A study of electronic commerce adoption factors in Nigeria

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Abstract: The paradigm shift to e-commerce in business transactions provides significant advantages such as expanding markets, improving customer services, reducing costs, and enhancing productivity. The global phenomenon is less aggressive in developing economies where small and medium enterprises struggle to provide internet services at their own expense due to limited government support and infrastructural deficiency. The acceptance of e-commerce adoption among Nigerians is slow irrespective of the huge population which should be of an advantage. This study investigated the factors hindering the adoption of e-commerce among Nigerians. A quantitative approach through a survey method was utilised with a total of 150 questionnaires distributed to Nigerian post graduate students studying at a Malaysian university. The Statistical Package for Social Sciences (SPSS 16) was used to analyse the data. This study finds among others that poor infrastructural facilities are the major factors hindering e-commerce adoption among Nigerians.

Keywords: adoption; e-commerce; Malaysia; Nigeria; information and communication technology; ICT; information systems; change management.


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1 Introduction

The revolution in the information technology has a direct relationship with the way businesses are conducted. One of the most notable and momentary development has been the introduction of electronic commerce. As in December 2011, over two billion people had access to the internet globally. World usage of internet has increased by over 580% between 2000 and 2011 (Miniwatts Marketing Group, 2012). Gibbs and Dedrick (2003) defined e-commerce as the use of the internet to buy, sell or supports and services. Grandon and Pearson (2004) stated e-commerce as business carried out through electronic data transmission over the internet and World Wide Web. E-commerce enables
high customisation and allows organisations to improve customer services (Choi and Whinstone, 2000). A vital benefit of e-commerce is access to global markets which enables businesses to expand their reach. The internet allows increase in awareness, visibility and opportunity for organisations to promote its products and services (Senn, 2000). E-commerce acceptance is at initial adoption stage in Nigeria (Onifade, 2003). The acceptance of e-commerce is noticeably growing in the country particularly among the large number of educated people.

In retrospect, small and medium enterprises are still struggling to provide internet services at their own expenses due to limited government support (Onifade, 2003). Access to the web in developing countries was primarily restricted to e-mail communication (Kshetri, 2008). E-commerce in developing countries especially Nigeria has not been sufficiently researched (Molla, 2005). Limited research in e-commerce activity exists in developing countries, thus inappropriate to relate results from research conducted in developed countries applicability to developing ones. Invariably the findings from developed countries are not directly transferable to developing countries (Dewan and Kraemer, 2000; Molla and Duncombe, 2006). The identification of factors hindering e-commerce adoption, aids government and businesses to overcome factors that later would create a positive environment that will encourage e-commerce. Research on information and communication technologies (ICTs) and particularly e-commerce has focused on developed countries (Grandon and Pearson, 2004; Mbarika, 2003).

The primary route by which e-commerce affect the economy at large is through its impact on productivity and inflation. Consumers in developed countries using e-commerce have the benefit of reduction in costs in term of the time and effort required to reach for goods and services and to complete transactions (Craig and King, 1993). Several studies have noted factors that influence individuals and firms to adopt e-commerce (Rodriguez et al., 2008; Grandon and Pearson, 2004; Kurnia, 2006). These factors are technological characteristics, social characteristics, and environmental characteristics, time, relative advantage of e-commerce, IT knowledge, and e-commerce compatibility. Based on the previous studies, this study intends to identify factors hindering the adoption of e-commerce among Nigerians considering four important dimensions such as; infrastructure barriers, socio-cultural barriers, socio-economic barriers and government policy and support.

2 Innovation diffusion

Rogers (1995) described diffusion of innovation as the process by which an innovation is communicated through certain channels over time among members of a social system. The author identifies important characteristics of innovations as perceived by individuals (Roger, 1995). These are important as they are constructed in such a way that potential adopters may view the innovation. The characteristics, which forms the basis for what is regarded as perceived attributes include:

1 Relative advantage in this research is described as the degree in which an advantage of adopting e-commerce is perceived as better than not adopting the technology. Relative advantage requires the consumer to evaluate the costs implications and benefits of using the e-commerce technology, which can be expressed economically, socially, or in other ways.
Compatibility: “the degree to which an innovation is perceived as being consistent with the existing values, past experiences and needs of potential adopters” (p.224). The social cultural values of potential e-commerce adopters are evaluated relative to the values and belief system, previously introduced ideas, and consumer needs for the technology.

Complexity: “the degree to which an innovation is perceived as difficult to understand and use” (p.242). Complexity reflects the level of physical or mental efforts necessary to use an e-commerce technology for day to day transactions.

Trialability: “the degree to which an innovation may be experimented with in a limited basis” (p.243). Trialability allows the adopter to test drive an innovation so that it gives meaning to the adopter.

Observability: “the degree to which the results of an innovation are visible to others. The easier it is for potential e-commerce adopter to see the results of a technology the more likely they are to adopt it” (p.244). The more the innovation can be seen and communicated by others, the higher the observability (Rogers, 1995).

Pan and Jang (2008) used DOI characteristics on a study of technology infrastructure readiness on technology acceptance in Taiwan; a face to face survey of 99 firms shows that readiness of technology infrastructure influence technology acceptance. Choochinprakarn (2008) used DOI to explain how online shoppers via the e-commerce influence the sales turnover in US stores. Similarly, Brancheau and Wetherbe (1990) also applied the characteristics of DOI to argue that business is facing an exponential growth in sales and electronic purchases, whether locally, regionally or internationally due to spread of internet service at the state level. Some of the characteristics of DOI are appropriate for the current study. DOI has been used in many previous studies at individual and firm levels. Moreover, its factors help to understand the trend of the decision makers towards the implementation of new mechanisms in the workplace, particularly the information technology mechanisms such as e-commerce (Al-Qirim, 2005; Mirchandani and Motwani, 2001; Tan et al., 2009; Seyala et al., 2004, Siyal et al., 2006).

In Nigeria for instance, a large number of micro-enterprises operate in the informal economy of the country, and a more or less important number of foreign-based firms were disconnected from the rest of the economy (Oyelaran, 2006). There are limited researches on innovation diffusions in developing countries and universal systems are poorly connected to local realities, particularly to labour market needs and opportunities. Main challenge of innovation developing process is the lack of technological support services and infrastructure (Hill et al., 2007). Oyeyinka and Gehl (2007) argued that innovation could be radical or incremental radical innovations refer to new products that result from advances in knowledge/technology. Incremental innovations include improvement of process or product technology designs, with or without up-grading of technology and/or acquisition of new technology. This study consider a clearer understanding of what innovation means in developing countries as an important factor that proceed the adoption of e-commerce. These four important factors such as technology conditions, socio cultural conditions, socio economic conditions and government policy and support are influenced by the innovation diffusion theory and hence is essential in determining the level of e-commerce adoption among Nigerian students studying in Malaysia.
3 E-commerce in Nigeria

The e-commerce industry in Nigeria began in the mid-nineties when the internet and telecommunications industry started becoming popular (Martin and Ernst, 2003). Its growth was slow until the advent of internet banking at the beginning of the 21st century. This is because an e-commerce service is dependent on people’s ability to make use of this new innovation technology. Service like the electronic cash transfer has a large impact in the development of e-commerce in Nigeria (Bada et al., 2006). Nigerian businesses are facing expansion gradually, as e-commerce creates global advantages to open new profitable market for local goods and services at far and at close distance. Online shopping systems give consumers a much greater choice with regard to their desired products and services, and offer much more in terms of ease and convenience, as against overseas travels for shopping purposes (Park et al., 2007). Nigerian researchers suggest that in other to improve on e-commerce adoption in Nigeria, the Central Bank of Nigeria (CBN) should consolidate a few banks on unprincipled, potentially counterfeit on business practices and the scope. Introduction of this policy by CBN will reduce fraud and improve the confidence of the consumer on internet transaction (Adeleye et al., 2004). Hundreds of thousands of young people can access the internet access from their wireless application protocol (WAP)-enabled mobile phones, Smartphone and from their PCs using their phones as a modem. That is mainly owing to the introduction of general packet radio service (GPRS) connectivity by the global system of mobile communications operators (Peersman, 2000).

In Nigeria, the introduction of global system for mobile communications (GSM) means telecom explosion (Adomi, 2005; Adeyinka, 2008). The GSM revolution began in August, 2001 and changed the face of information and communications technology in Nigeria. Since the GSM launch, mobile telephony has rapidly become the most popular method of business contact communication in Nigeria. Growth has been so rapid that Nigeria has been rightly described in various quarters as one of the fastest growing GSM markets in the world (Adeyinka, 2008). In addition, research found that a country’s information technology policy add value to human resources development and that reliable infrastructure is the key instrument and means of assessment, planning, change management and development to achieve sustainable growth (Kessides, 1993; Lansiti, 2004). It is for this reason that every country has a national progressive IT policy and implementation strategy to address emerging global reality aside and become a victim of the digital divide. A developing nation like Nigeria that aspires to participate effectively and become a key player in the emerging information technology era needs to have in place, a highly efficient information technology system driven by a vibrant national IT policy (Yusuf, 2005).

Government recognises IT as a strategic imperative for national development and taking cognizance of its immense benefits, government has resolved to provide considerable national resources, both financial and otherwise for the realisation of its National IT objectives. In 2005, research found that over 40 ISPs have been licensed in Nigeria. So far, only 35 of those are operational and, according to some ISP owners, less than a dozen can really be classified as true internet service providers offering a broad range of internet services, and with sufficient satellite capacity. Internet cafés are also becoming abundant in the big metropolitan areas. Many of these centre are located in nooks and booths of local market places, with nothing more than a single dial-up subscription, which is then made available to clients at an hourly rate (Oyelaran and
Adeya, 2004). Balogun (2010) found that a new dimension to internet connectivity has been introduced with hundreds of thousands of people now accessing the internet on their WAP-enabled mobile phones, Smartphone and on their PCs using their phones as a modem. As a result of this, the implementation of internet in the country was perceived to be because of the comparative benefit of technology implied by the organisations. In conclusion, Balogun (2010) suggest that invention of new technology on telecommunication can influence adoption of e-commerce among Nigerians.

4 E-commerce barriers

4.1 Infrastructural barriers

The first infrastructural factor hindering e-commerce adoption is telecommunication, connecting to the internet in most developing countries is not steadfast because of poor telephone connections and irregular electric power supply. Most developing countries are not prepared for e-commerce, due to lack of network infrastructure, especially among individual users and business people. E-commerce accomplishment depends heavily on a number of infrastructure technologies (Lawrence and Usman, 2010). Lawrence and Usman (2010) found that in most developing countries like Kenya, Nigeria and Togo that are embracing outdated telephone cords and unreliable extension wires, due to this may result to the low performance many providers of internet services encounter. A poor telecommunication infrastructure may cause a concentration of the technology in urban areas, which makes the participation of rural users more difficult (Lawrence and Usman, 2010).

In addition, broadband connection is a key element in the development of ICT adoption and use. It accelerates the contribution of ICT to economic growth, facilitates innovation and enhances efficiency. Broadband market development, supply arrangements, effective innovation and effective use of broadband services require policies that: promote effective competition and continued emphasis on the liberalisation of trade in services, network infrastructure, and technological applications across different platforms (Oyelaran and Adeya, 2004). In conclusion, Oxley and Yeung (2001) stated that, even with access to the necessary equipment; individual users and enterprises may not become active e-commerce participants unless with reasonable and adequate internet infrastructure.

4.2 Socio-cultural barriers

Efendioglu and Yip (2004) argued that adoption of e-commerce may be hindered by individual consumers who thought that counterfeit products are sold online. Lack of transactional trust between parties is a major problem. Torre et al. (2006) affirmed that trusts in developed countries have ways to expand the basis of confidence by applying the law impartially and to adapt to new technological environment. This is the basis of trust that underpins e-commerce in the developed world. In Nigeria, legal and judicial institutions are underdeveloped, individual consumers and enterprises lack confidence and trust to engage on internet transactions (Lawrence and Usman, 2010). The authors affirmed that reluctance to adoption of e-commerce in developing countries could be traced to limitation on personal contact. In most developing countries, e-commerce
initiative versus traditional commerce may require time to adapt to such technology for those who are used to face-to-face transactions. Lawrence (2011) and Poon and Swatman (1999) found that consumers in developing countries prefer traditional commerce in order to ascertain the quality of the product. In developing countries, there is a perception that technology is to destroy their culture and way of life. However, the issue related to language is important because it is a gateway of information and knowledge transfer in the digital world. English is a primary language used in many western countries where new technologies are originated. It is the main language for development of IT and e-commerce.

4.3 Socio-economic barriers

Lawrence and Usman (2010) found that some of socio-economic characteristics may pose significant challenges on the e-commerce adoption. They indicated that economic conditions are one of the socio-economic characteristics hindering adoption of e-commerce in developing countries. Kshetri and Dholekia (2002) stated that, economic conditions in developing countries are widely recognised as a major hindrance to e-commerce adoption. Lawrence (2011) argued that, gross domestic product and per capita income are common indicators for the economic conditions of a country. Lu et al. (2010) affirmed that access charge relative to income and earning affects internet use. Similarly, Mbarika (2002) stated that many developing countries with unfavourable economic conditions are not likely to be involved in e-commerce. The common pattern found across developing countries is the contradiction between the urban and rural areas in terms of income distribution (Beneria, 1981). DiMaggio (2001) stated that, inequalities in income distribution mean the internet is expensive for a large proportion of the population in rural areas. Maguire (2007) found that, lack of ICT skills and business skills are widespread impediments to effective adoption of e-commerce. Lawrence and Usman (2010) affirmed that inappropriate IT education is apparent to be a reason why the potential value of computers and the internet as a means to participate in e-commerce is not valued. There is a need for early computer education to enable people could become computer literate from school; most schools in developing countries do not embrace computer education (Yusuf, 2005).

Lawrence and Usman (2010) concluded that, for online transaction to be more attractive in developing countries, educational system should focus primarily on the needs and problems of the majority of populations, i.e., populace who are traditionally deprived of education. Franklin et al. (2002) found that full efficiency and realisation of the benefits of e-commerce depends on rapid authorisation, payments, and settlement of accounts. Eichengreen (2001) affirmed that many developing countries do not have financial institutions or a central bank payments mechanism that is up to the task. Logistic (speed and timeliness of delivery) could hamper the acceptances of e-commerce in developing countries (Lawrence and Usman, 2010). E-commerce relies on efficient logistic infrastructures within a country. In most developing countries, logistical changes need to occur in order to create an appropriate environment for the effective participation in e-commerce (Lawrence and Usman, 2010). Inefficiencies in essential services such as postal service along with delivery required in an international transaction can frustrate the success of online transaction (Lawrence, 2011). The author also mentioned that the distribution and delivery mechanism are important ingredients in building electronic commerce. It is also necessary for an enterprise to have in place the distribution and
delivery channels capable of meeting customer expectations. Lawrence (2011) established that, burdensome customs procedures may also further hinder the seamless fulfilment of a cross border e-commerce transaction.

4.4 Political and governmental barriers

Lawrence and Usman (2010) found that, political and government policies may pose some significant challenges to e-commerce adoption in developing countries. He established that, active government intention in marketplace and monetary policy is the best method of ensuring country’s growth and political stability. Government initiatives are important in the adoption of e-commerce, information technology and other communications in general. Government initiative can be in terms of promotion of ICT usage, education and the establishment of adequate regulatory framework for e-commerce (Kshetri and Dholekia, 2002). ISPs are a key area where government policy can make a difference in access and adoption of e-commerce (Uzoka et al., 2007). It is very important for public policy makers in developing countries to ensure an open and competitive telecommunication markets that offer a range of interoperable technological options and network services (Oyelaran and Adeya, 2004).

In addition, political conditions had been an issue hindering e-commerce adoption in developing countries and most researches focus on global problems of modern society, socio-political development, social dynamics, structure and stratification of the society (Kshetri, 2008). Ogunsola and Aboyade (2005) found that the removal of tax and deregulation of tariff on telecommunication systems may increase the flow of information and an expanded use of ICT usage. Lawrence (2011) suggested that, the commitment and participation from the government in the provision of internet service and the reduction of customs duties on imports may lead to lower costs and make equipment more affordable and encourage connection to the internet. This study attempts to examine whether any of the four factors; government support and policy, socio-economic condition, socio-cultural condition and technology infrastructure hinders adoption of e-commerce in Nigeria and to investigate which of the four factors contribute most and least to e-commerce adoption in Nigeria.

5 Research methodology

Malhotra et al. (2007) opine that population of a study is the aggregate of all the elements that share some common set of characteristics. The target population adopted in this study is 191 Nigerian postgraduate students at Universiti Teknologi Malaysia, Skudai campus. The population is appropriate for two reasons, e-commerce studies show high internet literacy among these young and educated population and being overseas, this segment of population is familiar with online transactions particularly online banking. This study adopted a convenience sampling method due to inadequate population detailing. Convenience sample is used when the units that are selected for inclusion in the sample are the easiest to access. Filliben (2012) and Sheridan et al. (2006) indicated that numerous studies considered 50 to 100 subjects to be the minimum acceptable sample size when conducting multiple linear regression. Similarly, Bexley (2007) suggested 100 as adequate sample size. Dhungana et al. (2006) suggested that one can also determine sample size by using the rules of thumb in statistics (i.e., 20 subjects per
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variable). This study proposed the rule of thumb that specifies 20 subjects per variable, leading to 140 respondents in the study. Survey approach was considered the most appropriate for this study. The method was adopted because it was an inexpensive and efficient means of gathering information from the targeted population (Zikmund, 2009). Also targeted population for this study was mainly students; therefore to solicit for time for interview with these categories of respondents it is practically impossible due to their schedule of studies.

Section A consists of questions to collect information on demographic background of the respondents. Section B covers the four factors hindering e-commerce adoption among Nigerians using five-point Likert scale options (1 = strongly disagree to 5 = strongly agree) to measure all the factors. A pilot test was conducted prior to the final questionnaire distribution. The objective of the pilot test was to test on the clarity of the questions, examine the reliability and the validity of the instrument. The pilot test was conducted at Universiti Teknologi Malaysia. This is to take advantage of available access to the target sample. The pilot study involves ten Nigerian postgraduate students. The students were requested to complete the questionnaire. They were then asked to evaluate the questionnaire and comment regarding the general clarity of the questions. In general, the entire students felt that the questions were clear and easy to understand. However, they were slightly concerned about the income earned as it was in US dollar expression. The average time to complete the questionnaire was between 10 to 15 minutes and there were no comments on the completion time. Based on this feedback no changes were made to the questionnaire. The survey was then pre-tested on 30 Nigerian postgraduate students at UTM. The purpose of the pre-test was to examine the reliability of the instrument. The ten Nigerian postgraduate students who had participated in the pilot test were excluded from taking part in this pre-test survey. The internal consistency of the responses from the 30 students was investigated using SPSS 16.0 for windows. The Cronbach’s alpha coefficients for all constructs were greater than 0.70, indicating that the instrument was reliable. Table 1 shows the Cronbach’s alpha coefficient results.

Table 1  Cronbach’s alpha coefficient results

<table>
<thead>
<tr>
<th>Measurement</th>
<th>No of items</th>
<th>Cronbach's alpha</th>
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</thead>
<tbody>
<tr>
<td>1  Government policy and support</td>
<td>6</td>
<td>0.759</td>
</tr>
<tr>
<td>2  Socio-economic condition</td>
<td>6</td>
<td>0.762</td>
</tr>
<tr>
<td>3  Socio-cultural condition</td>
<td>5</td>
<td>0.734</td>
</tr>
<tr>
<td>4  Infrastructural technology</td>
<td>4</td>
<td>0.714</td>
</tr>
<tr>
<td>5  E-commerce adoption</td>
<td>5</td>
<td>0.851</td>
</tr>
</tbody>
</table>

Factor analysis is a statistical method used to describe variability among the observed (Steiger, 2007). In this study, factor analysis was used to seek a linear combination of variables such that the maximum variance is extracted from the variables. It then removes this variance and seeks a second linear combination which explains the maximum proportion of the remaining variance. This study used Kaiser and variance criterion to determine the number of factors loading and to determine appropriate range of solutions to investigate. The Kaiser is the default in SPSS to determine factor loading and factors affecting other variables of the research. Multiple regressions were used to analyse the
data and help to answer the research questions. Multiple regressions help to summarise the nature of the relationship between variables and for making predictions of likely values of the dependent variable (Hair et al., 2012). Tinsley (1987) affirmed that multiple regression technique allows discovering those independent variables or factors that contributed most to the explanation of the variance of a dependent variable. This study conducted a factor analysis and multiple regression analysis in order to identify the independent variables that best explain e-commerce adoption among Nigerians.

6 Findings

Data screening and transformation are useful in making sure that the data have been correctly entered and the distributions of data fulfilled the statistical assumptions (Greenland, 2009). Missing data, a total of 150 questionnaires were distributed for this study. 143 questionnaires of 150 were returned, indicating 95.3% response rate. Three responses were excluded for missing value because the respondents did not answer 70% of the questions. Therefore, 140 responses were used for statistical analysis. Assessing data normality is an important consideration when using multiple regressions. There are a number of ways to explore this assumption graphically. These include using histogram, stem and leaf plot, box plot, and normal probability plot (Burdenski, 2000). This study chose histogram and normal probability plot to assess the normality of the data over other box plot and stem and leaf plot statistical techniques. Histogram and the normal probabilities are graphical representation showing a visual impression of the distribution of data, estimates probability distribution and both are suitable for a large set of data. The normal probabilities are plotted against a theoretical normal distribution in such a way that the points are formed around the straight line. Departures from this straight line indicate departures from normality are shown in Figure 1.

Skewness and kurtosis refer to the shape of the distribution. Positive values for skewness indicate a positive skew, while positive values for kurtosis indicate a distribution that is peaked. Negative values for skewness indicate negative skew, while negative values for kurtosis indicate a distribution that is flatter (Sheridan et al., 2006). There is no definite way of interpreting skewness and kurtosis; most literature argued that they are arbitrary answers (Wilkinson, 1999). One way of determining if the degree of skewness ‘significantly’ skewed is to compare the numerical value for skewness with twice the standard error of the skewness and include the range from minus twice the standard error of skewness (Kleinbaum et al., 2007).

If the value for skewness falls within this range, the skewness is considered not seriously violated (Kleinbaum et al., 2007), the standard error of skewness is 0.205 and the skewness statistic is –0.415. Therefore, 2 × 0.205 = 0.410, this result indicates normal because 0.415 falls within the range of 0.410. Similar procedure is used to determine the appropriateness of the kurtosis, (standard error of kurtosis is 0.407 and the kurtosis statistic is –0.824, thus 2 × 0.407 = 0.814). Table 2 shows the results of skewness and kurtosis for the variables.

An outlier is an observation that lies in an abnormal distance from other values in a random sample from a population (Wu and Zhang, 2003). The authors posit that outliers is a data point that emanates from a different model than do the rest of the data. Extreme
cases have considerable impact on the regression solution and were deleted or modified to reduce their influence on the screening. Hair et al. (2012) define outliers as cases displaying unreasonable characteristics and which are distinctively different from the rest in the dataset.

This study examined outliers through the scatter plot graph which reported identifiable patterns of responses and in turn, indicated a relatively normal distribution. Figure 2 scatterplot of regression standardised residual for the dependent variable shows that there is no outstanding values (outliers) shown in the plot.

Figure 1  Histogram and normal P-P plot of regression standardised residual (see online version for colours)

Notes: *Predictors: (constant) socio economic, socio cultural (MySC) infrastructural technology (MyTI), government policy (MyGP)
*Dependent variable: intention to ecommerce (MyINTO)
Scale: 1 = strongly disagree, 5 = strongly agree
<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Minimum Statistic</th>
<th>Maximum Statistic</th>
<th>Mean Statistic</th>
<th>Std. deviation Statistic</th>
<th>Skewness Statistic</th>
<th>Std. error</th>
<th>Kurtosis Statistic</th>
<th>Std. error</th>
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<tr>
<td>MyGP</td>
<td>140</td>
<td>1.00</td>
<td>5.00</td>
<td>3.0786</td>
<td>1.42166</td>
<td>–.415</td>
<td>.205</td>
<td>–.824</td>
<td>.407</td>
</tr>
<tr>
<td>MySC</td>
<td>140</td>
<td>1.00</td>
<td>5.00</td>
<td>2.2586</td>
<td>1.34827</td>
<td>.392</td>
<td>.205</td>
<td>–.815</td>
<td>.407</td>
</tr>
<tr>
<td>MyTI</td>
<td>140</td>
<td>1.00</td>
<td>4.80</td>
<td>2.2757</td>
<td>1.18588</td>
<td>.429</td>
<td>.205</td>
<td>–.809</td>
<td>.407</td>
</tr>
<tr>
<td>MyINTO</td>
<td>140</td>
<td>1.00</td>
<td>5.00</td>
<td>3.8700</td>
<td>.98153</td>
<td>–1.717</td>
<td>.205</td>
<td>2.045</td>
<td>.407</td>
</tr>
<tr>
<td>MySE</td>
<td>140</td>
<td>1.00</td>
<td>5.00</td>
<td>2.7300</td>
<td>1.46399</td>
<td>.428</td>
<td>.205</td>
<td>–.838</td>
<td>.407</td>
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<tr>
<td>Valid N</td>
<td>140</td>
<td></td>
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Factor analysis was used to determine if the number of factors and the loadings of measured (indicator) variables on them conform to what is expected on the basis of pre-established theory as stated earlier. Factor loading should be 0.7 or higher to confirm that independent variables identified a priori are represented by a particular factor. Correlation matrix, factor extraction and rotation are used as an exploratory technique to summarise the structure of a set of variables, to test the reliability of the construct, and serve as additional means of determining the appropriateness of the factor analytic model. KMO and Bartlett’s test of sphericity was run to determine if items are tapping into the same construct and to test the reliability of the construct. Components matrix, KMO and Bartlett’s test sphericity are significant as reported in Table 3 which explains the Kaiser-Meyer-Olkin measure of sampling adequacy greater than 0.6 and acceptable for further analysis. An examination of factor loading identified items that did not load as expected, and was removed from further analysis following Hair et al. (1998). This study removed item 6 and item 12 with indicator reliability below 0.7 because they influence output of the model.

Table 3  
KMO and component matrix KMO and Bartlett’s test

<table>
<thead>
<tr>
<th></th>
<th>Kaiser-Meyer-Olkin measure of sampling adequacy</th>
<th>Bartlett’s test of sphericity</th>
<th>Df</th>
<th>Sig.</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>.874</td>
<td>Approx. chi-square</td>
<td>5.373E3</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Df</td>
<td>376</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sig.</td>
<td>.000</td>
<td></td>
</tr>
</tbody>
</table>

The result in Table 4 shows the demographic profile of the respondents. 99.3% of the respondents were males while less than 1% was female (0.7%). Their age range from 18 to 40 above, 35.7% of the respondents were above 40 years of age. 35% were in the age bracket of 36 to 40, 27.1% were between the age of 31–35 and less than 3% respectively were between the age of 18–25 and age of 26–30. This result shows that
more than 70% of the respondents were above 35 years of age. One of the reasons that could be adduced to this age distributional pattern is the fact that most Nigerian students came here for either their PhD or Masters’ degree after working for some years. Hence, they are matured students. In terms of their level of study, 72.9% were PhD researchers while 27.1% were Masters’ degree students. The low number of females in the sample is based on the fact that very few females go for their post graduate studies after the completion of their first degree especially when it involves studying abroad due to marital reasons.

Table 4  Demographic profile (n = 140)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>139</td>
<td>99.3</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>1</td>
<td>0.7</td>
</tr>
<tr>
<td>Age</td>
<td>18-25</td>
<td>1</td>
<td>0.7</td>
</tr>
<tr>
<td></td>
<td>26-30</td>
<td>2</td>
<td>1.4</td>
</tr>
<tr>
<td></td>
<td>31-35</td>
<td>38</td>
<td>27.1</td>
</tr>
<tr>
<td></td>
<td>36-40</td>
<td>49</td>
<td>35.0</td>
</tr>
<tr>
<td></td>
<td>Above 40</td>
<td>50</td>
<td>35.7</td>
</tr>
<tr>
<td>Class</td>
<td>Master</td>
<td>38</td>
<td>27.1</td>
</tr>
<tr>
<td></td>
<td>PhD</td>
<td>102</td>
<td>72.9</td>
</tr>
</tbody>
</table>

Figure 3 shows that out of 140 respondents, 46% earned above $900 per month, 23.7% earned between $600 to $900 per month, 23.7% earned between $301 to $600 per month, 4.3% earned between $241 to $300 per month and 2.2% of the respondents earned between $181 to $240 per month. As could be seen from the income distribution pattern, majority (70%) earned more than $600 monthly. The results also below showed that all the respondents (100%) understood what e-commerce and knew of e-commerce existence in Nigeria.

Figure 3  Monthly income (US-$) of respondents (see online version for colours)

Multiple regressions were performed after the measures of sampling adequacy which reveals that all our measures of sampling adequacy are well above acceptable. The independent variables are the mean scores of lack of government policies (MyGP), poor socio-economic condition (MySE), unsupportive socio-cultural factors (MySC) and poor technology infrastructural factors (MyTI), and the dependent variable was e-commerce adoption (MyINTO). The regression analysis as reported in Table 5, explained that there is a significant relationship between e-commerce adoption and lack of government policies and support, poor socio-economic conditions, poor socio-cultural factors and poor technology infrastructural factors. These variables explained 50.1% of the variability in e-commerce adoption $F (4,135) = 33.932, p \leq 0.05$. The result suggests that
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three out of four factors that were used in this study to an extent hinder e-commerce adoption among Nigerians. As indicated in Table 5, regression coefficient table reported poor technology infrastructural factors ($\beta = 0.576$, $p \leq 0.001$) contributed most among the four factors that hinders e-commerce adoption among Nigerians, followed by socio-economic condition ($\beta = 0.480$, $p \leq 0.001$) and government policies and support ($\beta = 0.337$, $p \leq 0.002$).

Table 5  Model summary for multiple regressions

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R square</th>
<th>Adjusted R square</th>
<th>Std. error of the estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.708*</td>
<td>.501</td>
<td>.487</td>
<td>.70331</td>
</tr>
</tbody>
</table>

ANOVA

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of squares</th>
<th>Df</th>
<th>Mean square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>67.137</td>
<td>4</td>
<td>16.784</td>
<td>33.932</td>
<td>.000a</td>
</tr>
<tr>
<td>Residual</td>
<td>66.777</td>
<td>135</td>
<td>.495</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>133.914</td>
<td>139</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Regression coefficient

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardised coefficients</th>
<th>Standardised coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. error</td>
</tr>
<tr>
<td>(Constant)</td>
<td>1.101</td>
<td>.257</td>
</tr>
<tr>
<td>MyGP</td>
<td>.233</td>
<td>.075</td>
</tr>
<tr>
<td>MySC</td>
<td>.039</td>
<td>.052</td>
</tr>
<tr>
<td>MyTI</td>
<td>.477</td>
<td>.061</td>
</tr>
</tbody>
</table>

Notes: *Predictors: (constant), MySE, MySC, MyTI, MyGP

Dependent variable: MyINTO

7  Discussions

7.1 Hypothesis 1: lack of government support and policy hinders e-commerce adoption among Nigerians

The regression results in Table 6 found lack of government policies and support ($\beta = 0.576$, $p < 0.0001$) to have a significant hindrance on e-commerce adoption among Nigerians. This finding is consistent with other studies in technology adoption (Lawrence and Usman, 2010; Mutula and Brakel, 2006; Efendioglu and Yip, 2004; Kshetri, 2002; Oxley and Yeung, 2001). The result shows that government policies and supports are very important in e-commerce adoption and on other information communication technology in general. The federal government of Nigeria should be more responsive and visible in the global internet policy issues undertakings, and facilitating investment benefit for the country (Oguntunde, 2012). The recent deregulation policy on national telecommunication of Nigeria should uplift the face of ICT in the country, through easy communication within and across the countries. Though internet connectivity has improved, cost still remains an issue (Paul, 2012). Also, the ongoing deregulation of National Power Holding Company of Nigeria, a public enterprise in charge of electricity power supply will play a large role in e-commerce adoption. These policies are hopeful.
towards solving the problem of inadequate electricity supply hindering e-commerce adoption in Nigeria. Government could also improve e-commerce adoption by promoting information communication technology usage and reduce custom duty and tax imposed on telecommunication equipments, to reduce the high telephone cost and increase internet subscription. In addition, deregulation policies should encourage foreign investors who would help in much needed foreign capital to develop the communication industries.

Table 6  Regression coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardised coefficients</th>
<th>Standardised coefficients</th>
<th>T</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>MyGP</td>
<td>.233</td>
<td>.075</td>
<td>.337</td>
<td>3.110</td>
</tr>
<tr>
<td>MySC</td>
<td>.039</td>
<td>.052</td>
<td>.054</td>
<td>.754</td>
</tr>
<tr>
<td>MyTI</td>
<td>.477</td>
<td>.061</td>
<td>.576</td>
<td>7.759</td>
</tr>
<tr>
<td>MySE</td>
<td>.322</td>
<td>.077</td>
<td>.480</td>
<td>4.182</td>
</tr>
</tbody>
</table>

Notes: Dependent variable: MyINTO
Predictors: (constant), MySE, MySC, MyTI,

7.2 Hypothesis 2: poor socio-economic condition hinders e-commerce adoption among Nigerians

The results supports the second hypothesis that socio-economic condition (β = 0.480, p < 0.05) has a significant contribution on e-commerce adoption. The results support previous studies on the influence of socio-economic factors on e-commerce adoption (Siyal et al., 2006; Ling, 2001; Lawrence and Usman, 2010) and supported Al-Ghaith (2010) on factors influencing the adoption and usage of online services. Poor economic situation is among the most pressing factors hindering e-commerce adoption in developing countries (Lawrence and Usman, 2010). Nigeria is a country known with the greatest development potentials in Africa, given the immensity of her resources and rich human resource legacy is still among the poorest countries of the world (Aniekan, 2011). With multiple economic difficulties, couple with recent global economic meltdown, the country is unable to raise the standard of living of it citizens to an appreciable level. Thus poor economic situation in both absolute and relative terms constitutes one to the most serious problems confronting Nigeria. The dimension of the poor economic situation includes unemployment, large number of low income salary earners, socio-political exclusion and insecurity (Adejuwon and Tijani, 2012). The payment system hinders the appreciation of the e-commerce adoption as they perceived insufficient security, authentication, difficulties in obtaining credit card and other illegal actions such as credible payment channels hinders the adoption of e-commerce.

Levi and Burrows (2008) stated that in case of fraud, the credit card holder bears the loss and not the issuer. Akintola and Akinyede (2011) found that current payment system in Nigeria is one of the characteristics of socio-economic condition hindering e-commerce adoption. Studies currently found that intention to obtain credit card in Nigeria is highly difficult and discouraging users, considering the requirement and the protocols, among the requirement to obtain a credit card include: current account, and to open a current account entails rigorous protocols such as guarantor letter from who had being operating current account at least for one year, drivers license/international
passport which requirements money and the process is very cumbersome. However, after obtaining the current account and the credit card, a $25 charges for (ID token security pins) to enable complete online transaction, when the national minimum wage was $48, apart from token charges there are other charges for operating current account such as standing order charges, transfer charges, check charges, etc. (Awodele and Onuiri, 2012). Also banks providing efficient online transactions services are numbered and this gives room for monopoly of the services. In conclusion, since it is a general phenomenon that the poor economic situation of Nigeria needs to be improved, this study suggested that provision of employment and effective implementation of national minimum wage policy might influence the willingness e-commerce adoption among the Nigerians.

7.3 Hypothesis 3: socio-cultural factors hinder e-commerce adoption

The results of this study shows that ($\beta = 0.480, p < 0.452$), social cultural factors does not hinder electronic adoption. This is consistent with the findings of Martinson’s (2008) theory and evidence which found that institutional factors such as socio-cultural factors are not significant to factor hindering adoption of technology. English Language proficiency is one of the socio-cultural factors investigated as a hindrance to e-commerce adoption and was seen insignificant to this study. Although Lawrence and Tar (2010) barriers to e-commerce in developing countries argued that, English language is an important characteristic of socio-cultural factors that hinder e-commerce adoption both in terms of access to information and to the internet. In addition English is a primary language used in many Western countries where new technology originates; it is the predominant language for the development of IT and e-commerce. Thus, why poor socio-cultural factors was insignificant to this study could be attributed to the fact that the general acceptable language in Nigeria is the English language, therefore factors such as language might not hinder e-commerce adoption. Thus, English seem not to be a factor hindering e-commerce adoption among Nigerians. In order to improve the level of technology adoption in Nigeria, this study suggests that Nigerians should lay more emphasis on IT education from elementary to university level.

This study also indicated that online transactions are hindered by other factors and not by transactional trust among Nigerians alone, this could be a result of newly developed systems that offers payment system guarantees, one that insures the delivery of goods and services sold to Nigerian credit card holder on the internet, also some Nigerian financial institutions has fraud prevention controls that enable Nigerians to buy and sell securely on the internet, and provide confidence, increase the level of transactional trust of online trading. Although, socio-cultural factors were found insignificant to the study, thus this study suggested they should simply improve on how to reduce operational risks by implementing internal control schemes, this control could be contacting the credit card holder in other to confirm the transaction through phone call and private email before transaction can be fully completed.

7.4 Hypothesis 4: poor technology infrastructure factors hinder e-commerce adoption among Nigerians

Finally, the results ($\beta = 0.576, p < 0.05$) of this study supported hypothesis 4, that poor technology infrastructure factors hinder e-commerce adoption and is the most contributing predictor among the other factors hindering e-commerce adoption as
proposed in this study. This study shows that poor telecommunication network hinders e-commerce adoption among Nigerians. The internet connection in Nigeria is unreliable due to poor telephone service and erratic power supply. Telecommunication infrastructures are required to connect various region and parties within the country and across the countries (Lawrence, 2011). In Nigeria, telecommunication infrastructure is not evenly distributed to all regions of the country, access to internet and electricity supply in most urban parts of the country are fairly distributed while the rural parts of the country are poorly distributed. More than 60% of Nigerians, about 100 million people, have no access to electricity. And half of Nigerians live in rural communities, where four in five households go without power (Margaret and Zheng, 2011).

In addition to the effect of poor telecommunication infrastructures, Adomi (2005) study of internet development and connectivity in Nigeria, argued that unfashionable and unreliable telephone connection in Nigeria results in narrow bandwidths offered by many ISPs, with consequent low connections, thus uneven telecommunication infrastructure in the country leads to concentration of technology in urban part of the country, which makes the involvement of rural users more complicated. Likewise the high cost of computer couple with internet access charge hinders e-commerce adoption among Nigerians. Combination of these costs and high fee charged by internet service providers contributed to depression of internet connectivity and taking part in e-commerce. The Figure 4 shows the representation of the final standard model, which includes the standardised coefficients. Overall, the results indicated that the model provides a good understanding of factors hindering e-commerce adoption among Nigerians.

Figure 4  The final model

Notes: Standard coefficient beta. Sig. at p < 0.005.

8 Conclusions

As the e-commerce paradigm in business transactions shifts from developed countries such as Britain, USA, Japan and Canada to developing nations, the findings of this study contributes to limited study on e-commerce in developing countries and relevant to future research in e-commerce and related fields. Also, priority consideration to improve e-commerce adoption focused on technology infrastructure and solutions to poor electricity supply. The study provides a yardstick for provision of best devices/appropriate strategies, suitable policy and infrastructures to assist Nigerian businesses and consumers in their transactions via e-commerce. The respondents cut
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across the six geopolitical zones of Nigeria strengthening generalisation of the findings, although with high values of male respondents. Future research should look towards population sample drawn from commerce-oriented individuals and e-commerce adoption in other developing countries. The results identified and investigated factors in e-commerce adoption namely: lack of government policies and support, socio-economic factors, infrastructural factors is significant to this study. Depicting the challenges in terms of government policies and supports, socio-economic situations and technology infrastructure in place mostly centred cost effect. Provision of technology infrastructures and IT education at primary levels of education will encourage e-commerce adoption irrespective of the current limitations with limited existing infrastructures, poor economic situation and poor socio-cultural conditions.

References


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