



## African Tax Administration Paper 8

# Small Business Use of the Integrated Tax Administration System in Nigeria

Uchenna Efobi, Ibukun Beecroft and Tanankem Belmondo  
with Amelia Katan

May 2019

ICTD African Tax Administration Paper 8

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Uchenna Efobi, Ibukun Beecroft and Tanankem Belmondo

## Summary

Our research explores the factors that drive the ways in which small business owners perceive and use the Integrated Tax Administration System (ITAS) in Nigeria. We surveyed nearly 500 small businesses. We apply logistic regression analysis to the survey data to determine which among a range of factors – relating to the ownership of businesses, their internal organisation and their external environment – most affect their use of ITAS. The business ownership characteristics that have most influence are: the owner's level of education, whether they received ITAS training and their trust in the tax administration process. The most significant internal firm characteristics are: the use of an external auditor, tax consultant or computerised accounting system. The most important factor in the external environment is the extent to which tax offices advertise the availability of ITAS. Our findings suggest that tax officers' collaboration with external auditors and tax consultants, provision of ITAS training and targeted advertisements and education campaigns will increase the positive perception and use of ITAS.

**Keywords:** developing countries; electronic tax filing; small business; technology; taxation

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# Introduction

Building government tax administration capacities is vital to increasing internal revenue generation and to facilitating development in Africa. Currently, tax revenue accounts for only about 16 per cent of GDP in the average Sub-Saharan African country. In Nigeria, tax revenue made up just 5.3 per cent of its GDP in 2016 (International Monetary Fund 2018). Ineffective tax collection and corruption are significant obstacles to timely and adequate government revenue generation. Opportunity for corruption is rife due to the high level of autonomy given to tax officers and to their repeated interactions with taxpayers (Okunogbe and Pouliquen 2018). The cost of tax collection in Sub-Saharan African countries is also high due to poor data on potential taxpayers, infrastructure and administrative capacity. The cost of collection varies from 1 to 4 per cent of the total tax collected, while total salary and collection-related expenditures range from 60 to 80 per cent of collection costs (Carter and Cebreiro 2011). Inefficient tax collection is therefore a major impediment to revenue generation and development in Africa.

In developing countries, improving small businesses' voluntary tax compliance in the formal and informal sector is a major concern for tax administrations (Sarker 2003). In Nigeria, small and medium businesses make up about 97 per cent of the economy and their aggregated tax remittances surpass those of large enterprises (see Ariyo 2005; Okauru 2012). This has spurred interest in increasing the accessibility and comprehensibility of tax processes through electronic systems. Electronic tax filing improves turnaround time, lowers costs and increases transparency in the tax administration process (Gwaro, Maina and Kwasira 2016; Lee 2016). Electronic tax filing has been introduced in about 32 per cent of developing countries (World Bank, 2016) and its use is growing.

Following this trend, Nigeria's Federal Inland Revenue Service (FIRS) has introduced the Integrated Tax Administration System (ITAS). ITAS is an online portal that users access to conduct a variety of tax related processes. After taxpayers register with the tax authority, they receive a tax administration number to log on to the online platform. ITAS is specifically designed to reflect Nigerian tax legislation and facilitates a 'do-it-yourself' model for taxpayer computing and filing. ITAS services include online tax payments, tax return submission, processing tax clearance certificates, automatic computation and imposition of penalties for late filing, as well as communication with tax officers (PwC 2015). The system was made available before 31 March 2018, the latest tax-filing period prior to our study.

As little is known about small businesses' use of electronic tax filing systems, we surveyed randomly selected small businesses from seven states in southwestern Nigeria. We define small businesses as enterprises with an employee base of 10 to 199 individuals and an asset base of 5 million to 500 million naira. Our study is timely given ITAS' implementation in 2017 and FIRS' current policy of ITAS use being voluntary. Survey responses were used to estimate the logistic regression in regard to firms' ownership characteristics, internal organisation and external environment, while controlling for other important covariates. In addition to measuring the level of ITAS use within firms, we also collected data on firms' perception to better understand whether it is poor opinion or logistical obstacles that inhibit ITAS use.

Our analysis finds that the following factors increase the likelihood of a firm adopting the electronic tax system: an older business owner and/or their greater experience in the industry, the use of a computerised accounting system and/or external tax consultants and auditors, as well as knowledge of tax penalties and technology. Additionally, the factors that matter most in regard to a firm's external business environment are trust in tax authorities

and exposure to tax authorities' ITAS training and advertisement. These results are consistent when controlling for the fixed effect of FIRS offices' presence and activities, which may impact the relationship of interest. Therefore, our research suggests that targeted ITAS promotion based on firm characteristics as well as collaboration with tax consultants and auditors will increase the efficiency of FIRS outreach. Informed policy implementation can decrease taxpayers' compliance costs, reduce tax officials' tendency for extortion and other corrupt practices and even reduce opportunities for collusion and tax evasion (Okunogbe and Pouliquen 2018).

The rest of the paper proceeds as follows: the next section presents background information on the use of technology and taxation in Nigeria. The following section provides a brief literature review. The data and estimation technique are included in the third section. The results, which include detailed descriptive statistics and the econometric analysis, are presented in the fourth section. Our conclusion and policy recommendations are further explained in the fifth section.

# 1 Background

Despite ITAS' potential to ease tax collection for both the government and taxpayers, FIRS' aim for its widespread use is threatened by the low use of electronic financial technology in Africa (Ishengoma 2011; Abdinoor and Mbamba 2017; Mothobi and Grzybowski 2017). In Nigeria, there is a particularly low rate of private sector use of government-initiated technologies. For example, the Central Bank's mobile money service is only used by about 13 per cent of the population despite it existing since 2011 (Okwuke 2016). Moreover, the rate of internet use among Nigerians to pay bills, use mobile money accounts and access financial accounts is below 10 per cent, while only about 30 per cent of the population use electronic platforms to make or receive digital payments. This is compared to 60 per cent of South Africans and 52 per cent around the world (World Bank 2018). Contextual evidence suggests that low uptake of financial technology is due to the informality of the tax and general financial environment in Nigeria, where individuals and businesses are used to 'face-to-face' interactions with tax officers. While personal relationships enable tax negotiations and clarifications, they also create opportunity for corruption (See Dutta and Sobel 2016; United Nations Office on Drugs and Crime 2017). Our study therefore seeks to identify the obstacles ITAS faces in light of the low use of electronic financial tools in Nigeria.

The successful implementation of ITAS is particularly vital given Nigeria's highly complicated and arduous tax system. World Bank reports that a typical manufacturing firm in Nigeria pays 59 types of taxes and contributions, including consumption taxes such as value added and sales tax. This is higher than the Sub-Saharan African average of 37.2 taxes and much higher than the world average of 10.9 taxes. To submit these taxes, the typical firm puts in about 366 hours per year, compared to the world average of about 160.7 hours (World Bank 2018). Thus, Nigeria is ranked about 50 percentage points away from the global best performers in the ease of paying taxes, with the ease of taxpaying determined by the number of tax payments, time allocated to tax computations, total tax and contribution rate and post-filing index (World Bank 2018). The uniquely complex nature of Nigeria's tax system suggests that wider ITAS use will greatly decrease small businesses' filing burden and will increase tax compliance and revenue.



## 2 Literature Review

This paper contributes to a growing body of literature on financial technology use as well as literature on improving revenue generation through taxation in Africa. Recent studies show that a user's likelihood and motivations to adopt new financial technology are related to their demographic characteristics and financial capacity, as well as the extent to which the technology has been publicised (Nyambura Ndung'u, Mwololo Waema and Mitullah 2013; Tobbin, 2012; Yilmaz and Coolidge 2013; Abdinoor and Mbamba 2017). Additionally, there is a positive relationship between an individual's trust in the new technology and prior tax compliance, as well as compatibility between the technology already in use and the likelihood of new financial technology being adopted (Chemingui and Lallouna 2013; Mohammadi 2015; Oyebola and Pouliquen 2018). Oyebola and Pouliquen also note that individuals who face the greatest increase in tax oversight as a result of transitioning to electronic tax filing may be the least inclined to use it. Building on existing research, our study considers both internal and external factors that influence small businesses' likelihood to adopt ITAS.

Generally, studies on improving revenue generation through taxation in Africa either support deterrence or advocate for tax compliance. While, deterrence is efficient in contexts with strong institutions and enforcement (see Fellner, Sausgruber and Traxler 2013; Ariel 2012; Dwenger, Kleven, Rasul and Rincke 2016), it is not efficient in contexts with low enforcement of noncompliance penalties (see Carrillo, Pomeranz, and Singhal 2016). In many contexts, tax evasion remains a utility-maximising behaviour for the individual taxpayer, particularly one who is able to enjoy the benefits of tax payment without actually paying taxes (Allingham and Sandmo 1972). For small businesses, factors such as low sales returns, poor book-keeping habits, frequent changes in ownership structure, and illiteracy also lead to low tax compliance levels (Gwaro, Maina and Kwasira 2016). Several studies show that tax compliance increases when incentives are used to increase tax morale (see Bott, Cappelen, Sorensen and Tungodden 2017; Mascagni, Nell and Monkam 2017). However, other studies indicate that tax compliance due to improved tax morale is contextual (Del Carpio 2014; Dwenger et al. 2016). As such, it is imperative that there is an effective tax administration system, which ensures that firstly, there are punitive measures for non-compliance, and secondly, the benefits of paying taxes outweigh the costs. With this in mind, our research seeks to specifically address the absence of research on factors that motivate the use of electronic tax systems within firms.

## 3 Methods

### 3.1 Data Selection

Data was collected through a survey of randomly selected small businesses between June and August 2018. Our study took place three months after the last tax filing date of 31 March 2018 and about a year after ITAS became available. Prior to conducting the survey, the authors interviewed the owner of a prominent business currently using ITAS, in addition to having informal conversations with several small business owners. These interactions informed the questionnaire's content by providing background information on firm use, perception and challenges related to ITAS. The questionnaire was about five pages long and had a similar format to World Bank's *World Enterprise Survey* (2013). It included issues related to small businesses' individual and ownership characteristics, environment, financial capacity, contact with tax administrators and knowledge and use of the ITAS. Questions regarding firms' contact with tax administrators included topics surrounding tax officers' enforcement or motivation for firms to adopt ITAS.

The survey focused on small businesses in Lagos and six other states in southwestern Nigeria. This area was chosen due to its high concentration of economic activity. About 60 per cent of small and medium enterprises in Nigeria are located within the southern region, with Lagos having the highest number (see SMEDAN 2013). Additionally, these states are considered an ideal benchmark for the Nigerian tax administration system (see World Bank 2018).<sup>1</sup> A sample selection across states with a higher presence of FIRS offices was chosen with the assumption that these firms are more aware of ITAS. This sample proved most appropriate as our study sought to understand the extent of ITAS use and the factors that influence it.

ITAS has the potential to greatly simplify the taxpaying process. This is especially true for small business owners because they have to personally file returns for both company income tax (CIT) and personal income tax (PIT). Larger incorporated firms with limited liability can engage consultants to manage their tax filing. Therefore, knowledge of ITAS is less useful to their owners. The calculated sample size for this study is approximately 430 small businesses from a population of 42,655.<sup>2</sup> The sample size was calculated using the 'principle of probability proportional to size,' which allocated the number of small businesses to states according to the concentration of firms and tax office locations. However, the actual sample was 485, due to the inclusion of contingency samples. The sample is distributed across states with the highest number of FIRS offices and across tax coordination areas. Table 3.1 below displays the number of small businesses surveyed across selected states and the distribution of FIRS offices' location. Figure 3.1 below provides a complete map.

**Table 3.1 Proposed Sample Selection**

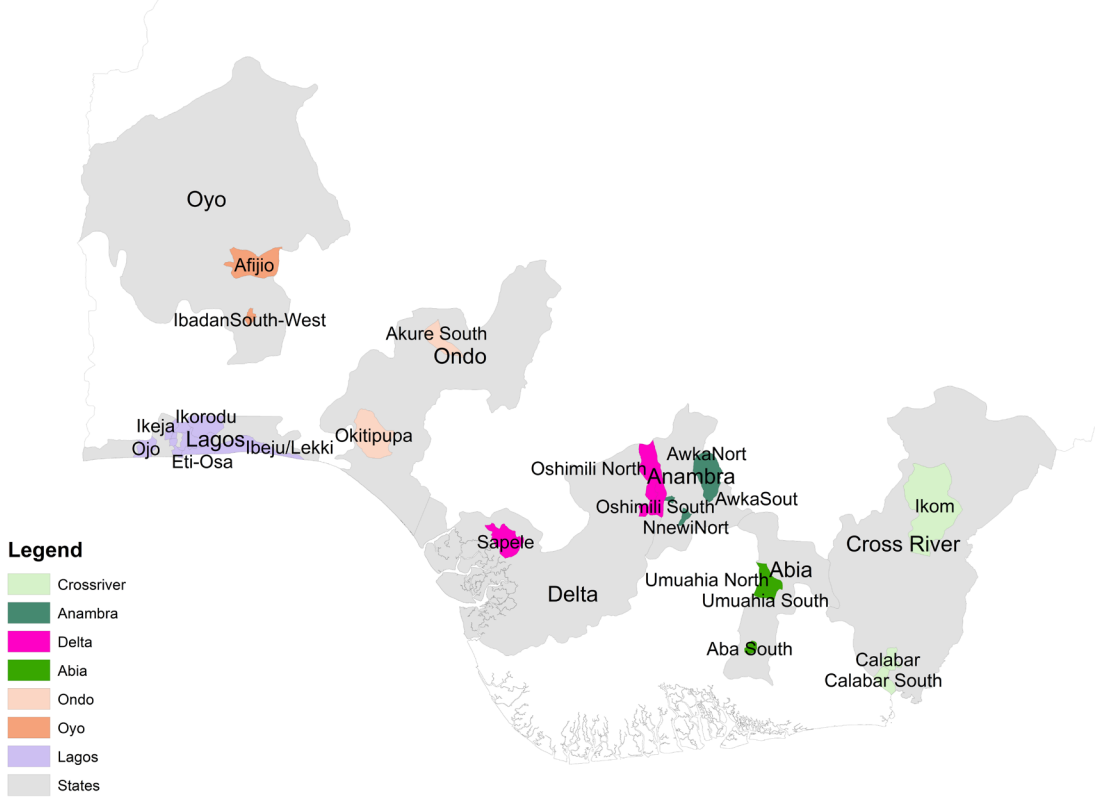
Tax Coordination Area	States	Total SMEs	Proportion	Proposed Sample	FIRS Offices
Akwa-Ibom, Bayelsa and Cross River Coordination	Akwa-Ibom	1093	0.025	17	2
	Bayelsa	426			2
	Cross-River	1294			3
Anambra and Imo Coordination.	Anambra	1737	0.040	27	4
	Imo	1394			3
Delta, Edo, Rivers Coordination.	Delta	1444	0.034	22	4
	Edo	1997			4
	Rivers	3022			3
Abia, Ebonyi, and Enugu Coordination	Abia	1809	0.042	28	4
	Ebonyi	1210			2
	Enugu	911			2
Ekiti, Kwara and Ondo Coordination	Ekiti	1029			2
	Ondo	1999	0.046	31	2
Lagos Coordination	Lagos	11663	0.271	179	16
Ogun, Osun and Oyo Coordination	Ogun	1794			3
	Osun	2272			1
	Oyo	7987	0.185	122	3
	Total	27,732	1.000	426	

Note: The total sample in the last row is the sum of all the SMEs in the states from which the sample was selected. The proportion of each state is computed as the number of SMEs in the state to the total number of SMEs (i.e. 27,732).

<sup>1</sup> Tax revenue in Lagos has risen from an annual 600 million in 1999 to 23 billion monthly in 2015 and further to 34 billion in 2018. There are many reasons for this success including: widening of the tax net, expansion of the tax base, efficient database development and updates for taxpayers and upgrades in the administrative processes that ensure operational efficiencies (Musbau, 2019).

<sup>2</sup> The number of SMEs in Lagos State was derived from the 2013 SMEDAN statistics. The sample was then computed based on a 99 per cent confidence level and a 5 per cent margin of error.

**Figure 3.1: Distribution of Sampled Locations**



As existing evidence suggests that firms consider both monetary and non-monetary factors when choosing to use tax systems (Traxler 2010; Mascagni et al. 2017), our analysis takes a comprehensive range of factors into account. The variables of interest are broadly categorised under ownership characteristics, internal structure and external environment. Firstly, small businesses’ ownership and management characteristics may explain their willingness to adopt technology, as studies show that younger individuals are more likely to adopt electronic systems for business operations.<sup>3</sup> Secondly, we hypothesise that the internal characteristics of firms that could affect ITAS use include the presence of auditing processes, accounting systems, and technology proficiency. Thirdly, current studies suggest that small businesses’ perception of their external business environment, such as their trust in the tax system and tax officials, may also be an important determinant of ITAS use (Fjeldstad, Schulz-Herzenberg and Sjursen 2012; Yesegat and Fjeldstad 2016). We therefore explored a variety of characteristics within these three categories to determine those that most influence a firm’s perception and use of ITAS. Table 3.2 in Section 3.2 lists the definitions, mean and standard deviations of the variables.

**3.2 Methods of Analysis**

Firstly, basic descriptive statistics were implemented to understand small businesses’ awareness and knowledge of ITAS. A probit regression was then applied to identify the factors that determine, or are associated with, the probability of a firm adopting ITAS. Formally we estimate the following equation:

<sup>3</sup> For instance, the calculations from the 2015/2016 World Bank Living Standard Measurement Survey reveal that 57 per cent of individuals who report mobile phone use are 19 to 45 years old. Meanwhile, 25 per cent are 46 to 65 years old, while only 6 per cent are 66 years old and above. A similar trend was seen for those who use the internet, about 67 per cent of users are in the age group of 19 to 45 years, while the rest are spread across the other age groups.

$$\Pr(Y_i|X_i, W_i, Z_i, C_{i,c}) = \varphi(\sigma X_i + \delta W_i + \lambda Z_i + \emptyset C_i)$$

The dependent variable is equal to one for small businesses who filed their tax return in the previous/current tax filing period and zero if not.  $X_i$  represents a vector of small businesses' internal characteristics, such as firm financials, age of incorporation, sector of engagement, firm size, quality of accounting processes, among other relevant factors.  $W_i$  represents small businesses' owners and/or managers' personal characteristics including age, educational qualifications, industry experience and so on.  $Z_i$  represents business environment characteristics including the binary variable if the small business experienced challenges from the tax regime, shocks from tax regulatory change and influential interactions with government officials and tax officers.  $C_{i,c}$  controls for firm location, business type and the industry fixed effect to reduce the bias that could stem from these variables. For instance, whether a firm is located in an industrial enclave and its type of industrial classification (i.e. whether manufacturing or service) could affect a firm's awareness and use of ITAS. The identifiers ( $\varphi, \sigma, \delta, \lambda$ , and  $\emptyset$ ) are the coefficients to be computed in the econometric estimations. Our study also applies an estimation technique to take into consideration firm responses to the question of how they perceive ITAS, with the value ranging from 0 (less positive) to 6 (more positive).

**Table 3.2: Variables, Measurement, and Basic Descriptive Statistics**

Variables	Definition	Mean	Std. Dev.
<b>Ownership characteristics</b>			
Owner's education	Measured as '1' if owner's highest education qualification is secondary school, 2 if university and 3 if post-graduate degree	2.604	0.653
Board size	Measured as the firm's number of owners. This shows the diversity of views that may be present among the small businesses' top managers	1.373	0.876
Owners' industry experience	The number of years that the owner (i.e. entrepreneur) of the firm has been in this particular business or industry. We expect that greater experience will imply that the owner will be less responsive to change in its administration.	8.521	5.938
Owners' age	The age of the owner. Older individuals are expected to be less receptive to change, implying that they will be less likely interested in adopting ITAS.	43.417	9.009
Manager finance degree	A count variable of the number of the small businesses' board members with a finance degree. A priori expectation is positive considering their conversance with systems that can improve tax efficiency.	1.328	1.918
Owners' involvement	A dummy variable '1' if the owner of the firm is also a member of the board of the firm. A priori expectation is also positive.	0.715	0.452
<b>Organisational structure</b>			
Audit efficiency	Measures the efficiency of the audit process, where '1' equals that the firm uses an external auditor and '0' otherwise.	0.220	0.415
Computerised accounting system	A dummy variable '1' if the firm's accounting system is computerised and '0' otherwise. This variable is expected to have a positive influence on the likelihood of adopting ITAS.	0.333	0.476
External tax consultant	A dummy variable '1' if the firm engages the services of an external tax consultant for tax related matters. This is expected to have a positive influence on the probability of adopting ITAS.	0.270	0.444
Small business participated in ITAS training	A dummy variable '1' if the firm participated in a training organised by FIRS on how to use ITAS and '0' otherwise. This variable is expected to have a positive relationship with the likelihood of adopting ITAS.	0.154	0.361
Internet use	A dummy variable '1' if the firm uses the internet for its operations and '0' otherwise.	0.706	0.456
Legal consequence of tax non-compliance	A dummy variable '1' if the firm reports that they are aware of the consequences of tax non-compliance and '0' otherwise.	0.643	0.480

Firm Size	This is measured as the firm's total number of employees. It is expected that larger firms are more likely to adopt ITAS than smaller firms.	20.867	32.024
Firm Age	Measured as the total age of the firm since its incorporation.	12.960	12.732
Firm performance	This is measured as the logarithm value of profit of the firm in the last 12 months before the survey.	15.205	1.645
Firm innovativeness	This variable ranges from 0 to 6. Values were computed as a sum of the following activities: if a firm introduced a new or significantly improved product or service, introduced a new or significantly improved processes, introduced new technology to its operations, trained workers on new methods and processes, organised seminars or trained workers on improving organisation processes or introduced new technology to the firm's marketing or customer relations.	3.099	2.067
<b>External environment</b>			
Tax burden score	Burden score of the tax administration is defined as the cumulative weighted score of firms' responses across eight different indicators including: tax regulations, tax payment system, tax officials, tax information, filing tax complaints, courts to settle tax dispute, accessibility of tax offices and online tax payment system. The different indicators are given similar weight (1/8), as each indicator effects taxpayers' response to by tax administrators' initiatives	0.433	0.257
Tax environment	Firms' general perception of taxation is computed as an index that ranges from 0 to 1 with higher values implying that firms have a negative perception of taxation. The index comprises questions related to whether firms pay taxes regularly, misreport their income and expense, over report their allowances, pay bribes to tax officers, declare losses to avoid paying taxes, and tax officials demand bribes. Responses are then weighted (1/6) and the sum of all the responses comprised the values for this variable. Firms with negative perception are less likely to adopt ITAS.	0.619	0.285
FIRS personal encouragement	A dummy variable '1' if the firm ever received any letter or information from FIRS encouraging them to use ITAS to pay their taxes.	0.455	0.499
FIRS advertisement	A dummy variable '1' if the only information about ITAS was through a public advertisement by the FIRS office.	0.308	0.462
Trust in tax administration	A dummy variable '1' if the firm reports that they trust the tax administration system in their location/area.	2.275	0.996
<b>Outcome variables</b>			
Used ITAS for tax computation	A dummy variable '1' if the firm used the ITAS system to compute and file its tax in the last filing season and '0' otherwise.	0.140	0.349
Perception of ITAS	Ranges from 0 to 6 with higher values implying that a firm perceives ITAS as preferable to manual tax filing. The variable is computed from the sum of answers regarding: a firm's preference for ITAS compared to the manual tax system, reporting less mistakes using ITAS, perceiving ITAS as less complex and difficult to follow, trusting ITAS' tax computation, receiving better tax values from ITAS and whether a firm needed more time to understand ITAS processes. The initial response to these questions is '1' if yes and '0' if no.	0.727	1.445

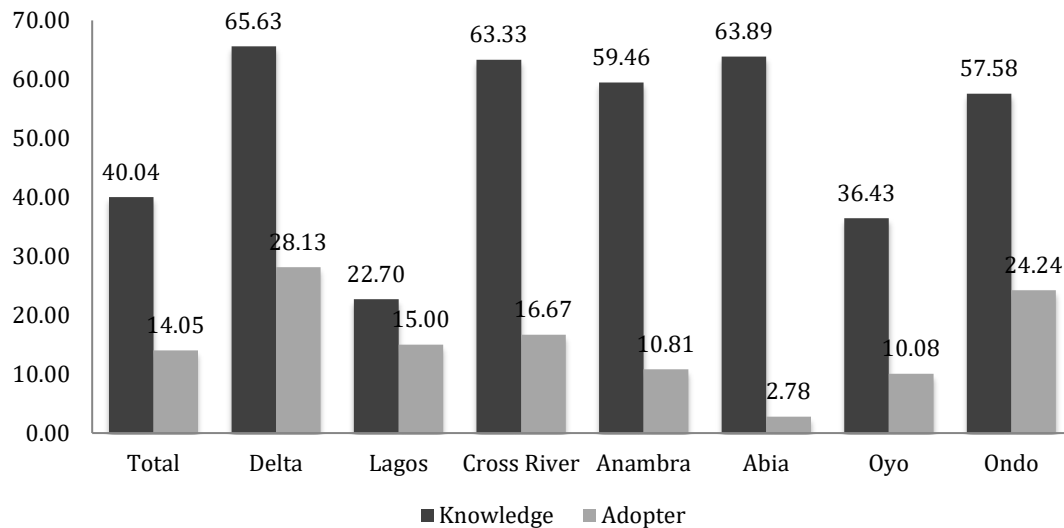
# 4 Results and Discussion

## 4.1 Knowledge and Use of ITAS

Knowledge and use of ITAS varies across sampled states and reveal several notable trends. As displayed in Figure 4.1, 40 per cent of firms sampled knew of ITAS. Delta State had the highest rate of knowledge at 66 per cent and Lagos State the lowest at 23 per cent. Across all states, an average of 14 per cent of firms have adopted ITAS. The highest rates of ITAS adoption are in the states of Delta and Ondo at 28 and 24 per cent respectively. Comparatively, Cross River and Lagos State are at 17 and 15 per cent respectively, while Oyo and Anambra hover around 10 per cent. Abia State has the lowest rate of ITAS use at just 3 per cent.

Comparing the ratio of firms' awareness of ITAS to its use provides relevant insight. In Lagos, 66 per cent of firms who know of ITAS adopt it. Comparatively, about 43 per cent of firms in Delta and Ondo adopted the system after becoming aware of it. In the other states, such as Oyo, Cross River and Anambra, the level of use among informed firms ranges from 18 to 27 per cent, while less than 5 per cent of informed firms adopted the system in Abia. Evidence from states like Lagos therefore implies that awareness of ITAS lends itself to a greater likelihood to adopt it. This suggests that targeted promotion in states like Delta and Ondo may more readily lead to wider ITAS use.

**Figure 4.1 Sampled States' Knowledge and Use of ITASs**

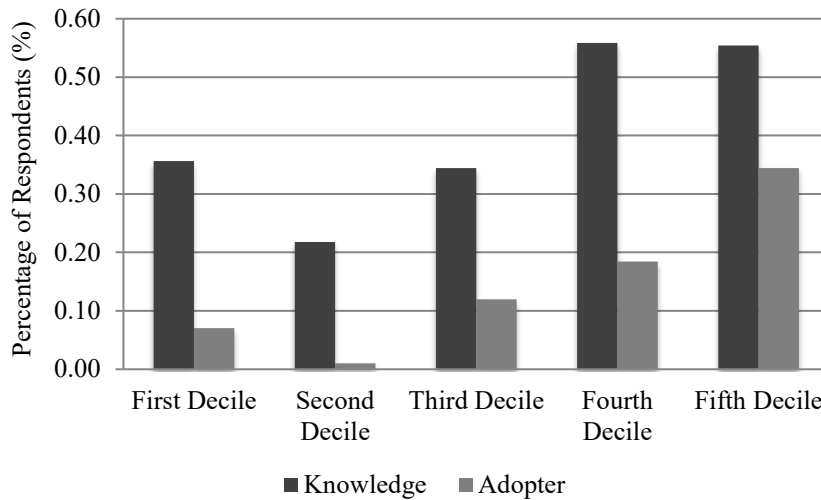


Next, we will consider three specific firm characteristics' relationship to the level of ITAS use to give a general sense of possible correlations. Comparison of ITAS use and business size, owners' educational qualifications, and the tax administration system's burden score are shown in the figures below. Figure 4.2a compares knowledge of ITAS and its use to show that medium and large firms, according to employee size, have more knowledge of ITAS and are more likely to adopt it. Generally, knowledge and use of ITAS increases with the firm's size. Likewise, we observe in Figure 4.2b that ITAS use increases with the management's educational level. Evidently, firms with more educated top managers tend to adopt ITAS more

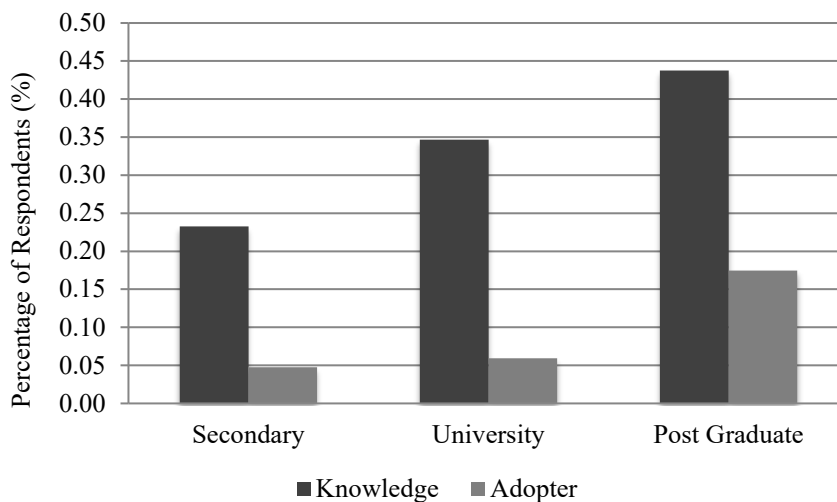
than firms with lower educated top managers. The statistics displayed in Figure 4.2c do not show that perceiving tax administration as a burden means that firms are less likely to adopt ITAS. Therefore, there is no clear evidence on the direction of trend in regard to a firms' burden score of tax administration and ITAS use.

An interesting comparison can also be drawn between the level of ITAS use across states and a firm's perception of tax administration as an obstacle to business. States that report higher use of ITAS, like Delta and Ondo, perceive tax administration as a minor obstacle. Meanwhile, states with lower use, like Abia, perceive tax administration as a moderate obstacle. Consequently, it is possible that using ITAS to file taxes leads firms to view tax administration as less burdensome.

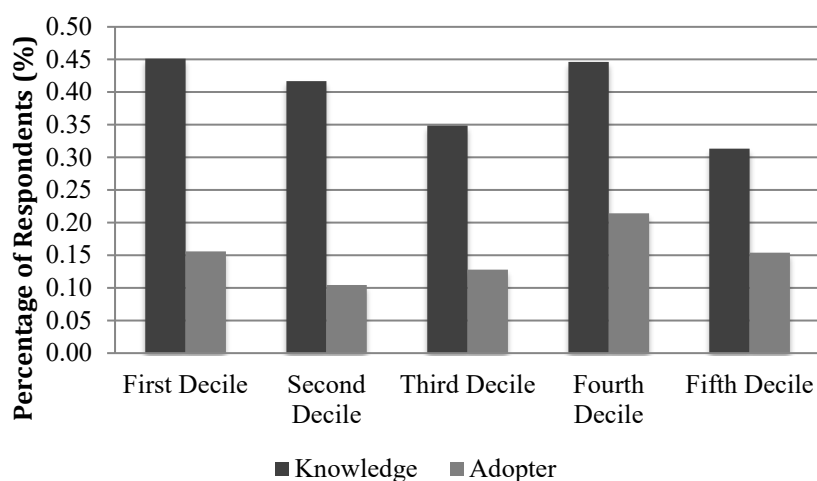
**Figure 4.2a Knowledge and Use of ITAS Across Deciles of Firm' Size (Total Employees)**



**Figure 4.2b Knowledge and Use of ITAS Across Firm Management Educational Qualification**



**Figure 4.2c Knowledge and Use of ITAS Across Deciles of Tax Administration Burden Score**



## 4.2 Ownership Characteristics and ITAS Use

Table 4.1 below presents the main findings from our estimation results of ownership characteristics and firms' use and perception of ITAS. The 'a' columns are the estimates from the marginal effect of the probit regression, while the 'b' columns are the estimates from the Tobit regression model. Both models cluster the error term by state to enhance the estimation's efficiency. From columns 1a, 3a and 4a, we can observe that the owner's education, industry experience and age are very important determinants of the likelihood to adopt ITAS. We also find that the conditional probability of adopting ITAS for tax filing increases by 0.075 as long as the owner's education improves from the reference (e.g. secondary education). Similarly, a year increase in an owner's industry experience increases the conditional probability of adopting ITAS by 0.006, while a year increase in the owner's age also increases the probability by 0.003. We also find a marginally significant effect for a manager's education in finance improving the likelihood of adopting ITAS. However, we do not regard this variable as an important determinant of a firm's likelihood to adopt ITAS as it is at the 10 per cent significant level.

In regard to small businesses' perception of ITAS, we find that the higher education of an owner, especially in a finance-related degree, improves perception of ITAS. The results in columns 1b and 5b of Table 4.1 show that improved education level improves an owner or manager's perception of ITAS by 0.367 on a scale of 0 (worst perception) to 6 (best perception). This increase is significant at the 1 per cent level. We find that, as the number of managers with a finance degree increases in the firm by one member, the perception of ITAS also improves by a significant coefficient of 0.197. We also find that, while there is a positive response in ITAS perception as a result of larger board size and owners' industry experience, it is marginally significant at the 10 per cent level. Therefore, our findings imply that these two variables may not be important in defining firms' perception of the new ITAS tax filing system.



**Table 4.1: Firm Ownership Characteristics and ITAS Use**

<i>y</i> = Use of ITAS/ Perception about ITAS	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6a	6b	7a	7b
Owner's education	0.075*** (0.006)	0.367*** (0.001)	---	---	---	---	---	---	---	---	---	---	0.052 (0.194)	0.365*** (0.002)
Board size	---	---	-0.006 (0.413)	0.112* (0.093)	---	---	---	---	---	---	---	---	0.021 (0.172)	0.068 (0.436)
Owners' industry experience	---	---	---	---	0.006*** (0.003)	0.021* (0.075)	---	---	---	---	---	---	0.001 (0.658)	0.015 (0.279)
Owners' age	---	---	---	---	---	---	0.003*** (0.000)	0.002 (0.980)	---	---	---	---	0.008** (0.000)	0.006 (0.750)
Manager finance degree	---	---	---	---	---	---	---	---	0.045* (0.100)	0.197*** (0.010)	---	---	0.050** (0.016)	0.180** (0.033)
Number of managers	---	---	---	---	---	---	---	---	---	---	-0.033 (0.216)	-0.063 (0.684)	0.034 (0.570)	0.193 (0.411)
Business type	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm location	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	---	-0.285 (0.232)	---	0.421* (0.056)	---	0.167*** (0.000)	---	0.097 (0.127)	---	0.253*** (0.000)	---	0.742*** (0.000)	---	-0.426 (0.681)
R2	0.104	0.022	0.075	0.015	0.090	0.067	0.087	0.063	0.125	0.090	0.083	0.060	0.170	0.022
Prob. > chi2	(0.000)	(0.000)	(0.001)	(0.000)	(0.010)	(0.016)	(0.023)	(0.001)	(0.010)	(0.019)	(0.002)	(0.015)	(0.000)	(0.000)
Cluster error (by state)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observation	468	463	462	457	467	467	461	461	245	245	467	462	232	230

Note: Columns 1a – 6a report the *probit* marginal effects coefficients. Columns 1b – 6b report *the Tobit* regression coefficient. Standard errors are clustered at the state level and the probability values are reported in parentheses. The R2 in columns 'a' are from the initial estimated probit regression. \*, \*\* and \*\*\* indicate significance at the 10 per cent, 5 per cent and 1 per cent levels respectively. The control variables include business type, industry dummy and firm location. The variable 'business type' controls for whether the firm is a sole proprietor business '1' or otherwise '0'; 'Industry dummy' is defined as '1' if the firm is a manufacturing firm and '0' if not; while the firm location is defined as '1' if the firm is located in the capital city or the central business district, and '0' otherwise. The variables that measure firm characteristics were included individually because of the high level of multicollinearity that exists from their combinations in a single model.

### 4.3 Internal Organisational Structure and ITAS Use

Next, we will consider ten firm characteristics related to internal organisational structure. Table 4.2 reports the coefficient of the probit and Tobit regression model. Factors that positively affect the conditional likelihood of adopting ITAS are: auditing efficiency; use of computerised accounting systems, internet, and external tax consultants; participation in FIRS training of ITAS; awareness of legal consequences of tax non-compliance; and the company's age. Columns 1a and 4a show that firms that undergo FIRS training and use an external auditor are 44.2 and 33 per cent more likely to adopt the platform. The effects of these variables are the highest across all the variables that make up Internal Organisation Structure. As expected, a firm's use of an external tax consultant, awareness of the legal consequences for non-compliance and internet facilities were the second most influential factors in the category. The results in columns 3a, 5a and 6a show that use of an external tax consultant increased a firm's likelihood to use ITAS by 24 per cent, awareness of the legal consequences by 12.6 per cent and use of internet for business operations by 11 per cent. Other important internal determinants are the use of a computerised accounting system and the firm's age. ITAS use is not determined by a firm's performance or level of innovativeness, as these variables are not significant at any of the levels.

In the 'b' columns 1-4, 8b and 10b of Table 4.2 below, we likewise find that the use of external auditors, electronic firm accounting systems, tax consultants, as well as participation in FIRS training, company age and extent of innovativeness positively effect firm perception of ITAS. The greatest effect of between 0.764 and 0.963 was seen for firms with external auditors, those who participated in the FIRS training and those who use external tax consultant services. The effects of these variables were significant at the 1 per cent level. Other important variables such as having a computerised accounting system, firm age and extent innovation had a positive effect of between 0.018 and 0.346 on perception. These results suggest that the most influential firm characteristics are the utilisation of external auditors and tax consultants, as well as FIRS training on ITAS use. Our findings bode well for the potential of FIRS' training and cooperation with external tax consultants and auditors to promote greater ITAS use.

**Table 4.2 Internal Characteristics and ITAS Use**

<i>y = Use of ITAS/ Perception about ITAS</i>	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6a	6b		
Auditor efficiency	0.330** * (0.000)	0.963** * (0.000)	---	---	---	---	---	---	---	---	---	---	0.073** (0.025)	0.712* * (0.014)
Computerised accounting system	---	---	0.088** * (0.000)	0.346** * (0.046)	---	---	---	---	---	---	---	---	0.004 (0.767)	0.197 (0.366)
External tax consultant	---	---	---	---	0.240** * (0.000)	0.764** (0.003)	---	---	---	---	---	---	0.114** (0.022)	0.420* * (0.050)
FIRS official training	---	---	---	---	---	---	0.442** * (0.000)	0.818** * (0.012)	---	---	---	---	0.259** * (0.000)	0.406 (0.211)
Internet use	---	---	---	---	---	---	---	---	0.105*** (0.000)	0.219 (0.220)	---	---	0.014 (0.468)	0.123 (0.923)
Awareness of legal consequences	---	---	---	---	---	---	---	---	---	---	0.126** * (0.000)	0.326* (0.100)	0.004 (0.229)	0.037 (0.744)
Business type	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm location	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	---	0.286** (0.044)	---	0.537** * (0.000)	---	0.377** * (0.016)	---	0.557** * (0.000)	---	0.541** * (0.007)	---	0.164** * (0.000)		
R2	0.225** * (0.000)	0.033** * (0.000)	0.103** * (0.000)	0.019** * (0.000)	0.170** * (0.000)	0.027** * (0.000)	0.278** * (0.000)	0.026** * (0.000)	0.104*** (0.002)	0.016 (0.001)	0.130 (0.002)	0.085 (0.000)		
Prob > chi2	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.001)	(0.002)	(0.000)		
Cluster error	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Observation	466	461	468	463	446	441	466	462	465	460	469	469		
Firm size	0.009 (0.317)	0.005 (0.192)	---	---	---	---	---	---	0.002 (0.328)	0.001 (0.844)				
Firm age	---	---	0.005** (0.024)	0.018** * (0.000)	---	---	---	---	0.002 (0.035)* *	0.001** * (0.000)				
Firm performance	---	---	---	---	0.022	0.025			0.001	0.084				

Firm innovativeness	---	---	---	---	(0.120)	(0.826)	---	---	(0.851)	(0.370)				
Business type	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes				
Industry dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes				
Firm location	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes				
Constant	---	0.495** * (0.008)	---	0.358** (0.027)	---	0.195 (0.916)	---	0.336* (0.067)	---	0.995 (0.516)				
R2	0.089	0.019	0.129	0.021	0.0852	0.012	0.092	0.021	0.349	0.0479				
Prob > chi2	(0.048)	(0.000)	(0.002)	(0.000)	(0.001)	(0.000)	(0.019)	(0.000)	(0.000)	(0.000)				
Cluster error	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes				
Observation	466	461	464	458	402	397	397	392	320	316				

Note: Columns 1a – 6a report the *probit* marginal effects coefficients. Columns 1b – 6b report the *Tobit* regression coefficient. Standard errors are clustered at the state level and the probability values are reported in parentheses. The R2 in the 'a' columns are from the initial estimated probit regression. \*, \*\* and \*\*\* indicate significance at the 10 per cent, 5 per cent and 1 per cent levels respectively. The control variables include business type, industry dummy, and firm location. The variable 'business type' controls for whether the firm is a sole proprietor business '1' or otherwise '0'; 'industry dummy' is defined as '1' if the firm is a manufacturing firm and '0' if not; while the firm location is defined as '1' if the firm is located in the capital city or the central business district and '0' otherwise. The variables that measure firm characteristics were included individually because of the high level of multicollinearity that exists from their combinations in a single model.

#### 4.4 External Environment and ITAS Use

Lastly, we compared firms' perception of their external environment and their use and perception of ITAS. Table 4.3 below shows the results of the estimation for the five variables of tax burden score, firm opinion of ITAS, FIRS officials' personal encouragement of ITAS use, public advertisement and a firm's trust in the tax administration process. We find that the most influential variables are FIRS officials' personal encouragement of ITAS use, FIRS public advertisement, and firms' trust in the tax process. An official FIRS visit to promote ITAS use increases the firm's conditional likelihood of adopting it by 14.4 per cent. Meanwhile, FIRS advertisement and firm trust in the tax administration increases the probability of adopting ITAS by 8 and 4 per cent respectively. Resultantly, our research confirms that FIRS outreach and advertisements positively effects ITAS use.

Turning to firms' perception of ITAS, we find that the only influential variable is FIRS officials' personal visits to encourage firms to adopt ITAS. For this variable, firms that are visited by FIRS officials will have a better perception of ITAS by 0.258. Other external environment variables such as tax burden score, general perception of tax, FIRS advertisements of ITAS and firms' trust for the tax administration do not significantly affect firms' perception of ITAS. Therefore, in-person ITAS promotion by FIRS officers is a worthwhile component of increasing ITAS use among small businesses.

**Table 4.3 External Environment and ITAS Use**

<i>y</i> = Use of ITAS/ Perception about ITAS	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6a	6b
Tax burden score	-0.044 (0.572)	0.099 (0.195)	---	---	---	---	---	---	---	---	-0.002 (0.978)	0.106** (0.065)
Perception of tax	---	---	0.028 (0.591)	0.026 (0.919)	---	---	---	---	---	---	0.003 (0.945)	0.001 (0.997)
FIRS personal encouragement	---	---	---	---	0.144** (0.013)	0.258** (0.050)	---	---	---	---	0.026** (0.038)	0.473** (0.017)
FIRS advertisement	---	---	---	---	---	---	0.082*** (0.002)	-0.010 (0.952)	---	---	0.153*** (0.005)	0.318 (0.136)
Trust in tax administration	---	---	---	---	---	---	---	---	0.040*** (0.002)	0.105 (0.190)	0.034* (0.073)	0.105 (0.143)
Business type	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm location	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	---	0.501** (0.026)	---	0.687*** (0.001)	---	0.562*** (0.002)	---	0.704*** (0.000)	---	0.448*** (0.044)	---	0.084 (0.786)
R2	0.072	0.016	0.079	0.015	0.139	0.017	0.096	0.015	0.090	0.017	0.139	0.022
Prob. > chi2	(0.002)	(0.000)	(0.005)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.037)	(0.000)	(0.000)	(0.000)
Cluster error	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observation	460	456	466	461	467	463	462	460	459	454	438	436

Note: Columns 1a – 6a report the *probit* marginal effects coefficients. Columns 1b – 6b report the *Tobit* regression coefficient. Standard errors are clustered at the state level and the probability values are reported in parentheses. The R2 in columns 'a' are from the initial estimated probit regression. \*, \*\* and \*\*\* indicate significance at the 10 per cent, 5 per cent and 1 per cent levels respectively. The control variables include business type, industry dummy, and firm location. The variable 'business type' controls for whether the firm is a sole proprietor business '1' or otherwise '0'; 'industry dummy' is defined as '1' if the firm is a manufacturing firm and '0' if not; while the firm location is defined as '1' if the firm is located in the capital city or the central business district and '0' otherwise. The variables that measure firm characteristics were included individually because of the high level of multicollinearity that exists from their combinations in a single model.

## 4.5 Further Checks

To check the consistency of our result, we further re-estimated the regression results in Tables 4.1 to 4.3 in Sections 4.2 to 4.4 by controlling for the FIRS office fixed effect. Some FIRS offices share tax information, ensure compliance and promote ITAS more actively than others. Therefore, differences in FIRS operations across the sampled location will likely impact the efficiency of our regression results. We further estimate a different regression that accounts for the FIRS office fixed effect across the sampled states. The result of this additional regression is presented in Table A2 (in Appendix 2), while still controlling for the business type, the industry dummy, and the firm's location.

Panel A in Table A2 illustrates our sensitivity test that found that an owner's education remained consistent in determining the use and perception of ITAS. Likewise, an owner's industry experience and age remained consistent in explaining ITAS use, but not small businesses' perception of ITAS. Moreover, a managers' finance degree was now insignificant when we controlled for the FIRS office fixed effect. These results show that despite FIRS offices' varying behaviour in ITAS promotion, an owner's education influences both use and perception of the system. On the other hand, owners' experience and age are consistently important for ITAS use, while these variables do not matter for perception of ITAS.

From Panel B in Table A2, we also see that the effect of engaging the services of an external auditor and tax consultant, having a computerised accounting system and receiving FIRS training consistently improved the use and perception of ITAS, controlling for the differences in FIRS offices. However, these results also show that despite the consistency in internet use and firm age on ITAS use, the significance of these variables vanishes when controlling for the fixed effect of the FIRS offices. The remaining variables that capture the internal organisation of the firm still maintained their non-significant effects on the two outcome variables.

Finally, we find from Panel C that FIRS' personal encouragement of firms to adopt ITAS remains influential irrespective of differences among FIRS office operations across sampled states. FIRS advertisement and firms' trust in the tax administration system maintained their positive effect and even became significant for firms' perception of ITAS. This indicates that more active FIRS offices are better at improving small businesses' view of ITAS through in-person meetings and public advertising.

# 5 Conclusions and Policy Implications

Using a survey of small businesses from southwestern Nigeria, this paper presents early and in-depth findings on how small business ownership characteristics, internal attributes and external environment affect their use and perception of the Integrated Tax Administration System. We find that the firm ownership characteristics that matter most include the owner's education, experience and whether the owner has a finance degree. The most influential internal characteristics are use of an auditor, computerised accounting system, external tax consultant, as well as receiving FIRS training and a firm's age and innovativeness. Finally, FIRS officials' personal encouragement of small businesses to adopt ITAS is the most important variable in regard to a firm's external environment. While we find FIRS advertisements and a

firm's trust in the tax administration system to be important, the levels of significance were not consistent across the estimation techniques.

Our findings have important implications for developing countries' transition to electronic tax administration systems. Firstly, small business owners' characteristics can be used to target outreach programs. Educated owners, for instance, are more likely to adopt new systems. Similarly, an owner's greater experience in the industry and possession of a finance degree also further increase the probability of adopting the system. FIRS officials should target educated firm owners, those with finance-related degrees and those with computerised accounting systems for efficient outreach. FIRS should also develop specific plans to influence small businesses that lack these characteristics. Our estimations show that third-party influence, such as use of external auditors, tax consultants and FIRS training increase ITAS use and perception among small businesses, also carries important policy implications. FIRS should collaborate with actors who play a professional advisory role to small businesses on effective ITAS promotion. As ITAS compliance reduces tax officers' working hours, such collaboration could lead to FIRS officers' greater ability to invest time in other activities and increase the tax process' productivity.

While our study sought to account for the various factors that effect ITAS use in Nigeria, some factors, such as political connections, were not addressed. Some small businesses within our sample might be disincentivised to use ITAS due to government connections that shield them from official audits. Moreover, some other important variables explain firms' decision to adopt ITAS. This study is therefore not comprehensive and leaves ample space for future research to further explore this issue.



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# Appendices

## Appendix 1

**Table A1 Sample Across FIRS Office Locations in Each Selected States**

S/N	State for Sample Collection	FIRS Office Location	Sample
1	Cross River	13, Okim Osabor Street, Ikom, Cross River State	7
		24/26, Murtala Mohammed Way, Calabar, Cross River State	7
		Plot 7, New Ikang Layout, IBB Way, Calabar, Cross River State	6
2	Anambra	Opp. Government Dunukofia LGs House Expressway, Awka, Anambra State	7
		15, Onitsha Road, Nnewi, Anabra South	7
		87, Upper New Market Road, Onitsha	7
		Plot 4, Abuja Estate, Glass House, Government House, Awka, Anambra	6
3	Delta	Plot 4, Govt House, Illah Road, Asaba	6
		2015, New Ogorode Road, Sapele Delta State	6
		87, Efurun/ Sapele Road, Delta State	5
		Plot 4, Govt House , Illah Road, Asaba	5
4	Abia	4, Ojike Street, Umuahia, Abia State.	7
		176, Azikwe Road, Aba, Abia State	7
		140, Aba-Owerri Road Aba, Abia State	7
		4, Ojike Street, Umuahia, Abia State	7
5	Ondo	67, Okitipupa road, opposite Heritage Bank, Ore Ondo State	15
		Alred Rewane Alagbaka, GRA Akure Ondo State	16
6	Lagos	2B, Lateef Jakande, Ikeja Lagos	11
		106, Adeniyi Jones Avenue	11
		31, Lagos Road Benson Bus Stop ikorodu	11
		19, Ijumu/Egbeda Isheri Ijumu	11
		2-4 Olusoji Idowu, Ilupeju Street	11
		14B Olojo Drive Ojo Town	11
		Afrik House, Off western avenue Iponri	11
		33, Imam Dauda, Off Eric more Road Surulere	11
		Osolo Way, Ajao Estate	11
		Orile Iganmu ITO, Sunny Building, Suru Alaba Bustop Orile	11
		22 Warehouse Road, Apapa, Lagos State	12
		AVM Building, Beside Atrwool Sunflower School Km14, Lekki -Epe Expressway Lagos	11
		Sterlin towers, 20 Marina Road	12
		Plot 1716, chattered Bank Close off, Idejo Street Adeola Odeku VI	11
		5th Floor, 17B, Awolowo Road, Ikoyi lagos	12
		23/25/Catholic Mission Street, City Hall, Lagos State	11
7	Oyo	1NTC Leaf Road, Glass House Olorunsogo Close, Iyanganku Ibadan	40
		Awe Junction, Akunlemu Area, Oyo Town Oyo State	41
		No 55, Adeoyo Hospital off Ring Road, Ibadan	41

## Appendix 2

**Table A2 Sensitivity Checks when Controlling for Tax Office Fixed Effects**

<b>PANEL A</b>												
<b>y = Adoption of ITAS/ Perception about ITAS</b>	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6a	6b
Owner's education	0.039*** (0.001)	0.297*** (0.001)	---	---	---	---	---	---	---	---	---	---
Board size	---	---	-0.016 (0.282)	0.105 (0.303)	---	---	---	---	---	---	---	---
Owners' experience in industry	---	---	---	---	0.007*** (0.030)	0.008 (0.713)	---	---	---	---	---	---
Owners' age	---	---	---	---	---	---	0.003** (0.016)	0.004 (0.619)	---	---	---	---
Manager finance degree	---	---	---	---	---	---	---	---	0.053 (0.012)	0.171 (0.055)	---	---
Managers involvement in business	---	---	---	---	---	---	---	---	---	---	-0.038 (0.430)	-0.060 (0.757)
Business type	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm location	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	---	-0.045 (0.939)	---	0.475 (0.185)	---	0.619*** (0.007)	---	0.545 (0.047)	---	0.879 (0.097)	---	0.758 (0.025)
R2	0.184	0.022	0.170	0.015	0.185	0.211	0.191	0.210	0.270	0.196	0.182	0.208
FIRS office fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster error (by state)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observation	468	463	462	457	467	462	461	457	245	243	467	462
<b>PANEL B</b>												
	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6a	6b
Auditor efficiency	0.366*** (0.002)	0.936*** (0.010)	---	---	---	---	---	---	---	---	---	---
Computerised accounting system	---	---	0.156*** (0.002)	0.606** (0.015)	---	---	---	---	---	---	---	---
External tax consultant	---	---	---	---	0.256*** (0.006)	0.712** (0.045)	---	---	---	---	---	---

FIRS official training	---	---	---	---	---	---	0.457*** (0.002)	0.786* (0.084)	---	---	---	---	
Firm internet use	---	---	---	---	---	---	---	---	0.108*** (0.001)	0.276 (0.101)	---	---	
Awareness of legal consequence	---	---	---	---	---	---	---	---	---	---	0.144*** (0.002)	0.251 (0.441)	
Business type	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Industry dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Firm location	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Constant	---	0.313 (0.283)	---	0.491 (0.131)	---	0.421 (0.101)	---	0.550** (0.047)	---	0.532* (0.090)	---	0.564* (0.092)	
R2	0.308***	0.253*	0.211***	0.234**	0.256***	0.242	0.346***	0.237**	0.196***	0.208	0.212**	0.216	
FIRS office fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Cluster error	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Observation	<b>466</b>	<b>461</b>	<b>468</b>	<b>463</b>	<b>446</b>	<b>441</b>	<b>466</b>	<b>462</b>	<b>465</b>	460	469	464	
		7a	7b			8a	8b		9a	9b		10a	10b
Firm size		0.002 (0.214)	0.005 (0.367)			---	---		---	---		---	---
Firm age		---	---			0.008*** (0.001)	0.016*** (0.000)		---	---		---	---
Firm performance		---	---			---	---		<b>0.064** (0.017)</b>	0.187** (0.037)		---	---
Firm innovativeness		---	---			---	---		---	---		0.024 (0.172)	0.052 (0.170)
Business type		Yes	Yes			Yes	Yes		Yes	Yes		Yes	Yes
Industry dummy		Yes	Yes			Yes	Yes		Yes	Yes		Yes	Yes
Firm location		Yes	Yes			Yes	Yes		Yes	Yes		Yes	Yes
Constant		---	0.538** (0.050)			---	0.364 (0.205)		---	-2.318* (0.083)		---	0.650* (0.070)
R2		0.207**	0.217			0.236***	0.225**		0.206***	0.219*		0.211***	0.220***
FIRS office fixed effect		Yes	Yes			Yes	Yes		Yes	Yes		Yes	Yes
Cluster error		Yes	Yes			Yes	Yes		Yes	Yes		Yes	Yes
Observation		466	461			463	458		402	397		397	392



PANEL C												
	1a	1b		2a	2b	3a	3b		4a	4b	5a	5b
Tax burden score	-0.005 (0.321)	0.037 (0.580)		---	---	---	---		---	---	---	---
Perception of tax	---	---		0.036 (0.491)	0.075 (0.689)	---	---		---	---	---	---
FIRS personal encouragement	---	---		---	---	0.186*** (0.003)	0.598*** (0.008)		---	---	---	---
FIRS advertisement	---	---		---	---	---	---		0.186*** (0.003)	0.598*** (0.008)	---	---
Trust in tax administration	---	---		---	---	---	---		---	---	0.039** (0.046)	0.138** (0.045)
Business type	Yes	Yes		Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes		Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
Firm location	Yes	Yes		Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
Constant	---	0.637* (0.083)		---	0.677* (0.091)	---	0.366 (0.284)		---	0.366 (0.284)	---	0.417* (0.096)
R2	0.178*			0.181***	0.2054*	0.231**	0.235***		0.231***	0.235***	0.177*	0.211**
FIRS office fixed effect	Yes	Yes		Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
Cluster error	Yes	Yes		Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
Observation	460	456		466	461	467	463		467	463	459	454

**Note:** Columns 1a – 6a report the *probit* marginal effects coefficients. Columns 1b – 6b report the *Tobit* regression coefficient. Standard errors are clustered at the state level and the probability values are reported in parentheses. The R2 in the ‘a’ columns are from the estimated probit regression. \*, \*\* and \*\*\* indicate significance at the 10 per cent, 5 per cent and 1 per cent levels respectively. The control variables include business type, industry dummy, and firm location. The variable ‘business type’ controls for whether the firm is a sole proprietor business ‘1’ or otherwise ‘0’; ‘industry dummy’ is defined as ‘1’ if the firm is a manufacturing firm and ‘0’ if not; while the firm location is defined as ‘1’ if the firm is located in the capital city or the central business district, and ‘0’ otherwise. The variables that measure firm characteristics were included individually because of the high level of multicollinearity that exists from their combinations in a single model.

### Appendix 3

Figure A1 Data Collection Locations in Nigeria

