# Tax System Automation and Value Added Tax Compliance; The Moderating Role of Obligation Cost

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*Authors' contributions*

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## ABSTRACT

**Aims:** Actual revenues and expected revenue always differ, resulting in a shortfall in revenue collection. It is for this reason that the research sought to determine the moderating role of obligation cost on the relationship between Tax system automation and VAT compliance.
**Study Design/Methodology:** The study moderated tax obligation cost on the relationship between; tax invoice management system, VAT automated assessment, online filing procedure, digital payments, and VAT compliance using SMEs in Nairobi, Kenya. The research was underpinned by the ability to pay theory, the unified theory of acceptance, and the innovation diffusion theory. An explanatory design using a questionnaire was adopted to collect data from a sample size of 326 respondents. Hypotheses were tested using Hierarchical regression analysis.
**Findings:** It was evident that the Tax Invoice Management system, VAT automated assessment, Online filing procedure, and Digital payments have a significant effect on VAT compliance. Further,

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tax obligation costs negatively impact VAT compliance, while also moderating the direct effect relationships.

**Practical Implications:** Tax agencies should therefore encourage automation of their processes through digital tax payment, enhanced online filing procedures, and investing in VAT assessment systems, while ensuring reduced tax obligation costs, in their quest to increase VAT compliance.

## 1. INTRODUCTION

Globally, governments are responsible for providing essential services to citizens. This means they have to generate revenue to facilitate in the provision of these services. One of the major ways through which governments raise revenues is through taxes which form an integral part of the government's revenue source. Tax refers to an obligatory commitment to the government's income which is administered on the workers' salaries and wages and business benefits or profits obtained from goods or service provision. Effective tax collection is vital for sustainable fiscal growth and reduction of reliance on foreign aid [1]. Taxes are essential for a country's growth, providing revenue for government spending, redistributing wealth, and regulating the economy to foster a favorable business environment [2].

While tax collection is not the only revenue source, it is crucial for raising and spending funds that impact fiscal and social development significantly. Le Minh (2017) describes a type of tax known as Value Added Tax (VAT) as a tax that is applied at each stage of production and distribution, becoming a final tax for household consumption. VAT is a significant supporter of the absolute government charge income [3]. The VAT generated revenue to finance a considerable part of government functions among them planning of social management and guiding the national development agenda.

Tax revenue collection has however faced significant challenges in various countries, but the challenges are prominent in developing countries as compared to the developed nations [4]. Revenue authorities are confronting numerous challenges as far as the collection of tax revenue is concerned. Bikas and Andruskaite [5] note that the elevation amount of obliviousness and defiance from taxpayers has been a test in the revenue collection process. This challenge represents a significant problem since government activities and functions will be affected, investments wrecked and more so, the public will be adversely impacted by being denied extremely important management.

Developed countries, for example, USA and Canada have developed successful revenue collection frameworks consequently limiting revenue collection problems [6]. According to Nyaga [7], the degree of compliance impacts the revenue collection process by the mandated revenue collection bodies. Non-compliance which is the lack of taxes remittance is a major obstacle to revenue generation. Additionally, despite the ongoing tax restructuring systems in the Central governments, many African continent countries are characterized by several tax system structures that are not comprehended by the taxpayers.

It is therefore imperative for developing countries to develop and actualize strategies that will help in enhancing tax compliance. Innovation Diffusion Theory underscores the uptake rate at which innovations such as digital payment or online filing procedures are adopted by taxpayers and integrated into VAT compliance. Governments have been seeking tax reforms in structuring the tax system that will be feasible in supporting the government without a shortage in financing and a lesser burden on the taxpayer. To support the tax revenue collections, there is a demand for expansion of revenue generation strategies. For instance, incorporating Information Technologies (IT) in tax activities is likely to enhance tax authority activities in various ways such as enrolling taxpayers, filing returns, and processing payments as well as the process of issuing assessments. One significant factor driving efficiency in tax processes is digitalization, which aims to simplify and streamline compliance [8].

According to Kanbur and Keen [9], indeed, the use of platforms such as ESD and ETR systems should lead to improved compliance amongst large corporations since through the use of I-tax systems there exists reduced errors in the filing

procedures, improved efficiency, reduction in the life of tax and augmentation in multitasking levels of tax officers. The use of an automated tax system enables an organization to gain a holistic perception of its tax compliance. Enhancing tax compliance may not be a factor of automation only as it is also informed by the cost incurred by the taxpayer during the compliance process, such as the transaction costs and fees, filing costs, and cost of consultancy, among other costs. Eichfelder and Hechtner [10] highlight that taxpayers incur costs in meeting legal requirements and fulfilling their tax obligations, while Tran-Nam et al. [11] identify that tax compliance costs include both social costs and technical taxpayer compliance costs. The purpose of the research was to check on the possible impact of tax system automation on Value Added Tax compliance while exploring the moderating role of the tax obligation cost.

## 2. LITERATURE REVIEW

### 2.1 Tax Invoice Management System Process and Value-Added Tax Compliance

TIMS is an initiative geared toward improving the efficiency of the system of ETRs, which lack some elements, by linking with traders' systems at the point of sale, thereby tracking VAT transactions from inception. TIMs are also aimed at standardizing and ensuring the authentication of a tax invoice issued by VAT traders and verifying the validity of inputs claimed in the VAT returns. The Unified Theory of Acceptance and Use of Technology theory justifies the grounds for exploring issues of tax automation technologies adoption, such as VAT automated assessment, online filing procedures, and digital payments by the taxpayers.

The broad objectives of the ETI initiative are to increase VAT compliance, reduce VAT fraud, and increase tax revenues. This is done through real-time validation of invoices at the point of sale before being transmitted to the customer and to the revenue agency. The ETI system is tasked with improving trust between customers and businesses by taxpayers, providing fair business with a clean environment, making VAT returns easier with forms that are pre-filled, and hastening the processes so that VAT refunds are affected faster [12]. This is one approach that is targeted to enhance precision in managing automated V.A.T data. It solves the problem of discrepancies in invoices, registers invoice data

to bring about minimal fraud, streamlines tax invoices and receipts, and facilitates V.A.T returns filing with pre-filled forms easily. In another study, Bellon et al. [13] evaluate the effect of e-invoicing on corporate tax compliance and performance using administrative tax data and quasi-experimental variations in the roll-out of VAT e-invoicing in Peru.

Their results indicate that e-invoicing increased more than 5% in reported firm sales, purchases, and value-added within the first year of adoption. This effect was stronger for smaller firms and sectors with a higher rate of non-compliance, proving that e-invoicing improves compliance by reducing compliance costs and enhancing deterrence. While these are positive effects on tax collection, the effectiveness of the reform was diminished by weaknesses in Peru's VAT refund system, which calls for complementary reforms in addition to digital tools like e-invoicing that seek to enhance revenue mobilization. According to the OECD, it is using software technologies that businesses evade taxes through the manipulation of electronic cash registers and other point-of-sale systems used in retail outlets and restaurants.

Now, while it is generally presumed that such systems maintain correct records, the addition of particular "sales suppression" software allows these systems to commit large-scale inscrutable tax frauds. This poses a very large risk globally and massive government tax revenue losses. For instance, it has been estimated that the sales suppression occurring in restaurants in just Canada can have tax losses soaring up to $2.4 billion annually. As noted by Twesige et al. [14], Rwanda implemented Electronic Tax Registers in place in the year 2014, leading to the installation of more advanced Electronic Tax Registers in comparison to the other East African members.

Rwanda introduced a system in which the Electronic Billing Machines (EBMs), installed at the premises of taxpayers, are connected to the Rwanda Revenue Authority (RRA) using telecommunication SIM cards. In this setup, the tax administration can track issued invoices on a real-time basis, while records are also kept in the RRA archive system, accessible by the respective taxpayers. By facilitating this technological reformation, Rwanda was able to boost its VAT revenue by 25%. According to Dhaliwal et al. [15], the Kenya Revenue Authority was using a system called TIMS (Tax Invoice Management System) for the enhancement of

how VAT compliance is performed through technology in Kenya.

TIMS integrates the KRA I-Tax platform with all trader systems that include electronic tax registers, point-of-sale terminals, and ERP billing/invoicing systems to ensure effective monitoring for the issuance of electronic tax invoices. By offering real-time access to invoices issued, TIMS helps taxmen deal with evasion and brings efficiency to the performance of tax administration. Adopting technology as part of compliance-seeking means was adopted to enhance compliance with VAT and curb the high level of tax evasion. Among others, one of the initiatives for ensuring an expanded tax base and enhanced revenue collection is the VAA system, through the detection of variances between reported VAT input and output.

*$H_{01}$: Tax Invoice Management system has no significant effect on Value Added Tax compliance.*

## 2.2 VAT Automated Assessment and Value-Added Tax Compliance

Most governments run VAT collection based on self-assessment; that is, companies are required to calculate the value-added tax payable on their purchases and sales. However, studies have revealed that this kind of voluntary compliance system can be exploited in several ways since taxpayers may delay or evade payment consequently leading to a loss of revenue by the government [16]. Proper implementation may help reduce evasion to near nil through the identification of undeclared income and fictitious documents. Although the KRA had made plans for the system in 2018, it now appears to have been rolled out on a trial basis, as indicated by OECD [1]. Where VAT-registered taxpayers who receive discrepancy, notices rectify the issues within 30 days, or else it is assessed. This requires buyers to team up with suppliers and may be complex concerning the time of dealing with the transactions and the inclusion in the VAT returns.

Nazarov, Mikhaleva and Fomin [17] assessed how automating tax administration systems influences the approach by using secondary data from journals, and content analysis. Their results showed that technology offers real-time tax data, and thus it allows for the evaluation of non-compliance. In addition to that, it enhances the general tax compliance as well. They implied that

the real-time tax systems extremely raise compliance. In the United States, there are numerous strategies and laws that the government has put forward to ensure that it enhances VAT compliance among taxpayers. These strategies include mandating tax withholding at the income source, meaning that organizations purchasing goods or services deduct VAT and remit it to the government. An additional approach incorporates the perspective of giving revenue agencies enforcement powers that incorporate imposing fines on those flouting the tax laws.

Adeyeye [18] explored how technological innovation impacts tax administration in Nigeria. Using structured questionnaires, data was collected from 219 employees of the Federal Inland Revenue Service. Analysis was conducted using ANOVA, regression, and descriptive statistics models. The study revealed that information technology enhanced tax assessment by providing real-time control over tax processes. Evnevich and Ivanova [19] investigated the link between digital technologies and tax monitoring in Russia. Using both primary and secondary data, with questionnaires for primary data and secondary data from the Federal Tax Service's statistics, the study found that automating tax control systems significantly boosts audit efficiency and reduces informal tax schemes, leading to higher compliance and increased tax revenue. In Kenya, the Finance Act 2015 further amended Section 25A, allowing the Commissioner to appoint any person as a withholding VAT agent. Initially, only government institutions, parastatals, banks, financial institutions, cooperative societies, insurance companies, and regular exporters were designated as withholding VAT agents.

*$H0_2$: VAT automated assessment has no significant effect on Value Added Tax compliance.*

## 2.3 Online Filing Procedure and Value-Added Tax Compliance

The concept of online tax filing began in the United States when the Internal Revenue Service (IRS) started offering e-filing for tax refunds only [20]. This system has grown significantly, with around one in five individual taxpayers now filing electronically. Over the years, numerous enhancements have been added to the program. Today, electronic filing has expanded to many developed countries, including Australia,

Canada, Italy, the United Kingdom, Chile, Ireland, Germany, France, the Netherlands, Finland, Sweden, Switzerland, Norway, Singapore, Brazil, Mexico, India, China, Thailand, Malaysia, and Turkey [21]. Developing countries such as Uganda, Nigeria, Rwanda, and Kenya are also adopting electronic tax filing [20].

Akram et al. [22] conducted a study on the impact of online tax filing on tax collection in Saudi Arabia. The research aimed to understand how technology affects online tax filing and its subsequent impact on tax collection. The data was collected through an online survey of 409 users of online filing services. The analysis for this study was based on covariance-based structural equation modeling. It concluded that the collection of taxes in Saudi companies was significantly influenced by online tax filing.

Globally, the tax environment is changing rapidly. The advancement of Information and Communication Technology (ICT) poses challenges to tax revenue systems. Tax authorities must maintain a modern and responsive tax administration system. Since the 1990s, many tax authorities, particularly in developed countries, have leveraged ICT to adopt electronic tax filing [23]. Electronic filing represents a contemporary method for tax authorities to interact with taxpayers.

According to Andarias [24], electronic filing relies on technology, including computers, the Internet, and software applications. Effective e-filing can be measured by its ability to achieve desired outcomes. The measures include reducing the lifespan of tax processes, enhancing efficiency, minimizing procedural errors, increasing the multitasking capacity of tax officers, and assisting taxpayers in complying with regulations. A key component of e-filing is having a single database encompassing all aspects of taxable activities, such as valuation, billing, collection, and enforcement. Recognizing the impact of tax operating costs is not new; Adam Smith introduced the principles of good tax practice (equity, certainty, convenience, and economy) in 1776.

*H0₃: Online filing procedure has no significant effect on Value Added Tax compliance.*

## 2.4 Digital Payment and Value Added Tax Compliance

Digital tax payment is the process of paying taxes electronically using digital platforms such as online banking, mobile apps, or electronic fund transfers. This method allows taxpayers to conveniently fulfill their tax obligations without the need for physical visits to tax offices or manual paperwork [25]. Taxing authorities that demand tax remittance by mobile phones have recorded high jumps in the amounts collected. For instance, Mauritius recorded a 12% rise in tax revenue after the addition of mobile phones to its tax collection system [26]. The implication in this regard is that the use of mobile phones for tax administration is likely to improve tax collection. On the other hand, the Turkish policy of taxation simplifies the relevant tax laws in harmony with the stipulations by the European Union.

Roger [27] assessed the effect of electronic tax management on revenue collection in Rwanda. They assessed variables that included internet payment systems, mobile payment systems, and electronic billing systems among others. They targeted 120 respondents, from which they sampled 75, through a descriptive research design. Their results showed that mobile payments significantly enhance timely payments and thus help reduce operational costs by providing people with the convenience of making a payment anywhere. Night and Bananuka [12], established the effect of an electronic payment system on tax compliance and collection in Uganda. The survey research design was adopted for this case. A sample size of 38 respondents included importers, clearing agents, and Uganda Revenue Authority officials. Self-administered questionnaires were used to elicit data from these respondents. It was established that the e-payment system improved tax compliance by easing the ability of taxpayers to estimate their obligations properly and pay on time. This, in turn, made the work easier for URA staff and slightly improved tax collection. concluded that the introduction of an e-payment system significantly improves revenue collection performance.

*H0₄: Online filing procedure has no significant effect on Value Added Tax compliance.*

## 2.5 The Moderating Effect of Tax Obligation Cost

Sandford (2020) argues that tax obligation costs refer to the expenses incurred during tax compliance. It is these expenses related to meeting tax obligations that have occupied scholars, government officials, and business people similarly. According to Sandford [28], tax obligation costs are simply compliance costs that encourage tax evasion. With the realization that

high compliance costs can be detrimental to any country's competitiveness towards being attractive destinations for investments, public service agencies have increased their efforts in seeking ways of simplifying their tax systems. In this regard, the Ability to Pay Theory which states that taxes are to be imposed according to the ability of an individual or organization to bear the burden. The theory can be seen to relate to this research because it informs the VAT compliance Variable. It suggests that automation of VAT processes is fair to ensure the burden of tax is correctly spread in line with the financial ability of the taxpayer.

Tax obligation costs, therefore, may refer to expenses needed to assemble and sort out required information, engage internal auditors, buying materials as well as other supplies. Eragbhe and Modugu [29] did a study on the estimation of the burden of compliance to taxation for SMEs in Nigeria. They checked various areas including the internal compliance cost, external compliance cost as well as incidental burdens, for example offering a bribe or psychological burden. Compliance burden refers to the cost and effort that a taxpayer is compelled to incur to comply with tax laws and regulations. Compliance costs include several hard-core expenses on labor and time to meet the obligation of taxation. This includes the time businesses to get acquainted and comply with their tax liabilities, charges of hiring tax professionals or experts, and further expenses incurred on necessary systems, software, and travel.

Not all tax obligation costs are financial as they can be both internal and external [30]. Some are psychological, stemming from the stress and anxiety of meeting tax deadlines, the fear of non-compliance, and the significant penalties that come with it. These psychological burdens can cause considerable frustration for taxpayers. Businesses often face substantial challenges in striving to be tax-compliant. To alleviate this, tax authorities occasionally assist, especially regarding the filing of returns at decentralized locations in the country. However, despite these efforts, many businesses still experience significant burdens due to the high demand for these services.

Various studies have portrayed different findings on the cost of tax compliance. For instance, Lignier [31] found that while the compliance costs for SMEs are significant, such costs play a minor role in tax compliance compared to other factors such as perceived fairness and audit risk. At this point the cost of complying is of minimal relevance. Similarly, Yesegat [32] observed that while the cost of compliance is high in Ethiopia, the same is not a significant determinant of overall compliance. The view by Coolidge [33] is contrary to that argument that high compliance cost prevents compliance, especially for SMEs in developing countries. This would suggest that the higher the cost of complying, then the lesser the likelihood of taxpayers complying. Slemrod [34] in a publication entitled "Cheating Ourselves: The Economics of Tax Evasion" observed that the higher the cost of compliance encourages greater compliance out of fear of penalties and due to better access to advisory services it is positively correlated. From these different outcomes, it is apparent then that there is a need to determine the moderating effect of tax compliance cost.

*H0$_5$: Tax obligation cost does not moderate the relationship between the Tax invoice management system process, VAT automated assessment, Online filing procedure, digital payment, and Value Added Tax Compliance.*

## 3. METHODOLOGY

The study moderated tax obligation cost on the relationship between; tax invoice management system, VAT automated assessment, online filing procedure, digital payments, and VAT compliance using SMEs in Nairobi, Kenya. Explanatory research design suited the research since it was a cause-effect in nature. Primary data were collected using a questionnaire targeting a sample size of 326 respondents. Out of these only 265 questionnaires were correctly completed, retuned and analyzed, indicating a response rate of 81%. Both descriptive and Inferential statistical techniques were used in data analysis. Inferential statistical techniques involved correlation analysis and hierarchical regression analysis to test the hypotheses at a 0.05 significance level.

## 4. RESULTS AND DISCUSSION

### 4.1 Descriptive Statistics

The demographic data of the respondents were analyzed and summarized in Table 1. This was conducted to understand the nature of the respondents. The gender distribution among the respondents is relatively balanced. Out of 265 participants, 127 were female, making up 47.9% of the sample, while 138 were male, accounting

for 52.1%. This slight male predominance indicates a near-equal representation of both genders, which helps in minimizing gender bias in the analysis.

The educational qualifications of the respondents were diverse, with the most common qualification being a degree, held by 59 individuals (22.3%). This is closely followed by diploma holders, comprising 55 respondents (20.8%). Those with a master's degree constituted 48 participants (18.1%), and those with secondary education made up 53 respondents (20.0%). Additionally, 50 participants (18.9%) fell into the 'Others' category, which may include various other qualifications not explicitly listed. This distribution suggested a well-educated sample with a significant proportion of respondents holding advanced degrees, indicating a potentially high level of expertise and knowledge among the participants.

The experience levels of the respondents in terms of years in business also varied. The largest group consisted of those with 4 to 6 years of experience, representing 71 participants (26.8%). This was followed closely by those with 7 to 10 years of experience, numbering 67 (25.3%), and those with less than 3 years, comprising 66 respondents (24.9%). Individuals with more than 10 years of experience formed the smallest group, with 61 participants (23.0%). This spread of experience levels indicated a diverse range of business tenure among the respondents, thus providing insights from both relatively new and highly experienced business individuals.

Employee numbers showed a range, with most firms having between 301 and 400 employees (24.2%), followed by 100-200 employees (22.6%), being trailed by more than 400 employees with 19.2%, followed by SMEs with 201-300 employees, and lastly those with less than 100 employees at 15.1%. This reflects a broad spectrum of business sizes and experience levels. This represented the two control variables namely SME age and SME size. Overall, the demographic data indicate a well-rounded and diverse sample in terms of gender, educational background, and business experience. This diversity is beneficial for obtaining comprehensive insights and ensuring that the analysis captures a wide array of perspectives.

## 4.2 Correlation Results

The correlation matrix was used to determine the relationships between the research variables and is presented in Table 2. The findings show that the Tax invoice management system has a positive and significant relationship (r=0.582 p-value =0.000<0.05) with VAT compliance. This indicates that the use of a structured and systematic approach to managing tax invoices improves the accuracy and reliability of VAT reporting, thereby enhancing compliance. Further, VAT automated assessment also indicated a positive and significant (r=0.591, p-value =0.000<0.05) association with VAT compliance. Automated assessment systems help in streamlining the evaluation process and reduce errors, thereby ensuring that businesses accurately report their VAT liabilities.

### Table 1. Descriptive statistics

|  |  | Count | Percent % |
|---|---|---|---|
| Gender | Female | 127 | 47.9% |
|  | Male | 138 | 52.1% |
| Leve Of Education | Degree | 59 | 22.3% |
|  | Diploma | 55 | 20.8% |
|  | Masters | 48 | 18.1% |
|  | Others | 50 | 18.9% |
|  | Secondary | 53 | 20.0% |
| Length in Business | 4 to 6 years | 71 | 26.8% |
|  | 7 to 10 years | 67 | 25.3% |
|  | Less than 3 years | 66 | 24.9% |
|  | More than 10 years | 61 | 23.0% |
| Number of Employees | Between 100 and 200 | 60 | 22.6% |
|  | Between 201 and 300 | 50 | 18.9% |
|  | Between 301 and 400 | 64 | 24.2% |
|  | Less than 100 | 40 | 15.1% |
|  | More than 400 | 51 | 19.2% |

**Table 2. Correlation results**

|  | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| VAT Compliance | 1 |  |  |  |  |  |
| Tax Invoice Management System | .582** | 1 |  |  |  |  |
| VAT_Automated_Assessment | .591** | .599** | 1 |  |  |  |
| Online_Filing_Procedure | .551** | .513** | .505** | 1 |  |  |
| Digital_Payments | .406** | .233** | .330** | .182** | 1 |  |
| Tax_Obligation_Cost | -.631** | -.523** | -.526** | -.494** | -.375** | 1 |

Online filing procedure has a positive and significant (r=0.551, p-value =0.000<0.05) relationship with VAT compliance. The positive correlation suggests that making the filing process easier and more accessible encourages compliance. Online filing systems make it easier for businesses to submit their VAT returns, increasing convenience and reducing the likelihood of late submissions. Digital payment also indicated a positive and significant (r=0.406, p-value =0.000<0.05) relationship with VAT compliance. The significance of digital payments highlights the importance of modernizing payment systems. The ability to pay taxes digitally provides a secure and traceable method for transactions, which helps in maintaining accurate records.

Tax obligation cost has a negative and significant relationship (r= -0.63, p-value=0.000<0.05) with VAT compliance. The negative relationship indicates that higher costs can discourage compliance. High costs associated with fulfilling tax obligations can deter compliance, as they may be perceived as burdensome by businesses.

## 4.3 Conditional and Direct Effect Regression Results

A hierarchical regression analysis was conducted to test the hypotheses through six models that regressed the predictor variables against the dependent variable and subsequently introduced the interactions while observing for change in R-square and significance. Table 3 presents the regression results for the models.

The findings indicated that the Tax Invoice Management system has a positive and significant effect on VAT compliance (β=0.249, p-value<0.05). This underscores the reliability of the TIMS as a crucial determinant in enhancing VAT compliance. the analysis emphasizes the importance of the Tax Invoice Management system in bolstering VAT compliance. This

research aligns with Bellon et al. [13], Twesige et al. [14], and Dhaliwal et al. [15], who suggested that to enhance VAT compliance through technology, the Revenue Authorities should implement Tax Invoice Management to control the issuance of invoices. This system connects trader systems, like electronic tax registers, point of sale systems, and ERP billing/invoicing systems, with the revenue authorities' iTax platform, aiming to oversee the transmission of electronic tax invoices.

Value Added Tax automated assessment indicated a positive and significant effect on VAT compliance (β=0.267, p-value<0.05). This result implies that the implementation of automated VAT assessment has a substantial positive impact on VAT compliance. In particular, for every single unit increase in the effectiveness or extent of automated VAT assessment, VAT compliance improves by 0.267 units. This study agrees with Evnevich and Ivanova [19], where the researchers analyzed the impact of digital technologies on taxation monitoring and evaluation processes in Russia. They concluded that the automatization of tax control systems positively and strongly influenced the efficiency of tax audits and reduced informal practices of tax administration with higher compliance and consequently increased tax collections.

The findings further indicated that an online filing procedure causes a positive and significant effect on VAT compliance (β = 0.133, p-value < 0.05). The results show that a unit improvement in the online filing procedure brought a proportional increase of 0.133 units in VAT compliance. This study supports Akram et al. [22] who examined the impact of online tax filing on tax collection in Saudi Arabia. They observed how technology influenced online tax filing and further its relationship with tax collection. Their findings showed that the e-filing procedures for tax greatly improved the efficiency of tax collection in Saudi Arabian companies. Again, Okunogbe and Pouliquen [23] reported that the measures for

electronic filing ought to reduce tax processing time as a way of enhancing efficiency, reducing errors, increasing the multitasking capabilities of the tax officers, and easing taxpayers' compliance with set tax laws.

Digital payment was seen to have a positive and significant influence on VAT compliance as shown by $\beta$=0.045, p-value <0.05. Companies will have the benefit not only in convenience or efficiency terms from adopting digital modes of payment but also for better compliance with the VAT regime. Moreover, the study stands in line with past research that has underscored the benefits of mobile technology in tax collection. As an illustration, Naghavi and Scharwatt [26] mention that upon changing the adoption of mobile phones for tax collection in Mauritius, an increase of 12% in the collected tax revenues was attained. Roger [27] assessed the electronic tax management systems in Rwanda and established that mobile payment systems had a positive impact on improving timely payments and reducing operational costs since customers could pay at any place.

In addition, according to the research findings, tax obligation cost has a negative influence on VAT compliance; $\beta$= -0.032 with a p-value <0.05. The high compliance cost is therefore something that businesses should factor into their VAT compliance. The study findings agree with Eragbhe and Modugu [29] and Musimenta [30] who suggest the way forward to improve VAT compliance by easing the administrative and financial burdens on taxpayers by introducing simplified tax procedures or reducing filing fees. As such, investing in an efficient tax management system or professional tax advisory services will lower compliance costs.

The study further found out that tax obligation cost moderates the relationship between tax invoice management system ($\Delta R^2$=0.004, $\beta$= -0.010, p-value<0.05), VAT automated assessment ($\Delta R^2$=0.003, $\beta$= -0.160, p-value< 0.05), online filing ($\Delta R^2$=0.003, $\beta$= -0.127, p-value<0.05), digital payments ($\Delta R^2$=0.078, $\beta$= -0.034, p-value<0.05). These findings exhibit a negative sign on the coefficient of betta, which proves that the cost of the tax obligation is lessening the effect of some factors within the system automation on VAT compliance. While these variables tend to improve the level of compliance among taxpayers, their effect could

indeed be somewhat less if there is a perception by taxpayers that the cost of compliance exists. The findings of the study are supported by Sandford [28], who discussed compliance costs. This includes an aspect of labor and time used in the meeting of their tax compliance. Discussion The time and money spent to acquire knowledge about taxes due, hiring professionals or tax experts, and other costs such as systems, software, and travel.

## 5. DISCUSSION

Businesses that invest in solid tax invoice management systems normally have a more structured and accurate accounting process; therefore, they tend to ensure easy compliance with the VAT. Correct issuance and recording of the invoices are facilitated by such systems, hence reducing the likelihood of errors or omissions that may lead to cases of non-compliance. From here, therefore, such businesses are better placed to deliver their tax obligations both accurately and on time. That brings out the fact that tax authorities need to make sure that these systems are promoted or at times, making them mandatory. It will have increased the overall compliance rates significantly. Allowance of the authority to do this makes for a more open and effective tax environment that reduces opportunities for tax evasion and underreporting. Further, it may ensure consistent and reliable tax revenue collection, since the possibility of going in for practices that lead to discrepancies or disputes is less in businesses using such systems. The findings agree with the recommendations of Evnevich and Ivanova [19], who suggested the use of technology in tax administration and emphasized the role of tax control systems as a shift from the informal tax administration practices that can enhance tax compliance.

With automation, the assessment will be less prone to errors and less inconsistent because it will involve minimal manual handling. This shall help not only in calculating the correct tax liability but will also render the process more transparent and hence fair. For the tax authorities, investment in automation technology would be a strategic decision for bringing more efficiency into the system of tax collection. As supported by Akram et al. [22], online tax filing exerts a positive effect on tax compliance.

**Table 3. Hierarchical regression results**

| | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 |
|---|---|---|---|---|---|---|
| Constant | .127(.045) | .658(.106) | .507(.182) | .412(.194) | .449(.195) | .415(.201) |
| SMEage | .199(.030) ** | .185(.028) ** | .188(.028) ** | .184(.028) ** | .179(.028) ** | .179(.028) ** |
| SMEsize | .169(.017) ** | .138(.016) ** | .148(.017) ** | .156(.017) ** | .149(.018) ** | .148(.018) ** |
| Tims | .267(.031) ** | .246(.029) ** | .274(.040) ** | .231(.051) ** | .259(.054) ** | .249(.056) ** |
| Vatas | .145(.032) ** | .139(.030) ** | .138(.030) ** | .204(.056) ** | .263(.070) ** | .267(.070) ** |
| Ofp | .253(.037) ** | .232(.035) ** | .229(.035) ** | .225(.035) ** | .136(.051) ** | .133(.051) ** |
| Dpay | .015(.006) ** | .022(.010) ** | .022(.010) ** | .023(.011) ** | .025(.012) ** | .045(.021) ** |
| Tobc | | -.113(.018) ** | -.061(.022) ** | -.030(.010) ** | -.045(.021) ** | -.032(.010) ** |
| Tims*Tobc | | | -.039(.012) ** | -.015(.007) ** | -.025(.012) ** | -.010(.004) ** |
| Vatas*Tobc | | | | -.079(.017) ** | -.157(.024) ** | -.160(.024) ** |
| Ofp*Tobc | | | | | -.124(.027) ** | -.127(.027) ** |
| Dpay*Tobc | | | | | | -.034(.011) ** |
| R$^2$ | 0.441 | 0.442 | 0.446 | 0.449 | 0.452 | 0.523 |
| Δ in R$^2$ | - | 0.001 | 0.004 | 0.003 | 0.003 | 0.078 |
| F statistic | 47.096 | 30.232 | 26.066 | 22.831 | 20.138 | 18.137 |
| F-Sig | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

*SMEAGE: SME Age, SMESIZE: SME size, TIMS: Tax Invoive Management System, VATAS: VAT Automated Assessment, OFP: Online Filing Procedure, DPAY: Digital Payments, TOBC: Tax Obligation Cost*

The easier it is to file, the more willing and able are users to comply. Online filing systems make life easy for every citizen, allowing them to file from any location at their convenience and saving hassle and time in compliance. It is in the interest of tax authorities to encourage online filing systems. They not only provide timely filing but also increase the accuracy of data collected since digital systems can automatically check for errors or omissions. Online systems facilitate administrative tasks, therefore easing the workload of tax office staff and giving them an easy time in handling returns. This can, in turn, shorten the time of processing and speed up problem-solving, therefore facilitating the whole process of taxation and hence enhancing efficiency and effectiveness as also put forward by Okunogbe and Pouliquen [23]. The digital payment options will provide a secure avenue for businesses to pay their taxes and assist in making correct and timely payments. Doing this, will not only reduce the risks of errors that may occur with manual payments but also provide very clear and traceable transactions, thereby actually facilitating the duty of businesses and all forms of taxation authorities to operate transparent records.

Naghavi and Scharwatt [26] agree to pay tax digitally to increase the collected tax. Given this, there are various benefits that policymakers could reap from encouraging the adoption of digital payments. First, it eases the payment process for taxpayers. That is because it increases their compliance rate since businesses find it easy to comply with their taxation obligations. Second, it increases transparency and accountability in tax collections, for they do not allow fraudulent intentions or underreporting in tax collection. By embracing these technologies, the tax authorities should create an efficient and reliable tax system to collect revenues consistently without many troubles for better management of the fiscal budget. Roger [27] has explained that it is where digital payment is supposed to be encouraged because it enables customers to pay from any point, hence increasing their compliance. The findings of the research indicate that perceived variations in tax obligation costs can explain differences in the effect size of compliance measures that encourage VAT compliance. Although, in general, tax invoice management systems, VAT automated assessment, online filing, and digital payment encourage compliance with the VAT regime, perceptions of the cost of obligations reduce their impact.

If the costs are perceived as being too high, the business will be less likely to use the system to its full potential and hence probably lower levels of compliance will be recorded. This, in a way, means the tax authorities shouldn't consider implementing advanced compliance tools while designing ways of alleviating applicable financial burdens on the taxpayer. By making the systems more accessible and more attractive, overall compliance results improve as it ensures that the advantages of modernization in tax administration are maximally realized. It is not lacking when Adaku et al. [35] reiterated the view of reducing the burden in tax compliance [36].

# 6. CONCLUSION

These findings underline the critical role that modern technology can play in enhancing VAT compliance. The functionality set out for the improved version of the TIMS is sensitive to better adherence to tax regulations. At the same time, automated assessments for VAT and online filing procedures have a benign influence on the tax process, making it more streamlined and accurate. Digital payment methods contribute a great deal towards compliance by safeguarding and making it efficient for businesses to handle their tax obligations. In sum, therefore, the study concludes that the integration of these technological tools is of utility value in achieving enhanced compliance with VAT regulations in the best interest of business operators and tax authorities alike by opening up the tax system for greater effectiveness. Furthermore, even if the schemes themselves are in place, if there is a perception that the cost to business is too great, this can reduce their willingness to comply fully. This moderation effect illustrates very clearly that it is not only the provision of sophisticated tools for compliance that tax administrations need to bear in mind but also the overall cost implications for taxpayers. It is within the reach of rather feasible to lessen these costs if accessibility, effectiveness, and business-friendliness of the systems are achieved. Only then will the authorities realize that businesses show greater willingness to comply with VAT requirements without feeling overly burdened.

## DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies have been used.

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## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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