




“Tax compliance in an EFD-enabled environment: Evidence from a developing economy”

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ARTICLE INFO

Agnes Elson Malima, Surendran Pillay and Adefemi A. Obalade (2020). Tax compliance in an EFD-enabled environment: Evidence from a developing economy. *Accounting and Financial Control*, 3(1), 53-68.
doi:[10.21511/afc.03\(1\).2020.05](https://doi.org/10.21511/afc.03(1).2020.05)

DOI

[http://dx.doi.org/10.21511/afc.03\(1\).2020.05](http://dx.doi.org/10.21511/afc.03(1).2020.05)

RELEASED ON

Monday, 13 December 2021

RECEIVED ON

Monday, 25 October 2021

ACCEPTED ON

Wednesday, 24 November 2021

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JOURNAL

"Accounting and Financial Control"

ISSN PRINT

2543-5485

ISSN ONLINE

2544-1450

PUBLISHER

LLC “Consulting Publishing Company “Business Perspectives”

FOUNDER

Sp. z o.o. Kozmenko Science Publishing



NUMBER OF REFERENCES

77



NUMBER OF FIGURES

1



NUMBER OF TABLES

13

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BUSINESS PERSPECTIVES



LLC “CPC “Business Perspectives”
Hryhorii Skovoroda lane, 10,
Sumy, 40022, Ukraine
www.businessperspectives.org

Received on: 25th of October, 2021

Accepted on: 24th of November, 2021

Published on: 13th of December, 2021

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Conflict of interest statement:

Author(s) reported no conflict of interest

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TAX COMPLIANCE IN AN EFD-ENABLED ENVIRONMENT: EVIDENCE FROM A DEVELOPING ECONOMY

Abstract

The focus of this study was to assess the contribution of Electronic Fiscal Devices (EFDs) to ensuring tax compliance among small business owners in the Arusha Region in Tanzania. The study was motivated by the fact that the government of Tanzania has invested effort and funds to ensure that revenue adequately supports development projects. Regardless of effort, there is continued reliance on external sources of funds to support development projects. This poses a question on how the introduction of EFDs would increase tax compliance and eventually impact the government income for development projects. The main objective of the study was to determine whether the rate of using EFDs, the level of transparency, fairness in tax procedures, and the perceived audit effectiveness affect the level of tax compliance. Data was analyzed using descriptive procedures, One Way ANOVA, Chi-Square, and ordinal regression. Findings of the study are as follows: First, fairness in tax procedures, the perceived level of transparency and the rate of EFD use had no impact on the level of tax compliance; second, business and EFD use experience, audit effectiveness, and the use of EFDs in tax audits have impacted tax compliance. The study recommends other government departments to consider adopting relevant technology in operational areas where transparency, fairness and compliance are required. The inclusion of other sectors not currently captured by EFD use will be a step in the right direction.

Keywords

Electronic Fiscal Devices, tax compliance, tax evasion, fairness, transparency, audit effectiveness, small businesses, Tanzania

JEL Classification

H21, H22, H83

INTRODUCTION

Because of the key role of taxation, several efforts are in place to improve government revenue collection under the custodianship of the Tanzania Revenue Authority (TRA) (Malima, 2020). First, the TRA redefined its administrative blocks into small administrative geographical areas, down to the smallest unit called a “block” (Malima, 2013; Lubua, 2014). This smallest unit of administrative organization assists the revenue authority to reach out to taxpayers in their localities (Kagoro, 2011; Chege et al., 2015). The TRA uses online information systems to enable citizens who are located in various places to have access to tax services (Hoffman & Gibson, 2009). Some of online systems, which the TRA uses in performing its tasks are: Income Tax System (ITAX), Tanzania Customs Integrated System (TANCIS), Central Motor Vehicle Registration System (CMVRS), the Electronic Fiscal Devices (EFDs), and others, which are accessed through the website (Enahoro & Jayeola, 2012; Ministry of Finance Tanzania, 2015).

The use of EFDs is essential because it provides a mechanism to link the majority taxpayers with the revenue authority (Kira, 2016; Bostan et al.,

2017). The relevance of EFDs is evident in studies by Chege et al. (2015), and Kira (2016), who attributed the increase of Value Added Tax (VAT) to the roll-out of EFDs in Tanzania. Regardless of the success in revenue collection due to different administrative controls and the use of EFDs (and related information systems), it is accepted that Tanzania needs more revenue to detach itself from its dependency on donors, as 14.3% of government income originates from non-tax sources, including foreign aid and loans (Muriithi, 2013).

To increase revenue collection, there is a need to increase the compliance among small business owners that comprises above 80% of all entrepreneurs and that contributes up to 35% of the total Gross Domestic Product (GDP) of Tanzania (Machogu & Amayi, 2013; TCCIA, 2009). In Tanzania, EFDs were introduced to partly automate the taxation process and improve the collection of Value Added Tax (Tanzania Revenue Authority, 2018a). They monitor the movement of sales and stocks to businesses; the latter forms a basis for the general income tax estimation in respect of business (Akinboade, 2015). The EFD machine is expected to submit all business transactions to the tax authority, synchronously (Lubua, 2014; Mandari et al., 2017). The availability of business transaction reports reduces the workload required to determine outstanding tax, while enhancing the accuracy of the tax estimation process (Lumumba et al., 2010; Kira, 2016). If used as prescribed, EFDs contribute to fewer disputes between taxpayers and the revenue authority (Mativo et al., 2015). Despite the usefulness of EFDs, their application is still challenged by a low level of acceptance by taxpayers in the Tanzanian context (Ikasu, 2014). This is one of the reasons for unreliable tax collection during the period between 2012 and 2018, where the rise and fall in tax collection was observed (Malima, 2020). It is necessary to establish a scholarly position of the influence of EFDs in enhancing tax compliance.

Studies conducted in Tanzania acknowledged the role of EFDs in raising revenue among VAT traders (Chege et al., 2015; Gberegbe & Umoren, 2017). However, it is understood that non-VAT traders represent a complex segment of revenue collection (Ikasu, 2014). The category of non-VAT traders is mostly comprised of small businesses, which comprises 95 percent of all business activities in Tanzania (Malima, 2020). The failure to address this category of traders means that the government will miss out on collection of eligible tax. Additionally, none of these studies integrates the impact of EFDs with the determinants of tax compliance. Such determinants include the audit effectiveness, fairness in tax procedures and the level of transparency in tax processes (Muhrtala & Ogundeji, 2013; Ade et al., 2017). The current study addresses these knowledge gaps together with the impact of EFDs on tax compliance. Consequently, the study is more focused on small business owners, because they are the largest group of business owners, and their compliance would significantly enhance income revenue (Tanzania Revenue Authority, 2018a).

The aim of this study was to determine the impact of Electronic Fiscal Devices (EFDs) in ensuring tax compliance. To achieve this objective, this study examined the individual impact of the rate of using EFDs and factors determined by the literature to influence tax compliance, namely the perceived level of transparency, audit effectiveness, and the fairness of tax procedures on the compliance of taxpayers. The subsequent sections of this paper include literature review, methodology, results and analyses, and, lastly, the conclusion.

1. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

The Fiscal Exchange Model suggests that citizens' trust of the government relates to the quality of public services offered (Alabede et al., 2011; Gangl et al., 2015). Where the trust is high, and

government expenditures are relevant, taxpayers are likely to comply with the tax system (Palil et al., 2013; Engida & Baisa, 2014). Vries (2013) noted that perception by citizens about the quality of services received is the combination of factors such as the level of accountability shown by officials, the level of transparency in administrative processes, the perceived fairness to recipients, and the efficiency in service provision (Al-Maghrebi

et al., 2016). The achievement of these standards depends on the strength of the internal controls of the government (Sevilla, 2005; Simangunson, 2014; Aramide & Bashir, 2015). Strong internal controls allow the organization to detect any deviation that may affect the expected output (Gurama et al., 2015). Additionally, the Fischer model of tax compliance identifies the role of social, economic and psychological aspects in influencing tax compliance behavior among taxpayers (Lawan, 2017). The determining factors for tax compliance are categorized as follows: demographic characteristics, the opportunity for non-compliance, the attitudes and perceptions of taxpayers, and the tax system (Chau & Leung, 2009; Sapiei et al., 2014).

1.1. Perceived level of transparency, fairness and audit effectiveness

Transparency and fairness are key components of good governance (Obicci, 2015). In taxation, transparency is expected to enable a taxpayer and a tax auditor to arrive at a relevant tax position, in an open manner (Mukhlis et al., 2015). Both the taxpayer and tax auditor must openly see how the tax is established based on provided data. When the taxpayer hides part of the data, the level of transparency is affected (Grimmelikhuijsen et al., 2013). The intervention of Electronic Fiscal Devices is meant to eliminate that possibility, except where the business owner decides not to issue a receipt for every sale. The decision not to offer receipts after sales can be addressed through auditing other documentation pointing to the income of an individual such as bank accounts, purchases, and expenditures (Badara, 2012).

Studies conducted by Sidik et al. (2019) suggested the lack of fairness to affect taxation. The tax auditor is often unfair to the taxpayer, if they are motivated by corruption, hence, uses the lack of knowledge of the taxpayers to establish the tax, which is irrelevant by hiding the audit process from the client. Either the government or the taxpayer is affected where there is no transparency in the tax process (Devos & Zackrisson, 2015; Mandari et al., 2017). Knowing the need for transparency, this study determined its perceived level where EFDs are used, and how it affects tax compliance. The current information is used to derive and test the hypothesis below:

H_{01} : *The perceived level of transparency in tax processes does not impact the perceived level of tax compliance.*

1.2. Perceived level of fairness

Fairness in government services is another factor determining the perception of taxpayers on government expenditure. Fairness comes in a number of perspectives; the first is the distributive perspective (Gberegbe & Umoren, 2017). This perspective focuses on fair distribution of public services among different groups of the society. Procedural fairness is the second perspective of fairness in public services (Gberegbe & Umoren, 2017). In the taxation environment, this is the fairness of services given by tax officers to taxpayers (Kagoro, 2011). The literature explained that fair treatment in tax processes and simplified tax laws reduce taxpayers' complaints (Thomas, 2012). Retributive fairness presents the third perspective in public services (Gberegbe & Umoren, 2017). This refers to the fairness of the punishment imposed on taxpayers as a result of their failure to comply.

Practically, the perceived fairness and the perceived transparency are closely related. The study conducted in India by Geetha and Sekar (2012) and that of Ikasu (2014) conducted in Tanzania suggested that transparency leads to fairness in government activities; this is likely to be the same in the tax environment. In Malaysia and China, Palil (2015) and Wu et al. (2017) respectively asserted that when people feel they are being fairly treated, their tendency of complying with government directives is high. In the past, different studies reported unfair treatment by employees of the revenue authority in different African countries, as acknowledged by Alabede et al. (2011) of Nigeria, and Sidik et al. (2019) of Libya. The perception that taxpayers in the African continent are treated unfairly is not conducive for enhancing compliance (Sidik et al., 2019). Knowing the relevance of fairness in taxation, this study determines the extent to which taxpayers perceive fairness in the tax process. Furthermore, the study determined the impact of the perceived fairness on the level of tax compliance in Tanzania. The hypothesis below is developed to address this aspect of the study:

H_{02} : *The perceived fairness in tax processes does not impact the level of compliance.*

1.3. The level of audit effectiveness and tax compliance

Different studies established the role of audit in the tax process. For example, according to the study conducted by Yildiz (2019) in Turkey, tax audits make taxpayers careful of their decisions because of the knowledge that their financial data will be scrutinized to establish accurate tax dues. Accordingly, the study by Grimmelikhuijsen et al. (2013) concluded that the correct audit exercise provides fair grounds for establishing tax liabilities. Factors for an effective audit exercise include proper communication with the auditee. This was further explained by Drogalas et al. (2015) for Greece who suggested that the revenue authority must establish an effective communication system for enhanced extraction of information from the client. Proper communications will favor transparency, which is another requirement for effective auditing (Obicci, 2015). The audit team must openly discuss all facts for establishing the tax liability with the client (Maisiba & Atambo, 2016).

It is accepted that the ultimate goal of an enhanced relationship between the revenue authority and taxpayers is to ensure voluntary compliance (Deyganto, 2018). Nevertheless, studies by Gemmell and Ratto (2012) of the United Kingdom, and Beer et al. (2019) of the United States, shed light on the short-termism impact of relying on vigorous tax audits for compliance by taxpayers. They said that the short-termism is due to the fact that taxpayers will perceive that they will not be audited in the near future; therefore, they will continue with tax-evasion behavior. In addition, the short-termism may be a result of effort by taxpayers to compensate penalties or losses due to the previous audit exercise through whatever means possible. This factor is supported by Hebous et al. (2020), whose study was conducted in Norway.

The use of EFD is expected to enhance the audit process, through constant electronic monitoring of business transactions. It addresses the short-termism challenge through alerting taxpayers that the audit exercise is a continuing process (Emmanuel et al., 2013; Simangunson, 2014). The

availability of tax records makes the audit process quicker and simplified (Yunus et al., 2017). With this position, this determines the perceived effectiveness of the audit exercise in ensuring compliance, in the environment supported by Electronic Fiscal Devices. Therefore, the study is designed to test the hypothesis below.

H_{03} : *The perceived level of audit effectiveness does not determine tax compliance by the taxpayer.*

2. DATA AND METHODOLOGY

This section presents all research methods used in this study that empirically investigates the effectiveness of Electronic Fiscal Devices (EFDs) in ensuring tax compliance among small businesses owners of Arusha-Tanzania. This study adopted advanced quantitative research methods to abide with objectivism and positivism (Williams, 2007; Dulock, 1993) in order for the relationships between studied variables to be established explicitly. Following the quantitative nature of the current study, the survey research strategy is adopted. The strategy enabled the collection of data from a large number of respondents, using the structured survey questionnaire in the collection of the main data. The survey strategy facilitated the testing of relationships between the studied variables, because all variables were presented in measurable terms. Likert scale measurements are utilized except Gender, which is a categorical variable.

2.1. Population and sampling

This study targeted taxpayers of the Tanzania Revenue Authority who had the obligation to use EFDs in their business. Nevertheless, Tanzania is geographically too large to be confined to this study, given the limited timeframe and resources. To ensure that the study is effectively conducted, the population is redefined to include small enterprises based in the Arusha Region. In Tanzania, small businesses have the annual turnover not exceeding TZS 20 million (Tanzania Revenue Authority, 2018b). According to a report by the Tanzania Revenue Authority, all major economic activities (such as mining, business, tourism and agriculture) take place in the Arusha Region.

The national statistics suggested that the Arusha Region had approximately 1,694,310 people aged over 25 years (National Bureau of Statistics, 2019). Unfortunately, the actual number of small business taxpayers within the population is unknown. Therefore, the current study used respondents who visited all districts' tax centers in March 2019. On average, 1,500 clients visited tax centers in all six districts of the region in one month (Malima, 2020); the number is used as an estimated population for this study. These clients were extracted from the TRA register, where access is assured. The sampling frame engaged clients from small businesses, because they are more problematic in tax compliance (Malima, 2020). This category is estimated to constitute two-thirds of the number visiting the tax centers each month; therefore, the sampling frame is estimated to be 1,000. According to Bartlett et al. (2001), at the standard error of 0.05, at least 278 units of the sample adequately represent 1,000 units of the population. This study used 279 units in its sample. The adopted model is supported by credible studies on sampling; for example, both studies by Singh and Masuku (2014), and Suresh and Chandrashekara (2012) recommended the use of the model in quantitative sampling.

2.2. Research instrument and administration

A questionnaire was developed based on variables and their associated hypotheses to fulfil conditions for carrying out a quantitative study. To simplify the questions, the study adopted a closed-end questionnaire as explained to minimize ambiguity to respondents (Bowling, 2005). The questionnaire components include respondents' characteristics, EFD uses in business transactions, the level of transparency of the tax system, audit effectiveness and the perceived procedural fairness. Different stakeholders were involved in designing the questionnaire. The first draft of the questionnaire was shared with two holders of Ph.D. degrees who are experts in business studies, particularly taxation and EFDs to validate the content. The study and questionnaire involved in data collection were shared in a group discussion, and the feedback was incorporated. This approach has been followed by previous studies (Sobh & Perry, 2006; Walsham, 2006). The group discussion included taxpayers who are users of EFDs, and employees of the revenue authority.

Further to this, the pilot study was conducted to determine the answerability of the questions. The final questionnaire was understandable and unambiguous to respondents and that it is the original version of this study. Through interpersonal interactions, respondents were able to seek clarifications in all areas of ambiguity before submitting their responses. A period of two days was allocated for respondents to complete the questionnaire and return their responses to the researcher.

2.3. Data analysis methods

The analysis of the current study used descriptive statistics to describe the main features of the sample and to know how their frequencies are distributed across the sample, more especially among demographic variables. The descriptive statistics used are frequency, percent, and mean. The study presented the descriptive information through tables, and a pie chart, the cross tabulation or group means. To test the impact of independent variables on respective dependent variables, the study used models such as ordinal regression, ANOVA and the chi-square analysis for testing hypotheses. In order to analyze how the perceived level of tax compliance (TC) is hypothetically determined through the perceived effectiveness of tax auditing (ETA), the perceived fairness of tax procedures (PF), the perceived level of transparency (LT) and the perceived rate of EFD use, this relationship is symbolically represented through equation 1.

$$TC = +1ETA + 2PF + 3LT + 4RATE. \quad (1)$$

For equation 1, independent variables were the PF, and the LT, the ETA and the perceived rate of EFD uses. In Table 1, the observed highest Variance Inflation Factor (VIF) was 1.050. The observed VIF is low, therefore the independent variables are free from being affected by the multicollinearity effect (Taylor & Medina, 2013). A VIF above 5.0 is unacceptable (Sobh & Perry, 2006).

Table 1. Multicollinearity coefficients of equation 1

Source: Authors' design (2020).

Model	Collinearity statistics	
	Tolerance	VIF
Rate of EFD Use	.985	1.015
Fairness of Tax Procedures	.967	1.034
Level of Transparency	.953	1.050

In testing the reliability of items, the Alpha value measures the scale reliability, where the high value is considered as more reliable. The testing yielded the Cronbach Alpha equal to 0.82, 0.76, 0.74, 0.75, and 0.73, respectively, for the perceived level of tax compliance, perceived fairness of tax procedure, rate of EFD use in business transactions, the perceived effectiveness of tax audit and perceived level of transparency.

3. RESULTS AND DISCUSSION

3.1. Demographic variables and tax compliance

It is assumed that demographic variables can affect the level of compliance that will be useful to tax professionals and academics (Al-Mamun et al., 2014). As a result, this study examines the following demographic variables: age, gender, education and business experience. Using the percentage of responses in Figure 1, a total of 54.3% of respondents admitted to compliance with taxation regulations through paying their tax dues. The remaining percentage admitted to not fully complying. The percentage of those who did not comply is significant; therefore, it requires the attention of the revenue authority. The percentage of those who did not comply carried more significance because it was drawn from among active taxpayers, who are registered with the revenue authority (Agbi, 2014; Kastlunger et al., 2010). The implication is that the percentage of non-compliance would be greater if the sample were to be drawn randomly from the general population of Tanzanians.

In addition, the study determined the categorical relationship between demographic variables and

the perceived level of tax compliance. The study observed that the age of respondents, gender, and their level of education showed no significant relationship with the perceived compliance to tax laws. Based on extracts of the one-way ANOVA presented in Table 2, each tested variable showed the p-value greater than the threshold (0.05). Similarly, the variables showed an insignificant impact on the perceived tax compliance; after the ordinal regression model was applied between suggested variables (refer Table 4). In each case, the model-fitting information p-value was greater than the threshold (0.05). None of the parameter estimates showed a significant impact as indicated in Table 4. Given this data, the age of respondents, gender and level of education cannot be used in predicting the compliance of taxpayers. Regardless of these results, a different perspective may be observed if the study was to be conducted in the general population as supported by Antwi and Hamza (2015) and Curristine et al. (2007) who observed that age, gender and education related to the level of compliance of individuals. For example, the aged population was more responsive to compliance than the young population in the study conducted on a general population by Al-Mamun et al. (2014).

Table 2. Demographic variables and tax compliance – ANOVA extracts

Source: Authors' estimation (2020).

Demographic variable	P-value	Status
Age	0.370	Rejected
Gender	0.420	Rejected
Education	0.369	Rejected
Business experience	0.005	Confirmed

The study observed that the business experience relates significantly with the level of compliance. According to Table 2, there is a significant cate-

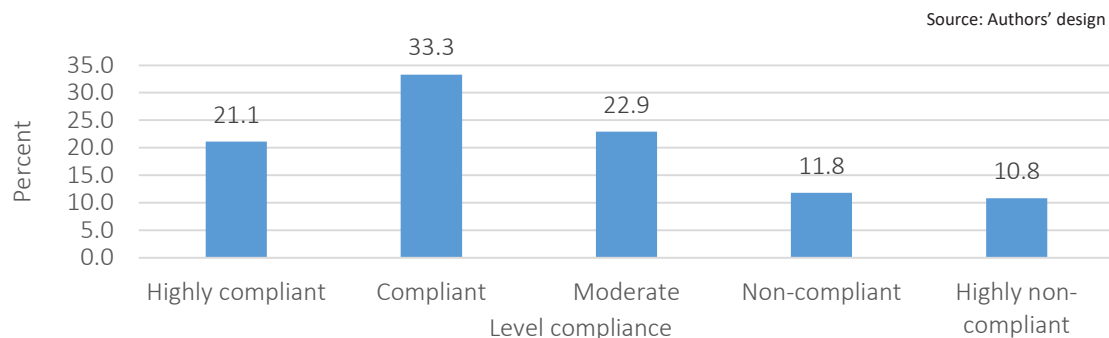


Figure 1. The perceived level of tax compliance

gorical relationship between business experience and the level of compliance; the observed one-way ANOVA p-value was 0.005. According to descriptive information presented in Table 3, those with business experience of between 3 and 5 years are more compliant, followed by those with the lowest experience. It was surprising to learn that those with more experience in business were more inclined to non-compliance; this is the group with 6 years and more business experience.

Table 3. Business experience and tax compliance-descriptive extracts

Source: Authors' estimation (2020).

Parameters	N	Mean
2 years and below	148	2.56
Between 3 and 5 years	78	2.31
6 years and above	53	3.02
Total	279	2.58

An additional analysis was conducted between business experience and the level of compliance. The analysis was aimed at knowing the presence of a causal relationship between business experience and the level of tax compliance. The ordinal regression results presented in Table 4 suggest that the model is suitable for analysis. The observed model-fitting information p-value was 0.008; this is less than the threshold. The study observed that the business experience offered a 3.6% influence on the level of tax compliance. Additional evidence

shows a significant difference on the response of clients across parameters for business. After respondents with business experience of more than 6 years were set as the reference value, the p-value for respondents with less than 2 years, and those between 3 and 5 years were observed to be less than the threshold (see Table 4). In this study, it was collectively confirmed that business experience is a useful determinant of the level of compliance expressed by registered taxpayers, more especially in a non-VAT category of respondents.

3.2. EFD use and tax compliance

The interest of this section is to test the influence of the rate of EFD use (and other related EFD factors) on the level of tax compliance. In addition, the study determines the categorical relationship as Table 5 presents the results of the one-way ANOVA analysis between tax compliance and other variables, including the rate of using EFDs.

Table 5. Tax compliance and other variables – ANOVA extracts

Source: Authors' design (2020).

Demographic variable	P-value	Status
Rate of EFD use	0.479	Rejected
EFD use experience	0.017	Confirmed
EFD use in tax audit	0.000	Confirmed
Effectiveness in tax audit	0.004	Confirmed
Fairness in procedures	0.003	Confirmed
Transparency in tax procedures	0.002	Confirmed

Table 4. Demographic variables and level of compliance – ordinal regression extracts

Source: Authors' estimation (2020).

Input variable	Element of measurement	Value	Parameter estimates for respective input variables	
			Input variable scale	P-value
Gender	Model-fitting information p-value	0.631	Female	0.634
			Male	Ref. value
	Nagelkerke Pseudo r-square	0.001		
Education	Model-fitting information p-value	0.568	Primary	0.374
			Secondary	0.203
	Nagelkerke Pseudo r-square	0.008	Certificate/Diploma	0.543
			Degree or above	Ref. value
Business experience	Model-fitting information p-value	0.008	2 years and below	0.030
			Between 3 and 5 years	0.002
	Nagelkerke Pseudo r-square	0.036	6 years and above	Ref. value
Age	Model-fitting information p-value	0.252	18-30 years	0.671
			31-40 years	0.738
	Nagelkerke Pseudo r-square	0.015	41-50 years	0.166
			51 or above	Ref. value

According to results presented in Table 5, the study confirmed no significant categorical relationship between the rate of EFD use and the declared level of tax compliance, since the observed one-way ANOVA p-value (0.479) was greater than 0.05. According to Table 6, the study observed upon testing the impact of the rate of EFD use on the level of compliance, that the model-fitting information p-value was 0.581, and all parameter estimates had the p-value above 0.05. Based on this information, the rate of EFD use does not have a significant causal influence on the level of tax compliance. Regardless of the level of EFD use expressed, the level of tax compliance was not affected. Janeska-liev and Debarliev (2015), who suggested that the EFD use rate does not impact the level of tax compliance, support the observations of the current study. This suggests that people can have different use rates and share the same level of compliance.

It was surprising to note that the experience of users with the use of EFDs, resulted to a significant relationship with tax compliance. For example, results in Table 5 suggested the One-Way ANOVA p-value equal to 0.017. The observed p-value meets the requirement for a confirmatory test of the categorical relationship between user experience and tax compliance, because it is less than 0.05. Accordingly, the descriptive information extracts presented in Table 7 suggest that users with EFD experience of between 2 and 4 years were more inclined to comply with tax rules, than the rest of the categories. According to Okpeyo et al. (2019),

those with scant experience are expected to be more resistant to compliance than those with experience; however, this study does not completely support this position. Consistent with the current study is Mansor et al. (2015) who found that those with more experience find ways to avoid paying tax, with the understanding that they will not be noticed because of their experience. The ordinal regression analysis presented in Table 6 suggested that when the parameter with 5 years of experience and above is set as a reference value, only those with experience of between 2 and 4 years were significantly different in their response. Referring to Table 7 shows that the category with experience between 2 and 4 years is the only one with respondents who are more compliant with taxation, compared to the rest of the parameters.

Table 7. EFD use experience and tax compliance – descriptive information extracts

Source: Authors' estimation (2020).

Parameters	Frequency	Mean
Below 12 months	108	2.78
Between 2 and 4 years	143	2.37
Above 5 years	28	2.86
Total	279	2.58

3.3. Audit effectiveness and tax compliance

The perceived audit effectiveness is among variables predicted to influence the perceived tax com-

Table 6. Ordinal regression results between different variables and tax compliance

Source: Authors' estimation (2020).

Input variable	Element of measurement	Value	Parameter estimates for respective input variables	
			Input variable scale	P-value
Rate of EFD use	Model-fitting information p-value	0.581	Above 80% of use	0.275
			Between 60% and 80%	0.449
	Nagelkerke Pseudo r-square	0.011	Between 40% and 60%	0.238
			Between 20% and 40% 20% and below	0.678 Ref. value
EFD use experience	Model-fitting information p-value	0.014	1 years and below	0.727
			Between 2 and 4 years	0.049
	Nagelkerke Pseudo r-square	0.031	5 years and above	Ref. value
			Very high	0.879
Transparency in tax procedure	Model-fitting information p-value	0.008	High	0.890
			Moderate	0.912
	Nagelkerke Pseudo r-square	0.051	Low	0.199
			Very low	Ref. value

pliance. Before testing the main hypothesis, the study tested the categorical relationship between the perceived audit effectiveness and tax compliance. The observed one-way ANOVA p-value in Table 5 was 0.004, which shows that there is a significant categorical relationship between audit effectiveness and tax compliance. This result is further clarified through descriptive information presented in Table 8, which suggests that those who agree/strongly agree on the audit effectiveness are more inclined to practice tax compliance than their counterparts. Their mean response value is lesser than the average mean, which is 2.58.

Table 8. Audit effectiveness and tax compliance – one-way ANOVA mean extracts

Source: Authors' estimation (2020).

Parameters	Frequency	Mean
Strongly agree	52	2.06
Agree	105	2.53
Moderately agree	82	2.77
Disagree	23	3.00
Strongly disagree	17	2.94
Total	279	2.58

According to Table 8, those who strongly agreed with the audit effectiveness showed few counts in their frequency. Therefore, the study merged the following parameters of the variable: disagree merged with strongly disagree, agree merged with strongly agree. The new parameters were “agree” and “disagree”. The study used the new set of variables to test the impact of the perceived audit effectiveness on tax compliance. According to the results of the ordinal regression model presented in Table 9, the regression model matches the current relationship, with the model-fitting informa-

tion p-value presented as 0.001. Furthermore, the Nagelkerke r-square value is 0.065, suggesting an influence of 6.5%. It is further observed that when the parameter “disagree” is set as a reference value, the parameter “agree” showed a significant difference in its p-value ($p = 0.004$). Therefore, a significant influence is exerted by the perceived audit effectiveness on the level of tax compliance. This observation supports those of Verboon and Goslinga (2009) and Sidik et al. (2019) who in their studies suggested that when taxpayers are treated fairly through the audit process, they are likely to comply.

Another variable that was engaged in this section is the performance of audit through the EFD system. In the first case, the study determined whether the use of EFD in auditing categorically related to the level of tax compliance. According to results presented in Table 5, the observed one-way ANOVA p-value was 0.000; this value suggested a significant categorical relationship between the use of EFD in tax auditing and the level of tax compliance. Further, the descriptive information presented in Table 10 suggests that the mean value for those who agree/strongly agree on the effectiveness of EFD use in audit, prefers EFDs for audit compared to those who disagreed. This information suggests that the EFD use in audit is linked more to tax compliance.

In another set of analysis, the study determined the impact of the use of EFD systems on tax compliance. According to the results presented in Table 9, the ordinal regression model fits properly to the relationship by the two variables; the model fitting information p-value is 0.000. Furthermore,

Table 9. Ordinal regression between different variables and tax compliance

Source: Authors' design (2020).

Input variable	Element of measurement	Value	Parameter estimates for respective input variables	
			Input variable scale	Input variable scale
Audit effectiveness	Model-fitting information p-value	0.001	Agree	0.004
			Moderately Agree	0.399
	Nagelkerke Pseudo r-square	0.065	Disagree	Ref. value
EFD use in tax audit	Model-fitting information p-value	0.000	Strongly agree	0.000
			Agree	0.000
	Nagelkerke Pseudo r-square	0.113	Moderately Agree	0.000
			Disagree	0.260
			Strongly disagree	Ref. value

the Nagelkerke r-square value is 0.113, which suggests 11.3% influence on tax compliance by EFD use in the audit process. These observations are further described by parameter values obtained after setting the response of those who strongly disagree that EFD is useful for effective audit as the reference value. It is observed that those who disagree that EFD use leads to effective audit exercise are the only ones who expressed opinions similar to those who strongly disagree. The rest of the parameters significantly differ with the reference value. According to Table 10, those who agree on the use of EFDs in auditing are more compliant than their counterparts.

Table 10. EFD use in audit and tax compliance mean extracts

Source: Authors' estimation (2020).

Parameters	N	Mean
Strongly agree	49	2.49
Agree	102	2.36
Moderately agree	98	2.48
Disagree	21	3.67
Strongly disagree	9	4.00
Total	279	2.58

Generally, the use of EFDs in auditing is perceived to create a fair ground as it enables the tax auditor and the auditee to have a common ground for their discussions and estimations (Chatama, 2013). This is made possible by the ability of the EFD machine to capture transaction records and preserve them for future use (Darwish et al., 2014; Lubua & Pretorius, 2019). Furthermore, the EFD sets a platform for sharing different tax-related information (Kira, 2016).

Table 11. Ordinal regression analysis between different variables and the level of tax compliance

Source: Authors' design (2020).

Input variable	Element of measurement	Value	Parameter estimates for respective input variables	
			Input variable scale	Input variable scale
Fairness in tax process	Model-fitting information p-value	0.007	Very fair	0.136
			Fair	0.099
			Moderate	0.073
			Unfair	0.700
			Very unfair	Ref. value
Transparency in tax procedure	Model-fitting information p-value	0.008	Very high	0.879
			High	0.890
Transparency in tax procedure	Nagelkerke Pseudo r-square	0.051	Moderate	0.912
			Low	0.199
			Very low	Ref. value

3.4. Fairness, transparency in tax process and tax compliance

In this section, the intention is to test their categorical relationship of the perception of taxpayers on the levels of transparency and fairness with tax compliance using a one-way ANOVA. Furthermore, the study tests the influence of these variables (independently) on tax compliance. According to the information presented in Table 5, the study showed the presence of a significant categorical relationship between fairness in tax procedures and tax compliance. The observed one-way ANOVA p-value was 0.003. A closer look at descriptive information presented in Table 12 suggests that respondents who moderately agree, agree or strongly agree are more compliant with tax laws. In addition, results of analysis to determine the impact of the perceived fairness on the level of tax compliance are summarized in Table 11.

According to the results of the ordinal regression, the model-fitting information ($p = 0.007$), and the Nagelkerke r-square value (0.052) were observed. Regardless of these values, parameter estimates are all above 0.05, which therefore confirms the lack of a significant influence by the perceived fairness in tax processes. Nonetheless, it is encouraging to note that those who perceive more fairness are more inclined to compliance, and vice versa. Fairness affects the trust of taxpayers toward their government (Kagoro, 2011; Gurama et al., 2015).

Furthermore, the study conducted an analysis which was intended to determine the significance of the categorical relationship between the perceived level of transparency and tax compliance.

Table 12. Fairness and tax compliance – mean extracts

Source: Authors' estimation (2020).

Parameters	N	Mean
Strongly agree	40	2.50
Agree	69	2.32
Moderately agree	83	2.37
Disagree	66	3.05
Strongly disagree	21	2.90
Total	279	2.58

Table 13. Transparency and tax compliance mean extracts

Source: Authors' estimation (2020).

Parameters	N	Mean
Strongly agree	56	2.52
Agree	103	2.40
Moderately agree	72	2.46
Disagree	43	3.28
Strongly disagree	5	2.60
Total	279	2.58

Based on the results presented in Table 5, the one-way ANOVA analysis observed that the p-value was 0.002, which confirms the significance of the relationship. Moreover, the descriptive information presented in Table 13 suggests that respondents who agree or strongly agree that audit processes are transparent are more compliant to tax laws than their counterparts. Transparency in taxation enhances the confidence of taxpayers (Grimmelikhuisen et al., 2013).

Moreover, the study used ordinal regression to determine whether the perceived level of transparency significantly affects the level of tax compliance. According to results presented in Table 11, the regression information (model-fitting p-value is 0.008, and the Nagelkerke r-square value is 0.051) was significant. Regardless of the above observation, none of the parameters showed a significant difference when the parameter known as "strongly disagree" was set as a reference value. All the p-values were greater than 0.05. Therefore, the perceived transparency is not a good determinant of the level of compliance.

4. DISCUSSION OF FINDINGS

Tax compliance is the ultimate output variable of the study. Other variables were either completely independent or moderating variables with re-

spect to tax compliance. Although the percentage of those who perceive compliance is 54.4%, a large group of taxpayers is still not fully complying with tax laws and regulations. This is particularly noteworthy, because respondents are aware that they are not complying. With reference to demographic variables, only business experience showed a significant relationship with the level of compliance. The approved relationship is both categorical and causal. It was observed that people with business experience below 5 years are more compliant than those more experienced. According to Deyganto (2018), and Edogbanya and Sule (2013), the observation is possible because experience exposes taxpayers to more methods of avoidance, with a low chance of being detected.

One of the hypotheses was tested whether the rate of EFD use determined the level of compliance. The result of the analysis suggested no significant relationship between the two variables. Furthermore, the study tested other variables related to EFDs against tax compliance. In this case, the EFD use experience, and EFD use in tax audit both tested positive with tax compliance. The less experienced are more compliant, and the more the EFDs are used in audit, the higher the level of compliance. With this information, the relevance of EFD use is a good cause for compliance as concluded by Mandari et al. (2017).

Accordingly, the study confirmed the hypothesis suggesting that effectiveness in tax audit related to tax compliance. In this case, both categorical and causal relationships were confirmed. It was revealed that respondents who perceive effectiveness in tax audit are more inclined to compliance. Another relationship that was confirmed was between fairness in tax procedures and compliance. Hartner et al. (2008) suggested that fairness

is a motivation to taxpayers. Transparency was equally detected to determine the level of compliance. In this case, both categorical and causal relationships were confirmed. When the level of transparency is high, the chance for tax compliance also increases. As concluded by Verboon and Goslinga (2009), transparency removes the room for corruption and hence it becomes the point of motivation.

CONCLUSION AND RECOMMENDATIONS

Altogether, the perceived level of transparency, perceived fairness in tax procedures, audit effectiveness, EFD use experience, and EFD use in audit exercise were confirmed to determine tax compliance. In this regard, the study provides information of relevance for enhancing the rate of EFD use and eventually tax compliance. In this context, EFD use will go a long way in enhancing government revenue income emanating from taxation. The ultimate result will be getting adequate revenue to build the infrastructure necessary to boost the national income. Another implication is that the introduction of EFDs is a useful initiative by the TRA to promote the fundamental characteristics of an effective tax system such as fairness and transparency. Additionally, findings imply that EFD is capable of achieving the intended objective such as accuracy and efficiency in tax management, addressing tax and poor record-keeping. This will eventually simplify the process of tax auditing and revenue collection in general.

In the light of the findings, the study recommends other government agencies to consider the adoption of relevant technology in operation areas where transparency, fairness and compliance are desirable. Inclusion of other sectors that are not currently captured by EFD use will be a step in the right direction. This study was more inclined to a quantitative approach. An extensive study with a qualitative perspective would bring additional information. Furthermore, even within the quantitative approach, other models such as Structural Equation Modelling (SEM) could provide their own perspective of relationships within the conceptual framework.

AUTHOR CONTRIBUTIONS

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