Impediments of Electronic Commerce as a Tax Revenue Facilitator in Nigeria

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Abstract

This study measures the contributions of e-commerce activities to the national tax revenues in Nigeria, against the background of some country-specific problems. Using a data set spanning between 2008 and 2011 we develop a model that measures the statistical significance of indirect taxes sourced from four proxies of e-commerce: Automatic Teller Machines (ATM); Point-of-Sale (POS); On-line Purchasing (Internet Purchasing); and, Mobile Phone Payment (GSM). We find that e-commerce transactions have a very low overall contribution to the national tax revenue. We also find that while tax revenue contributions from ATM and POS are relatively significant, those from Internet Purchasing and GSM are insignificant. We recommend Public-Private-Partnerships between government and firms in developing the infrastructures required for improving the current level and depth of Internet and telephony usage. Consumer education is also recommended for improving awareness of the benefits of e-commerce transactions. Further research into the behavioural and infrastructural causes of the current low level of tax remittance from e-commerce transactions by sellers is recommended.

Keywords: e-commerce, tax revenue, Nigeria

1. Introduction

1.1 Background

Developments in Information and Communications Technology (ICT) have had the greatest influence on society in recent times. Beyond the Global System for Mobile Communications (GSM), the advent of the Internet and its related infrastructures in the last two decades has driven significant shifts and restructuring in the way business is done across the globe - where a sizeable percentage of commercial activities are now being conducted electronically. While globalization has generally fueled the tempo of world trade, the Internet has particularly accounted for its recent exponential growth. The internet has not only changed the way firms, customers and suppliers interact, it has also restructured the internal workings of firms, and affected the nature, basis and intensity of competition across industries globally (Wheelen & Hunger, 2012). This growth however has manifold implications for tax administration - as it does for just about everything else.

The increase in electronic commerce (e-commerce) presents a daunting challenge to tax authorities' traditional approaches to both direct and indirect taxation. Unlike in traditional commercial activities where such details of transaction as the amount involved, parties to the transaction and the place in which the transaction was carried out can easily be established, e-commerce, in contrast, mainly occurs in the virtual and borderless world of the Internet, with the aid of a network of computers, within which untraceable trade can be carried on from obscure or even unidentifiable locations (Rosenberg, 2008). This virtual nature of the Internet makes e-commerce intangible in many ramifications, multi-jurisdictional and susceptible to shielding in tax havens (Doernberg, Hinnekens, Hellerstain & Li, 2001). It also poses serious challenges to the effectiveness of tax authorities. Although the magnitude and true effect of e-commerce on tax revenue has not been fully ascertained, and may appear relatively small as at yet, its longer-term implications and influence on fiscal policy administration demands early and close attention (Tanzi, 1998). The ability to respond, by adjusting and adapting to the demands of e-commerce, remains the greatest threat to tax regimes (Deloitte & Touché, 1997).

Deep concerns have been raised about the administrative feasibility of effectively taxing commercial transactions conducted on the Internet. Indeed, it presents for tax administration the dangers of inefficiency on the one hand, and mistreatment of the tenets of sound tax policy on the other, with concomitant loss of tax revenues for fiscal authorities (Mikesell, 2001). Specifically, the cardinal principles of taxation such as fairness, neutrality and avoidance of double taxation may become compromised or eroded, while opportunities for tax avoidance and evasion tend to rise (Krupsky, 2003). As earlier suggested by Davis and Chan (cited in Hanefah, Hassan & Othman, 2008), the potential for tax avoidance heightens as physical location becomes unclear, such as what often obtains in an e-commerce environment. Indeed, there is growing evidence that the internet is being exploited by consumers for tax avoidance (Alm & Melnik, 2005; Goolsbee, 2000; Scanlan, 2007). For instance, Purie and Perrin found that firms take advantage of the Internet to minimize VAT payments, and On-line transactions generally assist in the avoidance of consumption taxes, such as Goods and Services Tax in New Zealand (cited in Bristol, 2011). More instructively, commercial activities conducted through the internet raise important regulatory concerns that carry with them the potential of international fiscal conflicts over the determination of the basis of the transactions, and therefore locus of taxation (Rosenberg, 2008).

Under the local tax system, individuals and corporate bodies resident in Nigeria are liable to pay tax on their global income. Non–residents are subjected to Nigerian tax on activities they have carried out within Nigeria through a *permanent establishment* – the country within which the person receiving the income resides or operates from. Where a tax liability arises in more than one jurisdiction, the taxpayer can seek relief from double taxation under existing double taxation treaties, which Nigeria currently holds with seven countries including UK, France and Canada. These treaties are an adaptation of the Organization of Economic Cooperation Development (OECD) model for tax convention (cited in Emenyi, 2013). At present, a huge proportion of the national tax revenue is generated from Value Added Tax (VAT), which is imposed on the supply of all goods and services, other than those exempted by statute. As regards VAT and other indirect taxes, the major issue is how Nigerian tax authorities can effectively monitor and track e-commerce transactions for the purpose of tax collection.

1.2 Problem Definition

The main difficulty that e-commerce poses for the Nigerian tax system, like in most other countries, stems from the fact that the extant national laws governing income taxation are premised on the assumptions of physical presence of parties to business transactions (Horn, 2003; Vohra, 2004). However, these laws are incompatible with the taxing of e-commerce transactions (Hanefah, Hassan & Othman, 2008). Physical presence justifies the concept of permanent establishment, as defined in the double tax treaties. With e-commerce, the need for physical presence in the country receiving the goods or services is removed, or is at best diminished. This creates a problem of how to determine the right to tax profits that are derived from electronic transactions - with serious intrinsic implications for the full realization of income tax revenues.

Although the recognition of the Internet as a major platform for communication has grown in recent times, the current poor state of infrastructures required for e-commerce transactions presents yet another drawback to the widespread use of the Internet for commerce in Nigeria. It is important to note that e-commerce does not merely involve a consumer surfing the internet for his needs with his personal computer, but includes interfaces between businesses in order to be able to serve the customer effectively – implying that all the players lining up the supply chain must be fully equipped with the Internet and other facilities. The infrastructures required for this critical business-to-business interface are often inadequate or lacking in developing countries such as Nigeria (United Nations Conference on Trade and Development, 2001). A related challenge that is increasingly being faced by users of electronic facilities for commercial transactions is a lack of universal security mechanism that forms a first-line of defense for such users. This problem has exposed local firms and individuals to substantial avoidable losses that negatively impact their income, profitability, and ultimately the tax revenue derivable from them.

Further compounding these problems is evidence of a relatively slow acceptability and adaptability of firms and individuals to the reality of conducting commercial transactions electronically, which has manifested itself in the apathy or even resistance to use of e-payment for financial transactions (Nwaolisa & Kasie, 2011). Indeed, this has been the reason for the recent compulsion of physical cash payment limits instituted by the Central Bank of Nigeria in 2012. These issues, among others, have jointly impacted the tax revenues realized from e-commerce activities in Nigeria especially on AMS, online purchasing, Point-of Sale and mobile phones.

1.3 Objectives and Justification of the Study

Although the debate on the full implications of e-commerce for tax revenues remains to be settled, this study

seeks to contribute to a better understanding of the contributions of e-commerce activities to the national tax revenues in Nigeria, against the background of the earlier highlighted country-specific problems. To achieve this, we develop a model that recognizes the effect of these factors on the level of tax revenues raised through the main facilities and instruments of e-commerce, that is, On-line (Web-based or Internet) Purchasing, Point-of-Sale (POS), Automatic Teller Machines (ATM) and Mobile Phone (GSM) Payments.

Being a typical developing economy, Nigeria features a population that is fast embracing the internet as a tool for social interaction and business transactions. As at December 2011, there were 45,039,711 Internet users, representing 26.5% of the total national population (Internet World Stats, 2012). By this, Nigeria currently ranks 10th among the highest Internet users in the world, according to Moreno (cited in BrandCrunchng, 2013). The growing importance of the Internet as an emerging driver of growth for the Nigerian economy is further reflected in the bourgeoning local online shopping statistics, which according to Konga.Com, currently stands at an annual US$1.8billion (cited in British Broadcasting Corporation, 2013). Given these potentials, the imperatives of conducting an empirical study on the current contribution of e-commerce to the national tax revenue are strong and obvious.

1.4 Study Hypotheses

The following hypotheses are formulated for the study:

H1: Automated Teller Machine contributes significantly to tax revenue in Nigeria.

H2: On-line purchasing contributes significantly to tax revenue in Nigeria.

H3: Point-of-Sale contributes significantly to tax revenue in Nigeria.

H4: Mobile Phone Payment contributes significantly to tax revenue in Nigeria.

Using empirical data spanning four years from 2008 to 2011 obtained from the Central Bank of Nigeria (CBN), the above hypotheses are tested in this study.

2. Theoretical Framework and Empirical Review

In the most basic sense, e-commerce describes the use of the internet to electronically conduct business transactions (Wheelen & Hunger, 2012). An electronic transaction involves the exchange of goods and services between businesses (including affiliates), households, individuals, governments, and other public or private organizations through sale or purchase, conducted over computer-mediated networks for which payment and delivery may be carried out either on or off-line. As such, any form of electronic order, whether payment is made through the same network or not, is covered here. The electronic medium may include proprietary networks such as those used for electronic data interchange (EDI), telephony, etc. Furthermore, the basic parties involved in the exchange are consumers, businesses or government, operating in a business-to-business, business-to-consumer or business-to-government combination (UNCTAD, 2001).

The hallmark of e-commerce lies in the simplicity of its transactions, as exchanges are often completed without the intervention of such business intermediaries as banks and other financial institutions and consultants. This allows businesses the freedom to reach, and be reached, by customers across geographical borders. Because of its features, the Internet has driven a number of important trends, including compelling firms to reshape, reconfigure or totally transform into entities that now almost exclusively interface with their customers, suppliers, partners and others electronically. It is also facilitating closer interaction and access between firms and their customers, thus eliminating distributors and agents in the value chain, and in the process reducing operating costs, improving service and fostering mutually rewarding relationships – a factor that influences customer bonding, loyalty and fidelity. Instructively, the internet has forced a shift in the balance of power from the supplier to the customer, as the latter now has unrestricted access to market information that is empowering for making choices. This particular development has triggered greater competition across industries in which firms unrelentingly strive to out-perform one another with the most innovative and efficient means of reaching the increasingly discerning customer (Wheelen & Hunger, 2012).

2.1 Theoretical Foundations

The theoretical foundations of e-commerce are arguably anchored on the *Garg* (2000) *model* for electronic commerce taxation, which suggests that a number of qualities must be met by the tax system: *Neutrality* – the tax mechanism should be neutral and equitable between the traditional physical mode of commerce and electronic transaction, such that transacting under either mode should neither affect the incidence of tax nor should it result in double or non-taxation; *Efficiency* – since increase in compliance cost is likely to lead to tax evasion or even a reversal on the use of electronic transactions, the tax system should necessarily be cost-effective, not only to the

fiscal authorities, but also to businesses; *Simplicity* – the tax system should be devoid of complexities while being user-friendly, in order to engender voluntary compliance and reduce opportunities for litigation; *Flexibility and effectiveness* – although it is challenging to produce a tax law that will take care of all possible future developments or scenarios in the economy and all fields of technology, it is nevertheless critical that the enactment is flexible enough to be adapted to new situations without necessitating radical change in its content and form. Furthermore, the law should be able to produce the maximum amount of tax in a timely way, while also presenting a disincentive for tax evasion and avoidance; *Split of revenue in case of clash of tax jurisdiction* – the tax policy should contain a mechanism that allows for an equitable split of revenues from a taxable activity or transaction whose locus is being contended by another country. The overriding principle is that the taxpayer should not have to suffer double-taxation, while the tax authority avoids controversies and litigation.

On its part, the *Optimal Taxation theory* specifies how taxes can be configured in a way that offers the best outcomes in terms of social welfare. It features two models: the *Ramsey Rule* and the *Laffer Curve Model*. The Ramsey Rule posits that the excess burden of taxation will be minimized by setting the ratio of taxation inversely proportional to price elasticities of demand for tangible and intangible electronic products. This models assumes that government attempts to minimize the excess burden (efficiency loss) of taxation subject to given revenue requirements. The *Optimal Taxation theory* under Ramsey rule is the rate that minimizes the excess burden of taxation while still generating the required revenue from tangible and intangible electronic business. The Laffer Curve *model* on the other hand assumes that government will attempt to generate as much revenue as possible without any regard to the efficiency losses caused by taxation. Only constitutional constraints and other legislation can limit government's desire for increased revenue. The Laffer Curve considers the inverse relationship between taxation and tangible and intangible electronic products and the impact of these relationships on tax revenues. The analysis reveals that a higher tax is not always the maximizing rate – as a lower tax rate may actually raise more tax revenues than a higher one in electronic commerce transactions (cited in Emenyi, 2013).

2.2 Implications of E-Commerce for the Nigerian Tax System

Although there is scant literature available, and it is still relatively early days to fully comprehend and measure the effects of e-commerce on the Nigerian tax system, a number of issues as suggested by Lao-Araya (2003) must be considered in addressing the tax implications of e-commerce:

(i) As the total value of e-commerce continues to rise globally, the taxing strategies of various countries will drastically have to shift from the domestic to the international level, since e-commerce, via the internet, is borderless. It follows a process that makes it challenging to physically locate the participants involved in commerce, and therefore difficult to reach for the purposes of tax assessment.

(ii) As e-commerce continues to become more and more decentralized, bilateral or multilateral disputes in respect of trade agreements or tax jurisdiction will become virtual and obviously more difficult to settle.

(iii) Over time, many trading entities, especially multi-national companies, will tend to operate as virtual organizations with little or no physical presence in any particular taxing jurisdiction, and as such challenging to tax.

(iv) In order to handle the challenge posed to tax administrators by e-commerce, tax jurisdictions need to be globalized and wide scale agreements between trading countries and common tax policies put in place.

2.3 Legal Dimensions of Electronic Commerce in Nigeria

Being a typical emerging economy, Nigeria understandably does not currently have comprehensive legal or regulatory framework in place for governing e-commerce activities. Essentially, disputes arising from e-commerce have so far been resolved with the use of decided cases and relevant commercial laws. Appropriate legislation is being formulated in the form of the twin laws of: Nigerian Bill on Cyber Crimes and the Electronic Transaction Bill - which is modeled on the UNCITRAL Law on electronic commerce. The former addresses cybercrime security in terms of policing, prevention and prosecution, while the latter will focus on frameworks for contract governance (Akomolede, 2008).

3. Methodology

3.1 Research Design

The historical-descriptive research design was adopted in carrying out this study. This approach involved the use of secondary data reported in various issues of the Central Bank of Nigeria (CBN) Annual Reports and Accounts.

The data set used as proxies for the e-Commerce variables and the regression analysis in this study were derived

from these sources over a four-year period covering 2008 to 2011.

3.2 Model Specification

The researchers developed an Electronic Commerce Model (ECLM) for this study. The essence of this model is the measurement of the reliability of the independent variables. Crucial to the understanding of the issues in this study is the construction of a statistical model which establishes the relationship between the study variables. The consensus from the literature on e-Commerce and tax revenue is that the appropriate functional form of analysis is the linear one.

The relationship between e-Commerce and tax revenue is expressed by the following equations:

$$Tax\ Rev = f\ (ATM,\ WEB,\ POS,\ GSM)$$

The statistical model becomes:

$$Tax\ Rev = b_0 + b_1ATM + b_2WEB + b_3POS + b_4GSM + e_i$$

Where:

Tax Rev = Tax Revenue

ATM = Payments through ATM machines

WEB = On-line Payments through the Web

POS = Payments through Point-of-sale

GSM = Payments through Mobile phones

b_o = Unknown coefficient to be estimated

$b_1 - b_4$ = Coefficient of the contributions of the independent variables: Automated Teller Machines (ATM), WEB/ Internet subscription, Point-of-Sale (POS) and Global System for Mobile telecommunication (GSM) to the attainment of the dependent variable (Tax revenue).

e_i = Error term

b_o, b_1, b_2, b_3, $b_4 \geq 0$.

3.3 Data Estimation Technique and Treatment

The study adopted an inductive and empirical methodological framework. On the basis of existing theories, the hypotheses are rigorously tested. The Ordinary Least Square (OLS) regression and correlation coefficient was adopted in the determination of the relationship between variables in the study. To ensure the validation of the research hypotheses, the independent student t-test was adopted arising from the OLS result interpretation.

4. Results and Discussion

4.1 Results

In Tables 1 to 5 where the ordinary least square regression results are presented, the estimated Pearson Correlation, Standard Errors, t-value and the Coefficient of determination coefficient are arranged vertically for each e-Commerce variable. The t-value is calculated using a two-tailed test. The level of significance of 5% is used. The coefficient of determination (R^2), the adjusted R^2 and F-statistic are also presented. The R^2 measures the goodness of fit of the regression equation, that is, it gives the proportion or percentage of the total variation in the dependent variable explained by the exploratory variables. The adjusted R^2 is a better goodness of fit than R^2 as it adjusts for increasing R^2 when a new explanatory variable is added to the model. The F-statistic is used to test whether the regression equation taken as a whole significantly explains the variation in the dependent variable.

Table 1. Modeling the effect of e-commerce on tax revenue from ATM machines using ordinary least square method

Variable	Estimated coefficient	Standard error	t-value	Sig.
Constant term	403.618	81.429	4.957	.038
ATM	0.210	.083	2.518	.013
Rho	.872			
R^2	.760			
Adjusted r^2	.640			
F-statistic	6.340			
DW	1.919			

Notes: a. Predictors: (Constant), ATM; b. Dependent variable: TAXREV.

Source: SPSS Result.

Table 2. Modeling the effect of e-commerce on tax revenue from On-line (WEB) purchasing using the least square regression method

Variable	Estimated coefficient	Standard error	t-value	Sig.
Constant term	416.677	147.903	2.817	.106
Online	2.532	2.042	0.659	0.341
Rho	0.659			
R^2	0.435			
Adjusted r^2	0.152			
F-statistic	1.537			
DW	0.917			

Notes: a. Predictors: (Constant), Online; b. Dependent Variable: TAXREV.

Source: SPSS Result

Table 3. Modeling the effect of e-commerce on tax revenue from Point of Sales (POS) using ordinary least square method

Variable	Estimated coefficient	Standard error	t-value	Sig.
Constant term	897.762	149.495	6.005	.027
POS	-26.857	12.347	-2.175	.016
Rho	0.838			
R^2	0.703			
Adjusted r^2	0.554			
F-statistic	4.731			
DW	2.320			

Notes: a. Predictors: (Constant), POS; b. Dependent Variable: TAXREV.

Source: SPSS Result.

Table 4. Modeling the effect of e-commerce on tax revenue from GSM using least square regression method

Variable	Estimated coefficient	Standard error	t-value	Sig.
Constant term	508.399	65.451	7.768	.016
GSM	10.569	6.055	1.745	.222
Rho	0.777			
R^2	0.604			
Adjusted r^2	0.405			
F-statistic	3.018			
DW	1.754			

Notes: a. Predictors: (Constant): GSM; b. Dependent Variable: TAXREV.

Source: SPSS Result

Table 5. Benchmark or tabulated value

Table F- Statistic $F_{0.05}$ (1,3)	3.84
Table F- Statistic $F_{0.01}$ (1,3)	6.63
Table Value t-value $t_{0.05}$(N-k=3)	2.042
Table Value t-value $t_{0.10}$(N-K=3)	1.697

Source: Gujarati (2005).

Table 1 shows the effect of ATM Machines on tax revenue in Nigeria. The result indicates that the model fits the data well, as measured by the adjusted coefficient of determination (Adjusted R^2). The adjusted R^2 value of 0.640 or 64.0% indicates that about 64% of the observed changes in the dependent variable, that is, tax revenue in Nigeria were explained by the independent variable, ATM machines. It follows that the remaining 36% was not accounted for by the model and was therefore represented in the usual stochastic error term. The high value of the adjusted R-squared did not occur by chance, since its overall statistical significance as measured by the F-statistic showed a high level [F-statistic (1, 3) = 6.340 compared to F0.05 (1, 3) = 3.84]. This therefore confirms that the model had a high predictive power. To examine the statistical significance of the individual variables in the model, the t-statistic value was used. First, the expected a priori sign confirmed the theoretical stance that revenue sourced from transactions made on ATM machines is positively related to tax revenue in Nigeria. Specifically, the independent variable was found to be statistically significant at unconventional level [tcal =2.518 > t0.01 = 1.697]. This was read from a two-tailed test table.

Table 2 indicates the results of the relationship between On-line purchasing and tax revenue. Here, the model shows that there is a very low and insignificant predictive power of the independent variable on the dependent variable. The adjusted R-squared value of 0.152 or 15.2% indicates that about 15% of the observed changes in the dependent variable, tax revenue, were explained by changes in the independent variable, On-line purchasing. The remaining 85% was captured by the stochastic error term with its usual normality assumptions. The low F-statistic also confirmed the low explanatory power of the independent variable. A look at the statistical significance and the a priori sign of the variable in the model indicates that the independent variable was statistically insignificant at the conventional levels.

Table 3 indicates the effect of Point-of-Sales (POS) on tax revenue in Nigeria. With an adjusted R-squared value of 0.554 or 55.4%, it could be confirmed that the model has a high prediction power and fits the data well. The high and statistically significant value of the F-statistic [F-stat. (1, 3) = 4.731 > F0.05 (1, 3) =3.84] confirms the overall significance of the model and the predictive power of the independent variable. A quick examination of the statistical significance of the variable in this model indicates that, it was statistically significant at unconventional level. Specifically, the independent variable was found to be statistically insignificant at 1% level [tcal = -2.175 < t0.01 = -1.697] and carried the wrong a priori negative sign.

Table 4 shows the effect of Mobile phone payments (GSM) on tax revenue in Nigeria. It indicates that the model does not fit the data well, as measured by the adjusted coefficient of determination (Adjusted R^2). The adjusted R^2 value of 0.405 indicates that 40.5% of the observed changes in the dependent variable, tax revenue, is explained by the independent variable, GSM. It follows that the remaining 59.5% was not accounted for by the model, and was therefore represented in the usual stochastic error term. The very low value of the adjusted R-squared did not occur by chance, since its overall statistical significance, as measured by the F-statistic, showed a low level [F-statistic (1, 3) = 3.018 compared to F0.05 (1, 3) = 3.84]. This therefore confirms that the model had a low predictive power.

4.2 Test of Hypotheses

4.2.1 Hypothesis One

Automated Teller Machine (ATM) contributes significantly to tax revenue in Nigeria.

Our test of this hypothesis shows a t-statistic of 2.518. This confirms that there is a positive significant relationship between the e-commerce variable of ATM machines and tax revenue. This is further confirmed by the value of the F-statistic which is higher than the tabulated or theoretical value.

4.2.2 Hypothesis Two

On-line purchasing contributes significantly to tax revenue in Nigeria.

Our test of this hypothesis shows that the estimated t-value for On-line purchasing in the equation is 0.659. This result indicates that the contribution of On-line purchases to tax revenue in Nigeria is insignificant at 5 percent

level of significance. It is therefore concluded that On-line purchasing does not contribute significantly to tax revenue in Nigeria.

4.2.3 Hypothesis Three

Point-of-Sale contributes significantly to tax revenue in Nigeria.

The test of this hypothesis shows that Point-of-Sale (POS) contributes significantly to tax revenue in Nigeria. The estimated t–value of the equation is -2.175 and is significant at 1 percent. The F-statistic is 4.731 and is significant at 5 percent level. This result confirms that Point-of-Sale contributes significantly to tax revenue in Nigeria.

4.2.4 Hypothesis Four

Mobile phone payment contributes significantly to tax revenue in Nigeria.

The result of a test of this hypothesis shows that the estimated t-value for payments through Mobile phones (GSM) in the equation is 1.745. This indicates an insignificant relationship between GSM and tax revenue in Nigeria at 5 percent level of significance. Mobile phone payment therefore does not contribute significantly to tax revenue in Nigeria.

4.3 Discussion

The four variables that were used as proxies for e-commerce in this study were found to have varying degrees of contribution to tax revenue in Nigeria. The results showed that while Automated Teller Machines and Point-of-Sale activities made significant contributions, On-line Purchasing and Mobile Phone payment did not contribute significantly. Analysis of the disaggregated data set of the distribution of taxes from e-commerce transactions indicates that ATM and POS jointly accounted for over 90% of the taxes from all such transactions in the Nigeria (see Appendix).

The results of this present work agree with the earlier findings of Nwankwo and Eze (2013) and Odior and Banuso (2012) in their studies of cashless banking in Nigeria, in which they concluded that ATMs and POS transactions have generally increased bank profits. This is so since POS and ATM contribute to revenue growth and help reduce cost of banking services. By deduction, this has in turn helped to grow the amount of the available taxable revenue.

The value of e-commerce transactions amounted to just 4% of the overall retail trade in the US in 2009 (U.S. Census Bureau, 2011). This draws some parallel with the Nigerian situation in which the contributions of e-commerce to annual total tax revenue was a mere 1.14% in the same period (CBN, 2012). However in the US, electronic (On-line) shopping and mail order accounted for a significant 48.1% of all e-commerce transactions, whereas in Nigeria its contribution to tax revenue was only 13%. This contrast further serves to explain the results of this present study, which found On-line Purchasing to be a statistically insignificant contributor to e-commerce taxes. Arguably, inadequate Internet infrastructures (personal computers, Internet service connectivity, etc) account for the low use of On-line Purchasing for retail procurements, and therefore the substantial difference between both cases. Another factor that may account for it is the perceived low rate of remittance of VAT and Sales Tax made by sellers for On-line transactions. As found by Alm and Melnik (2011), seller tax compliance is generally low in On-line sales. However, the larger and more established sellers tend to have a higher tax compliance rate than smaller ones. Regarding Mobile Phone Payment, its low level of contribution may not be unconnected with the current gaps in buyer education or awareness of the facility. A further reason may be the difficult connectivity or quality of service experienced by consumers with most of the GSM service providers in Nigeria.

5. Conclusion

This study found that revenue from Automated Teller Machine and Point-of-Sale make more significant contributions to national tax revenue in Nigeria than those from On-line Purchasing and Mobile Phone Payment, although the overall contribution of e-commerce activities to the fiscal treasury is relatively dismal. However, the clear signs of improvement in the taxes derived from e-commerce transactions (as a percentage of total tax revenue) at an annual rate of about 44% over the last two years, and the fact that one quarter of Nigerians now depend on it for different kinds of activities portend very promising prospects by this tax revenue source. As firms attempt to reach wider markets with their products and services, they are likely to seek for the most innovative, cost-effective and efficient ways of making direct and interactive contact with consumers. This need will drive greater efforts at facilitating the development of the currently inadequate infrastructures, directly or indirectly, by business firms. The expected outcome is higher sales and profits for firms, and by extension higher tax revenue. Also, the growing level of education, awareness and consumer rights is set to cause a greater insistence by

customers on being served with only the best products and services. This factor should influence a greater use of the Internet, which remains the most viable platform for viewing and selecting from a range of alternatives the ones that offer the best quality and/or competitive prices. We therefore recommend Public-Private-Partnerships (PPPs) as the best way forward for Internet infrastructure development in Nigeria. Similarly, consumer education is also required to address the current poor adoption of e-commerce tools among Nigerian consumers, as it is evident that the use of such services as Mobile Phone and On-line Purchasing is currently low. This effort will best be championed by sellers themselves than government.

It is pertinent to consider the fact that part of the solutions to low e-commerce taxes may lie in ensuring effective remittance of VAT and Sales Tax by sellers. For now, there is no clarity about the level of remittance in Nigeria, and reliable data were not available for use. The absence of data on remittance understandably places some limitation on the results obtained in this study. The search for an answer to this perceived problem presents scope for further research. And, if the losses arising from this source are found to be significant, then the behavioural and infrastructural factors that are responsible for poor compliance need to be understood and addressed in order to improve overall e-commerce contribution to national revenue beyond its current performance.

Finally, there is no evidential indication that e-commerce either affects the incidence of tax in an adverse way or leads to double taxation in Nigeria. There is also no evidence that e-commerce is more costly to the tax payer in a way that encourages or leads to tax evasion. Neither is it indicative of a less efficient source of tax revenue that suggests higher cost of administration for the tax authorities.

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Appendix

Data set of research variables

Year	ATM (₦m)	On-line (₦m)	POS (₦m)	GSM (₦m)	Total e-commerce tax (₦m)	% of e-commerce tax to total tax revenue	Total tax Revenue (₦m)
2008	399.7	25.1	16.1	0.7	441.6	1.06	4,168
2009	548.6	84.2	11.0	1.3	645.1	1.14	5,681
2010	954.0	99.5	12.7	6.7	1,072.9	1.63	6,573
2011	1,561.8	58.0	6.7	20.5	1,647.0	2.35	7,005

Sources: Central Bank of Nigeria Annual Report (2012); Central Bank of Nigeria Annual Report (2011); Central Bank of Nigeria Annual Report (2010); Central Bank of Nigeria Annual Report (2009).