VAT compliance

The part below shows the impact of other compliance activities conducted by RRA on VAT compliance indicators namely audit, Tax education and Tax advisory visits. The results have obtained through to the survey conducted by researcher on the taxpayers of Musanze station.

- Tax audits

Some studies claimed that audits have a positive impact on tax evasions (Dubin, 2004). These findings suggest that in self-assessment systems, tax audits can play an indispensable role and their essential role is to increase voluntary compliance. Frequencies and meticulousness of audits could encourage taxpayers to be more prudent in completing their tax returns, reporting all income and claiming the correct deductions to ascertain their tax liability. In contrast,

taxpayers who have never been audited might be tempted to under report their actual income and claim false deductions.

Table 8: Impact of audit on accurate reporting of information in VAT declaration

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	95	59.7	59.7	59.7
	Agree	16	10.1	10.1	69.8
	Strongly disagree	32	20.1	20.1	89.9
	Disagree	16	10.1	10.1	100.0
	Total	159	100.0	100.0	

Source: Primary data, 2019

Table 12 shows the impact of audit on accurate reporting of information in VAT declaration, 59.7% strongly agree with the positive impact of audit on accurate reporting in VAT declaration, 10.1% agree, 20.1% strongly disagree and 10.1% of all respondents disagree with the positive impact of audit on accurate reporting of information in VAT declaration.

Table 9: Impact of audit on timely payment of VAT liabilities

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	8	5.0	5.0	5.0
	Agree	16	10.1	10.1	15.1
	Strongly disagree	127	79.9	79.9	95.0
	Disagree	8	5.0	5.0	100.0
	Total	159	100.0	100.0	

Source: Primary data, 2018

Table 13 shows the impact of audit on timely payment of VAT liabilities, 79.9% of all respondents strongly disagree with the impact of audit on timely payment of VAT liabilities, 10.1% agree, and 5.0% of all respondents strongly agree and other means 5.0% of all respondents disagree. These results confirmed that there is no relationship between the impact of audit on timely payment of VAT liabilities.

Table 10: Impact of audits on timely of filing of VAT declaration

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	16	10.1	10.1	10.1
	Agree	8	5.0	5.0	15.1
	Strongly disagree	127	79.9	79.9	95.0
	Disagree	8	5.0	5.0	100.0
	Total	159	100.0	100.0	

Source: Primary data, 2018

Table 14 shows the impact of audit on timely filing of VAT declaration, 79.9% of all respondents strongly disagree with the impact of audit on timely filing of VAT declaration, 10.1% strongly agree, 5% of all respondents agree and 5% disagree. These results confirmed that there is no relationship between the impact of audit and on timely filing of VAT declaration.

Table 11: Impact of audit on voluntary VAT registration

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	5	3.1	3.1	3.1
	Agree	11	6.9	6.9	10.1
	Strongly disagree	127	79.9	79.9	89.9
	Disagree	16	10.1	10.1	100.0
	Total	159	100.0	100.0	

Source: Primary data, 2018

The table 15 shows, the impact of audit on voluntary VAT registration, then 3.1% strongly agree with the impact of audit on voluntary VAT registration, 6.9% agree, 79.9% strongly disagree and 10.1% disagree on the impact of audit on voluntary VAT registration . These results explain clearly that there is no relationship between the impact of audit and voluntary VAT registration.

i. *Education*

Previous literature supports the direct, positive relationship between educational level and taxpayer compliance (Jackson and Miliron, 1986). Chan *et al.* (2000), also postulate that education level is directly linked to a likelihood of compliance. Educated taxpayers may be aware of noncompliance opportunities, but their potentially better understanding of the tax system and higher level of moral development promote a more favourable taxpayer attitude and greater compliance. The influence of tax knowledge on compliance behaviour has been described in various researches. The level of education received by taxpayers is an important factor that contributes to the understanding about taxation especially regarding the laws and regulations of taxation (Eriksen and Fallan, 1996).

Table 12: Impact of tax education on accurate reporting of information in VAT declaration

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	95	59.7	59.7	59.7
	Agree	32	20.1	20.1	79.9
	Strongly disagree	11	6.9	6.9	86.8
	Disagree	21	13.2	13.2	100.0
	Total	159	100.0	100.0	

Source: Primary data, 2018

The table 16 shows that 59.7% of all respondents strongly agree on the positive impact of tax education on accurate reporting of information in VAT declaration, 20.1% agree, 6.9% strongly disagree and 13.2% of all respondents disagree on the positive impact of tax education on accurate reporting of information in VAT declaration. The results obtained confirmed that there is positive relationship between the impacts of tax education on accurate reporting of information in VAT declaration.

Table 13: Impact of tax education on timely payment of VAT liabilities

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	92	57.9	57.9	57.9
	Agree	35	22.0	22.0	79.9
	Strongly disagree	10	6.3	6.3	86.2
	Disagree	22	13.8	13.8	100.0
	Total	159	100.0	100.0	

Source: Primary data, 2018

Table 17 shows the results of respondents on the positive impact of tax education on timely payment of VAT liabilities, 57.9% strongly agree, 22% agree, 6.3% strongly disagree and 13.8% of all respondents disagree on the positive impact of tax education on timely payment of VAT declaration.

Table 14: Impact of tax education on timely of filing of VAT declaration

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	87	54.7	54.7	54.7
	Agree	41	25.8	25.8	80.5
	Strongly disagree	6	3.8	3.8	84.3
	Disagree	25	15.7	15.7	100.0
	Total	159	100.0	100.0	

Source: Primary data, 2018

Table 18 shows that 54.7% of all respondents strongly agree with the positive impact of tax education on timely of filing of VAT declaration, 25.8% agree, 3.8% strongly disagree and 15.7% of all respondents disagree on the positive impact of audit tax education on timely filing of VAT declaration. These results mean that there is strong positive relationship between tax education and timely of filing of VAT declaration.

Table15: Impact of tax education on voluntary VAT registration

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	108	67.9	67.9	67.9
	Agree	32	20.1	20.1	88.1
	Strongly disagree	6	3.8	3.8	91.8
	Disagree	13	8.2	8.2	100.0
	Total	159	100.0	100.0	

Source: Primary data, 2018

According to the results in the table 19, 67.9% of all respondents strongly agree with the positive impact of tax education on voluntary VAT registration, 20.1% agree, 3.8% strongly disagree and 8.2% of all respondents disagree with the positive impact of tax education on voluntary VAT registration. This means that there is positive impact of tax education on VAT registration.

ii. *Role (efficiency) of the tax authority/government*

For many aspects of tax compliance, there is a debate in literature as to how the effective operation of the tax system by the tax authorities influences taxpayers' compliance behaviour. The role of the tax authority in minimizing the tax gap and increasing voluntary compliance is clearly very important. Hasseldine and Li (1999) illustrated tax compliance is placing the government and the tax authority as the main party that need to be continuously efficient in administering the tax system in order to curtail tax evasion. Besides, the study of Richardson (2008) also suggested that the role of a government has a significant positive impact on determining attitudes toward tax.

Table 16: Impact of tax advisory visits on accurate reporting of information in VAT declaration

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	100	62.9	62.9	62.9
	Agree	37	23.3	23.3	86.2
	Strongly disagree	6	3.8	3.8	89.9
	Disagree	16	10.1	10.1	100.0
	Total	159	100.0	100.0	

Source: Primary data, 2017

For the table which shows the results on the impact of tax advisory visits on accurate reporting of information in VAT declaration, 62.9% of all respondents strongly agree, 23.3% agree, 3.8% strongly disagree and 10.1% of all respondents were agree. This results shows that there is positive impact of tax advisory visits on accurate reporting of information in VAT declaration.

Table 17: Impact of tax advisory visits on timely payment of VAT liabilities

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	37	23.3	23.3	23.3
	Agree	39	24.5	24.5	47.8
	Strongly disagree	16	10.1	10.1	57.9
	Disagree	67	42.1	42.1	100.0
	Total	159	100.0	100.0	

Source: Primary data, 2018

According to the results in the table 21, 23.3% of all respondents strongly agree with the impact of tax advisory visits on timely payment of VAT declaration, 24.5% were agree, 10.1% strongly disagree and 42.1% of all respondents disagree with the impact of tax advisory visits on timely payment of VAT liabilities. This means that there is no impact of tax advisory visits on timely payment of VAT declaration.

Table 20: Impact of tax advisory visits on timely of filing of VAT declaration

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	32	20.1	20.1	20.1
	Agree	40	25.2	25.2	45.3
	Strongly disagree	24	15.1	15.1	60.4
	Disagree	63	39.6	39.6	100.0
	Total	159	100.0	100.0	

Source: Primary data, 2018

For the table 22 which shows the results on the impact of audit tax advisory visits on timely of filling of VAT declaration, 20.1% of all respondents strongly agree, 25.2% agree, 15.1% strongly disagree and 39.6% of all respondents disagree with the impact of audit tax advisory of filing of VAT declaration. This means that there is no impact of audit tax advisory visits on timely of filing of VAT declaration.

Table 21: Impact of tax advisory visits on voluntaryVAT registration

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	100	62.9	62.9	62.9
	Agree	37	23.3	23.3	86.2
	Strongly disagree	6	3.8	3.8	89.9
	Disagree	16	10.1	10.1	100.0
	Total	159	100.0	100.0	

Source: Primary data, 2018

The table 23 shows the impact of tax advisory on voluntary VAT registration, 62.9% of all respondents strongly agree with the positive impact of tax advisory visits on voluntary VAT registration, 23.3% agree, 3.8% strongly disagree and 10.1% of respondents disagree with the positive impact of tax advisory visits on voluntary VAT registration. These results explain that there is positive relationship between tax advisory visits and voluntary VAT registration.

c) *Statistics of RRA Musanze station in relation to objectives of the study*

The part below is composed of statistics of RRA Musanze station on number of voluntary VAT registration before and after the adoption of EBM, sales declared and VAT collected before and after the adoption of EBM, filing and payment rates of VAT declaration before and after the adoption of EBM .

Table 22: Number of voluntary VAT registration before and after the adoption of EBM

N°	YEAR	Number vat registered taxpayers	
1	2010	148	
2	2011	283	
3	2012	301	
4	2013	350	BEFORE
5	2014	432	
6	2015	499	
7	2016	523	
8	2017	661	AFTER

Source: Secondary data, 2017

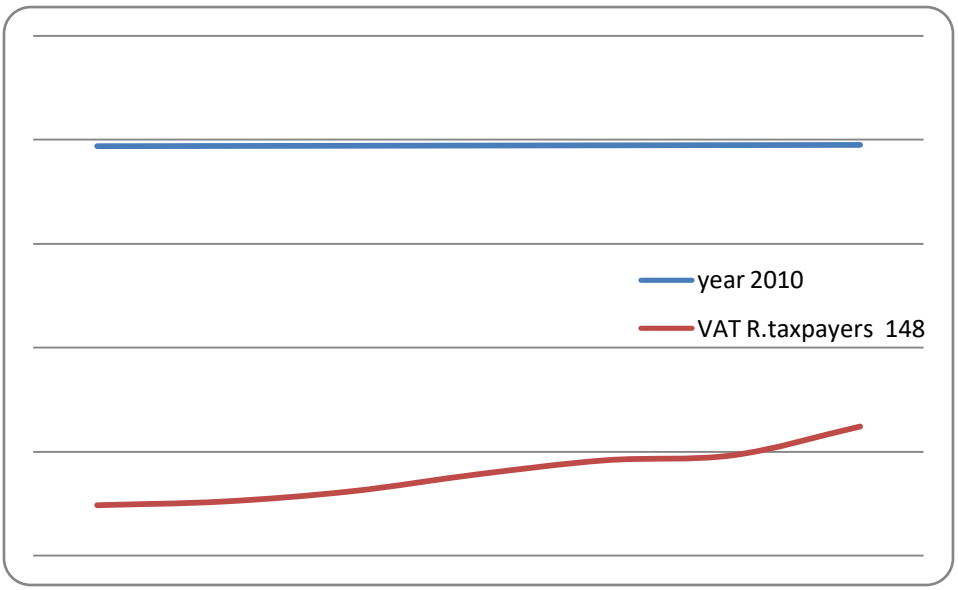

Figure 3: Statistics of voluntary VAT registration before and after the adoption of EBM

Figure 3 shows how the EBM have positive impact on the VAT taxpayers registered, before the adoption of EBM means from 2010 up to 2013 the total number of taxpayers registered was 1082 taxpayers while after the adoption of EBM the number of taxpayers was increasing. The total number of taxpayers from 2014 up to 2017 was 2115 taxpayers who were registered.

Table 23: VAT sales declared and VAT collections before and after the adoption of EBM

N°	Year	Annual sales declared	VAT collected	
1	2010	8,695,712,436	249,870,919	
2	2011	17,928,313,102	418,758,690	
3	2012	23,112,614,685	475,606,998	
4	2013	28,550,951,623	1,479,780,990	BEFORE
5	2014	32,475,180,057	1,523,357,813	
6	2015	45,183,565,134	1,349,195,453	
7	2016	51,369,499,239	1,657,830,866	
8	2017	67,086,778,494	2,073,708,020	AFTER

Source: RRA Musanze station, 2017

Table 25, shows the annual turnover declared and VAT due paid in Musanze before and after the adoption of EBM (from 2010 up 2017).

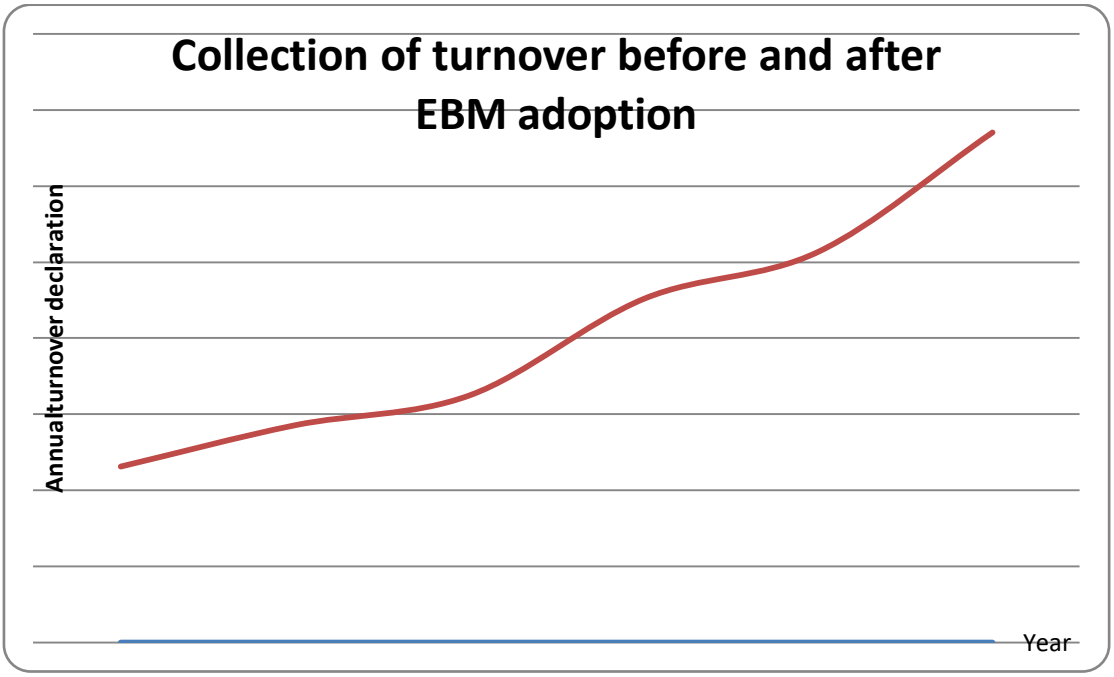

Figure 4: Trend of VAT turnovers declared before and after the adoption of EBM

This figure shows the collection of annual turnover before and after the adoption of EBM, the results fund after the analysis was shows that there is big difference between the annual turnover collected before and after the adoption of EBM. From 2010up to 2013, the total annual turnover of those years was 78,287,591,846 Rwfs while from 2014 up to 2017 after the adoption of EBM the total annual turnover was 196,115,022,924 Rwfs, these total turnover shows that there is higher difference between the turnover collected before the adoption of EBM means 78,287,591,846 Rwfs and the total turnover after the adoption of EBM which is 196,115,022,924 Rwfs. The results of this study agree with the study conducted by Machogu and Amayi (2013) which is state that the adoption of EBM have positive impact on the annual turnover collected. Other compliance indicators are; percentage of income that is reported for the taxation purposes and the programme impact indicator. Here, one may assess the impact of specific programmes or initiatives on the VAT compliance as well as behaviour of the target taxpayer population (Machogu and Amayi, 2013).

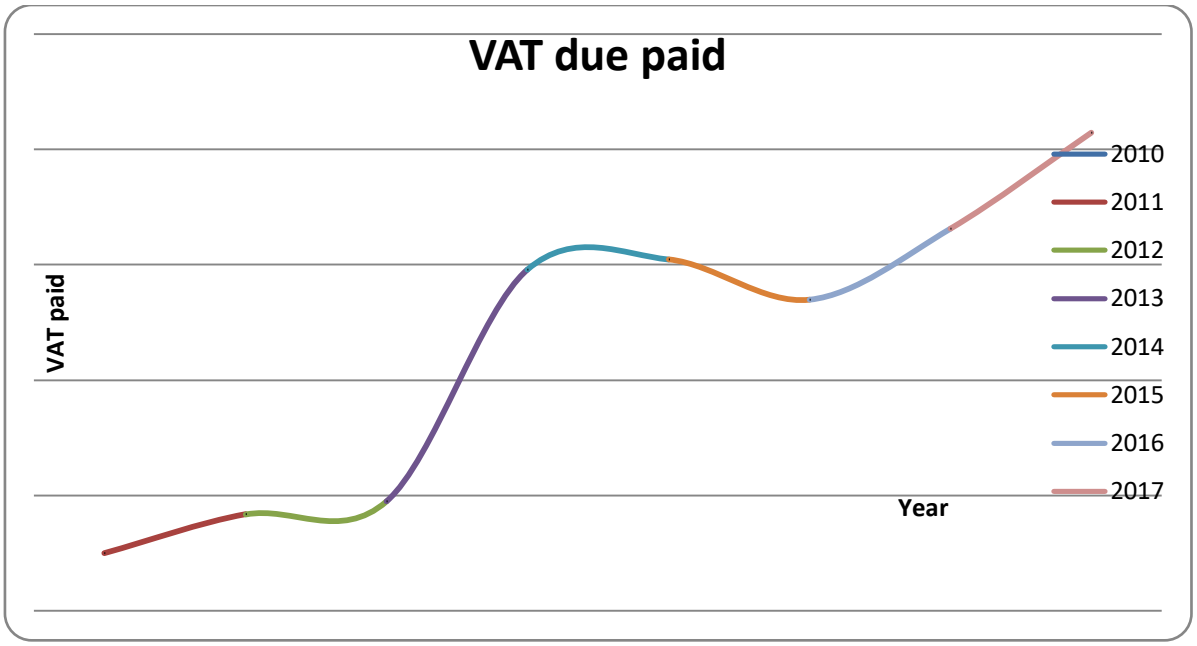

Figure 5: Trend of VAT collected before and after EBM adoption

This figure 4 shows the collection of VAT paid before and after EBM adoption, the results fund after the analysis was shows that there is big difference between the VAT paid before and after EBM adoption. From 2010up to 2013, the total annual turnover of those years was 2,624,017,597Rwfs while from 2014 up to 2017 after the adoption of EBM the total VAT paid was 6,604,092,152Rwfs, these total VAT paid shows that there is difference between the VAT paid before the adoption of EBM means 2,624,017,597Rwfs and the total VAT collected after the adoption of EBM which is 6,604,092,152 Rwfs. The adoption of EBM has positive impact on the VAT collected.

Table 24: Statistics on filing rates of VAT declarations before and after the adoption of EBM at Musanze station

		BEFORE		
N°	Year	On time filing rate	Late filing rate	Non filing rate
1	2010	57.8%	18.4%	23.9%
2	2011	69.6%	13.6%	16.8%
3	2012	58.6%	5.8%	35.5%
4	2013	66.9%	7.7%	25.4%
		AFTER		
5	2014	69.8%	7.4%	22.5%
6	2015	77.1%	8.4%	14.6%
7	2016	85.8%	6.8%	7.4%
8	2017	87.1%	3.9%	9.0%

Source: RRA Musanze station, 2017

The table 26 shows the statistics of number of timely filing of VAT before and after the adoption of EBM at Musanze station. Then the results obtained through to the secondary data of RRA musanze station confirmed that from 2010 to 2011 there is increasing on time filing rate means 57.8% to 69.6%, from 2012 to 2013 there an increasing on time filing rate means 66.9% to 69.8% . we know that the adoption of EBM was begin in 2013 this results shows that after the adoption of EBM there is increasing on time filing rate while for rate filing there is a decreasing of rate filing means 18.4% in 2010 to 3.9% in 2017. For non filing rate there is also decreasing from 23.9% in 2010 to 9.0% in 2017, this decreasing confirmed the positive impact of EBM adoption on timely filing.

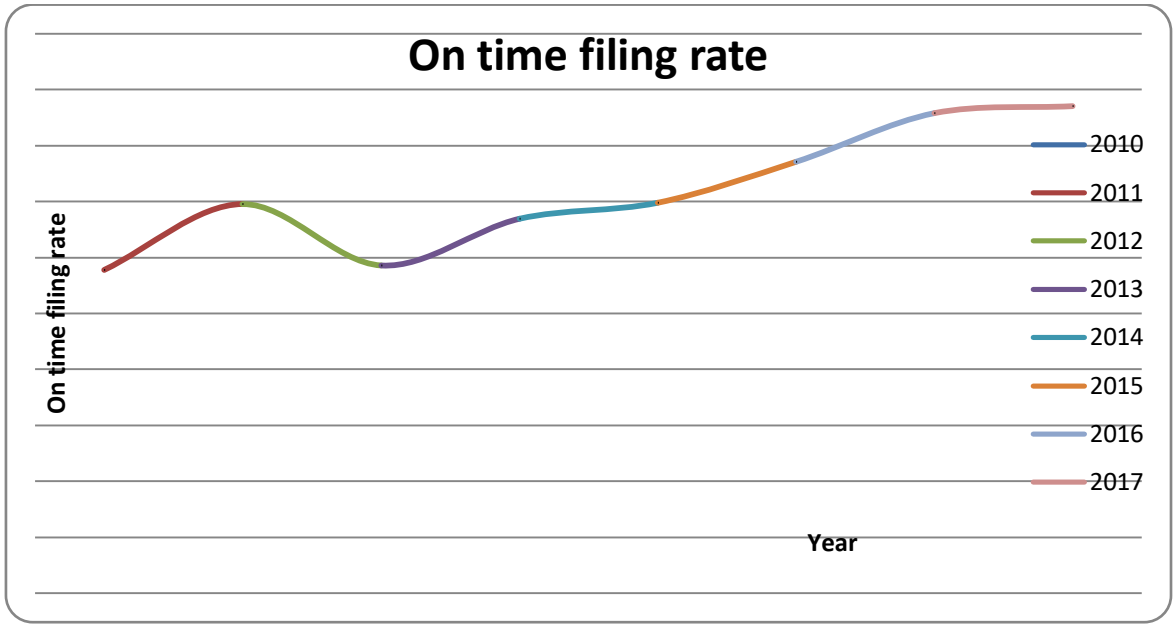

Figure 6: RRA statistics on on time filing rate

Figure 5 shows that the EBM has positive impact on time filing, the data from RRA Musanze station was collected and analysed then the results confirmed that from 2010 up to 2013 the rate of time filing was 57.8% in 2010, 69.6% in 2011, 58.6% in 2012 and 66.9% in 2013 before the EBM adoption. Then after the adoption of EBM the on time filing rate was increasing, means in 2014 was 69.8%, 2015 was 77.1%, 2016 was 85.8% and in 2017 was 87.1%. this results confirmed that the the adoption of EBM have positive impact on time filing rate.

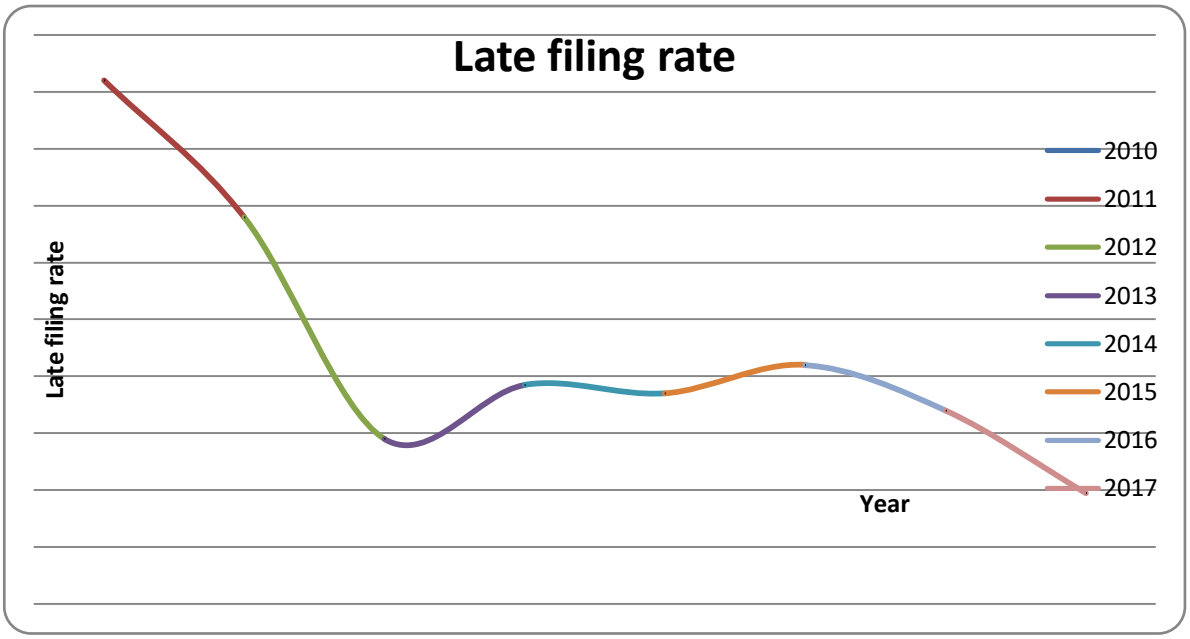

Figure 7: RRA statistics onlate filing rate

Figure 6 shows the late filing rate before and after the EBM adoption, the results confirmed that from 2010 up to 2013 the late filing rate was 18.4% in 2010, 13.6% in 2011, 5.8% in 2012 and 7.7% in 2013 before the EBM adoption. Then after the adoption of EBM the late time filing rate was decreasing, means in 2014 was 7.4%, 2015 was 8.4%, 2016 was 6.8% and in 2017 was 3.9%. this results confirmed that the the adoption of EBM have positive impact on decreasing late filing rate.

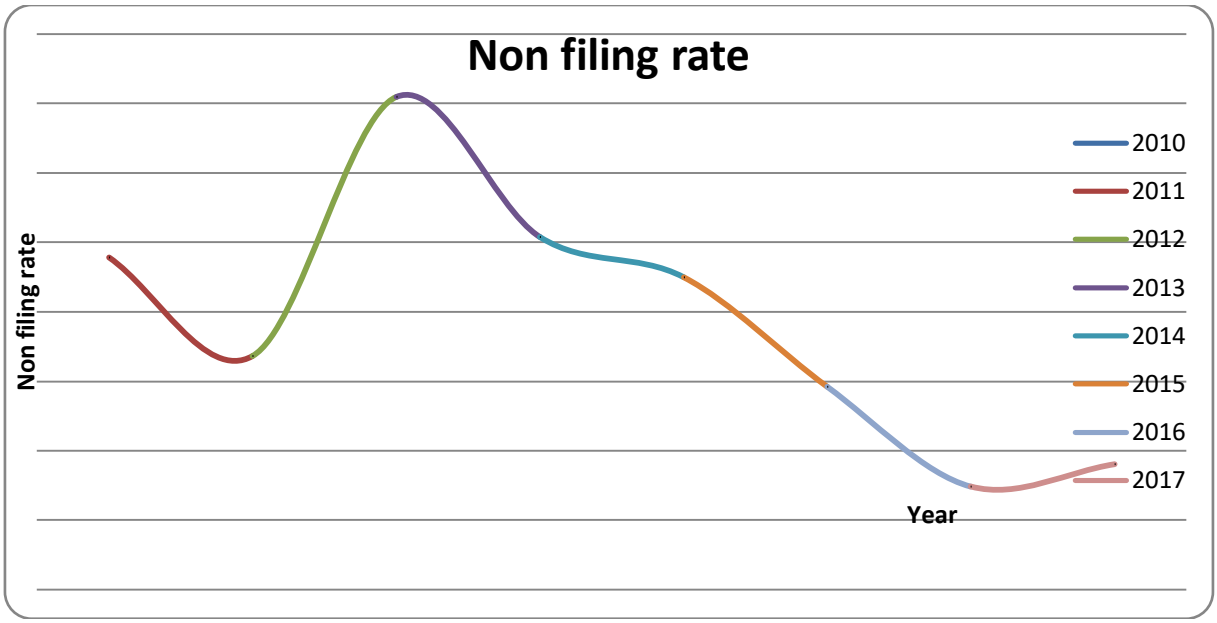

Figure 8: RRA statistics on non filing rate

Figure 7 shows the non filing rate before and after the EBM adoption, the results confirmed that from 2010 up to 2013 the non filing rate was 23.9% in 2010, 16.8% in 2011, 35.5% in 2012 and 25.4% in 2013 before the EBM adoption. Then after the adoption of EBM the non filing rate was decreasing, means in 2014 was 22.5%, 2015 was 14.6%, 2016 was 7.4% and in 2017 was 9.0%. this results confirmed that the the adoption of EBM have positive impact to decrease non filing rate.

Table 25: Statistics on payment rates of VAT liabilities before and after the adoption of EBM at Musanze

N°	YEAR	On time payment rate	
1	2010	70.3%	
2	2011	60.6%	
3	2012	75.1%	
4	2013	79.4%	BEFORE
5	2014	82.7%	
6	2015	84.3%	
7	2016	84.5%	
8	2017	82.3%	AFTER

Source: RRA Musanze station, 2017

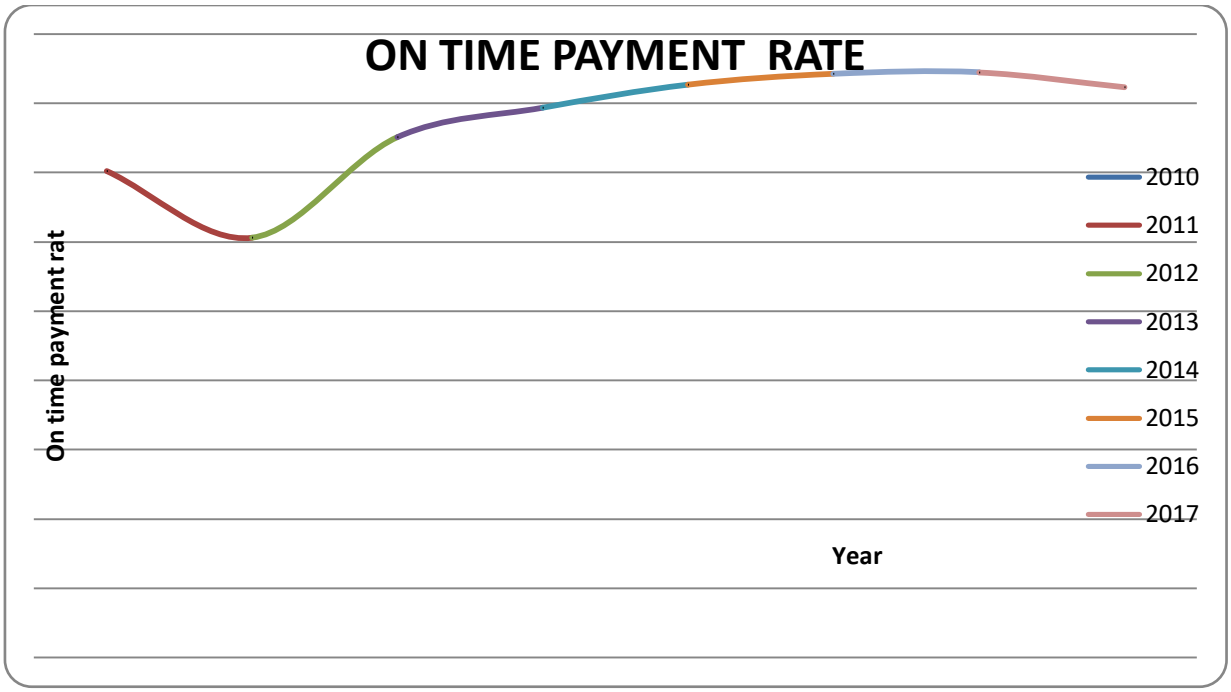

Figure 9: RRA statistics on timely payment rate

The figure 8 shows the time payment rate, before and after the adoption of EBM from 2010 up to 2017. The analysed data confirmed that from 2010 up to 2013 thetime payment rate was 60.6% in 2010, 75.1% in 2011, 79.4% in 2012 and 82.7% in 2013 before the EBM adoption. Then after the adoption of EBM the time payment rate was increasing, means in 2014 was 84.3%, 2015 was 84.5%, 2016 was 82.3% in 2017. This results confirmed that the the adoption of EBM have positive impact to increase time payment rate.

d) Correlation Analysis

The correlation coefficient is a number between -1 and +1 that measures both the strength and direction of the linear relationship between two variables. The magnitude of the number represents the strength of the correlation. A correlation coefficient of zero represents no linear relationship, while a correlation coefficient of -1 or +1 means that the relationship is perfectly linear (all of the dots fall exactly on a straight line). The sign (+/-) of the correlation coefficient indicates the direction of the correlation. A positive (+) correlation coefficient means that as values on one variable increase, values on the other variable tend to also increase; a negative (-) correlation coefficient means that as values on one variable increase, values on the other tend to decrease, that is, they tend to go in opposite directions.

Table 26: Correlation

		Mandatory usage of EBM	Frequency audit	Frequency of tax education	Frequency of tax advisory visits
Mandatory usage of EBM	Pearson Correlation	1	.936**	.913**	.843**
	Sig. (2-tailed)		.000	.000	.000
	N	159	159	159	159
Frequency audit	Pearson Correlation	.936**	1	.889**	.835**
	Sig. (2-tailed)	.000		.000	.000
	N	159	159	159	159
Frequency of tax education	Pearson Correlation	.913**	.889**	1	.934**
	Sig. (2-tailed)	.000	.000		.000
	N	159	159	159	159
Frequency of tax advisory visits	Pearson Correlation	.843**	.835**	.934**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	159	159	159	159

***. Correlation is significant at the 0.01 level (2-tailed).*

Table 28 is the Pearson correlation coefficient for factors of Electronic Billing Machine and VAT compliance indicators of small and medium size enterprises in Rwanda. From the correlation analysis, it can be deduced that there is a positive relationship between the mandatory usage of EBM for all VAT registration and frequency audit, where the correlation coefficient was 0.936 and a p-value of 0.000. The findings indicate that the frequency audit and mandatory usage of EBM correlate positively with correlation coefficients of 0.936 and p-value of 0.000. The study further established that there is a positive relationship between frequency of tax education and mandatory usage of EBM with a correlation coefficient of 0.913 and p-value of 0.000. Furthermore, the study found that there is a positive relationship between the frequency of tax education and mandatory usage of EBM. Lastly, the study found that there is a positive relationship between the frequency of tax advisory visits causes of mandatory usage with a correlation coefficient of 0.843 and a p-value of 0.000.

These findings clearly show that all the four independent variables (mandatory usage of EBM for all registered, frequency of audit and inspection conducted on taxpayers, frequency of tax education and frequency of tax advisory visits) had a significant influence on the dependent variable (VAT compliance). This is because the p-value in all the relationships was 0.000 which is less than the alpha value (level of significance) 0.01. From these findings we can infer that mandatory usage of EBM and frequency audit and inspection conducted on taxpayers had the most significant influence on mandatory usage followed by frequency tax education and frequency of tax advisory visits.

e) Combined linear regression Model

Regression analysis was done to determine the relationship between Electronic billing machine (EBM) and VAT compliance.

Table 27: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.544[a]	.291	.288	.13577

a. *Predictors: (Constant),mandatory usage of EBM, frequency audit and frequency advisory visits*

Table 19 shows that the coefficient of determination R square is 0.294 and R is 0.544 at 0.05 significant level. The coefficient of determination indicates that 29.1% of the variation in the dependent variable VAT compliance is explained by the independent variables (mandatory usage of EBM for all registered, frequency of tax audit, tax education and frequency advisory visits).

Table 28: ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	.573[a]	3	.192	11.268	.000[b]
	Residual	1.383	52	.018		
	Total	1.853	55			

a. *Dependent Variable: Tax litigation*

b. *Predictors: (Constant), mandatory usage of EBM for all registered, tax education, frequency of tax audit, frequency advisory visits*

Table 30 presents the results of Analysis of Variance (ANOVA) on usage of Electronic billing machine and VAT compliance. The ANOVA results for regression coefficient indicate that the significance of the F is 0.00 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 30 indicates that the significance of the P value 0.000 is less than 0.05, implying that null hypothesis is rejected, and alternative hypothesis accepted. It is concluded that there is a significant effect of adoption of EBM and VAT compliance for small and medium enterprises.

VI. Conslusion and Recommendations

a) Conclusion

According to the results of this study based on the objective of assessing the impact of the adoption of EBM on timely filing of VAT declaration compared to the period before EBM is introduced in Rwanda, 93% of all respondents confirmed that the adoption of

mandatory usage has a positive influence of timely filing of VAT return. This was confirmed as well by the report of RRA on VAT filing rate from the year 2010 to 2017, whereby the figures demonstrate that the adoption of mandatory usage of EBM by all VAT registered of RRA Tax station has reduced the late filing rate by 14 % and by and non filing rate by 20%.

Regarding the results obtained by analyzing the data collected basing on the objective of assessing the impact of the adoption of EBM on timely payment of VAT liabilities , 92.4% of all respondents confirmed that EBM has a positive influence on timely payment of VAT liabilities. This finding was also confirmed by the report of RRA on payment rate of VAT from the year 2010 to 2017 whereby the report shows that after the introduction of EBM the payment rate of VAT was increase by 20%.

In regard with The results obtained by analyzing the data collected basing on the objective of assessing the impact of the adoption of EBM on accurate reporting in VAT declaration, 90% of all respondents confirmed that the adoption of mandatory usage of EBM has a positive impact on reporting of VAT sales comparing to VAT sales that were declared before the adoption of EBM , in addition 96.8% of all respondents confirmed that the adoption of mandatory usage of EBMs has a positive on VAT payable and collected by RRA comparing to the VAT that was collected before the adoption of mandatory usage of EBM. These findings are confirmed by the RRA report on VAT collections before and after the adoption of EBM whereby report shows that after introduction of EBM VAT collections increased by 732 %, that means increased by 7 times . In addition the RRA report shows as well that, after the introduction of EBB, sales reported by taxpayers were also increased by 737 %.

Regarding the results obtained by analyzing the data collected basing on the objective of assessing the impact of the adoption of EBM on voluntary VAT registration,79.9% of all respondents confirmed that the mandatory usage `of EBM has a positive impact on voluntary VAT registration . This finding was also confirmed by the report of RRA on figures about the number of taxpayers voluntarily registered for VAT from the year 2010 to 2017 whereby the report of RRA indicates that after introduction of EBM the number of voluntary VAT registration increased by 346 %.

The correlation coefficient on analysis of the relationship between mandatory usage of EBM and indicators of VAT compliance is 0.586. this value indicates that correlation is significant at 0.05 level (2tailed) and implies that there is a positive relationship between mandatory usage of electronic billing machine and VAT compliance indicators of (r= .586). We can therefore conclude Electronic Billing Machine contribute positively to VAT compliance in Rwanda.

According to the results of this study obtained from the analysis of the data collected basing on the objective of assessing the significance of other compliance activities that have been always used by RRA to improve VAT compliance, 69.8 % all respondents confirmed that the frequency of audit has a positive influence accurate reporting in VAT.

Regarding the activity of Tax Education, 80.5 % of all respondent confirmed a positive influence of Tax education on timely filing of VAT declaration while 80 % of all respondent confirmed that Tax education has a positive influence on timely payment of VAT liabilities and accurate reporting in VAT declaration and 88% of all respondents confirmed a positive impact of Tax education on voluntary registration.

Regarding the activity of Tax advisory visits. 86.6% of all respondent confirmed a positive influence of tax advisory on voluntary VAT registration followed by 86.2% of all respondents who confirmed as well that Tax advisory visits have a positive influence on accurate reporting in VAT declaration.

In conclusion The findings of this study clearly show that all the four independent variables (mandatory usage of EBM for all registered, frequency of audit and inspection conducted on taxpayers, frequency of tax education and frequency of tax advisory visits) had a significant influence on the dependent variable (VAT compliance). Therefore to improve VAT compliance through EBMs. RRA is recommended to come up with plan integrating EBMs within broader tax compliance frameworks that create the environment which will best ensure taxpayers' voluntarily compliance. This suggests that the most cost-effective way to improve compliance will likely involve a small number of high-profile enforcement activities (targeting high-risk evaders), close monitoring and reviewing of activities (for medium-risk evaders) and improved tax information and facilitation activities for the majority of taxpayers.

b) Recommendations

Basing on the results of this study, following actions are recommended:

Regular identification of EBM non usage: RRA should be able to reliably identify when a taxpayer is not using EBM using data from back office guiding field visits interventions. Tax advisory visits for taxpayers who regularly failed to use EBM, as the results of this research have confirmed the positive impact of tax advisory on VAT compliance ;

Deterrent measures against to regular Defaulters of EBM usage: RRA needs to be willing and able to enforce receipt issuing on taxpayers who usually fail to issue receipt because if there is no sanctions for defaulters it can lead to negative competition against compliant taxpayers operating in the same sector and decrease their compliance.

Extensive communication strategy: Through tax education, tax awareness campaigns, tax dialogues and media, RRA should communicate their focus and ability to enforce EBM receipting for any specific sector. This will further facilitate voluntary compliance;

Higher Risk Tax payers(High risk, big consequences): For this category of taxpayers, real time deterrence is recommended. This may include surprise checks, comprehensive audit and continuous monitoring of compliance in respect of timely filing of VAT return, timely payment of VAT liabilities and accurate reporting regular checked basing third party information, data matching;

Key taxpayers (Low risk, big consequences): For this category of taxpayers, regular monitoring of their tax return is recommended, regular tax advisory visits to address issue of non-compliance with EBM instead of conducting audit, tax dialogues and regular reminders advising them to file and pay before due dates in order to avoid penalties;

Medium risk taxpayers(High risk, low consequences): For this category tax education and close monitoring of their tax returns and discuss with taxpayer on any discrepancies identified. Tax advisory visits and desk audits are appropriate to boost compliance of these taxpayers instead of using deterrent measures;

Lower risk taxpayers (Lowrisk, low consequences): Tax education, tax advisory visits and periodic review of their tax returns and EBM back office followed by reminders if there any tax issue to address without conducting audit.

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