Disruptive Technology and Tax Filing Process in Ondo State, Nigeria

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Abstract

The inability of taxpayers to file their taxes effectively and flaws in the tax system have been perceived as the main reason behind the failure of the taxpayers to submit correct and accurate tax returns the relevant tax authorities in a manner prescribed by law and in accordance with the laid down administrative procedure. Prior studies have attributed these anomalies to the inefficient use of information technology and incompetent tax officials. Therefore, this study investigated the effect of disruptive technology on tax filing process in Nigeria. The study adopted a quasi-experimental research by employing survey research design. Primary data were collected through an online survey questionnaire. The population comprised 789 management and administrative staff of both FIRS (302) and ODIRS (487) in Ondo State offices. The sample was determined through Taro Yamane sampling approach. The results showed that the model is significant at 0.05 level and the coefficients are different from zero having a Wald chi2 (4) of 13.75. AI, big data and cloud computing present positive effects while blockchain demonstrates negative effect on tax filing process, but the results are only significant for AI, BCT and CCT. The study concluded that disruptive technology is capable of creating a new market for tax filing in Nigeria through tax automated. The study thereby recommended that for a proper tax filing process, the government should ensure that tax filing is handled by professionals and trained personnel to bring the best in them and also instill discipline in them.

Keywords: Tax filling, Artificial intelligence, Big data, Block chain and Cloud computing

Introduction

Information technology has become an integral part of organizational life. An internet connection enables the worldwide distribution of information and facilitates all forms of organizational activities, and organizations can use information technology to manage activities and create sustainable competitive advantages (Alzahrani, 2019; Verhoef et al., 2021; Khristianto et al., 2021; Rusmana et al.,2023). Governments all over the world, through the use of information and communication technology introduced into tax filing have improved public service delivery and disseminate public administration information (Wasao, 2014). The Nigerian revenue authority introduced the disruptive technology to increase revenue collections, improve tax filing process, avail services to tax payers at all times from anywhere, reduce compliance costs and improve tax compliance. Disruptive technology was adopted since it can process (at less time) and store a lot of data and information effortlessly compared with the traditional tax method (Qassim, Abaas, & Dhyaa, 2018).

Ibrahim *et* al (2020) suggested that, as in the case of the transformation of any business disruptive technologies infrastructure, tax authorities, in general, also demonstrate a step-by-step approach to digital transformation, although not always in the same order. Various information technology maturity levels can be observed among international tax authorities, ranging from the mere digitization of manual tax filing to a maturity Level where tax filing is pre-populated for taxpayers and taxes are filed and verified in (near) real-time. Ernst & Young (2017) categorised this journey towards a digital tax authority in terms of the following five maturity levels: 'E-filing,' 'E-accounting,' 'E-match,' 'E- audit' and 'E-assess.' While the correlation between tax filing and effective tax administration systems is indisputable, the digital maturity levels of tax authorities globally are still at various levels that directly affect their ability to file taxes within the digitalized economy (Regan, 2018). Some of the leading countries with regards to disruptive technology include, but are not limited to, Australia, China, Italy, Russia, New Zealand and the United Kingdom (HMRC, 2020; Hartley & Stanley-Smith, 2019; OECD, 2019). Whereby, on the other side of the spectrum, some African and Asian Pacific countries are only in the inception phases of digitizing traditional tax filing for selected tax types.

Filing of tax returns for various taxes with the tax authority is a legal obligation that must be fulfilled by every taxpayer. A taxpayer has a duty to file tax returns as required under a specified tax law. The law specifies the type of returns, the nature of information required as well as the frequency and manner in which the returns should be filed (Igbekoyi & Adedipe 2021). On the other hand, the tax authority has the duty to facilitate the process of filing tax returns by providing a taxpayer with standardized forms, guidelines and procedures. This guide is therefore

intended to provide information on the tax returns which are required to be filed with the Federal Inland Revenue Service (FIRS) by various taxpayers under the Federal tax jurisdiction and State Internal Revenue Service (SIRS) by various taxpayers under the State tax jurisdiction (Hassan 2023).

The disruption from technological developments has forced organizations in innovating tax filing process to support tax collection in the digital era (OECD et al. 2023). Current digital economy conditions and developments in disruptive technologies demand changes that must be followed by various innovations and developments that are inherent in human life (Wuzhen 2021). The advancement of disruptive technologies on the one hand presents a challenge to all tax authorities in the world on how to make use of disruptive technologies in tax filing process especially in developing countries. If the challenge cannot be dealt with by the tax authorities, then the state will erode its tax base. On the other hand, advances in disruptive technologies open up opportunities that allow the tax authorities to make new breakthroughs in tax filing (Isiadinso & Omoju 2022).

Nnamdi (2024) suggested that, technology has significantly impacted how the tax authorities approach tax filing process in Nigeria. A decade ago, tax filing in Nigeria was largely manual. Taxpayers physically interacted with the tax authorities for most of their tax filing needs which were largely done at the premises of the tax authorities such as Federal Inland Revenue service (FIRS) and State Internal Revenue Service (SIRS). This meant that taxpayers who are not located close to a physical tax office, have to travel many kilometers just to comply with their statutory tax obligations. Technology has been significantly infused into tax administration in Nigeria. Take for instance, the Tax ProMax (TPM) portal which was introduced in 2020 by the Federal Inland Revenue Service (FIRS), allows taxpayers file their company income tax, value added taxes, withholding tax, capital gains tax returns, etc. without physical appearance at the office of the tax authorities. (Eke & Alohan 2023).

As opined by OECD (2023), efficient and effective revenue collection is a key driver for financing development and strengthening good governance. Disruptive technology has a great potential to improve tax filing by automating processes, better servicing taxpayers and increasing compliance. However, one information system that has received much attention from researchers in Nigeria is the annual tax reporting information system known as the tax filing process. This has become an important component of modern tax administration, offering convenience and efficiency for taxpayers. One of the important factors affecting the user experience and implementation of the system is quality: good system quality can significantly impact how taxpayers interact with the system, which in turn affects their overall filing process. Disruptive

technology are typically web-based platforms or software applications that users access through web browsers or dedicated apps. Internet connectivity is essential to access these systems. Disruptive technology and tax filing process relies on the Internet as a fundamental component of its functionality.

Muslichah *et al* (2023) discovered that, internet connectivity enables the complete filing process, which encompasses digitally submitting forms, documents, or information to pertinent authorities. This allows individuals and businesses to electronically submit their tax returns, pay taxes, and receive refunds. Tax e-filing has many benefits compared with manual tax filing and reporting, including time efficiency, remote online tax reporting at any time, and proof of reporting that is secure and easy to manage. Filing with disruptive technology simply requires the taxpayer to complete their tax filing return online, after which they will receive feedback via email, this eliminates the risk of taxpayers losing their tax returns and other necessary information as it can be stored in their email. According to Wuzhen (2021), disruptive technology can reshape the economy of the world by creating new business models, with new products and services which includes new ways of communication, work and transactions. The expansion of the Internet, social media, mobile platforms, cloud computing and big data technologies and advanced analytics are all creating opportunities and options for the businesses and society. The new development in the modern digital world provides challenges to tax administrations on their traditional way of interaction with taxpayers yet providing new opportunities for tax administrations to collect taxes, support taxpayers and enhance compliance via new technologies and tools (Hassan 2023).

Ineffective tax filing and systemic deficiencies have led to the general perceptions that taxpayers do not submit correct and accurate tax returns to the relevant tax authorities in a manner prescribed by law and in accordance with the laid-down administrative procedures. This issue significantly affects tax revenue generation in Nigeria. Muslichah *et al.* (2023) affirm that, in the all the economy of the world, tax filing processes are being confronted with myriads of challenges and difficulties adapting to the new technology in which Nigeria is not an exceptional. Despite the measure (Tax ProMax (TPM) portal which was introduced in 2020 by the FIRS, Integrated Tax Administration System (ITAS), E-Tax filing, etc.) put in place by the government of Nigeria, tax filing process in Nigeria still faced with the problems of manual computation resulting in inaccuracies and errors, perennial delay in tax filing process, loss of tax revenue generation due to inadequate taxpayers' database, and non-tax compliance (Ifere and Eko 2023).

Similarly, Sunday *et al*. (2017) documented that the challenges of manual computations and filing of tax in Nigeria among taxpayers are quite disturbing. However, the tax filing process

has continuously been fraught with a myriad of challenges ranging from fraudulent collection procedures, misappropriation of tax proceeds by fraudulent tax officials and tax evasion and avoidance by the taxpayers. The challenges of poor tax revenue in Nigeria have been associated with errors and delay in tax filing, lack of comprehensive taxpayers' database or non-availability of tax statistics, poor tax compliance, increasing tax evasions, ineffective tax filing and returns, high level of professional incompetence and unskilled tax administrators, huge reported unethical sharp practices and corruptions cases. Previous studies found that technologies enhanced better management of taxpayers data (Adeniyi & Adesunloro, 2017), improves tax filing process and made it easy (Olurankinse & Oladeji, 2018) some believe handling of tax issues by taxpayers with the use of technologies was unsatisfactory (Monica, *et al* 2017), improved technologies will improves accountability and transparency (Newman & Eghosa, 2019) while others asserted that seeking clarifications on tax issues online by taxpayers was minimal (Monica et. al. 2022). The studies that exist in Nigeria focused largely on electronic tax filing and their impact on economic growth. Consequently, there was need to fill this gap, disruptive technology and the Nigerian tax filing process. Unfortunately, there were evident challenges: inadequate staff, incompetent professionals, huge corruption profile and inefficient trained staff to control its filing process and the case of putting round hole in square pegs (Abogan et al., 2014; Olaoye and Aguguom, 2018).

Disruptive technologies must be combined with the political will to enforce tax filing process to yield potential for greater revenue. Technology without accompanying enforcement procedures will not help in increasing revenue. Disruptive technology can help in developing a master file system. The system assigns a unique number to each tax payer (Marcelo 2020). The main focus of this study is to examine the effect of disruptive technology on tax filing process among Federal and state revenue services in developing economy of Nigeria, particularly, Ondo State. The outcome of this study will be of relevance to the tax authorities, government, taxpayers and academia. Literature review is set out in section two, Section three of this study describes the methods applied in this study, and in section four the data and results are summarized. The conclusion and recommendations based on these results are set out in section five.

Literature Review

Conceptual Review

Tax filing

Wuzhen (2021) described tax filing as a report prepared by a taxpayer containing information on his tax affairs for a given period for the purpose of complying with the tax laws. Tax Filing is

the submission of tax returns by a taxpayer to the relevant Tax Authority in a manner prescribed by law and in accordance with the laid down administrative procedure. Tax filing is the submission of tax returns by a taxpayer to the relevant Tax Authority in a manner prescribed by law and in accordance with the laid down administrative procedures. According to Hassan (2023) Filing of tax returns for various taxes with the tax authority is a legal obligation which must be fulfilled by every taxpayer. A taxpayer has a duty to file tax returns as required under a specified tax law. The study conducted by Edward -Dowes, (2018) stated that modern tax agencies have expanded scope and nature offered to taxpayers and agents which makes it easier to process tax refunds where excess tax was paid, also made it possible for taxpayers to quickly assess themselves with the new technology. It also helps reduce and eliminate tax evasion. Tax payers' database built by the tax authorities makes it easy to identify tax evaders.

The study conducted by Ben (2021) reveal that, law specifies the filing process of tax returns, the nature of information required as well as the frequency and manner in which the returns should be filed. On the other hand, the tax authority has the duty to facilitate the process of filing tax returns by providing a taxpayer with standardized forms, guidelines and procedures which is achievable with the use of disruptive technology. This guide is therefore intended to provide information on the tax returns which are required to be filed with the Federal Inland Revenue Service (FIRS) and State Internal Revenue Service (SIRS) by various taxpayers under the Federal/State Tax Jurisdiction. The aim of the introducing disruptive technology for tax filing in Nigerian tax system is to directly contribute to the well-being of citizens directly and indirectly by improving formulation of filing process, policies and appropriately utilizing revenue generated for their benefits. Challenges existing such as its complexity and instability of government which led to inaccurate filings with the relevant tax authorities have prevented it from achieving its aims and objectives (Mohammed, Derashid & Ibrahim, 2016).

Disruptive Technology (DT)

Disruptive technology is an innovation that significantly alters the way that consumers, industries, or businesses operate which sweeps away the systems or habits it replaces because it has attributes that are recognizably superior (Smith 2022). According to Audretsch, (2019): Damanpour (2019), disruptive technology is the adoption of an idea or behavior, which creates new market and reshapes existing ones thereby giving customers and end users the greatest level of access, empowerment, convenience, choice and value. The focal point of disruptive technologies is to challenge established business models and radically transform products and services (Polder et al. 2010). Other studies on disruptive technologies that gave definitions

include Alvonitis and Salavou, (2017), Lumpkin and Dess (2019), Kuratko and Hodgetts (2014), Thornhill 2006; Jong and Vermenlen (2016), Beaver (2020), and Anderson (2019).

Disruptive Technologies (DT) and Tax Filing Process in Nigeria

Disruptive technology creates an entirely upgraded administration by displacing conventional technology (Anam, 2019). New technologies spawned new business models and provided new tools and methods for tax governance, while bringing new challenges and unprecedented opportunities to tax authorities. Disruptive technologies enable tax administrations to be more organized and more efficient, both in combating abuse and in improving the quality of tax filing, leveraging automation and analytics to drive decision-making, disruptive technologies in tax administrations can also provide insight to tax authorities through growing volumes of data, focusing their scarce resources on the most serious cases of evasion, fraud and aggressive tax avoidance (Ernst & Young 2018). The integration of new technologies which include, artificial intelligence, big data technology, block chain technology, cloud computing technology, mobile app technology and social media technology, are also rapidly changing many aspects of everyday lives and driving wider expectations (Asian Development Bank (ADB) 2020).

Artificial Intelligence and Tax Filing Process in Nigeria

Artificial intelligence (AI) is an enabling machine to develop the same intellectual capabilities as humans. It involves using computers to do things that traditionally require human intelligence, it is the science of making machines that can think like humans. It can do things that are considered "smart." AI technology can process large amounts of data in ways, unlike humans. Tax practitioners put a lot of efforts in collating and analysing financial data in order to serve their clients and taxpayers. Artificial Intelligence (AI) make it easier for tax practitioners to simplify and accelerate tax filing and various data-related tasks. Robotic Process Automation (RPA) software has been demonstrated to be effective in handling routine and monotonous aspects of the tax filing (Salami et al., 2015; Sanni, 2019).

AI is capable of making tax practitioners more productive in tax filing as its algorithms allow machines to take over time-consuming, repetitive, and redundant tasks. Rather than just crunch numbers, tax professionals will be able to spend more time delivering actionable insight on tax implications of tax filing. AI can help reduce costs and errors by streamlining operations. For instance, the optical character recognition (OCR) technology enables practicing firms to automate and accelerate manual entries by converting textual data to digital files using scanners and mobile device cameras. Tax authorities in many developed jurisdictions are using virtual or

digital assistants to help respond to taxpayers' inquiries and to support self-service. The use of Al is increasing rapidly in providing services to taxpayers and tax officials. Hence, application of AI in taxation is a frontier subject (Anam 2019).

H_{01} Artificial Intelligence do not have significant effect on Tax filing process in Ondo State, Nigeria.

Big Data Technology and Tax Filing Process in Nigeria

Big data technologies are the software tools used to manage all types of datasets and transform them into business insights. Big Data technology offers tax authorities the opportunity to extract business value from existing data and to identify the relevant data for tax administration. Investment in innovative capabilities creates the opportunity to develop new and convenient services for taxpayers, together with the ability to create new tools that will assist the revenue authority to provide proactive services (OECD, 2016). Furthermore, the availability of (near) real-time data creates excellent opportunities for revenue bodies. Instead of capturing and analysing past transactions, revenue bodies can now consider how they might support tax assessment in (near) real-time. Tax authorities should consider options where features of the tax system are incorporated into the natural systems used by taxpayers for business purposes (for example e-invoicing) or to complete personal transactions, such as banking. These technologies also offer tax authorities the opportunity to differentiate the service offering to taxpayers and other stakeholders based on the inherent risk of a transaction, a taxpayer or an event (OECD, 2023).

H_{02} Bigdata Technology do not have significant effect on Tax filing process in Ondo State, Nigeria.

Blockchain Technology and Tax Filing Process in Nigeria

Blockchain technology is an advanced database mechanism that allows transparent information sharing within a business network. A blockchain database stores data in blocks that are linked together in a chain. Blockchain technology is a secured system of decentralized peer-to-peer encrypted digital ledger, which enables the compilation of transactions within its chain and can be used to streamline and automate indirect taxes. Where the tax consultant or the tax authorities are made part of the transaction flow and given access to the data chain, it allows all parties to see each transaction and determine the tax implication. The blockchain can equally be used to facilitate tax payments to the government at highly reduced processing cost. Blockchain enables smart contracts, protecting and transferring ownership of assets, verifying people's identities and

credentials, etc. Once blockchain is widely adopted, and challenges around industry regulation are overcome, it will benefit businesses by reducing costs, increasing traceability and enhancing security (Anam 2019).

According to Marija (2018), blockchain technology can be applied to many aspects of tax administration, such as the tax filing process, automation of tax collection processing, information tamper-proof, transaction fidelity, economic activity identification, credit management, which is of great significance for further improving the quality and efficiency of tax collection and management. Many economies, including German, China, Peru, Kazakhstan, Thailand, Netherlands and Denmark, are exploring how to deal with tax compliance with blockchain technology. Blockchain technology became popular globally through the advancements in digital currency transactions such as Bitcoin. Many businesses now leverage on the blockchain technology to record their financial and non-financial transactions in an open, secured and decentralized ledger.

H_{03} Blockchain Technology do not have significant effect on Tax filing process in Ondo State, Nigeria.

Cloud Computing Technology and Tax Filing Process in Nigeria

Cloud computing is the delivery of different services through the Internet, including data storage, servers, databases, networking, and software. Many accounting software are hosted in the cloud. Some of them come along with modules for tax management used for: automated tax computation; Tax returns preparation and filing; Tax planning and forecasting; and Tax payment; etc. In most advanced tax environments, there are cloud-based independent automated solutions for tax management. When a tax practice or administration subscribes to a cloud-based tax management solution, it is relieved of the need to invest in physical onsite servers with the attendant costs of maintenance and support. Cloud-based tax management solutions afford tax practitioners the opportunity to work remotely from practically any device with internet connection and serve their clients from any location at any time. It further helps tax practitioners to facilitate collaborations among themselves and clients.

H_{04} Cloud Computing Technology do not have significant effect on Tax filing process in Ondo State, Nigeria.

Theoretical Review

Theory of digital diffusion

Innovation theory was developed by a sociologist Everett Rogers in 1962 in the first edition of a publication "Diffusion of Innovations" in 1962. The theory of digital diffusion is based on the notion that adoption of an innovation involves the spontaneous or planned spread of new ideas. It involves the application of new idea, practice or object that is perceived as new innovation (Rogers, 1995). The theory stressed that it is the perception of change that is important, if the idea seems new to the potential adopter, then it should be considered to be an innovation (Thomas, 2014). The philosophy of this theory is associated with the independent variable of this study which is disruptive technologies, hence considered appropriate and relevant to the study as the theory contented that disruptive technologies embodies information and its adoption acts to reduce complexities as applicable tax filing process in Nigeria.

Empirical Review

Muslichah *et al.* (2023), examined the effect of tax e-filing system quality on taxpayer satisfaction using perceived usefulness as a mediating variable, the findings of our study demonstrated a positive effect of tax e-filing system quality on both user satisfaction and perceived usefulness, and that perceived usefulness has a positively significant effect on user satisfaction. Also, the study of Uguagu *et al* (2023) found out that disruptive technology has significant positive effect on tax revenue in Nigeria, the study also revealed higher mean value for tax revenue after the adoption of disruptive technology when compared with the mean value before the adoption of the technology system, it also revealed that technology has significantly helped in stemming the tide of tax avoidance to a large extent in Nigeria. It equally supports the result of Ajagun, et al 2023 that examines the effects of disruptive technologies on company income tax, and the results obtained by the study shows that there is significant positive relationship between disruptive technology and company income tax of the selected telecommunication network providers in Nigeria. Igbekoyi and Adedipe (2021) also investigated electronic tax filing system and tax compliance in Ondo State, the study found that electronic filing system has a significant and positive effect on response time to tax payer queries; as it also showed a significant but negative effect on level of interaction between tax payer and tax authorities. Likewise, Ajala and Adegbie (2020), conducted a study to examine effects of information technology on effective tax assessment in Nigeria, the study reveals that each of digital tax net of taxpayers, enabling tax laws, information technology acquisition and financial

resources support exhibited a positive significant effect on effective tax assessment. The study negate the result of Chijioke et al. (2021) who investigated the impact of disruptive technology on tax revenue generation in Nigeria and the study generates evidence on the gaps in the study which found out that federally collected revenue significantly decreasing after the introduction and implementation of new technologies. The study also found that tax revenue decreased after the implementation though the mean difference was not statistically significant.

Gap in Literature

The existing studies on the topic reported inconclusive regarding the effect of disruptive technology on tax filing process. Uguagu *et al* (2023) focused on disruptive technology and tax revenue, Muslichah *et al* (2023), examined tax e-filing system and taxpayer satisfaction, also Nirwanto & Andarwati (2019) and Andarwati et al. (2020) focused on disruptive technology and accounting information systems, Kim & Lee (2024) focused on personal robots and tax filing, Savitri (2019) focused on ERP-based software, Ajala and Adegbie (2020) focused on information technology and effective tax assessment, likewise Igbekoyi and Adedipe (2021) investigated electronic tax filing system and tax compliance. However, this study fills the gap in the recommendation of Chijioke et al. (2021) who investigated the impact of disruptive technology on tax revenue generation in Nigeria, the study found out that federally collected revenue significantly decreasing after the introduction and implementation of new technologies. This research adds a body of knowledge to the empirical study theory of diffusion on disruptive technology. Some of the existing studies reported positive significant effect, others reported negative effects. To the best of the researchers‟ knowledge, there is still dearth of studies that have considered the effect of disruptive technology and effective tax filing process in Nigeria. In addressing this gap in literature and expanding the frontiers of knowledge in this regard, this study sought to contribute to knowledge proposed and investigated the effect of disruptive technology on tax filing process in Nigeria. When taxpayers are satisfied with modern way of filing, they are more likely to trust the tax authorities that tax filing is secure, reliable, and accurate. Thus, easy filing can contribute to promoting trust and confidence in tax officials, thereby encouraging taxpayers to transition from traditional filing methods.

Data and Method

The study adopted quasi-experimental research by employing survey research design. Primary data were collected through online survey questionnaire to examine the effect of disruptive technology on tax filing process in Nigeria. This design was deemed appropriate because a

survey helps to obtains stronger data representation and better approximation. The population comprise of management and administrative staff of Federal Inland Revenue Services (FIRS) in Ondo State offices and Ondo State Internal Revenue Services (ODIRS). The population of the study comprise 789 management and administrative staff of both FIRS (302) and ODIRS (487). Sample was determined through Taro Yamane (1967) sampling approach. The Taro Yamane (1967) equation is given below;

$n = N/(1 + N(e)^2)$ …… (i)

Where: n = signifies the sample size, N= signifies the population under study

e = signifies the margin error (it could be 0.10, 0.05 or 0.01)

$n = \frac{789}{1 + 789\ (0.05)2} = \frac{789}{2.973} = 272.0$, *therefore* $n \approx 272$ …… (ii)

Given the above, sample size for the study was 272. However, due to variation in the number of staff in both FIRS and ODIRS, it would be inappropriate to use the same sample population in both areas of study. As such, the investigation adopted Falade et al. (2021) statistical equations to arrive at the specific population for FIRS and ODIRS.

$N = \frac{P1}{n} \times n_1$ …… (iii)

Where; N= Sample population, P_1= Population of each unit, n= Total population of the study area

n_1= Calculated sample for the total population; therefore, we have

FIRS = $\frac{302}{789} \times \frac{272}{1}$ = 104	ODIRS = $\frac{487}{789} \times \frac{271}{1}$ = 168

Source: Researcher's Computation (2024)

Model Specification

$Y = f(X)$

$Y_i = \beta_0 + \beta X_i + \varepsilon i$

Where

Y = Dependent Variable: Tax Filing process

X = Independent Variable: Disruptive Technologies

DT = (AIG, BDT, BCT, CCT)…….Equation 1

$TAi = \beta 0 + \beta_i AIG_{it} + \beta_2 BDT_{it} + \beta_3 BKC_{it} + \beta_4 CCT_{it} + e_{it}$ ……..……Equation 2

Where;

TFP= Tax Filing Process

DT = Disruptive Technologies

AIG = Artificial Intelligence

BDT = Big Data Technology

BKC = Block Chain Technology

CCT = Cloud Computing Technology

β_0 = the constant; β_1- β_4 = the coefficients of the independent variables; e_{it} = the error term

Data Analysis and Discussion of Findings

The study seeks to investigate the effect of disruptive technologies on tax filing process in Ondo State, Nigeria. The results of both descriptive and inferential analysis performed are presented and discussed as follows:

Descriptive Statistics

Descriptive statistics where the interaction of the data are described is presented in Table 1. It shows the mean, standard deviation, minimum and maximum values for both outcome and explanatory variables. Tax filing process (TXFP) has an average value of 4.478 with a standard deviation of .5008 which imply that on the average, the respondents agreed to the questions raised as the value falls in between strongly agree and Agreed on the likert scale. The standard deviation implies moderate variation in response to the efficiency of the tax filing process considering the distance from the mean value and this is supported by the coefficient variation showing the value of 0.1118 which imply 11.18 percent level of variation in responses. The minimum response is 4 which represents agree on the likert scale while its maximum value stood at 5 which indicates strongly agree on the likert scale and this denoting its range for the responses The total sum of the responses stood at 815. From table 1, tax filing process is positively skewed and normally peaked having a value of .08799 for skewedness and 1.007 for kurtosis. Artificial intelligence (AIG) has an average value of 4.5054 with a standard deviation of .5013 which imply that on the average, the respondents agreed to the questions raised as the value falls in between strongly agree and Agreed on the likert scale. The standard deviation implies moderate variation in response to the use of artificial intelligence asked of the respondents considering the distance from the mean value and this is supported by the coefficient variation showing the value of .11127 which imply 11.27 percent level of variation in responses. The minimum response is 4 which represents strongly disagree on the likert scale while its maximum value stood at 5 which indicates strongly agree on the likert scale and this denoting its range for the responses. The total sum of the responses stood at 820. From table 1,

response on the use of artificial intelligence is negatively skewed and normally peaked having a value of -.02197 for skewedness and 1.00048 for kurtosis.

On table 1, it is shown that big data technology (BDT) has an average value of 4.1098 with a standard deviation of 0.872 which imply that on the average, the respondents agreed to the questions raised as the value falls in between strongly agree and Agreed on the likert scale. The standard deviation implies moderate variation in response to the use of big data technology by the tax authority considering the distance from the mean value and this is supported by the coefficient variation showing the value of 0.21230 which imply 21.23 percent level of variation in responses. The minimum response is 2 which represents disagree on the likert scale while its maximum value stood at 5 which indicates strongly agree on the likert scale and this denoting its range for the responses. The total sum of the responses stood at 748 while the data for big data analytics is negatively skewed and abnormally peaked having a value of -1.0147 for skewedness and 3.5986 for kurtosis. Likewise, from table 1, it is shown that block chain technology (BKC) has an average value of 4.4340 with a standard deviation of 0.5187 which imply that on the average, the respondents agreed to the questions raised as the value falls in between strongly agree and Agreed on the likert scale. The standard deviation implies moderate variation in response to the use of block chain technology by the tax authority considering the distance from the mean value and this is supported by the coefficient variation showing the value of 0.116993 which imply 11.69 percent level of variation in responses. The minimum response is 3 which represents undecided on the likert scale while its maximum value stood at 5 which indicates strongly agree on the likert scale and this denoting its range for the responses. The total sum of the responses stood at 807 while the data for bloc chain technology is positively skewed and normally peaked having a value of 0.02725 for skewedness and 1.555 for kurtosis.

Lastly on table 1, it is shown that cloud computing (CCT) has an average value of 4.4285 with a standard deviation of .49623 which imply that on the average, the respondents agreed to the questions raised as the value falls in between strongly agree and Agreed on the likert scale. The standard deviation implies moderate variation in response to the question raised on cloud computing asked of the respondents considering the distance from the mean value and this is supported by the coefficient variation showing the value of .11205 which imply 11.205 percent level of variation in responses. The minimum response is 4 which represents agree on the likert scale while its maximum value stood at 5 which indicates strongly agree on the likert scale and this denoting its range for the responses. The total sum of the

responses stood at 806. From table 1, data for cloud computing is positively skewed and normally peaked having a value of .28867 for skewedness and 1.0833 for kurtosis.

Table 1: Descriptive Statistics

Variables	TFP	AIG	BDT	BKC	CCT
Observations	182	182	182	182	182
Mean	4.478022	4.505495	4.10989	4.434066	4.428571
Std. Deviation	.5008947	.501349	.8725469	.5187575	.4962368
Coeff.Variation	.1118562	.111275	.2123042	.1169936	.1120535
Minimum	4	4	2	3	4
Maximum	5	5	5	5	5
Sum	815	820	748	807	806
Skewness	.0879971	-.0219793	-1.014701	.0272585	.2886751
Kurtosis	1.007743	1.000483	3.598613	1.555865	1.08333

Source: Researchers' Computation (2024)

Test of Study Variables

To ensure the validity and reliability of the questions administered for the purpose of analysis, the principal-components approach of factor analysis was first used on the questions and this method is considered because it explains more variance than any other form of factoring (Kothari & Garg, 2014). A factor is dependable if it has four or more loadings of at least 0.4 regardless of sample size (Pituch &Stevens, 2016) and for this purpose, cut-off of 0.4 was employed for interpretative reasons. For the purpose of ensuring the internal consistency of the questionnaire, the Cronbach Alpha was used also used to test if the questions asked in the questionnaire which passed factoring test are significantly relevant to each objective of the study. The recommended threshold for strong reliability is 70 percent which imply that the reliability for all the questions measuring the variables must not be below the average (0.50)

Factor Analysis and Reliability Test for Tax Filing Process

The factor analysis for all the questions employed for variables measuring transparency in governance were computed. Five questions were asked to measure the tax filing process as a variable and two of the questions passed the factor analysis as their loadings are higher than 0.4.

Table 2a: Principal Component Factor Loadings for Tax Filing Process

Questions	Factor loadings	Uniqueness
There is usually smooth documentation for tax return	-0.3768	0.8175
Easier process of dispatching of tax return forms	0.4963	0.7382
The process does ensure completeness and correctness of tax returns	-0.0255	0.7595
The process is more simplified for large volume of transactions	-0.2722	0.6605
There is prompt release of tax receipt	0.6323	0.5948

Source: Researcher's Computation (2024)

Five questions were asked to measure the artificial intelligence as a variable and two of the questions did not pass the factor analysis as their loadings are below 0.4. All the remaining 3 questions was subject to reliability test using Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Cronbach Alpha while the 2 question with poor loadings were dropped.

Table 2b: Principal Component Factor Loadings for Artificial Intelligence

Questions	Factor loadings	Uniqueness
Do you agree that tax authorities will be effective and efficient with new technologies in tax administration in Nigeria?	0.6408	0.5212
Do you agree that disruptive technology has enabled FIRS/ODIRS to automate its tax administration processes?	0.5614	0.5325
Do you agree that taxpayers file their tax returns and pay their taxes online?	0.0681	0.6477
Technology reduce the need for physical visits to FIRS/ODIRS offices, thereby saving time and costs.	0.2240	0.6500
Do you agree that FIRS/ODIRS will improve in its tax filing and enforcement efforts?	0.4127	0.8140

Source: Researcher's Computation (2024)

Five questions were asked to measure big data analytics as a variable and all of the questions passed the factor analysis as its loadings are higher than 0.4. Therefore, all the questions were subjected to further analysis of reliability test using Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Cronbach Alpha.

Table 2c: Principal Component Factor Loadings for Big Data Technology

Questions	Factor loadings	Uniqueness
Do you agree that there is reduction in tax evasion in tax filing?	0.6661	0.5529
Do you agree that FIRS/ODIRS improve its tax filing enforcement efforts in tax administration?	0.5296	0.5736
Do you agree that non-compliant taxpayers improve in transparency?	0.4569	0.6232
Do you agree that technology has reduced the need for physical visits to FIRS/ODIRS offices in Ondo state?	0.7195	0.4250
Do you agree that the manual method/procedure of tax payment is tedious/difficult?	0.6143	0.5386

Source: Researcher's Computation (2024)

The factor analysis for all the questions employed for variables measuring block chain technology were computed. Five questions were asked to measure block chain technology as a variable and all of the questions passed the factor analysis as their loadings are higher than 0.4..

Table 2d: Principal Component Factor Loadings for Block Chain Technology

Questions	Factor loadings	Uniqueness
Do you agree that technology is of value to tax authorities and regulators in tax filing process?	0.5972	0.5723
Accurate information is shared and improve tax filing process.	0.7021	0.3879
Do you agree that the potential to simplify and automate tax process and transparency is achieved?	0.7868	0.3551
Do you agree that with technology into Nigerian tax administration, the verification of transaction data, validation of data, submission of returns and processing of tax filings and payment will be streamlined?	0.5158	0.5567
Do you agree that taxes such as Stamp Duties, VAT/Sales Tax, payment will be deducted directly from the parties liable to make payment?	0.6354	0.5494

Source: Researcher's Computation (2024)

The factor analysis for all the questions employed for variables measuring cloud computing technology were computed. Five questions were asked to measure block chain technology as a variable and all of the questions passed the factor analysis as their loadings are higher than 0.4.

Table 2e: Principal Component Factor Loadings for Cloud Computing Technology

Questions	Factor loadings	Uniqueness
Do you agree that tax authority take advantage of records analytics and reporting competencies?	0.7285	0.4163
Do you agree that technology is used in tax administration to improve tax filing, collaboration, and efficiency?	0.7488	0.4099
Do you agree that transforming the way tax filing are managed in Nigeria is achieved with new technology?	0.5498	0.6735
Do you agree that technology foster collaboration between tax administrations and other government agencies?	0.7978	0.3509
Do you agree that technology streamline tax filing processes, improve compliance, enhance data management and analysis?	0.5525	0.6469

Source: Researcher's Computation (2024)

To further establish the validity of the research instrument, Cronbach Alpha was used to test if the questions asked in the questionnaire are significantly relevant to each objective of the study and KMO for measure of sampling adequacy and the result is reported in table 2f. The percentages of reliability of questions raised to tax filing process is 54.11 percent. Likewise, the percentages of reliability of questions raised to artificial intelligence is 56.37 percent which can be said to be satisfactory because it is above average though not strong up to the recommended threshold of 70 percent for strong reliability. The percentages of reliability of questions raised to big data technology is 73.27 percent which can be said to be satisfactory because it is above the recommended threshold of 70 percent for strong reliability. The percentages of reliability of questions raised to blockchain technology is 76.06 percent which can be said to be satisfactory because it is close to the recommended threshold of 70 percent

for strong reliability. The percentages of reliability of questions raised to blockchain technology is 76.06 percent which can be said to be satisfactory because it is close to the recommended threshold of 70 percent for strong reliability. The percentages of reliability of questions raised to cloud computing technology is 80.64 percent which can be said to be satisfactory because it is higher than the recommended threshold of 70 percent for strong reliability.

Table 2f: Reliability Test of Variables

Variables	**Average interitem covariance**	**Scale reliability coefficient**	**No of items**
Tax Filing Process			
Cronbach Alpha	.2335924	0.5411	2
Kaiser-Meyer-Olkin (KMO)	-	0.500	2
(**Artificial Intelligence)**			
Cronbach Alpha	.0857264	0.5637	3
Kaiser-Meyer-Olkin (KMO)	-	0.621	3
Big Data Technology			
Cronbach Alpha	.2957137	0.7327	5
Kaiser-Meyer-Olkin (KMO)	-	0.709	5
Block Chain Technology			
Cronbach Alpha	.2145346	0.7607	5
Kaiser-Meyer-Olkin (KMO)	-	0.691	5
Cloud Computing Technology			
Cronbach Alpha	.1609435	0.8064	5
Kaiser-Meyer-Olkin (KMO)	-	0.787	5

Source: Researcher's Computation (2024)

Correlation of the Study Variables

A spearman rank correlation test was used for the assessment of the relationship between measurements of disruptive technology terms of artificial intelligence, big data technology, block chain technology and cloud computing and tax filing process in Ondo State and the

results are shown in table 3. and the results shows that budget implementation and artificial intelligence has a direct relationship and this is indicated by coefficient value of 0.2111 and probability value of 0.0042 and the indication is that one time improvement in artificial intelligence use to improve in its tax filing and enforcement efforts will cause an increase in tax filing process. Also, big data technology in has a direct relationship with tax filing process and this is indicated by coefficient value of 0.3185* and probability value of 0.0000 and the indication is that one time improvement in the use of big data technology will cause an increase in tax filing process in Ondo state by 31.85 percent and the relationship is significant at 5 percent. From table 3, it is shown that block chain technology has a direct and positive relationship with tax filing process and this is indicated by coefficient value of 0.2340* and probability value of 0.0015 and the indication is that one time improvement in blockchain technology will cause an increase in tax filing process with the Ondo State internal revenue service by 23.40. On table 3, it is shown that cloud computing technology and tax filing process is positive and significant and this is indicated by the coefficient value of 0.2141* with significance value of 0.0037 which is imply that on time improvement in cloud computing for data storage will improve tax filing process by 21.41 percent. The overall results of the relationship shows that disruptive technology has positive effect on tax filing process. Lastly for table 3, it is observed that the relationship between the independent variables is positive and significant at 5 percent.

Table 3: Correlation between Tax Filing Process and Disruptive Technology

Variables	Details	TFP	AIG	BDT	BKC	CCT
TFP	Corr. Coefficient (N) – Sig. level Obs	1.0000 - 182	0.2111* 0.0042 182	0.3185* 0.0000 182	0.2340* 0.0015 182	0.2141* 0.0037 182
AIG	Corr. Coefficient (N) – Sig. level Obs	0.2111* 0.0042 182	1.0000 - 182	0.6166* 0.0000 182	0.6431* 0.0000 182	0.6230* 0.0000 182
BDT	Corr. Coefficient (N) – Sig. level Obs	0.3185* 0.0000 182	0.6166* 0.0000 182	1.0000 - 182	0.6772 0.0000 182	0.5985* 0.0000 182
BKC	Corr. Coefficient (N) – Sig. level Obs	0.2340* 0.0015 182	0.6431* 0.0000 182	0.6772 0.0000 182	1.0000 - 182	0.8165* 0.0000 182
CCT	Corr. Coefficient (N) – Sig. level Obs	0.2141* 0.0037 182	0.6230* 0.0000 182	0.5985* 0.0000 182	0.8165* 0.0000 182	1.0000 - 182

Source: Researchers' Computation (2024) *** 5 percent**

Disruptive Technology and Tax Filing Process in Ondo State

In order to achieve the objective of the study which is to investigate the effect of disruptive technology on tax filing process in Ondo State, Nigeria, Structural Equation Modeling (SEM) was employed and the result is presented in table 4. The indices of interpretation is the Z-satistics and the probability value. The results shows that the model is significant and the coefficients are different from zero having Wald chi2 (4) of 13.75 which is significant having value of 0.0081. The overall variance caused to tax filing by the use of disruptive technology is 75.16 percent. The overall result shows that disruptive technology has a positive and

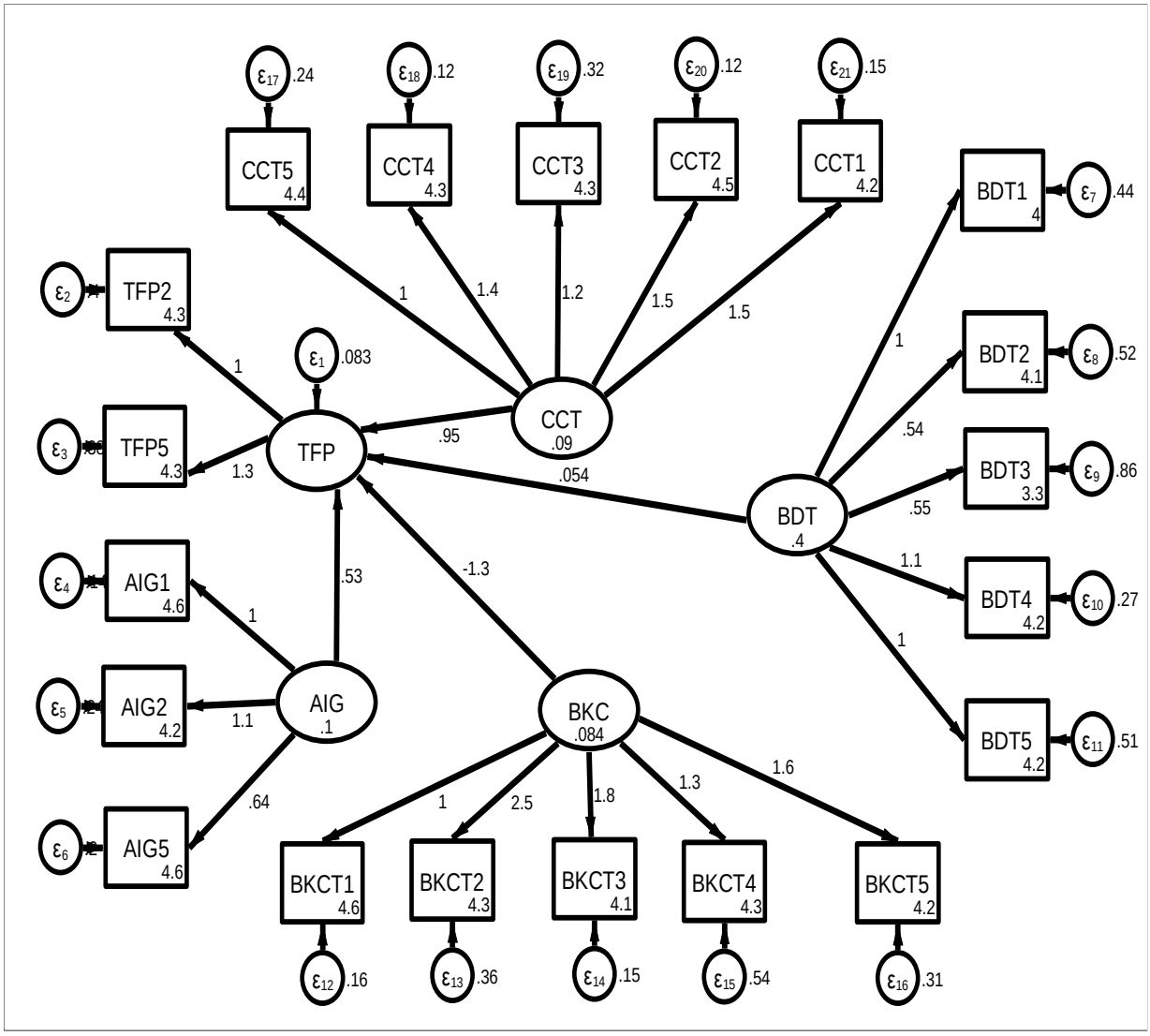
significant effect on the tax filing process in Ondo State, as three of the measures are significant, with two being positive.

The individual results shows that artificial intelligence (AIG) has a positive and significant effect on the tax filing process having capability to cause a significant variation to tax filing process and this is evidenced by coefficient value of 0.5268504, z-statistics of 2.51 and probability value of 0.012. It is also observed that all measures of big data analytics have positive coefficient and this indicated that there is positive correlation between the question asked and the phenomena been presented. The implication is that the use of big data analytics (BDT) in the tax filing made it easily admissible to stakeholders. However, the level of the positive effect is of no significance and this is evidence by coefficient value of 0.0535461, z-statistics of 0.40 and probability value of 0.686. Also, the results on table 4 further shows that block chain technology (BCK) has a negative and significant effect on the tax filing process having no capability to cause a significant variation to the documentation process. This is evidenced by coefficient value of -1.286758, Z- statistics of -3.12 and probability value of 0.002. It is also observed that all measures of block chain technology has positive coefficient and this indicated that there is positive correlation between the question asked and the phenomena been presented. Lastly on table 4, the results further shows that cloud computing technology (CCT) has positive and significant effect on the tax filing process having capability to cause a significant variation to the tax filing process. This is evidenced by coefficient value of .9518619, Z- statistics of 2.18 and probability value of 0.029. It is also observed that all measures of service quality has positive coefficient and this indicated that there is positive correlation between the question asked and the phenomena been presented.

The implication is that artificial intelligence enables the tax authority in the state (ODIRS) to automate its tax administration processes and this has increased the efficiency of the tax filing process, this technology has reduced the need for physical visits to FIRS/ODIRS offices, thereby saving time and costs to tax payers which in turn encourage them to do the needful. Also, the negative effect of block chain technology may mean that the technology is of no use in regulating tax filing process. More so, the findings imply a positive and significant effect of cloud computing on tax filing process, it then indicates that this technology has helped improved the records analytics and reporting competencies of the tax authority hereby making the documentation of the tax filing process more seamless than before. Also, using cloud computing technology has enhanced data management, thereby fostering the collaboration between the tax authorities and other government agencies.

The findings of this study align with the result of Ajala and Adegbie (2020), which conducted a study to examine effects of information technology on effective tax assessment in Nigeria, the study reveal that each of the digital tax net of taxpayers, enabling tax laws, information technology acquisition and financial resources support exhibited a positive significant effect on effective tax assessment. The study also supports Muslichah *et al.* (2023), the findings of the study demonstrated a positive effect of tax e-filing system quality on both user satisfaction and perceived usefulness, and that perceived usefulness has a positively significant effect on user satisfaction. Likewise in Enugu State, Uguagu *et al.* (2023) found out that disruptive technology has significant positive effect on tax revenue in Nigeria, the study also revealed higher mean value for tax revenue after the adoption of disruptive technology when compared with the mean value before the adoption of the technology system, it also revealed that technology has significantly helped in stemming the tide of tax avoidance to a large extent in Nigeria. Igbekoyi and Adedipe (2021) also investigated the electronic tax filing system and tax compliance in Ondo State, the study found that electronic filing system has a significant and positive effect on response time to tax payer queries; as it also showed a significant but negative effect on the level of interaction between tax payer and tax authorities. It equally supports the result of Ajagun, et al 2023 that examines the effects of disruptive technologies on company income tax, and the results obtained by the study shows that there is significant positive relationship between disruptive technology and company income tax of the selected telecommunication network providers in Nigeria. The study findings negate the result of Chijioke et al. (2018), who investigated the impact of disruptive technology on tax revenue generation in Nigeria found evidence of a decrease in federally collected revenue following the introduction and implementation of new technologies. The study also found that tax revenue decreased after the implementation though the mean difference was not statistically significant.

Table 4: Structural Equation Modelling of Disruptive Technologies and Tax Filing Process



Source: Researchers' Computation (2024)

Note: TFP (Tax Filing Process); CCT (Cloud Computing Technology); BDT(Big Data Analytics); BKC(Block Chain Technology); AIG (Artificial Intelligence)

Table 5: Structural Equation Modelling Results

Tax Filing Process	Coef.	Std. Err.	Z	P>|z|	[95% Conf. Interval]
Artificial Intelligence	.5268504	.2101157	2.51	0.012	.1150313 .9386696
Big Data Analytics	.0535461	.1325736	0.40	0.686	-.2062934 .3133856

Block Chain Technology	-1.286758	.4123345	-3.12	0.002	-2.094919	-.478597
Cloud Computing Technology	.9518619	.4356761	2.18	0.029	.0979524	1.805771

R-Square = 0 .7516 Log likelihood = -3433.2204

Wald chi2 (4) = 13.75 Prob > chi2 = 0.0081

RMSEA = 0.247 Number of obs = 182

LR test of model vs. saturated: chi2(166) = 2008.62, Prob > chi2 = 0.0000

LR test of baseline vs.saturated: chi2(190) = 2834.742, Prob > chi2 = 0.0000

Akaike's information criterion (AIC) = 6994.441

Bayesian information criterion (BIC) = 7199.497

Standardized root mean squared residual (SRMR) = 0.294

Source: Researchers' Computation (2024)

Policy Implications of Findings

It is evident from the research findings that disruptive technology significantly influences and facilitates a higher rate of tax filing. The positive effects that two of the technologies have on the tax filing process is an indication that the beneficial use of artificial intelligence and cloud computing technology can lead to improved outcomes. The findings of the study supported the idea of the theory of digital diffusion. The theory assumes that innovations that brings change in idea or practice should be considered as an application to be diffused into previous practice and since disruptive technologies embodies information and its adoption reduces complexities as applicable to tax related issues in Nigeria, it worth been called an innovation.

A good tax filing process need to offer quality service to enjoy support from all stakeholders especially the tax payer to support documentation and other process of tax filing which will lead to the overall tax compliance and as well improve the economic development of the state. In order to ensure a better tax filing process that can facilitate enough tax revenue, government is expected to be more responsive in order to earn the trust of citizens on tax principle of easiness. Obtaining feedbacks on the use of these technologies and acting on it promptly could help achieve an efficient and effective tax filing process.

Conclusion and Recommendations

The current study investigated the effect of disruptive technologies on tax filing process among Federal and state revenue services in developing economy of Nigeria, particularly, Ondo State.

The outcome of this study showed that artificial intelligence (AI) and big data technology proved more effective in tax administration for government's parastatals. In blockchain technology and cloud computing technology were less effective due to high rate of cyber theft. The study concluded that disruptive technology is capable of creating a new market for tax filing process in Nigeria through automation. The study thereby recommended that:

i. The government should maintain AI application, as well as, invests in technology of AI at state and federal level to boost local production in order to make it more easily to use at grassroots level for tax filing process.
ii. There is need to full digitalized tax process in ensuring that each tax filing process is done through online.
iii. There is need for a regular training in form of workshop, short time courses and other means of training to boost the information for respective tax administrators on application of block chain technology usage on tax administration in Nigeria.
iv. Government should provide high security measures via massive investment in information technology to tackle any cybercrimes that may impede successful application of cloud computing technology in tax administration.
v. To ensure an, effective and efficient tax filing process, the government should ensure that tax filing is handled by professionals and trained personnel. The personnel of the tax authorities of each of the three tiers of the government should be trained and retrained to maximize performance instill discipline on them.

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