

AKSU Journal of Social Sciences
(AKSUJOSS)
ISSN: 2504 – 933X
Vol.7,No.2 (June) 2026,pp. 185-197
DOI: https://doi.org/10.61090/aksujoss.7.2.185-197
URL: htpp://www.aksujournal.com/vol.7.2

Received: February 11, 2026
Accepted: May 28, 2026
Published Online: June 1, 2026

E-Filing and Tax Administration Efficiency: Exploring the Impact of Infrastructure on Sokoto State Internal Revenue Service, Nigeria

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Abstract

Tax administration in Sokoto State has faced persistent inefficiencies, characterized by fluctuating revenue despite the adoption of ICT tools such as e-filing platforms. These challenges, driven largely by infrastructural limitations, have hindered the ability of the Sokoto State Internal Revenue Service (SOIRS) to optimize revenue collection and service delivery. This study, therefore, examined the effect of ICT adoption, specifically e-filing, on tax administration performance, with infrastructural efficiency as a moderating factor, aiming to determine how improved infrastructure can strengthen the benefits of digital tax tools. Employing a quantitative research design, data were collected from 97 staff members across SOIRS Headquarters and three zonal offices using a structured questionnaire and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) to test both direct and moderating effects. The findings reveal that e-filing positively influences tax administration performance, contributing 18.9% to improvements, while infrastructural efficiency significantly enhances this relationship, accounting for an additional 14.1% of explained variance, highlighting the critical role of reliable electricity, internet connectivity, and functional ICT hardware. Based on these insights, the paper recommends SOIRS to prioritize strengthening infrastructural capacity to fully harness the benefits of e-filing, ensuring smoother operations, higher accuracy in tax assessments, and increased voluntary compliance. These results underscore the importance of integrating digital solutions with robust infrastructural support to achieve sustainable improvements in tax administration efficiency.

Keywords: E-filing, tax administration, infrastructural efficiency, Internal Revenue Service

1.1 INTRODUCTION

Tax revenue is universally recognized as the most reliable and sustainable source of government financing, forming the foundation for national development and effective public service delivery. Efficient tax administration enables governments to mobilize essential resources for critical sectors such as education, healthcare, infrastructure, and security. The importance of tax administration efficiency cannot be overstated, as no government can achieve sustained development or meet its obligations without a robust revenue system. When tax administration is weak, issues such as revenue leakages, declining public trust, and reduced state capacity inevitably arise, severely limiting the government's ability to deliver services (OECD, 2017). Consequently, improving tax administration efficiency has become a strategic priority, particularly for developing countries where internally generated revenue is vital for development financing (Adebisi & Gbegi, 2020).

In response to ongoing inefficiencies, governments worldwide have increasingly turned to Information and Communication Technology (ICT) as a reform mechanism to strengthen tax administration and boost revenue generation. ICT adoption in public sector administration is widely acknowledged for its role in enhancing efficiency, transparency, accountability, and service delivery. In tax administration, the deployment of electronic filing (e-filing), electronic payment platforms, automated tax systems, and digital record-keeping has dramatically reduced manual processes, minimized human errors, improved data accuracy, and fostered stronger compliance (Nwankwo, 2019). In developing nations, ICT is regarded as a strategic tool for strengthening institutional capacity and improving the overall effectiveness of tax administration (Okunogbe & Pouliquen, 2022).

Nigeria has embraced these global advances by implementing a range of ICT-based tax reforms at both the federal and state levels. The Federal Inland Revenue Service (FIRS) introduced the Integrated Tax Administration System (ITAS) to automate tax registration, filing, and payment (FIRS, 2013). This initiative was further enhanced by the launch of the TaxPro-Max platform in 2021, aligning with the Finance Act 2020, to provide a unified digital portal for taxpayer registration and remittance (Abdulrazaq & Ajibola, 2021). At the state level, numerous State Internal Revenue Services (SIRS) have adopted systems such as e-filing, electronic tax clearance certificates, taxpayer identification number (TIN) platforms, and online payment solutions to address inefficiencies associated with manual tax administration.

The benefits of ICT adoption are evident in several Nigerian states, particularly Lagos. Through sustained investment in automated billing, e-filing, e-payment platforms, and centralized databases, Lagos State Internal Revenue Service surpassed ₦1 trillion in Internally Generated Revenue (IGR) in 2024 (Lagos State Government, 2024). Rivers State and the Federal Capital Territory also demonstrated strong IGR, reflecting the advantages of robust digital infrastructure and institutional capacity (National Bureau of Statistics [NBS], 2024). Conversely, states like Bauchi made moderate gains, highlighting disparities in revenue generation linked to differences in ICT and infrastructural investments. Despite these successes, many states still struggle with low and fluctuating IGR due to infrastructural and operational constraints, suggesting that ICT adoption alone is insufficient for ensuring tax administration efficiency (Adebisi & Gbegi, 2020; Okon & Etim, 2021).

Sokoto State provides a compelling case study of these challenges. Despite the adoption of ICT tools, such as TIN systems, e-filing platforms, and integrated tax processes, Sokoto's IGR

performance has remained inconsistent and relatively low. After falling from approximately ₦19.03 billion in 2019 to ₦12.03 billion in 2020, the state's IGR rose to ₦23.76 billion in 2021 and ₦23.11 billion in 2022 before fluctuating again in subsequent years (Sokoto State Government, 2024; BudgIT, 2025). This volatility is attributed not only to limited ICT adoption but also to infrastructural challenges, frequent system downtimes, unreliable electricity, poor internet connectivity, and low digital literacy**,** all of which undermine the effectiveness of ICT-driven tax reforms (Fasina et al., 2024). Empirical studies largely confirm the positive effects of e-filing on compliance and revenue generation (Asmandani et al., 2020; Ajayi & Oyeniyi, 2021) but often overlook the moderating role of infrastructural efficiency in states like Sokoto.

This study, therefore, seeks to fill this gap by examining how infrastructural improvements can enhance the effectiveness of e-filing systems, offering evidence-based insights for designing more effective ICT-driven tax reforms in similar contexts.

2: LITERATURE REVIEW

2.1 Conceptual Review

Tax Administration

Tax administration encompasses the institutional framework through which governments enforce tax laws, assess liabilities, collect revenues, and ensure compliance via processes like taxpayer registration, enforcement, appeals, and information management. A robust tax administration system is essential for sustainable revenue generation and the provision of public goods, serving as the backbone of government financing while fostering fairness and public trust (Al-Harethi, 2024). Modern approaches to tax administration increasingly prioritize taxpayer education and support, aiming to boost voluntary compliance. By raising awareness of tax obligations and rights, these strategies enhance accountability and help reduce tax evasion (Rahman, 2009).

Amid growing administrative complexity, Information and Communication Technology (ICT) has become crucial for tax administration modernization. ICT integrates digital tools and networks to streamline tax processes, supporting innovations like e-registration, e-filing, digital payments, and real-time analytics (Al-Harethi, 2024; Josiah et al., 2020). Notably, e-filing enables taxpayers to submit returns online, reducing errors and simplifying compliance (Wuarmanuk et al., 2019; Zulita et al., 2018). The Technology Acceptance Model suggests ease of use and usefulness encourage e-filing adoption (Davis, 1985; Hung et al., 2006). However, the effectiveness of ICT reforms depends on infrastructural efficiency, reliable electricity, internet access, and hardware, which ultimately moderates the impact of digital tools on tax administration (Okunogbe & Santoro, 2023).

E-Filing and Tax Administration Performance

The digitalization of tax systems through electronic filing (e-filing) has garnered growing scholarly attention as governments strive to boost efficiency, transparency, and compliance. E-filing, an internet-based platform allowing taxpayers to submit returns electronically, reduces manual processes and administrative bottlenecks (Davis, 1985; Supadmi & Mediatrix Ratna, 2024). According to the Technology Acceptance Model, perceived usefulness and ease of use drive both staff and taxpayer adoption. Properly implemented, e-filing automates tax reporting, minimizes human errors, expedite processing, and improves record accuracy, collectively enhancing tax administration performance. These digital tools streamline operations and facilitate smoother interaction between taxpayers and authorities.

Empirical research consistently highlights e-filing's positive impact on tax administration outcomes. Asmandani et al. (2020) reported that e-filing significantly increases efficiency, convenience, and service quality. Su (2022) found that e-filing reduces costs and strengthens compliance, ultimately improving revenue. Studies from Africa and other developing regions further show that e-filing simplifies self-assessment and enhances transparency, while limiting opportunities for corruption by reducing direct taxpayer-official contact (Lannai, 2024). Under the Resource-Based View (RBV), e-filing is seen as a strategic resource that, when effectively deployed, strengthens institutional processes, workflow integration, and service delivery (Wade & Hulland, 2004).

Moderating Role of Infrastructural Efficiency

Despite the potential benefits of e-filing, its efficiency is highly contingent upon the quality of supporting infrastructure. Infrastructural efficiency refers to the reliability and adequacy of electricity supply, internet connectivity, ICT hardware, system integration, and technical support that enable uninterrupted digital operations (Waribugo & Ndukauba, 2021). Inadequate infrastructure can lead to system downtimes, failed transactions, and reduced user confidence, thereby weakening the effect of e-filing systems. Empirical evidence confirms that digital tax systems yield stronger outcomes in infrastructure-enabled environments. Ofori et al. (2022) demonstrated that digital infrastructure significantly amplifies the positive effects of ICT on tax revenue mobilisation across African countries. Similarly, Uyar et al. (2021) found that e-government initiatives are more effective in reducing tax evasion in countries with higher ICT capacity. At the organizational level, studies such as Purba et al. (2020) highlight that enabling conditions significantly shape the effectiveness of e-filing, although prior research often focused on user literacy rather than institutional infrastructure.

Theoretically, infrastructural efficiency is justified as a moderating variable. Under the Resource-Based View, infrastructure represents a critical internal resource that determines whether ICT tools can function optimally. Under the Unified Theory of Acceptance and Use of Technology (UTAUT), infrastructure constitutes a facilitating condition that influences technology usage and performance (Venkatesh et al., 2003). Therefore, infrastructural efficiency is expected to strengthen or weaken the effect of e-filing on tax administration performance.

2.2 Research Hypotheses

H_1: E-filing has a positive and significant effect on tax administration performance.

H_2: Infrastructural efficiency positively moderates the relationship between e-filing and tax administration performance.

2.3 Theoretical Framework

This study is grounded in the integrated application of the Resource-Based View (RBV) and the Unified Theory of Acceptance and Use of Technology (UTAUT) to explain ICT-driven performance in tax administration. RBV focuses on how internal organizational resources contribute to sustained performance advantages, while UTAUT explains the behavioral and contextual factors that influence technology adoption and use. The integration of these frameworks allows for a comprehensive understanding of both technical capability and human interaction with ICT systems within SOIR. According to RBV, organizations achieve superior performance by effectively deploying valuable, rare, inimitable, and non-substitutable resources (Barney, 1991). In the context of tax administration, ICT tools such as e-filing systems represent strategic resources whose effectiveness depends on complementary assets including reliable infrastructure, skilled

personnel, and standardized operational procedures (Wade & Hulland, 2004). Without these supporting resources, ICT tools may fail to deliver meaningful administrative improvements.

Therefore, UTAUT complements RBV by emphasizing the role of performance expectancy, effort expectancy, social influence, and facilitating conditions in shaping technology usage (Venkatesh et al., 2003). In tax administration settings, facilitating conditions, particularly infrastructural efficiency are critical in determining whether e-filing systems are effectively utilized by staff and taxpayers. Thus, UTAUT explains why the presence of ICT tools alone does not guarantee improved performance unless supportive environmental and organizational conditions exist. In a nutshell, this shows that, integrating RBV and UTAUT, this study captures both the availability of ICT resources and the behavioural dynamics that influence their effective use. This combined framework provides a robust theoretical foundation for examining how e-filing affects tax administration performance and how infrastructural efficiency moderates this relationship within the Sokoto State Internal Revenue Service (SIRS).

2.4 Conceptual Model

Based on the hypotheses and theoretical foundations, the conceptual model of this study explains the relationship between e-filing, infrastructural efficiency, and tax administration performance. E-filing represents ICT adoption and serves as an independent variable, assessed through system reliability, ease of use, accessibility, and perceived usefulness. Tax administration performance is the dependent variable and is measured through efficiency, accuracy, transparency, compliance support, and revenue assurance. While infrastructural efficiency is introduced as a moderating variable that influences the strength of the relationship between e-filing and tax administration performance. This includes electricity stability, internet reliability, ICT hardware availability, system integration, and technical support. The model posits that e-filing directly improves tax administration performance, but the magnitude of this effect depends on infrastructural efficiency. High infrastructural efficiency strengthens the positive impact of e-filing, while weak infrastructure diminishes its effectiveness. The conceptual research model illustrating these relationships is presented in figure 1.

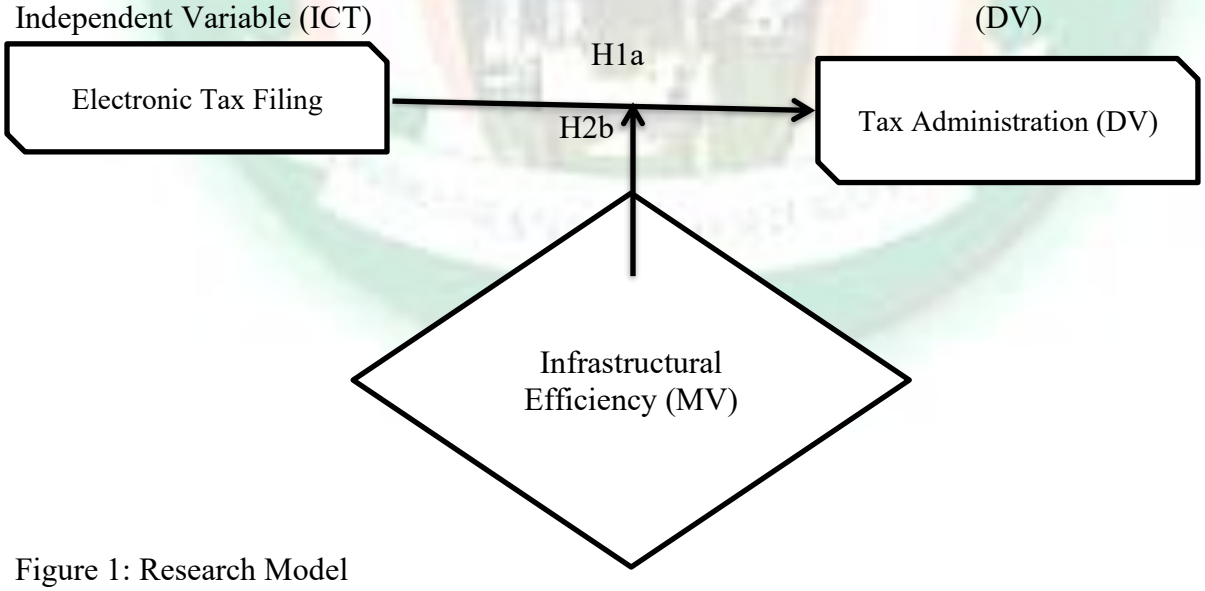


Figure 1: Research Model
Source: Developed for the Study, 2025

3: METHODS AND MATERIALS

This study adopted a positivist research paradigm, favouring objective measurement and empirical testing of relationships among observable variables. In alignment with this philosophy, a quantitative approach was utilized to investigate the impact of e-filing on tax administration performance and the moderating influence of infrastructural efficiency. A cross-sectional survey design enabled data collection at a single point, facilitating an assessment of current e-filing practices, infrastructural conditions, and administrative performance within the Sokoto State Internal Revenue Service (SIRS). The study population consisted of 128 staff from SIRS headquarters and three zonal offices, with only ICT-related departments included. Using Krejcie and Morgan's (1970) sample size table, 97 respondents were selected through stratified random sampling, ensuring proportional representation and minimizing selection bias.

Primary data were gathered using a structured questionnaire adapted from validated instruments in previous studies (Ajayi & Oyeniyi, 2021; Al-Harethi, 2024; Josiah et al., 2020; Lannai, 2024; Milamo & Magobe, 2024). The survey employed a five-point Likert scale covering e-filing (ease of use, speed, reliability, error reduction), tax administration performance (efficiency, accuracy, transparency, responsiveness), and infrastructural efficiency (electricity stability, internet reliability, ICT availability, technical support). Data analysis involved SPSS version 27 for descriptive statistics and SmartPLS for inferential analysis. Partial Least Squares Structural Equation Modeling (PLS-SEM) was applied to test hypothesized relationships and moderation effects, chosen for its suitability with small samples and interaction effects, thus aligning with empirical research standards in ICT and tax administration contexts.

4: RESULTS AND DISCUSSION

Data analysis for this study utilized Partial Least Squares Structural Equation Modeling (PLS-SEM) to assess both direct and moderating effects, given its suitability for small sample sizes and its strength in handling interaction effects and simultaneous evaluation of measurement and structural models (Hair et al., 2014). Following Preacher and Hayes (2008), SEM was selected for its flexibility in moderation model estimation and accuracy in parameter estimation. All main construction-filing, tax administration performance, and infrastructural efficiency—were specified as reflective, with no formative indicators. Consistent with methodological best practices, the reflective measurement model was evaluated using criteria recommended by Hair, Sarstedt, Hopkins, and Kuppelwieser (2014), ensuring each construct demonstrated sufficient reliability and validity before structural model assessment.

4.1 Measurement Model

The assessment of the measurement model commenced with a comprehensive evaluation of the reliability and validity of all latent constructs. Consistent with the two-step approach recommended by Hair et al. (2014), the study first examined the measurement model prior to evaluating the structural model. In Structural Equation Modeling (SEM), the measurement model assessment focuses on indicator reliability (factor loadings), internal consistency reliability, and construct validity, including both convergent and discriminant validity. These criteria ensure that the measurement items adequately represent their respective latent constructs and provide a sound basis for testing the hypothesized relationships in the structural model.

Table 1: Measurement Model: Reliability and Convergent Validity

Constructs	Items	Loading	Cronbach	CR	AVE

E-filling	EF7	0.892	0.858	0.892	0.692
	EF6	0.868			
	EF3	0.793			
	EF4	0.770			
Infrastructure Efficiency	INF1	0.710	0.758	0.772	0.578
	INF2	0.751			
	INF6	0.772			
	INF7	0.805			
Tax Administration	TA1	0.735	0.845	0.856	0.520
	TA2	0.835			
	TA3	0.626			
	TA4	0.607			
	TA5	0.779			
	TA6	0.699			
	TA7	0.740			

Source: Smart-PLS 4 Output, 2025

Note *AVE= Average variance Extracted *CR= Composite reliability.

Internal consistency reliability was initially assessed by examining outer loadings, with most items for the three core constructs demonstrating strong values. Following Hair Jr., Hult, Ringle, and Sarstedt's (2014) guidelines, items with loadings between 0.40 and 0.70 were retained, resulting in 15 valid items out of 21, while six items (EF1, EF2, EF5, INF3, INF4, INF5) were excluded for not meeting the minimum threshold. Reliability was confirmed through Cronbach's alpha and composite reliability, both exceeding the 0.7 threshold (α = 0.758–0.858; composite reliability = 0.772–0.892), indicating that the items reliably measured their respective constructs.

To validate the measurement model, convergent and discriminant validity were assessed. Average Variance Extracted (AVE) values ranged from 0.520 to 0.692, surpassing the 0.50 benchmark and supporting sufficient convergent validity (Hair Jr. et al., 2014). Discriminant validity was established by demonstrating that each construct's indicators were more strongly correlated with their respective construct than with others, in line with Hulland (1999). These results confirm the measurement model's robustness, ensuring that each latent construct is both conceptually and empirically distinct.

Table 2: Discriminant Validity-Heteriotrait Monotrait

Constructs	EF	INF	TA
EF	1		
INF	0.379	1	
TA	0.388	0.885	1

Source: Smart-PLS 4 Output, 2025.

Table 2 HTMT ratios present discriminant validity, which assesses whether the constructs are distinct and not highly correlated with each other. Since it is among the most used methods, researchers are advised to use Heterotrait-Monotrait ratio criteria because of its reliability over Fornnell and Criteria, and Cross loading (Henseler et al., 2015) as displayed in the table. Being the condition, discriminant validity of the construct is valid if the upper bound of the 95% confidence interval of HTMT is lower than 0.9. Hence, the constructs in the table satisfied the condition.

Table 3: Discriminant Validity (Cross Loadings)

Constructs	EF	INF	TA
EF3	0.793	0.220	0.304
EF4	0.770	0.083	0.123
EF6	0.868	0.360	0.347
EF7	0.892	0.306	0.375
INF1	0.389	0.710	0.536
INF2	0.043	0.751	0.512
INF6	0.206	0.772	0.500
INF7	0.323	0.805	0.702
TA1	0.335	0.466	0.735
TA2	0.397	0.550	0.835
TA3	0.157	0.590	0.626
TA4	0.137	0.258	0.607
TA5	0.402	0.639	0.779
TA6	0.159	0.611	0.699
TA7	0.257	0.531	0.740

Source: Smart-PLS 4 Output, 2025

Table 3 above is a cross-loading, which is another method of testing discriminant validity where the loading of the observable of a particular construct is compared with another (Chin, 1998). To ascertain satisfactory discriminant validity, Chin (1998) recommends that all the indicator items' loadings should be greater than the cross-loadings. Table 4.3 compares the indicator items' loadings with other reflective indicators. All indicator item loadings were higher than the cross-loadings, recommending acceptable discriminant validity for further analysis. This shows that the indicators clearly represent their respective constructs and do not overlap significantly with other constructs.

4.2 Structural Model

After establishing the reliability and validity of the measurement model, the next step is to evaluate the structural model using PLS-SEM. Assessing the structural model involves examining the relationships between constructs to test the proposed hypotheses. Key criteria for this evaluation include the assessment of the coefficient of determination (R^2) to determine the explanatory power of the model, evaluating the statistical significance and relevance of path coefficients, and measuring the effect size (f^2) to understand the impact of each predictor on the dependent variable (Shmueli et al., 2016).

Table 4: Coefficient of Determination (R^2) for Direct Relationship between IV and DV

	R-square	R-square adjusted
TA	0.599	0.568

Source: Smart-PLS 4 Output, 2025

The Table 4.4 displays the coefficient of determination score (R^2) which is commonly used to assess the model's predictive effect. This value (R^2) is found to be 0.599 which suggested that the ICT variable (e-filling) and the moderator accounted for 59.9% variation in Tax Administration. It also shows that the model is satisfactory as the predictive effect falls within the established threshold of 0.25-0.75 (Hair et al., 2019) and is greater than the threshold of 0.10 (Pirouz, 2006). Also, the result shows that the model has not failed in its capacity to measure the predictive power of the data.

Assessment of Effect Size for Direct Relationships

After evaluating the R^2 of Tax Administration (TA) in the structural model, the effect size (f^2) was assessed to determine the contribution of each independent variable. Effect size shows whether the impact of an independent variable is small, moderate, or large, based on standard thresholds: 0.02 = small, 0.15 = moderate, and 0.35 = large. Results indicate that Infrastructure Efficiency (INF) has a large effect on TA, meaning it strongly influences tax administration outcomes, while E-Filing (EF) has a moderate effect, showing a significant but smaller contribution. This highlights that while e-filing improves tax administration, the quality and reliability of infrastructure play a more critical role in enhancing its effectiveness in Sokoto State IRS.

Table 5: Assessment of the Effect Size f2 for Direct Relationships between EF and TA

Construct	R^2 Included	R^2 Excluded	f-square	Effect Size
EF -> TA	0.599	0.510	0.222	Moderate

Source: Smart-PLS 4 Output, 2025

The effect size (f^2) in Table 5 illustrates the magnitude of each independent variable's impact on Tax Administration (TA). E-Filing (EF) exhibits a moderate effect, with an f^2 value between 0.15 and 0.35, indicating a significant, though comparatively smaller, contribution. These results suggest that while e-filing enhances tax administration, the quality and reliability of infrastructure play a more critical role in maximizing its effectiveness at the Sokoto State Internal Revenue Service.

Table 6: Bootstrap path coefficient of Direct Relationships between EF and TA

Hypothesis	Relationship	Original sample (O)	T statistics (|O/STDEV|)	P values	Decisions
H1a	EF -> TA	0.189	2.168	0.000	Supported

Source: Smart-PLS 4 Output, 2025

The bootstrap path coefficient analysis presented in Table 6 was conducted to test the alternative hypotheses earlier stated in the study. The main purpose of bootstrapping in SEM is to test the alternative hypotheses as contained in Table 4.6. An alternative hypothesis would be accepted if the t-value is greater than ±1.96 and p-value is less than 0.05. It would otherwise be rejected if the t-value is less than ±1.96 and the p-value is greater than 0.05 (Wong, 2019).

Hypothesis Testing for Direct relationship between EF and TA

Hypothesis one tested whether E-filling has a positive and significant effect on Tax Administration. The result revealed that e-filling has a positive and insignificant effect on tax administration in the Sokoto State Internal Revenue Service. This is because the coefficient (β=0.189) is positive and greater than 10% (i.e. 18.9%), t-statistic (2.168) is greater than ±1.96, and p-value (0.000) is far less than 5% level of significance. Hence, accepting the null hypothesis and rejecting the alternative hypothesis that e-filling has no positive and significant effect on tax administration in Sokoto State Internal Revenue Service. This outcome signifies that, the more the State Revenue Service in Sokoto emphasizes e-filing, the less effective their tax administration becomes.

Indirect Effect: Moderation analysis

To report moderation analysis, it is the rule of thumb to report the R^2, Path coefficient, t-statistics, p-value, F^2, and slope analysis. The aforementioned items are extracted and discussed for each of the hypotheses below:

Table 7: Assessment of the Effect Size for Moderating Relationships: f^2

Construct	R^2 Included	R^2 Excluded	Percent Change in R^2	f-square	Effect Size
EF*INF-> TA	0.679	0.538	14.1	0.439	Large

Source: Smart-PLS 4 Output, 2025

Table 7 presents the effect size (f^2) for the moderating relationship. Effect size measures the strength of the effect of an independent variable or interaction term on the dependent variable. In this study, the interaction of Infrastructure Efficiency (INF) with E-Filing (EF) shows a large effect on Tax Administration (TA), as the f^2 value (0.439) is above the 0.35 threshold suggested by Cohen (1988).

Table 8: Bootstrapping Results showing Path Coefficient for Structural Model

Relationship	Hypotheses	Original Sample (O)	T statistics (|O/STDEV|)	P values	Remark
INF x EF -> TA	H2b	0.339	2.207	0.000	Supported

Source: Smart-PLS 4 Output, 2025

H2b: Infrastructural efficiency significantly moderates the relationship between E-Filing and tax administration.

The study accesses the moderating role of Infrastructural efficiency on the relationship between E-filling (EFLG) and Tax Administration. Without the inclusion of moderating effect (E-FLG*INFREFF), the R^2 value for the Tax Administration was 0.538. This shows that 53.8% change in Tax Administration is accounted for by E-FLG. With the inclusion of interaction term, the R^2 increased to 67.9%. This shows an increase of 14.1% in variance explained in the dependent variable (Tax Administration).

In addition to that, significance of moderating effect was analysed and the results showed a positive and significant moderating effect of Infrastructure Efficiency on the relationship between E-FLG and TAXADM (b=0.339, t=2.207, p=0.000), supporting H2b. This shows that with increase in the infrastructure efficiency, the relationship between E-FLG and TAXADM can further be strengthened. Moderation analysis summary is presented in Table 8.

Furthermore, slope analysis is presented to better understand the nature of the moderating effects as shown in Figure 2. Interpreting from the Figure, the line is steeper for high INFREFF compared to low IFREFF suggesting a stronger impact of E-FLG on TAXADM compared to low INFREFF. However, at low INFREFF, the line tends to be gradually rising, showing the increase in E-FLG can later guarantee closer change in the TAXADM. In conclusion, a higher INFREFF strengthens the effect of E-FLG on TAXADM very quickly and significantly.

Looking at the moderation effect size, the model produced a large effect size of 0.439 as classified by Cohen (1988), that a proposition of 0.02, 0.15, and 0.35 constitutes small, medium, and large sizes of moderation respectively. This shows that the moderating effect contribute significantly to explaining the endogenous construct (TAXADM).

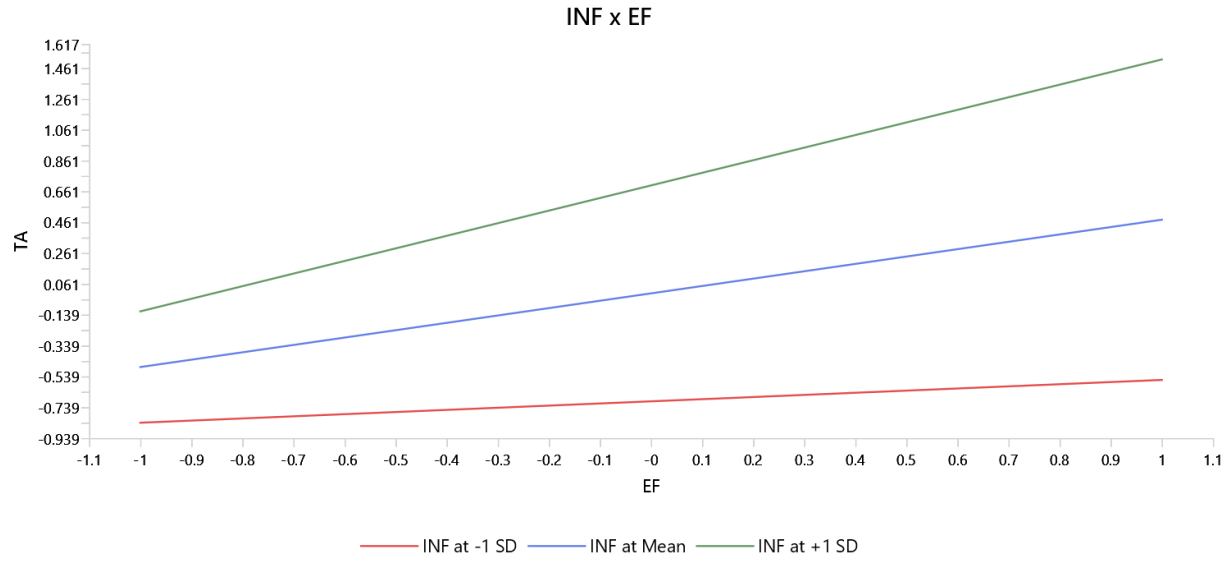


Figure 2: Slope analysis

4.4 Findings

This study examined the effect of ICT adoption (e-filing) on tax administration in the Sokoto State Internal Revenue Service, with infrastructural efficiency as a moderating variable. The major findings are summarized as follows:

1. E-Filing showed a positive effect of 18.9% ($\beta = 0.189$) on tax administration. This suggests that increased utilization of e-filing improves administrative processes by reducing manual errors, shortening processing time, enhancing record accuracy, and making tax assessment more efficient.
2. Infrastructural Efficiency significantly strengthens the relationship between E-Filing and tax administration, with the moderating effect contributing 14.1% additional variance explained ($f^2 = 0.439$, large). This means the administrative benefits of e-filing increase substantially when supportive infrastructure such as stable electricity, reliable internet connectivity, and functional ICT hardware is available.

4.5 Discussion

The results of this study show that e-filing has a positive and significant effect on tax administration in the Sokoto State Internal Revenue Service (SOIRS). The findings indicate that e-filing contributes about 18.9% to the improvement of tax administration performance, meaning that as the use of e-filing increases, tax processes become faster, more accurate, and more efficient. Through e-filing, tax officers spend less time on manual work, errors in tax records are reduced, and the time taken to process tax returns is shortened. This supports the idea that digital systems improve work efficiency when they are properly adopted (Davis, 1985). The result is consistent with earlier studies, such as Asmandani et al. (2020) and Su (2022), which found that e-filing improves service delivery, reduces administrative costs, and enhances the overall effectiveness of tax administration.

The study indicates that infrastructural efficiency significantly moderates the relationship between e-filing and tax administration, amplifying the positive effects of e-filing when stable electricity, reliable internet, and functional ICT equipment are available. The moderation analysis indicates a

large effect size ($f^2 = 0.439$), showing that good infrastructure greatly increases the impact of e-filing on tax administration performance. In practical terms, this means that with adequate infrastructure, the benefits of e-filing increase well beyond the initial 18.9% and increases by an additional 14.1% in tax administration performance, leading to fewer system breakdowns, less delay in processing, and better-quality tax records. This finding agrees with previous studies by Purba et al. (2020) and Rokhman et al. (2022), which emphasize that digital tax systems perform better when supported by strong infrastructure. In SOIRS, this result highlights that e-filing alone is not enough; its success depends largely on the availability and efficiency of supporting infrastructure.

5.1 CONCLUSION

Based on the findings, the study confirms that digital tools, when applied in a public revenue context like SOIRS, play a crucial role in modernizing administrative processes and improving operational efficiency. Importantly, the study also demonstrated that the effectiveness of e-filing in SOIRS is highly dependent on the quality of supporting infrastructure. Stable electricity supply, reliable internet connectivity, functional ICT hardware, and integrated systems significantly strengthen the positive impact of e-filing on tax administration. Conversely, poor infrastructure limits the efficiency of digital systems, even when e-filing platforms are implemented, resulting in delays, inaccurate assessments, and reduced compliance. This emphasizes that infrastructural efficiency is a critical factor in ensuring that ICT adoption achieves its full potential.

5.2 RECOMMENDATIONS

From the findings, therefore, the study recommends that:

1. SOIRS should focus on enhancing the usability of the e-filing platform to make it more intuitive and user-friendly for taxpayers. This can be achieved by simplifying filing guides, customizing the interface for easier navigation, establishing support points in zonal offices, and implementing feedback systems to quickly identify and resolve technical issues. Such measures will improve taxpayers' experience, reduce processing delays, minimize errors, and promote higher voluntary compliance, even for users with limited ICT skills.
2. The state government should prioritize improving infrastructural conditions to support digital tax administration effectively. This includes providing alternative power sources, such as solar inverters, upgrading internet bandwidth, improving server capacity, and replacing obsolete hardware. This should involve establishing a dedicated ICT maintenance unit, setting performance targets for system uptime, and monitoring network reliability across offices. Strengthening infrastructure will ensure smooth system operation, enhance staff productivity, and minimize disruptions in the e-filing process, thereby maximizing the benefits of ICT adoption in tax administration.

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