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The Strategic JOURNAL of Business & Change MANAGEMENT
ISSN: 2312-9492 www.strategicjournals.com
Vol. 10, Iss.1, pp 398 – 412. February 18, 2023. www.strategicjournals.com, ©Strategic Journals

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Accepted: February 9, 2023

ABSTRACT

The study sought to analyze the impacts of information communication technologies on the tax revenue collection in Rwanda. Revenue collection was low and tax administration weak and this was believed to be due to manual system of tax administration characterized by low tax collection, delays and poor record keeping, this made Rwanda Revenue Authority to meet their targeted budgets. With introduction of e-filing in 2012 it is believed that electronic tax management system will improve tax revenue and bridge the gap of the budget but still the challenges persisted as the country fail to meet their expected budget due to poor tax management system. The following specific objectives guided this research: To assess the determinants of Information Communication Technology used in RRA, to analyze the revenue collection in RRA; to find out the relationship between ICT and revenue collection in RRA. The study adopted a descriptive case study design using both qualitative and quantitative methods. Respondents were selected using purposive sampling technique to select 119 respondents as the sample size. The study used both primary and secondary data collected using questionnaires, interviews and documentary review. Quantitative data were analyzed using descriptive statistics and qualitative data were analyzed using thematic analysis. Data were presented using frequency table and percentage. As revealed from this study, it was found out that majority of the respondents (56%), agreed that online tax payments have helped RRA in expanding its revenue base. It was also found out that the level of revenue collection has been increased from 2014/15 up to 2020/21, where in 2014/15 revenue collected was 387.4 billion; in 2014/15; 2015/16; 2016/17; 2017/18; 2018/19; 2019/20; 2020/21 it has been increased to 474.9; 569.6; 663.8; 773.9; 872.3; 1,001.3; 1,102.8 billion respectively. The study indicated that there was a strong positive and significant relationship between ICT and revenue collection in RRA as approved by coefficients of correlation which was equal to 0.888. The study acknowledges the role that technology plays in enhancing tax compliance among the Large Taxpayers and recommends that Rwanda Revenue Authority should sensitize the Large Taxpayers on the systems it has in place and how they will be of advantage to them in terms of increasing their compliance levels. The study recommends to the taxpayers to be familiar with the ICT because it is the best way to facilitate the tax compliance management and control. Furthermore the study recommended to the Tax Administration to implement all the adequate possibilities of using ICT.

Keywords: *Information Communication Technology, Rwanda Revenue Authority, Tax Revenue collection.*

CITATION: Birakera, D., & Harelimana, J. B. (2023). Effects of information communication technologies on the tax revenue collection in Rwanda (2015-2021). *The Strategic Journal of Business & Change Management,* 10 (1), 398 – 412.

INTRODUCTION

It is impossible to think of any organization without the need of information system in their entities. Information system has helped organizations to be highly efficient and to stay competitive in its environment; therefore, it has been widely used in public sector and business organizations (Gupta, 2012). Organizations invest in information system for many reasons. Business organizations for example, may invest in information system in order to reduce operating costs and to stay competitive in the market. They have shifted from traditional ways of doing business to modern technologies which offer more convenience and faster processing activities. In banking environment, traditional banking activities such as bill payments, funds transfer or even passbooks updating can be done within a few minutes.

Many governments and other public sector organizations invested billions of money in information system development in order to provide better delivery services to its citizens and offer more effective government management. The claim that an effective government management must portray less corruption, increased transparency, better delivery of government services, improved interactions with business and industry. However, there were reports that those systems were underutilized in some countries. In Malaysia, online tax payment system is provided to facilitate the taxpayers to pay their taxes electronically via the tax authority website. Yet, the taxpayers are not using the system despite of its two-year existence in the community hence this needs sensitization of the users (Devereux *et al.,* 2014).

The expansion of the tax base in Rwanda is increasingly recognized as an important policy goal, as an increase in domestic revenue sources promises to reduce aid dependence and reduce distortionary consequences of taxes on externally traded goods. E-filing is one of advanced e-governance system adopted in developed countries. It provides convenience to tax payers for tax assessment and payment (Agrawal, 2006). Internet allows consumers or tax payers to conduct transactions within a few mouse clicks (Jahirul, 2011).

This convenience can serve as a key driver for e-filing adoption especially in developing countries like Rwanda. E-filing and e-payment provides many aspects of convenience to tax payers for example tax filing can be conducted at any time, filing can be done in any location, easy use of the system, information search and other online transactions that is not available in the traditional channels.

Electronic payment and filing also offers flexibility of time, reduces calculations of errors on tax return forms to the taxpayers, taxpayer privacy and security (Agawal, 2006). Furthermore, e-filing also offers other benefits to the beneficiaries who are the tax authorities for example e-filing minimizes their work load and operational cost due to submission of tax returns on a paperless environment. It also reduces the costs processing, storing and handling tax return (Jayakumar & Nagalakshmi, 2006). The Rwanda Revenue Authority has been operating below the national budget and it is believed that with introduction of electronic tax management system tax collection has been improving. E-filing and e-taxation payment was introduced by RRA in 2012 with functioning e-filing system in place such as Mobile declaration, Electronic Single for domestic taxpayers Window (ESW) and Authorized Economic Operator (AEO) for importers and exporters (Gupta, 2012) in order to improve on tax collection and meet the targeted budget accordingly, and this was done to enable the taxpayers to deal with RRA electronically anywhere and anytime as well as to enhance tax administration to collect tax revenue in short term and as a measure to improve on tax compliance and efficiency. It offers an option to the clients to file taxes like VAT, PAYE, Excise duty and Withholding taxes electronically on RRA's website without having to visit a RRA premise especially if there is tax education, compliancy aspect is guaranteed. All the reforms in Rwanda's tax base system were

aimed at improving tax collections, administrations, and above all tax compliance. In a bid to improve tax compliance, Rwanda Revenue Authority (RRA) decided 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.

Tax revenue collection should comply with best practices of equity, ability to pay, economic efficiency, convenience and certainty (Visser & Erasmus, 2005). Just like any other organisation, the government also looks at all ways and means to reduce the expenditure so as to have a reciprocate effect of the public national debt of the economy (Ireland, 1994). Various accounting and control procedures are usually adopted in order to ensure that the spending is in line with government policy and framework.

Some of the controls include budgetary measures, checks and balances and many others. This engulfs the whole rationale of any corporate be it public or non-public institution which institutes to lower expenditure and increase in revenue so as to attain ultimate objectives (IMF, 2014) Indeed these basic fundamentals play a role into the determinant of the efficiency of any operation including the efficiency of the government operations, hence, aspirations towards increase in revenue collections. Application of technological solutions towards the strategic goals for government is a key step towards 13 transforming government into an entity that can keep abreast of the needs, requirements and expectations of today's modern world (De-Wulf & Sokol, 2005).

Automation which inculcates usually technological enhancement in terms of upgraded hardware and software so as to curb inherent risks relating to revenue reductions or the vice versa for expenditures (Ireland, 1994). In Addition, automation of process at revenue collection points has a positive impact on the tax clearance time (Haughton & Desmeules, 2001). Conversely, the automation of tax system rather than just affecting the revenue collection, expenditure and clearance time as highlighted above, will also impact the overall staffing, confirming that the right measure of tax assessment has been undertaken so as to deter underpayments and tax evasions, and proper ways of accountability and audit trails instigated so as to curb embezzlements. This usually attained successfully by synchronizations of various systems in various systems towards a common repository mapping which is a fundamental tool in automation (Dramod, 2004). Such automation in enfranchised not only in the revenue collection administration but many other governmental and non-governmental institutions so as to not only obtain maxim on the key objectives but also smooth run other operations as well as deter any risks from (De-Wulf & Sokol, 2005).

According to Brostek (2007), a tax technology strategy is a representation of a company's plans when it comes to implementing and utilizing technology in a bid to enable tax operations, enhance efficiency in tax administration as well as increasing tax revenue for the government. In this regard therefore, there is need for the adoption of technology as a strategic tool for enhancing tax compliance to be coupled with a roadmap while taking into account short term, mid-term, as well as long-term horizons. Technology as a strategy needs to take into account the processes, department organization and also technologies used by the tax function, as well as tax's business priorities and related dependencies. Tax authorities continue to realize that they need a prioritized plan so as to help their tax function in accomplishing its goals and move forward. Brostek (2007) argues that nearly 85 percent of established tax authorities support the proposition that better technology and integration would improve their tax effectiveness.

According to Jones (2009), tax technology strategy will enable tax professionals to better focus their resources when it comes to analyzing data and creating strategies in a bid to generate revenue and cut costs, instead of spending valuable time gathering data. A tax technology strategy therefore enables the tax function to become more effective

when evaluating current tax processes, identify areas for improvement, as well as leveraging the most supportive technologies at the right time. In addition, a strategy can help a company spread out costs associated with investments in licensing and implementation of technology.

Having a technology strategy in place is likely to drive better and more efficient technology support for the tax function when it comes to the deployment of the company's resources in an effective manner. Finally, the underlying objective of any good tax technology is to enhance tax compliance which has three dimensions: filing, reporting, and payment compliance. There exist a number of techniques that have been used to enhance tax compliance. One such method has been through Tax Simplification or Tax System Reform. This has been established to have dual effects on enhancing compliance, this is because it helps taxpayers in avoiding inadvertent errors, as well as limit opportunities for tax evasion. Additionally, the second method which has also been used to enhance compliance is the provision of tax authorities with additional enforcement tools. Other methods also include improved taxpayer services for instance taxpayer education, adoption of modern technology as well as efficient administration by the tax authorities (Brostek, 2007).

Problem Statement

Revenue collection was low and tax administration weak and this was believed to be due to manual system of tax administration characterized by low tax collection, delays and poor record keeping, this made Rwanda Revenue authority to meet their targeted budgets. With introduction of e-filing in 2012 it is believed that electronic tax management system will improve tax revenue and bridge the gap of the budget but still the challenges persisted as the country fail to meet their expected budget due to poor tax management system. It is upon the above problem that this research study was prompted to analyse the effects of e filing and e payment on revenue collection by Rwanda Revenue Authority (RRA, 2017).

Rwanda Revenue Authority has been reporting growth in tax collections ever since it started using new technologies. However, sometimes there have been falls in tax collections while relating them to the set targets. The New Times Rwanda published on May 15, 2017 revealed the following information. RRA has announced it will issue 1,000 machines, a 'second generation of electronic billing machines' (EBM), a system the tax collectors said will help monitor transactions from entry of goods into customs to sale (RRA, 2017).

The Deputy Commissioner-General and Commissioner for Corporate Services at RRA, Pascal Bizimana, told lawmakers that the revenue agency will give the machines first to major business operators, mainly those engaged in import of goods, to control the entire supply chain. "From the time you enter the products into customs to their sale, we will be able to know the business person in question and to whom they sold the goods and the amount of transactions made," he said. He added that when EBMs were introduced in 2013, about Rwf110.5 billion was collected in VAT, which increased to Rwf169.5 billion in 2014 (RRA, 2017).

"This shows that EBM system is yielding results as VAT increased by over 90 per cent," Bizimana said. However, he concurred with parliamentarians that there are still issues in the EBM system, citing people who are reluctant to give EBM generated receipts. "This necessitated that RRA to deploy many workers on the field to monitor compliance," Bizimana said. Lawmakers said some traders connive with buyers to record wrong prices on receipts that are not produced by EBM, so that they share illicitly earned gains (RRA, 2017).

Hindura (2018) asserts thatEBM use still faces malpractice, claiming that there are some small businesses such as warehouses and shops whose proprietors tell buyers that they will reduce the cost of products only if they give them receipts that are not generated by EBM. Bizimana said that although

a receipt is given by the dear bassertler, there are people who have not yet understood VAT, because such tax is paid by the end-user, not the dealer (RRA, 2017).

Bizimana said RRA is carrying out awareness campaigns to make the public, mainly dealers, understand the role of VAT. MPs proposed that RRA carries out reward campaigns whereby businesses that use EBMs are recognised to motivate them. MP Theobald Mporanyi said that RRA should also come up with a week reserved for consumers, whereby people who bought a lot of goods and got receipts are awarded, arguing that this would incentivise consumers to ask for EBM receipts more regularly (RRA, 2017).

In line with widening tax base, the Permanent Secretary at the Ministry of Finance and Economic Planning, Caleb Rwamuganza, said taxpayers increased from 152,000 in 2015 to 168,346. In the 2015/16 fiscal year, total tax revenue amounted to Rwf986.7 billion, an achievement rate of 104.3 per cent. In 2017 RRA targeted to collect more than Rwf1 trillion for the first time in its 18-year history. Whether this target was achieved or not is a question that we will be able to answer after collecting data.

Research Hypotheses

- H_0: There is no relationship between ICT and revenue collection in RRA.
- H_1: There is a relationship between ICT and revenue collection in RRA.

LITERATURE REVIEW

Social presence theory

Technological determinism (TD), is a reductionist theory and states that technology is a social structure or a force which drives change. TD changes the organisational culture, structure, reporting line, norm and many other aspects including the modes of operations.

The two main hypothesis that technological determinism depends are;

a) belief that the technical base of a society is the fundamental condition affecting all patterns of social existence

b) belief that technological change is the single most important source of change in a society Critics like (Chandler, 2000) states that other than technological issue other factors have driving forces and some of them include political issues, class interests, economic pressures, educational background, general attitudes and others. TD has also had a long and controversial history in the social sciences in general and in organization studies in particular. Critics of TD argue variously that technology itself is socially determined, that technology and social structures coevolve in a nondeterministic, emergent process, or that the impact of any given technology depend mainly on how it is implemented which is in turn socially determined. Given the proliferation of new technologies in modern capitalism, the TD debate is continually renewed.

Conceptual Framework

Conceptual framework is a scheme of variables which the study operationalizes in order to achieve the set objectives. A variable being the measurable characteristic that assumes different values among the subjects, independent variables are the ones that the study manipulates in order to determine their effects on another variable. Independent variable is the presumed cause of changes in the values of the dependent variable; the dependent variable is expected to be influenced by the independent variable. This was illustrated in figure 1 below: This showed the relationship between the independent and the dependent variable.

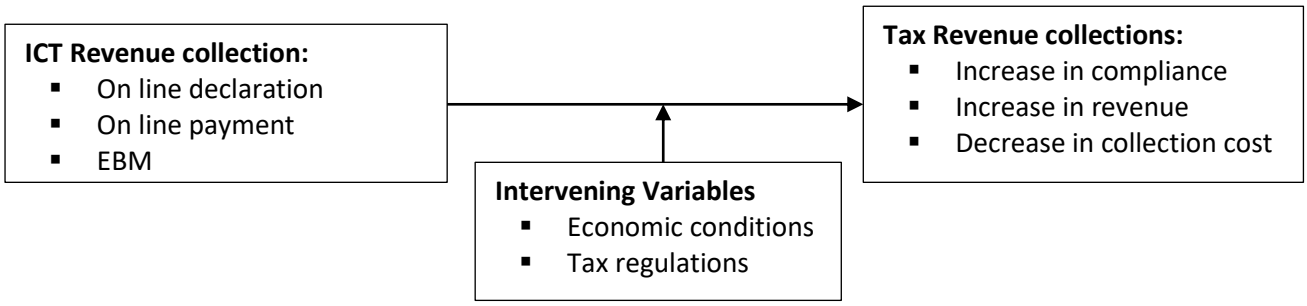

Figure 1: Conceptual Framework
Source: **Researcher, 2021**

The conceptual framework above drawn up states two types of variables which are interrelated. The ICT elements on the left side constitute the dependent variables whereas the tax revenue collections on the right side form part of the independent variables. The intervening variables are taken as the catalyzers to the two types of variables.

METHODOLOGY

The research design may be defined as the arrangement of conditions for collection, and analysis of data in a manner that aims to combine relevance research purposes with the economy in procedure (Kothari, 1999). In this research the researcher will use descriptive research design this because the study was deductive but supplemented by some inductive approach. The approach was taken because it enables the researcher to use different research strategy and it also it enables the researcher to use triangulation (Saunders *et al.*,2000).

Kasomo (2006) defined the population as an aggregate of all cases that conform to some designated set of specification. On the other hand, Mugenda (2008) defined the population as the set of all elements in the universe. In this study, the researcher will make a survey on the 170 employees of Rwanda Revenue Authority headquarter. However, the research targeted those employees domestic and VAT.

A sample is a sub set of the population being investigated by the researcher, whose characteristics will be generalised to represent the whole population (Kasomo, 2006). Kothari (2000) defined a sample design as the technique or the procedures the researcher would adopt in selecting the items from the population. Because the research cannot reach the whole population because of time, cost and easy management of data, the researcher will select a sample size of 119 employees and in selecting the sample size, was computed based on Slovin's and Yamane's formula 1967.

The samples within each selected population were selected using purposive sampling. Because the study requires people with technical knowledge about the study, the respondents with in each sample were selected using purposive judgement. Purposive sampling that is when you select a sample basing on your judgement on how that sample will enable you to answer your questions and to meet your objectives (Saunders *et al.,* 2000).

The researcher used both the primary and the secondary data. Secondary data is the data which may be used by raw data if there has been little if any processing or compiled data that have been received some of selection or summarizing (Saunders *et al.*, 2000). It can also be defined as the data which have already been collected by someone else and which have been passed through statistical process (Kothari, 2000).

The primary data was collected through the use of questionnaire and interview. The primary data enabled the researcher to create and approve the

hypotheses formulated and also to develop new models relating to ICT and revenue collection.

Data collection instrument are techniques and the methods that the researcher uses to collect data (Kothari 2000). In this study the researcher used the questionnaire, interviews and documentation. Data collection through the use of questionnaires, Questionnaires are data collection technique in which each respondent is asked to respond to the same set of questions in a predetermined order (Saunders *et al.*, 2000). Questionnaires may be structured or un structured, according to Kothari (2000), structured questionnaire are those with a definite, concrete and predetermined questions whereas the unstructured questionnaire are ones in which the respondent use his/her own words to respond to the questions.

In this study the researcher used both the structured and the unstructured self-administered questionnaires. The researcher has decided to use questionnaires in his study because of the advantages it has over other instruments as sited by Saunders *et al.* (2000), it is relatively cheap to collect data through questionnaires since it involves only spending money in preparing the questionnaire and mailing it to the respondents, because my study involves both deductive and inductive approach, questionnaire was best suit the study, because the study involves identifying a relationship the questionnaires helped to get data that describe a relationship between different variables.

The researcher also collected the data using Interviews, according to Saunders *et al.* (2000), an interview is purposeful discussion between two or more people. The researcher uses a formalized and structured interviews, under this the researcher designed an interview guide with a standardized question for the respondents. The researcher used the interview because of its advantages as provided by (Saunders *et al.*, 2000). Interviews helped the researcher to gather valid and reliable data that is relevant to the research questions and objectives. These techniques were only used to collect primary data.

Because the researcher also used secondary data in his study, the researcher collected the secondary data through the use of published financial reports, board meeting minutes and other reports that the researcher see that it is important.

The last approach that was used in data collection was the documentation of literature search from the financial reports, minutes and journals. This was done in order to establish the risk management process, the risk models used, performance measurement techniques applied and how risk models are incorporated into the economic capital models. Desk Data were used as raw data for processing and compiling data that had been received for analysis and presentation (Saunders *et al.*, 1999). It can also be defined as the data which had already been collected by someone else and which had passed through a statistical process (Kothari 2000).

The documentation of data helped the researcher to provide contextual and comparative data. In addition to that, it also helped the researcher in comparing data that was collected using secondary data (Saunders *et al.*, 1999). Since the researcher's study involved determining a relationship between ICT and revenue collection, the only way to get data on performance was by use of secondary data (Saunders, *et al.*, 1999). This therefore, made it inevitable for the researcher to use secondary data in this study, since it helped the researcher to compare the collected data with the previous studies

Questionnaires were developed in harmony with the guidelines specified by Kothari (2000) and pre-tested to check for validity and reliability so as to minimize on ambiguity of results generated.

The validity index (CVI) was used to measure the validity of the instruments. The instruments were tested on a four-point scale ranging from relevant, quite relevant, somewhat relevant and not relevant. Four questionnaires were distributed to

four professionals in the field of finance to rate the relevance of the questions on the study variables.

Reliability was performed using Cronbach's alpha test to determine the internal consistence of the scale that was used to measure study variables.

Data that were collected from the primary survey and secondary survey were compiled, sorted, edited, coded in order to have the required quality accuracy and will be analyzed statistically using statistical package for social scientist (SPSS). Principal component analysis approach was used to determine those factors that explain or measure ICT. The result of the analysis was presented in form of tables and graphs for the interpretation. Pearson correlation coefficient was used to establish the relationship between ICT and revenue collection and multiple regression analysis was used to determine to develop a model on ICT and revenue collection t-tests were used to examine the variability of each ICT on the revenue collection.

RESULTS AND DISCUSSIONS

Effect of information and communication technology on tax compliance

The study further sought to establish the effect of information and communication technology on tax compliance. This section therefore looks at what the respondents had to say with regards to how information technology has enhanced tax compliance.

Table 1: Level of automation

	Frequency	Percentages
Registration With RRA	50	42
Embracing Automation	69	58
Total	**119**	**100**

Source: Survey data 2022

The table 1, presents a summary of the findings with regard to the level of automation of the various taxpayers. As seen in the figure, majority of the large taxpayers have embraced automation, with functioning ICT departments. The findings agree with Holniker (2005), the use of the system has resulted in a significant improvement in the revenue collection time for taxpayers. Revenue mobilization is one of the key factors for economic development of nations and links into national agenda on social wellbeing, poverty reduction and economic development of countries and their citizens.

Table 2: RRA and Information Communication Technologies

Particulars	Strongly disagree	disagree	Not sure	Agree	Strongly agree
Filing of VAT 3 return on-line	1	4		67	47
Online filling of Withholding Tax Return	8	11	10	54	36
payment of PAYE Return on-line	4	2	5	43	65
Modernization of CSD	14	10	15	34	46
Customs Oil Stock Information System (COSIS)	17	19	3	53	27
Cargo Management Information System (CAMIS)	14	7	11	58	30
The Electronic Cargo Tracking System (ECTS)	2	5	13	42	38
Integrated Tax Management System (ITMS)	12	9	7	47	44

Source: Survey data 2022

As seen in the table 2, majority of the respondents agree that RRA has introduced filling of VAT 3 return on-line with a mean of 4.1 and a coefficient of variation of 0.13, this was followed by filing of Withholding Tax Return on line, payment of PAYE Return on-line as well as modernization of CSD. Additionally, majority of the respondents agree clearing agents and importers are now able to lodge their documents at any time and from any place in the world. In the same regard, it was revealed that the Customs Oil Stock Information System (COSIS) has been introduced in order to manage the stock of all refined oil. The Cargo Management Information System (CAMIS) has also been introduced to improve service delivery and minimize compliance costs. The Electronic Cargo Tracking System (ECTS), has also been introduced to track transit cargo from ports to borders to minimize diversion of transit cargo into the domestic market. Finally the Integrated Tax Management System (ITMS) has been introduced by RRA. The findings agree with Muwonge (2011),who suggested that improving tax compliance needs to have long-term reform efforts, that starts with strengthening the organization as well as management of the revenue agency, implementing robust collection systems notwithstanding building capacity in core tax administration functions (registration, filing and payment enforcement, debt collection, audit, taxpayer services, and processing of appeals).

The study revealed that, that RRA has introduced filling of VAT 3 return on-line. Additionally, majority of the respondents agree clearing agents and importers are now able to lodge their documents at any time and from any place in the world. In the same regard, it was revealed that the Customs Oil Stock Information System (COSIS) has been introduced in order to manage the stock of all refined oil. The Cargo Management Information System (CAMIS) has also been introduced to improve service delivery and minimize compliance costs. The Electronic Cargo Tracking System (ECTS), has also been introduced to track transit cargo from ports to borders to minimize diversion of transit cargo into the domestic market. Finally, the Integrated Tax Management System (ITMS) has been introduced by RRA. The findings agree with Muwonge (2011), who suggested that improving tax compliance needs to have long-term reform efforts, that starts with strengthening the organization as well as management of the revenue agency, implementing robust collection systems notwithstanding building capacity in core tax administration functions (registration, filing and payment enforcement, debt collection, audit, taxpayer services, and processing of appeals). Nakiwala (2010), further argues that the technology issue for tax authorities is regarded to be different to that of their taxpayers. There indeed appears to be a general acceptance that technology is likely to play a very essential role in tax management and as such most authorities have invested heavily in the recruitment for or developing their computer audit capabilities. There exists a number of techniques, which have been used to enhance tax compliance. One such method has been through Tax Simplification or Tax System Reform. This has been established to have a number of effects on enhancing compliance, as it helps taxpayers in avoiding inadvertent errors, while limit opportunities for tax evasion. Secondly the other technique which has also been used to enhance compliance is by through the provision of additional enforcement tools for tax authorities. Other 48 techniques include improved taxpayer services like taxpayer education, adoption of modern technology and efficient administration by the tax authorities (Brostek, 2007). The findings also affirm that indeed the past five years have seen the introduction of a number of other, Electronic Commerce‟ (EC) methods, technologies, and communications channels which have been well designed in a bid to allow for electronic processing via the application of the filing and payment of taxes, that includes Tele file, Internet, and others (Duncan, 2010). These technologies have seen the expansion of opportunities, which are available to countries and have therefore enables governments to carry on

with business with individuals and businesses electronically. At the same time, usage of these modes goes a long way to motivate countries to introduce such innovative approaches that are well related to business issues that are well are raised via electronics channels, for instance in the areas of authentication, acknowledgment of filings, as well as the treatment of filing intermediaries/transmitters. Additionally, the findings affirm further that such developments continually present the opportunity to develop new guidance for tax administrators, which takes into account both the wide range of new utility that are available to them, as well as the need to employ it in each instance with some consideration to consistency across tax jurisdictions. These rapidly increasing pace of technological change is likely to have a significant impact, positive and also negative, direct and indirect, on tax compliance (Erard, 2002). Information technology, which encompasses telecommunications as well as computerized systems, is likely to increase tax processes substantially, with savings in time as well as money, while at the same time affording customers a better service. On the other hand, the human element is also affected by technological changes in different ways, given that it makes jobs more important for some, while at the same time posing a threat to others. All the tax information systems including data bases need to be integrated and also have available the tools required to combat tax non-compliance; facilitate tax compliance and satisfy information requirements at the operational, managerial and internal control levels for the effective management of a modern Tax Administration (Allink & Kommer, 2000).

Table 3: Using on-line payment reduces tax payment process

	Frequency	Percentages
Strongly disagree	1	1
Disagree	5	4
Not sure	6	5
Agree	36	30
Strongly agree	71	60
Total	**119**	**100**

Source: Survey data 2022

As seen in the table 3, majority of the respondents (60%) strongly agree that using online payment reduces the tax payment process which saves on man-hour. Additionally, 30 % agree, 5 % disagree, 4 % strongly disagree while the remaining 1 % is uncertain about how using on-line payment reduces the tax payment process which saves on man-hour. According to Sani (2009), automation system helps to improve revenue collection. This is because they are based on the electronic payment system via applications such as toll revenue collection, automatic fare collection, bus revenue system and parking system.

Table 4: Using 0n-line payment reduces the receipting process

	Frequency	Percentages
Strongly disagree	3	3
Disagree	5	4
Not sure	6	5
Agree	36	30
Strongly agree	69	58
Total	**119**	**100**

Source: Survey data 2022

Table 4 shows that 58 % of the respondents strongly agree, 30 % agree, while 5 % are uncertain on how using on-line tax payment methods reduce the receipting process at RRA. On the contrary 4 % of the respondents disagree, while 3 % strongly disagree. The tax administration agency needs to see the taxpayer as a customer, not as someone who owes money to the Administration (Keen, 2013).

Table 5: Online Payment Process improves efficiency in dealing with RRA

	Frequency	Percentages
Strongly disagree	71	60
Disagree	6	5
Not sure	6	5
Agree	12	10
Strongly agree	24	20
Total	**119**	**100**

Source: Survey data 2022

Table 9, reveals that indeed 10 % of the respondents strongly agree 20 % of the respondents agree, 60 % of the respondents strongly disagree and 5 % of the respondents disagree while 13 % of the respondents are uncertain about how online payment process improves efficiency in dealing with RRA. Automation also provides huge transactions that need to be handled efficiently. According to him, automating revenue collection is key especially within the revenue collection agencies, which therefore requires fast and efficient output, as there will always be a trade-off between control and operational needs. (Sani, 2009)

Table 6: 0nline tax Payments improves tax compliance levels

	Frequency	Percentages
Strongly disagree	8	7
Disagree	12	10
Not sure	12	10
Agree	45	38
Strongly agree	42	35
Total	**119**	**100**

Source: Survey data 2022

Table 5 presents a summary of the findings with regards to how on-line tax payments have improved tax compliance levels. As seen in the figure, majority of the respondents (72%) agree that online tax payments have improved tax compliance levels. Specifically, 35 % of the respondents strongly agree, 38 % agree, 10 % are neutral, 10 % disagree while 7 % strongly disagree. These findings imply that indeed on-line tax payments have improved tax compliance levels. According to Duncan (2010), such ability helps a taxing authority in building interactive filing programs necessary for fairly complex tax filings, as well as for administrative functions such as taxpayer registration, account maintenance, and refund status tracking.

Table 7: Online tax payments helps RRA control the collection process

	Frequency	Percentages
Strongly disagree	7	6
Disagree	6	5
Not sure	2	2
Agree	29	24
Strongly agree	75	63
Total	**119**	**100**

Source: Survey data 2022

Table 7 shows that majority of the respondents (87%), were of the opinion that online tax payments has helped RRA to control of the Collection Process. Specifically, 63 % of the respondents strongly agree, 24 % agree, while 2 % are neutral that online tax payments has helped RRA to control of the Collection Process, while 5 % disagree as 6 % strongly disagreed. This implies that, with the implementation of on-line tax systems, 39 the collection process can be done from one central location, and thus enhancing control of the control process.

Table 8: Revenue collected

Revenue (Rwf bn)	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
Tax	376.8	460.6	556	651.9	763.4	859.1	986.7	1,086.50
Non-tax	10.6	14.4	13.6	11.8	10.5	13.2	14.6	16.3
Total	**387.4**	**474.9**	**569.6**	**663.8**	**773.9**	**872.3**	**1,001.30**	**1,102.80**

Table 8 shows that the revenue collected from 2009/10 up to 2016/17, where in 2009/10 revenue collected it was 387.4 billion; in 2014/15 2015/16 2016/17 2017/18 2018/19 2019/20 2020/21 2021/22 it has been increased to 474.9; 569.6; 663.8; 773.9; 872.3; 1,001.3; 1,102.8 billion respectively. Basing on these result the level of revenue collection was increasing this indicate the collection system is good.It follows therefore that maximization of societal welfare simply refers to minimization of collection costs. A higher rate of compliance helps the government to collect the same revenue with either lower tax rates and/or a reduced tax authority budget (Jones, 2009).

Relationship between information communication technologies and revenue collection

Considering the impact of information communication technologies on the tax collections in Rwanda, the research established the statistical relationship between Information Communication Technology and revenue collection in Rwanda. The relationship was established through Pearson correlation analysis using Pearson Moment correlation coefficient as depicted in table below.

Table 9: Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.888[a]	0.788	0.622	0.24618

a. Predictors: (constant), online declaration, online payment, EBM

Source: Survey data SPSS, 2022

Findings in the table 9 provide both the coefficient of determination is Adjusted R Square and the coefficient of correlation is R. The coefficient of determination (R^2 = 0.622) explained the

explanatory power of the model and indicates that 62.2% of variation in the revenue collection is being explained by the variation in the explanatory variable such as online declaration, online payment, EBM. However, the adjusted R square of 62.2% indicates that there are other variables that affect the revenue collection such as economic conditions, tax regulations which are not captured by the model formulated in the study that account for about 37.8% variation not explained by the model. The coefficient of correlation (R = 0.888) is greater than 0.5. This indicates that there is a strong positive and moderate relationship between ICT and revenue collection.

Table 10: Estimated coefficients of the model

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.821	0.301		2.727	0.054
	Online tax declaration	0.636	0.216	0.822	2.941	0.057
	Online tax payment	0.773	0.289	386	2.674	0.053
	EBM	0.664	0.234	0.469	2.874	0.056

a. Dependent Variable: Revenue collection

Source: Survey data computation from SPSS, 2022

A finding in the table 10 shows the estimated coefficients of the regression model of this study. From the findings, all the coefficients are statistically significant considering the positive value of the coefficients and a significance level great than 0.05. However, there is a correlation between online tax declaration and revenue collection (b = 0.636, sig =.057) online tax declaration itself explain 63.6% of the variation in the effectiveness of revenue collection. Moreover, there is significant and strong positive relationship between online tax payment with revenue collection (b = 0.773, sig=0.053) indicating that the 77.3% of the variation in revenue collection is explained by online tax payment. EBM has significant and positive relationship with the revenue collection (b = 0.664, sig = 0.056) indicating that 66.4% of the variation in the revenue collection is explained by EBM.

RECOMMENDATIONS

The following were the recommendations for improvement and further studies. These recommendations were drawn from the findings.

Rwanda Revenue Authority needs to involve Large Taxpayers while developing its systems to ensure that they take care of the needs of both the Authority and the Large Taxpayers. This will also ensure that they are user friendly and are efficient i.e. create an advantage over manual systems and enhance tax compliance.

The study acknowledges the role that technology plays in enhancing tax compliance among the Large Taxpayers and recommends that Rwanda Revenue Authority should sensitise the Large Taxpayers on the systems it has in place and how they will be of advantage to them in terms of increasing their compliance levels.

Given the positive response from the Large Taxpayers that they are willing to embrace technology in the long term, there is need for Rwanda revenue authority to keep on developing new systems and improving on the existing ones on a need to need basis. The new systems and improved existing ones will ensure that technology is sustainable and thus the compliance levels will also improve.

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