

E-Revenue Adoption in State Internal Revenue Service: Interrogating the Institutional Factors

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ABSTRACT

This paper focuses on investigating factors affecting e-revenue adoption in State Internally Revenue Service. The study utilizes a quantitative research methods. A conceptual research model to investigate factors affecting e-revenue was developed by integrating technology, organisation, and environment framework. The constructs employed in predicting e-revenue adoption include technological competence, financial cost, internal need, satisfaction with existing system, competitive pressure, taxpayer readiness, government regulation. Data were collected from 140 staff of the ICT department, collection departments, and some management staff of State Internal Revenue Service in three state of Nigeria. The data were analysed based on PLS-SEM using SmartPLS 3.0. The result shows that financial cost, level of satisfaction with existing system, internal need of the revenue agencies, government regulation, and competitive pressure are significant factors influencing the adoption of e-revenue in Nigeria.

KEYWORDS

adoption, e-revenue, IS innovation, Revenue, State Internally Revenue Service, Taxation, TOE

INTRODUCTION

A sound revenue system empowers a country and sets the pace for a successful fiscal policy, since it provides enabling ground for administrative accountability (Okiro, 2015). It enables the government to provide public services to the citizens and particularly in the developing countries if they are to achieve the Millennium Development Goals (MDGs) (Rahim, 2017). Unfortunately, public service delivery in Nigeria has not met up with expectations (Rahim, 2017; Abasilim & Edet, 2015).

Electronic revenue (E-revenue) services provide convenient revenue collection, with the capacity to improve revenue system and gain a competitive edge (Ndunda et al., 2015). Revenue is the general term for all monetary receipts accruing from both tax and non-tax sources (Ndemanishi, 2014). Internally Generated Revenue (IGR) is generated within by State governments, which depends on taxation (Omodero, et al., 2018).

State Internal Revenue Services (SIRS) are responsible for the collection and management of internal revenue of every state. According to Edogbanya (2013), IGR as instruments and institutions are still poorly structured in Nigeria. Also, the fluctuating political and economic environments of States in Nigeria reflect critically on IGR in part because institutions and structures (including database) that drive stability in IGR collection and remittance are weak or altogether non-existent. Although,

DOI: 10.4018/JOEUC.2020010103

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several measures taken by State governments witness a surge, this is neither sustained nor indeed sustainable. Besides this, institutional mechanisms that should drive steady growth are simply not available, the problem is even compounded by hiring tax consultants to manage these aspects of IGR (Onuiri et al., 2015). Despite establishment of different bodies and policy to support the adoption of technology in day-to-day running of the government businesses in Nigeria, many functions are still been carried out manually (Adeyemo, 2011, Oni et al., 2016). Many state governments are yet to fully explore the potential of technology in their operations or comply with the National ICT Policy (Oni et al., 2016). It is on this note that Oni et al. (2016) reiterated the need to investigate internal constraints and factors that impact e-government implementation at state level in Nigeria.

Information Technology (IT) innovation provides organizations the opportunity to improve their efficiency and effectiveness as well as gain competitive advantage. Yet, the slow rate of adoption of these technological innovations by SIRS is a critical issue (Githinji *et al.*, 2014). Technology Innovation adoption is made up of three stages namely: initiation, adoption, and implementation (Thong, 1999). Gathering and evaluating information about the technological innovation is done at the initiation stage, the adoption state handles the decision to adopt the technological innovation and the implementation stage is concerned with implementing the technological innovation in an organization. But research shows that, to date, more concentration is on the implementation stage of e-revenue in particular (Onuiri et al., 2015; Nkanor & Udu, 2016; Chatama, 2013; Efunboade, 2014; Githinji *et al.*, 2014; Adesoji & Chike, 2013). Few research works (Ndunda et al., 2015; Chatama, 2013) have considered the factors affecting IT adoption in SIRS. This is very important for developing countries such as Nigeria, given the current state of technological and economic development and literacy.

Other studies on Information System (IS) adoption (Armah-Attoh & Awal, 2013; Al-Mamary et al., 2014; Ibrahim, 2015; Zabadi, 2016; Rosli et al., 2012; Hameed & Arachchilage, 2016) examined other aspects of public sectors, but findings from these studies are unlikely to be generalizable to e-Internal Revenue Generation because of various fundamental differences. For instance, e-revenue as a subset of e-Government is associated with providing opportunities to increase the connectivity, availability and modes of interactivity between governance at multiple levels and the citizen (Mundy & Musa, 2010). The research work investigates the institutional factors that constitute enablers and barriers to the adoption of electronic revenue (e-revenue) system in SIRS using Technology-Organization and Environment (TOE) Framework.

LITERATURE REVIEW

Information and Communication Technology (ICT) has found relevance in all works of life and continued to change the mode of business transaction, education and governance. The application of ICT in government (i.e. e-government) has become a global phenomenon. The term e-government, which was coined in the late 1990s, has now become a self-contained concept and integrated in the field of information system research. It has become the generic term for Web-based services in all tiers of government. E-government is about social, cultural, political and economic transformation.

Several bodies and researchers have defined e-government from various perspectives. The World Bank defined e-government as “the use by government agencies, of information technologies (such as Wide Area Networks, the Internet, and mobile computing) that have the ability to transform relations with citizens, businesses, and other arms of government” (www.worldbank.org). These technologies can serve a variety of different ends such as better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information and or more efficient government management. Grant and Chau (2006) described e-government as broad based initiatives that leverage the capabilities of ICT to develop and deliver high quality, seamless, and integrated public services; enable effective constituent relationship management and support the economic and social development goals of citizens, business, and civil society at local, state, national and international levels.

The definitions of e-government by these various sources differ but all point to a common theme which is the fact that e-government involves using ICT to improve the delivery of government services to citizens, businesses, and other government agencies. It enables citizens to interact and receive services from the governments (local, state and federal) anytime anywhere. The goal of e-government is to provide better delivery of government services to citizens, foster communication between government and the populace, improve government interaction with businesses and industries, improve quality of lives through economic development and empowering the citizens through access to information (Ojo, 2014; World Bank, 2008). This could bring about increased transparency and accountability, revenue growth, increased scrutiny. It also has the capabilities of avoiding bureaucratic delay, change in power structure by making power more diffuse and less concentrated among small political elite.

Moon (2002) highlights four distinct aspects of e-government these include (1) a secure government intranet for more efficient interaction among governmental agencies; (2) Web-based service delivery; (3) e-Commerce for more efficient government transaction activities; and (4) digital democracy for more transparent accountability of government. These components are further described as Government-to-Citizen (G2C), Government-to-Business (G2B), Government-to-Employee (G2E), and Government-to-Government (G2G) (Rahim, 2017; Ojo, 2014). The G2C services aspect of e-government which is the domain of this study provide platforms for citizens to ask questions about government agencies and receive answers; perform duties such as file income taxes (local, state, and federal); pay taxes (income, real estate); change their address; renew driver's licenses; and pay traffic tickets.

ICT Adoption and E-Government in Nigeria

Nigeria is described as having the fastest growing telecommunication in Africa as a result of the exponential growth of Internet and mobile phone users from 2000 to 2010 when the number grew at 21,891.1% growth rate (Oni et al., 2017, Ayo et al, 2011). The number of Internet users in Nigeria in the year 2000 was 200,000 which was less than 1% of the national population (precise 0.1%) (Oni et al., 2017). By June 2010, the number had grown to 43,982,200, estimated to be 28.3% of the country's population (Ayo et al, 2011). The growth continues as Internet users accounted for 48,366,179 which was 38.4% of the nation's population in 2012. Likewise, Mobile technology has gained wider acceptance all over Africa. Mobile phone usage statistic of March, 2011 revealed that there are 90, 969,794 (64.98% of Nigeria population) mobile phones in use in Nigeria. This has risen to 141,900,405 in 2017 (www.ncc.gov.ng). Presently, Nigeria records 94,818,553 Internet user i.e. 49.4% of the nation's population as at November 2017 (www.ncc.org.ng). This trend provides opportunity for government to engage the use of ICT in its operations as other industries such as the Banking industry are taking full advantage of the technology to foster its business operation.

The Federal Government of Nigeria recognized the potentials of Information Communication Technology to improve public services and the need to join the race to becoming a digitized society (Oni et al., 2016). In 2001, it declared ICT as a national priority and formulated the policy for Information Technology. The National Information Technology Development Agency (NITDA) was also established in 2001. Subsequently, the foundation for e-government was laid as the country adopted the National Policy on Information Technology (IT) 'USE IT' policy document which spelt out the strategies and guideline for e-Government implementation (Oni et al., 2016). In 2004, the Government adopted public-private partnership approach to further its e-government initiative and established a Special Purpose Vehicle (SPV) named National E-Government Strategies Limited (NeGST). NeGST is a joint venture of government, consortium of banks, and other strategic partners mandated to develop models, programmes and projects for implementation of e-Government Services in Nigeria. In 2007, the legislative arm of Nigerian government (National Assembly) passed into law the National Information Development Agency Act which authorized NITDA to formulate, devise, develop and promote the use of Information Technology in Nigeria (Olatokun & Adebayo,

2012; Oni et al., 2016; Ajibade et al., 2017). This Act formalizes and regulates the activities of both NITDA and NeGST.

The Government recognised the need to review the national IT policy and harmonize all the various policies for the different sectors in the ICT industry for national IT policy to match up with global trend in IT sector. This gave birth to the National Information and Communication Technology (ICT) policy produced by the Ministry of Communication Technology in 2012. The goal of this National ICT Policy is to provide a framework to streamline the ICT sector, and enhance its ability to catalyze and sustain socioeconomic development critical to Nigeria's vision of becoming one of the top 20 economies by the year 2020 (www.nitda.gov.ng). In 2012, NITDA launched E-Nigeria, an initiatives to bring together stakeholders from the private, public, non-governmental sectors and the international IT community for the furtherance of ICT adoption and implementation. E-Nigeria has been a yearly conference of IT stakeholder since its inception in 2012.

Despite these government initiatives, Nigeria still struggles to have a notable improvement in the use of ICT for service delivery which is also evident in its e-government ranking (Abasilim, 2015; Olatokun & Adebayo, 2012; Adeyemo, 2011; UN E-Government Survey, 2014, 2016). Nigeria ranked 141 and 143 in the 2014 and 2016 World e-government development ranking respectively. In response to the national IT policy, many of the federal government ministries and all the state governments now have web presence but still lacking in IT enabled service delivery. Many interactions and applications for government services including taxes, driver's license, etc. are still done manually (Oni et al., 2016). IT adoption at the grassroot level is predominant low as most local governments are not accessible online. Some SIRS like Lagos state, Ogun State, Edo State are also moving from static website to dynamic websites where taxpayers can file and submit forms online. The web site of Kano State Internal Revenue Services is still predominantly static while some of other counterparts like Ondo, Nassarawa and Akwa Ibom states are yet to go online.

E-Revenue Adoption

According to Armah-Attoh and Awal (2013), Cucchietti (2013), the inability of State governments in developing countries to harness available opportunities such as ICT adoption, prevents them from growing their internally generated revenue. Many leading problems such as unexploited legitimate sources of revenue, short coming in procedures for collecting, remitting and accounting for the ones exploited giving room for avoidable leakages are prevalent in the system. Addition to these problems include lack of accessible database for taxation to all stakeholders, leading to reliance on unscientific procedures for tax collection, over-taxing of the few individuals and firms that are accessible to government institutions and representatives. Adesoji and Chike (2013) argued about effective and efficient internally generated revenue system in Nigeria and noted that it is not all about the various taxes allowed in the law, but the structure put in place to collect them.

According to existing research (Cucchietti, 2013; Omodero et al., 2018), operational effectiveness and efficiency in IGR system has to do with the extent to which the operations are made compatible with information technology. Effective IGR system enhancement using ICT is therefore a matter of long term vision for IGR as opposed to the ad hoc processes engendered by the current, immediate pressure for resources facing States, which is driving the current attention on IGR. This is supported by Sahay and Avgerou (2002), that ICT has the potential to transform uncompetitive industries and dysfunctional public administration and to provide unprecedented opportunities for the information-intensive social services. It has been persuasively argued to play a key developmental role in developing countries (Sahay & Avgerou, 2002; LeBlanc, Mbarika, McCoy & Meso, 2004). Thus, adopting and applying technological solutions towards the strategic goals for government will be a key to transforming government into an entity that can keep abreast of the needs, requirements and expectations of the modern world (Ndemanyisho, 2014).

Lack of proper e-revenue adoption model is the major hindrance to attaining a successful adoption process revenue organizations (Hameed & Arachchilage, 2016). This research attempts to

examine e-revenue adoption process in Internally Generated Revenue, which includes organizational adoption process of innovation. Innovation adoption processes in an organization are considered to be successful only if the innovation is implemented in the organization and individuals continue to use the innovation over a period of time (Hameed & Arachchilage, 2016).

Prior research in organization adoption of innovation and also revenue collection in developing countries is presented in Table 1.

The studies on revenue collection as listed above show that previous works in the area of revenue collection in developing countries have little or no focus on technology adoption. This reveals that gaps still exist in literature as to what factors influence adoption of technology revenue generation in the developing nations of the world. This is particularly important for Nigeria because technology has not been fully integrated in revenue generation of many of the state governments despite the long standing IT policy in place. This study therefore, evaluates the inherent institutional enablers and barriers to adoption of e-revenue in developing countries. Review of theories that form the theoretical underpinning of this research is presented in the next section.

The Technology, Organization and Environmental (TOE) Framework

The TOE framework developed by DePietro, Wiarda and Fleischer (1990) explains firm's technological innovation decision making behaviour. According to the TOE framework, there are three aspects (technological factors, organizational factors and environmental factors) of a firm's context that impact the adoption process of technological innovations. These aspects play a significant role in firm's adoption decision as they determine the ability of the firm to benefit from technological initiative. TOE framework is a generic theory of technology adoption and is a suitable theoretical foundation for studying IS adoption at organizational level (Zabadi, 2016; Zhu, Kraemer & Xu, 2003). TOE is not stereotype in the specification of the variables for the three adoption elements thus giving the researcher opportunity to first identify the variables that are salient for the domain and firm under investigation.

The first context of TOE framework, that is, the technological context refers to the relevant internal and external technology characteristics available to the firm adopting the innovation. Organization context identified several descriptive measures such as: financial cost, technical competence, internal need and satisfaction with existing system. Environmental context describes the arena in which a firm conducts its business which including competitive pressure, industry and government regulation (DePietro et al., 1990).

Technological Context

According to DePietro et al. (1990), technology, is "a knowledge-embedded tool" and "is a mixture of social/ behavioural and physical elements. This implies that, technology itself as a physical tool, requires humans knowledge, because, human has to interact with it to know the purpose of using it, how to operate the tool, and the impact of using it. On the basis of literature review, Zhu et al. (2003) posited that internal technology resources are very important for a successful IS adoption. Under technology context, this study consider technology competence as a determinant of e-revenue adoption. Zhu et al. (2003) operationalized technology competence as a second order construct of IT infrastructure, Internet skill and e-revenue know-how. IT infrastructure refers to technologies that enable internet-related business, Internet skills are defined as employee's skills of using the internet and related technologies and e-revenue know-how refers to the executive's knowledge of managing e-revenue (Zhu et al., 2003). Technology competence is not only made up of physical assets, but also includes human resources, which complement physical assets (Zhu et al., 2003) and can improve efficiency and effectiveness in revenue collection. This theoretical assertion is supported by a number of empirical evidence (Zhu et al., 2005; Pan & Jang, 2008; Soares-Aguiar & Palma-Dos-Reis, 2008) suggesting that, while technology infrastructure establishes a platform on which e-revenue technologies can be built, IT skills provide the technical skills to use e-revenue applications and e-revenue know-

Table 1. Prior research in organization adoption of innovation and also revenue collection in developing countries

Authors	Study Area	Main focus
Organization adoption of innovation		
Pan and Jang (2008)	Enterprise resource planning	Adoption of enterprise resource planning within the Technology-Organisation- Environment (TOE) Framework.
Zhu and Kraemer (2005)	e-business	Cross-Country variation in the usage and value of e-business by organisations in retail industry
Lippert and Govindarajulu (2006)	Web services	Factors affecting adoption and continual usage of web services
Teo et al. (2009)	e-procurement	Empirical evaluation of factors associated with e-procurement
Oliveira and Martins (2010)	e-business	Pattern of e-business adoption by firms in Europe based on eight factors categorised into three TOE aspects
Revenue Collection		
Ndemanyisho (2014)	Revenue collection in Tanzania	Prospects and challenges of record keeping in Tanzania Revenue Authority
Chatama (2013)	Impact of ICT on taxation	Availability and use of ICT at Tanzania's Large Taxpayer Department
Efunboade (2014)	ICT and Tax Administration in Nigeria	Overall effectiveness of ICT on tax administration in Nigeria
Nkanor and Udu (2016)	Electronic internally generated revenue (e-IGR)	Comparison of the impact of manual and e-IGR on infrastructural development of Ebonyi State, Nigeria
Karori et al. (2016)	Revenue Collection efficiency	Influence of revenue collection efficiency on the operational performance of County Government
Ngugi and Kagiri (2016)	Optimal Revenue Collection	Influence of public participation, competency, legislation and technology on optimal revenue collection
Ataro et al. (2016)	Revenue Collection efficiency	Effect of revenue collection practices, internal controls, competencies, and compliance level on revenue collection efficiency

how provides the business and managerial skills to oversee the implementation, deployment and use of e-revenue effectively. A positive evaluation of these factors may influence the adoption of e-revenue. Thus the following hypothesis is tested:

H1: Organizations technological competence positively influences adoption of e-revenue.

Organizational Context

Organizational context, according to Rogers (1995) and DePietro et al. (1990), refers to descriptive measures about the organization such as financial cost, technical competence, internal need and satisfaction with existing system as important organizational factors that influence the adoption of ICT innovations. It looks at the structure and processes of an organization that constrain or facilitate the adoption and implementation of innovations (Chau & Tam 1997; Oliveira et al., 2014). This study considers financial cost, internal need and satisfaction with existing system as three organizational factors influencing adoption of e-revenue in Nigeria.

Perceived Financial Cost

In adopting a new technology, organization would have to consider the characteristic of the technology, such as cost, as one of the measures for investing it. Organization focused more on, trouble-free installation, easy to use, availability of vendor support for training and upgradability cost when evaluating a software package for adoption (Rosli et al., 2016). The cost for technology innovation includes the potential administrative and implementation costs, while the cost related to IS adoption includes development cost, operating costs, setup costs, and training costs (Teo et al., 2009; Alam et al., 2016). For developing countries, cost is perceived as one of the challenges that can hinder technology adoption given the limited financial resource and huge investment that are usually required to implement technological innovation though emphasizes should be placed on the benefits that could be derived from the technology. Tan (2010) revealed that cost is an antecedent hindrance to technology adoption, despite its obvious benefits to SMEs owner. Alam et al. (2016) also identified perceived cost as significant organizational factors that affect any organization's intention of adopting modern technologies in the information systems. To further examine the relationship between perceived cost and technology adoption this study poses the hypothesis that:

H2: Perceived financial cost of e-revenue negatively influence the intention to adopt e-revenue.

Internal Need

The recognition of a genuine internal need to improve operation is one of the primary internal organizational variables influencing decision to adopt a new technology (Premkumr & Ramamurthy, 1995). Previous studies in technology adoption research have found support for organization's "need pull" or "relative advantage" (Premkumr & Ramamurthy, 1995) as an important factor in technology adoption decision (Rogers, 1995; Huang et al., 2004). According to Chang et al. (2007), organizations need pull includes the need to reduce cost, cut operation cost or to increase service efficiency. In the context of revenue authorities in Nigeria, it is believed that States that perceived a significant need to take advantage of technology capability to increase efficiency, effectiveness and accuracy in a political environment of deficits, coupled with the instability of oil revenues as a result of the volatile global oil market among other prevailing challenges, will adopt e-revenue collection system. This leads to the hypothesis that:

H3: The internal need of Internal Revenue Service will positively influence its decision to adopt e-revenue.

Satisfaction with the Existing System

According to Rogers (1995), benefits derived from technology's relative advantage affect the rate of technology adoption. Satisfaction with an existing system means the existing technology is perceived to be better than the proposed one. On the other hand, if the proposed technology offers improvements over currently available system, it will facilitate its adoption. Satisfaction can be justified in-terms

of time saving, ease of use, productivity enhancement and cost saving (Rosli et al., 2016). Adoption and diffusion of new technology is possible only if the new technology is perceived to be better than the old or existing technology in an organization (Chau & Tam, 1997). Level of satisfaction with the current system play significant role in adoption of a new one. A low level satisfaction indicate performance gap and serves as impetus for improvement (Chau & Tam, 1997). High level satisfaction with existing system on the other hand, negates the need for adoption of new system or technology. State Internal Revenue Services in Nigeria have been plagued with a number of challenges in revenue collection, including receipt related fraud (Adesoji & Chike, 2013), high demand for quick, easy and more transparent services (Kariuki, 2013; Efunboade, 2014), taxpayers' inaccessibility to their information. Organizations support the introduction of innovations when the existing process or service is replaced with one expected to be an improvement over the current system. This study, therefore posits that:

H4: Low level of satisfaction with the current system of revenue processing will positively influence adoption of e-revenue.

Environmental Context

To adopt a new technology, an organization has to interact with its surrounding business environment entities, such as competitors, customers' demand and government regulations. These entities act as constraints and/or opportunities for organization's technological adoption (Zhu et al., 2005). For example, clients may facilitate technology adaptation when the products/services desired by them are dependent on the implementation of a particular technology. They can as well impede adoption if the burden of paying for the technology is not affordable.

Competitive Pressure

As identified by several researchers (Akbulut, 2002; Oliveira & Martins 2010; Afuberoh & Okoye, 2014; Adel et al., 2015), external influence refers to the degree of pressure felt by the firm and the degree to which the decision to adopt a new technology is driven by environmental pressure. The study of Chau and Tam (1997) support the postulation that intense competition stimulates the rapid spread of an innovation and that firms, when confronted with a high degree of market uncertainty, are more likely to pursue an aggressive technology policy. Revenue authorities are challenged with constant demands to increase efficiency and effectiveness, coupled with the volatile global economy, customer expectations, along with the pressure to increase IGR. These are possible motivating factors to deploy certain technology with capabilities that enable them adapt to legislatively mandated changes in a timely fashion. Revenue authorities are also faced with challenge of meeting up with international standard and apply proactive actions that reduce non-compliance while maintaining a high level of service delivery (Oracle, 2015; Opoku et al., 2016). This leads to the hypothesis that:

H5: The presence of competitive pressure is positively associated with the intention to adopt e-revenue

Taxpayers' Readiness

According to Zhu et al. (2003) is it important for decision makers of information system adoption to consider consumer readiness as an important factor because it reflects the potential market volume and determines the extent to which innovation can be translated into profits. Also, Cook (2000) and Mundy & Musa (2010) opined that, it is essential to ascertain taxpayers' needs and expectations from e-revenue and also what they don't want and what they worry about. Their assertion is very important because as governments all over the world are developing and implementing strategies for the delivery of efficient and effective services to taxpayer, there is need to capture the requirements

of the taxpayers among other things. Driving the benefit of implementing e-revenue depends not only on the efforts of revenue authorities to digitize the process but also on the readiness of the taxpayers to engage in the use of the system. According to Zhu et al. (2003), readiness is the combination of taxpayer willingness and internet penetration. The level of taxpayer's engagement in online transaction facilitates willingness while the adoption and diffusion of computer and internet in the population of each country measures the internet penetration (Zhu et al., 2003; Oliveira & Martins, 2010). Zhu et al. (2003) found consumer readiness as a significant factor to e-business adoption. For e-revenue adoption to yield maximum result, taxpayers must be seen as willing and capable of engaging electronic channels. To capture the opinion on revenue authorities on taxpayer readiness on e-revenue, we proposed the hypothesis that:

H6: Taxpayers readiness positively influence adoption of e-revenue.

Government Regulation

Various researchers have shown that government regulations and support have significant influence on adoption decision of technology innovations in both developed and developing countries (Chang et al., 2006; Lian et al., 2014; Alam et al., 2016). Governments have important roles to play in regulating the activities of companies and citizens in the area of electronic revenue. Government regulation may increase or support a technological adoption, for example tax exemption for organization that adopts green technology and other monetary incentives. Governments can encourage adoption, specifically e-revenue adoption, by developing business and tax laws that support it adoption (Lippert & Govindarajulu, 2006). Thus, it is hypothesized that:

H7: Government regulation positively influence the adoption of e-revenue

Figure 1 shows the research model.

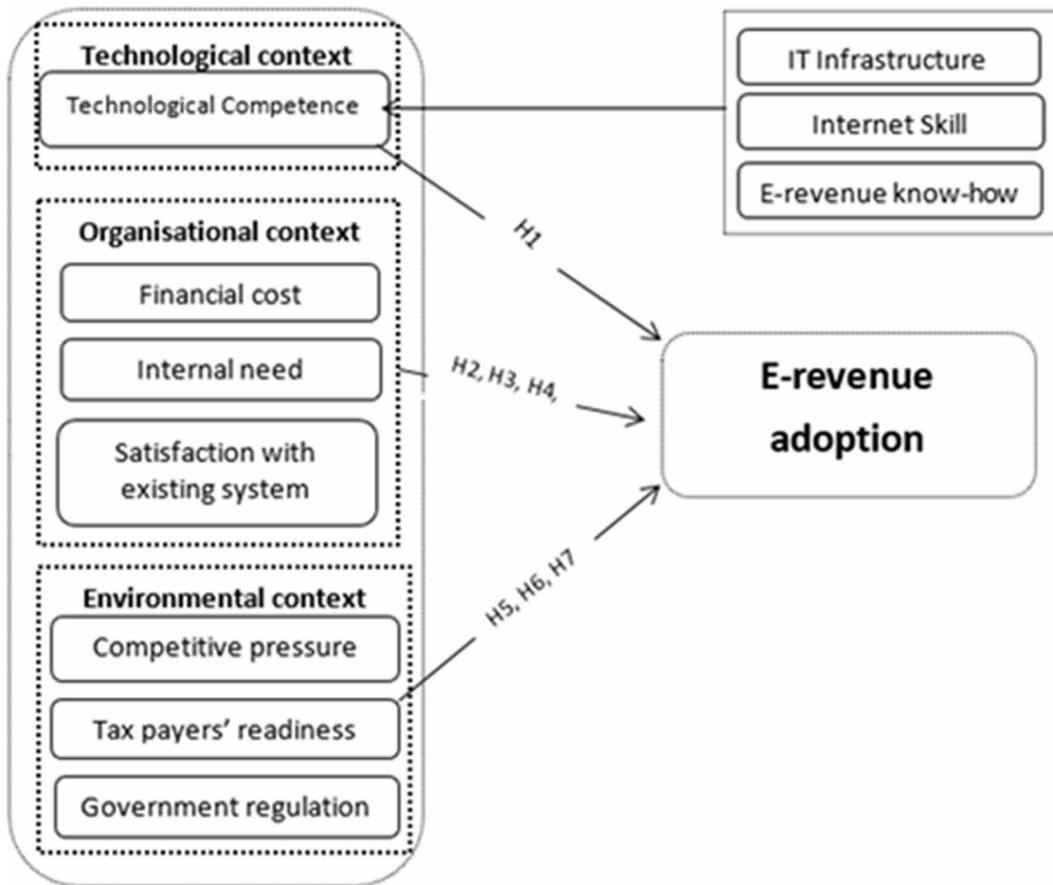
METHODOLOGY

Data Collection

This research employed the survey research method to empirically evaluate factors affecting adoption of e-revenue system in the State Internal Revenue Service of Nigeria. The designed questionnaire had two sections A and B: Section A consists of question relating to demographic profile of respondents such as age, name of LGA, occupation/job responsibility, period of service, computer knowledge, computer usage, and expected benefit of using computer (7 questions). Section B consist of multi-item scales used to measure the model variables with items rated on 6-point scale ranging from 1= strongly disagree, 2 = disagree, 3= Somewhat Disagree, 4 = Somewhat Agree, 5 = Agree to 6 = strongly agree. Measures of TOE framework constructs consists of 38 question items. The survey was first given to four experts in information system research to evaluate its conformity to standard. Errors were corrected in the process and the questions wordings were also improved.

The survey instrument was purposefully distributed to ICT department, collection departments (where present) and some management staff of Internally Generated Revenue Service in fourteen local governments within Lagos, Kogi and Ogun States Nigeria. Purposive sampling was adopted for this survey because the research intended to capture the opinion of government employees in the revenue generating related units only. As observed by Etikan et al. (2016), purposeful sampling technique is to be used when research involves identification and selection of individuals or groups of individuals that are proficient and well-informed with a phenomenon of interest. The three States involved in the survey span two geopolitical zones and were purposively selected because they were

Figure 1. Research model and hypothesis (DePietro et al., 1990)



observed to have the highest level of ICT usage in the revenue operation in their regions. Respondents' participation was solicited before the administration of the questionnaire and only willing persons were given copies of the questionnaire. Only paper-based questionnaire was used to facilitate quick response. Administration and collection of the questionnaire spanned a period of one month. A total of 140 copies of the questionnaire were administered, retrieved and analysed.

Instrument Development

Question items for the research model constructs were adapted from existing studies. The technological context of TOE framework as used in this study has one major construct; technological competence which consist of three sub-constructs namely: IT Infrastructure, Internet Skill and e-revenue know-how. Items for these three sub-constructs were adapted from Zhu et al. (2003) and Teo et al. (2007). Furthermore, drawing from Zhu et al. (2003), technological competence was operationalized as a formative emergent constructs from its three sub-constructs. The scales used to measure financial cost were adapted from Teo et al. (2009) and Alam et al. (2016). Items measuring internal need were adapted from Chang et al. (2007). Items measuring satisfaction with existing system were adapted from Chau & Tam (2007). Competitive pressure items were adapted from Zhu et al. (2003) and Teo et al. (2007). Items measuring taxpayers' readiness were adapted from (Zhu et al. (2003). Measurement items of government regulation were adapted from Chang et al. (2007), e-revenue adoption measures were adapted from Ifinedo (2012) and Adesina and Ayo (2010). The variance-based Structural

Equation Modelling (SEM) also known as Partial Least Square (PLS) is the statistical technique used to analyse the data. Smart PLS 3.0 was the statistical tool used.

DATA ANALYSIS AND RESULTS

Demographic Profile and Computer Usage of Respondents

The analysis of the frequency distribution of the respondents' demographic data showed that half of the respondents is between age 36-45 years. The least age of respondents is 18 years, 5 percent are within age 18-25 years, 20 percent are between age 26 – 35 years, 15 percent are between 46-55 years and 10 percent are between 56-65 years. There are 40, 50, and 50 respondents from revenues offices in Lagos, Ogun and Kogi state respectively. 85 percent of the respondent have worked more than five years length of service with their respective office. Only 5 percent have worked less than 1 year with their respective offices while 10 percent have worked between 1-5 years. Fifty-five percent, 30 percent and 15 percent of respondents indicated that computer has been introduced to administration, accounting and budgeting aspect of their work respectively.

Validity and Reliability of the Research Instrument

Two tests of validity were conducted on the research instrument: convergence validity and discriminant validity. The convergent validity was assessed using factor loading and cross loading. According to Fornell and Larcker (1981), for an item to be retained for further analysis, it should have standardised loading not less than 0.707 on its respective latent construct. Table 2 shows the result of the Confirmatory Factor Analysis (CFA) of each item on its respective latent variable. The assessment of the cross loading of the refined instrument shows good convergent validity, all the items have low cross-loading on other factors.

The discriminant validity was evaluated by comparing of square root of average variance extracted (AVE) with the ϕ (phi) matrix of the constructs. According to Fornell and Larcker (1981), square-root of AVE of a construct has to be higher than the construct's correlations with other constructs. Table 3 displays the result of the discriminant validity of the research model and all the constructs have square of AVE value greater than 0.70.

Two types of reliability are important to a reflective model: internal consistency reliability and construct reliability. Cronbach alpha coefficient (α) was used to measure internal consistency reliability while construct reliability was tested using the composite reliability (r_c). r_c is the assessment of the extent to which items in the construct measures the latent concept (Fornell & Larcker, 1981). The minimum r_c recommended for PLS is 0.8 while 0.7 is the acceptable minimum value for α (Oni et al., 2017). Table 2 also displayed the Composite Reliability and the Cronbach alpha of the refined constructs. All the constructs in the research model have acceptable values for the two assessments.

HYPOTHESES TESTING

The first analysis on the inner model to predict the research hypotheses is the coefficient of determination (R^2) which measures the percentage of constructs variation that the model explains. All the exogenous factors in the model explained 82.88% of the variation of e-revenue system adoption. On the other hand, Computer self-efficacy explained 25.5% and 2.4% of the variation of perceived ease of use and perceived usefulness respectively. From this figures, all the constructs adequately explain intention to adopt e-revenue system. According to Urbach and Ahlemann (2010), R^2 values around 0.670 are substantial values and values of 0.190 and below are weak. This shows that computer self-efficacy is not a good predictor of perceived usefulness.

Table 2. Evidence of validity and reliability of the research constructs

Construct	Item	Loading	Cronbach's α (>0.6)	Composite Reliability (>0.8)
IT Infrastructure	ITI1	0.928	0.965	0.974
	ITI2	0.964		
	ITI3	0.980		
	ITI4	0.931		
IT Skill	IS1	0.832	0.897	0.921
	IS2	0.826		
	IS3	0.754		
	IS4	0.839		
	IS5	0.890		
	IS6	0.726		
E-revenue know-how	EKH1	0.804	0.928	0.950
	EKH2	0.915		
	EKH3	0.947		
	EKH4	0.962		
Financial Cost	FC2	0.895	0.923	0.951
	FC2	0.967		
	FC3	0.928		
Internal need	IN1	0.886	0.950	0.964
	IN2	0.966		
	IN3	0.968		
	IN4	0.912		
Satisfaction with existing system	SES1	0.910	0.959	0.970
	SES2	0.947		
	SES3	0.966		
	SES4	0.947		
Competitive Pressure	CP1	0.969	0.900	0.933
	CP2	0.948		
	CP3	0.874		
	CP4	0.715		
Taxpayers' readiness	TRN1	0.924	0.958	0.970
	TRN2	0.985		
	TRN3	0.954		
	TRN4	0.904		
Government regulation	GR1	0.733	0.883	0.915
	GR2	0.856		
	GR3	0.904		
	GR4	0.792		
	GR5	0.842		
E-revenue adoption	EA1	0.872	0.805	0.873
	EA2	0.842		
	EA3	0.744		
	EA4	0.719		

Source: Researchers' Field work

The next assessment on the inner model is the path coefficient which is the degree of relationship between constructs (Oni et al., 2017). A bootstrapping with 1000 re-samples was run to calculate the path coefficient.

For technology competence that do not have associated items, the method found in Ayo et al. (2016) and Zhu et al. (2003) was used to assess the significance of the sub-construct on it to the second

Table 3. ϕ (phi) matrix of the constructs and square root of AVE

	AVE	CP	EA	EKH	FC	GR	IN	IS	ITF	S	TPR
CP	0.779	0.883									
EA	0.633	0.429	0.797								
EKH	0.827	0.595	0.294	0.909							
FC	0.866	0.638	0.504	0.581	0.931						
GR	0.685	0.671	0.81	0.486	0.595	0.827					
IN	0.872	0.657	0.292	0.366	0.517	0.366	0.933				
IS	0.661	0.641	0.523	0.575	0.575	0.7	0.475	0.813			
ITI	0.904	0.521	0.506	0.397	0.518	0.587	0.369	0.783	0.951		
SES	0.889	0.664	0.289	0.434	0.379	0.387	0.728	0.369	0.198	0.942	
TPR	0.888	0.543	0.477	0.47	0.534	0.492	0.388	0.577	0.431	0.201	0.942

order construct. The weight loading of the indicators are within acceptable values and significant at 1 per cent. Table 4 shows the weight and *t*-statistics of the indicator loading, the R^2 and the path coefficient of all the hypothesized paths in the model based on a bootstrap with 1000 resample. Figure 2 shows the structural path diagram with coefficient of paths that were statistically significant.

Compared to findings of Zhu et al. (2003), the conceptualisation of technology competence as a higher order multi-dimensional construct consisting of Internet skill, IT infrastructure and e-revenue know-how is justified. The three constructs are significant sub-construct of technology competence. Five out of seven hypotheses were supported as indicated in Table 4. Compare to the findings of Zhu et al. (2003), this study did not find support for significant relationship between technology competence and e-revenue adoption (Hypothesis 1).

Table 4. Model estimation

Predictor Construct	Predicted Construct	Path	t	Weights	t-value
E-revenue Know How	Technology Competence			0.260	3.894***
IT Skills				0.451	12.955***
IT Infrastructure				0.438	7.929***
Technology Competence	E-revenue Adoption	0.111	1.574		
Financial Cost		-0.077***	0.954		
Satisfaction		0.243**	2.785		
Internal Need		-0.268*	1.946		
Government regulation		0.285*	1.885		
Competitive pressure		0.076***	0.955		
Taxpayers' Readiness		-0.012	0.134		
		R²	F²		
	E-rev	0.828	2.597		

Note: *, **, *** are indication of level of significance which represents 10percent, 5percent, and 1percent respectively (Source: Researchers' Field work)

Two of the three hypothesized relationship under organizational context are significant predictors of e-revenue adoption. As predicted, financial cost had negative significant impact on e-revenue adoption (Hypothesis 2) with path significant path coefficient of -0.077. This supports the findings of Tan (2010) and Ifinedo (2012) that financial implication is a hindrance to technology adoption especially in developing countries. Low satisfaction with existing system is found to positively influence adoption of e-revenue. This supports the evident from Chau and Tam (2007) and Rogers (1995). The hypothesized relationship between internal need and e-revenue adoption is not supported. This confirms the finding of Chang et al. (2007). However, Hwang et al. (2007) and Premkumar & Ramamurthy (1995) had a contrary result.

Competitive pressure (Hypothesis 5) has significant effect on e-revenue adoption with path coefficient of 0.076. This also supports the findings of Alam et al. (2016) and Akbulut (2002). The hypothesized path between taxpayers' readiness and e-revenue adoption which is not supported (Hypothesis 6) contradicts the result of Zhu et al (2003). Government regulation was found to have a positive significant effect on e-revenue adoption with path coefficient of 0.285 at 0.1 significant level (Hypothesis 7). This finding is also consistent with that of Chang et al. (2007).

DISCUSSION

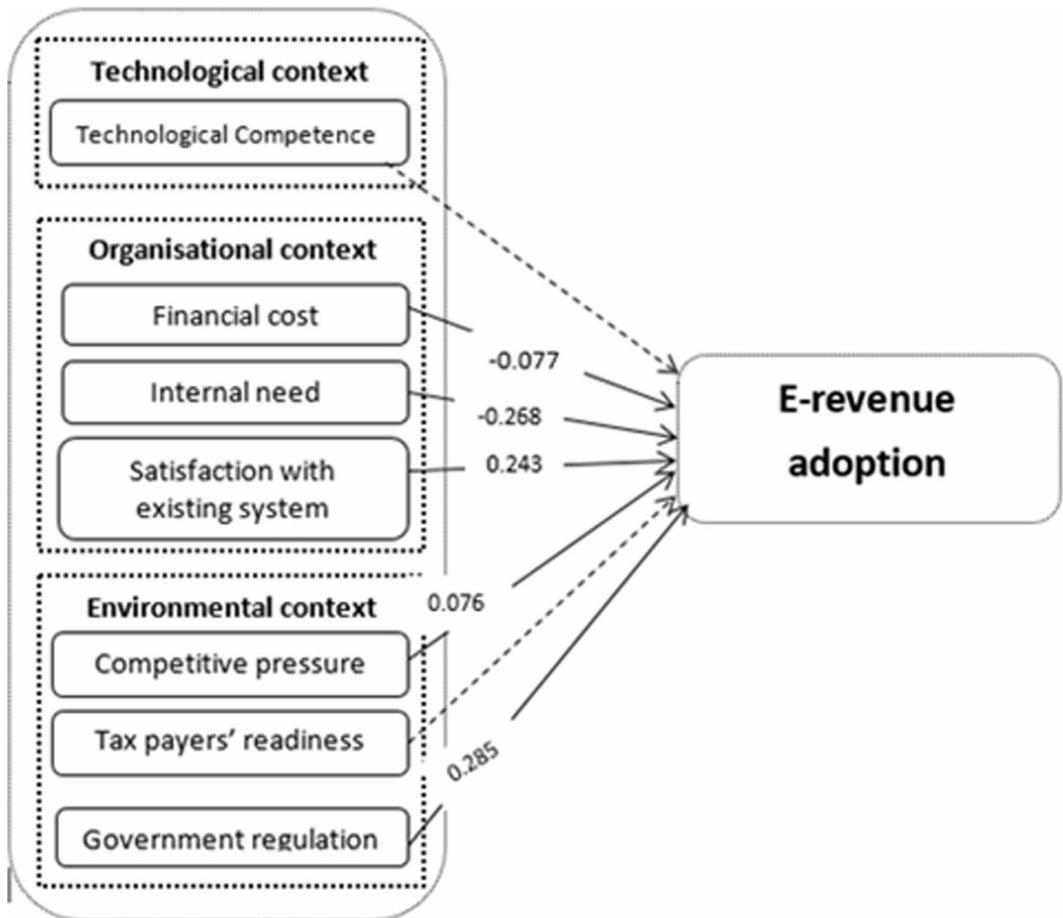
This study explores the factors that influence adoption of e-revenue by Nigerian states internal revenue authorities. It interrogates the inhibitors and enablers of e-revenue adoption by investigating organizational characteristics that influence the adoption of e-revenue by revenue authorities.

Following the work of Zhu (2003) and DePietro et al. (1990), this study further validates the structure of the second order construct of technology competence as a composition of intangible asset (internet skill and e-revenue know-how) and physical asset (IT infrastructure). This implies that the three constructs are important constituent of technology competence in the domain of investigation. The non-significant relationship between technological competence and e-revenue adoption implies that technology related issues such as IT infrastructure, skill and competence are inhibitors of e-revenue adoption in Nigeria. Previous studies suggested that it is important for Nigerian government to aid employees in acquiring internet skill to boost proficiency and productivity which will ultimately increase their organization's productivity (Abasilim & Edet, 2015; Olatokun & Adebayo, 2012). For Nigeria to achieve its ICT policy goals, there must be adequate provision of IT infrastructure (Abasilim & Edet, 2015; Adeyemo, 2011).

This study found a positive relationship between low level of satisfaction with existing system and e-revenue adoption with path coefficient of 0.254 (Hypothesis 4). This implies that the level of satisfaction by states internal revenue service with their current system of revenue processing is an enabler of e-revenue system adoption. It thus shows that e-revenue system is preferred to the current mode of operation. The level of satisfaction with the current system is low and the respondents recognised a performance gap that can be filled with technology adoption. This is also supported by earlier findings of Chau and Tam (2007) and Rogers (1995) proposition that motivation to innovate is based on low level of satisfaction with existing system.

Contrary to Hwang et al. (2007) and Premkumar and Ramamurthy (1995) that one of the main reasons for a firm's adoption of technology is internal need, this study finds a negative relationship between internal need and e-revenue system adoption. Chang et al. (2007), in their research, also did not find support for a significant influence of internal need on e-signature adoption by hospital management. This negative significant relation account for the reason State Internal Revenue Authorities in Nigeria have, over the years limited the adoption of technology to administrative functions and refused to interact with taxpayers using technology. Kogi State has no official websites or electronic means to interact with taxpayer. Lagos and Ogun states have website but are majorly information provisioning sites. Lagos State allows some forms of electronic payment but the collection

Figure 2. E-revenue adoption model with coefficient of significant paths



process is through third-party agent referred to as revenue collection agent who get certain percentage of amount collected.

In this study, financial cost was also included as one of the factors from the organizational context that hinder adoption of e-revenue collection system by internal revenue authorities. The negative significant finding on the impact of financial cost on e-revenue adoption supports previous studies which have identified financial cost as an antecedent hindrance to technology adoption (Tan, 2010; Premkumar et al., 1997; Ifinedo, 2012). This implies that cost remains a major consideration for Internal Revenue Authorities in Nigeria. Developers therefore must emphasize the long term return on investment in adopting e-revenue system to justify its initial huge investment.

The positive impact of government regulation on e-revenue adoption indicates its important role on revenue authorities' decision to adopt e-revenue system. Governments can encourage adoption of e-revenue systems in state internal revenue service by developing business and tax laws that encourage the adoption of e-revenue system by both taxpayers and revenue authorities. This further validate previous findings by Chang et al. (2007) that government policy is among the facilitating factors of e-signature in hospital information department. The significant positive relationship between competitive pressure and e-revenue adoption implies that the revenue authorities in Nigeria recognise the need to catch-up with current trend in revenue generation. E-revenue adoption is a means through which operations can be standardized and improve compliance.

CONCLUSION

This paper empirically investigates the factors influencing adoption of e-revenue system in SIRS in Nigeria. It theoretically constructs a model for e-revenue innovation adoption process in Internally Generated Revenue using TOE framework. Questionnaire was designed and administered to their Local Government offices within three States in Nigeria. This study contributes to literature on this theory by applying it to e-revenue adoption in a developing country.

The result showed that there is a significant relationship between the statistical constructs. The challenge of low e-revenue adoption in SIRS in Nigeria is not a problem of regulatory policy, but a result of technological competence, perceived taxpayers' readiness by the authorities and the cost associated with its implementation. Nigerian government must intensify efforts towards ensuring availability of adequate IT Infrastructure. Programmes to enhance Internet Skill and e-revenue know-how of employees should be set up with facilitating rules and regulation to provide enabling ground for the adoption of e-revenue system in SIRS in Nigerian. Perception of taxpayer's readiness to adopt e-revenue is one of the inhibiting factors of e-revenue system adoption. Nigerian government therefore should provide sufficient awareness to enlightening citizens on the benefits of e-revenue as well as the knowledge of its adoption in SIRS. The adoption of electronic internally generated revenue will certainly enhance the quality of services provided by the State Board of Internal Revenue Service to the citizens in an efficient, cost-effective and convenient manner making the processes of governmental administration more transparent and accountable to the public

Future research in this area should investigate direct relationship between IT infrastructure, e-revenue know-how, IT skills and e-revenue adoption. More indicators of e-revenue adoption could be added to these constructs for more empirical findings and a more acceptable generalization of outcomes. There is need for more research work to investigate the impact of internal need on organization's adoption of information system. Very few research works have considered this variable and there is a mixed result in their findings. Further research should also consider investigating e-revenue adoption from taxpayer's perspective in developing nations like Nigeria.

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