

An Integrated Model of the Factors Influencing the Adoption and Extent of Use of E-Payment Systems by SMEs in Nigeria

*Dr Patrick Ohunmah Igudia

Department of Business Administration, Ambrose Alli University, Ekpoma – Nigeria

Abstract

This paper investigates the factors influencing the adoption and extent of use of e-payment systems by SMEs in Nigeria. The paper develops an integrated model following a comprehensive review of literature in IS/IT adoption and diffusion in organisations. The paper used primary data culled from a survey conducted in Lagos state of Nigeria in 2012 for a PhD thesis. 239 SMEs were involved. Results of the logistic regression analysis show that three technology attributes (perceived benefits, perceived trust and perceived security), one organisation factor (firm IT infrastructure), one environmental factor (favourable government support policy), and two individual characteristics factors (IT knowledge and educational level) facilitated EPS adoption by SMEs in Nigeria. Furthermore, perceived complexity and age inhibited e-payment systems adoption by SMEs in Nigeria. With regard to the extent of use, perceived benefits, age, and perceived trust facilitated volume of use while perceived complexity and age influenced the breadth of use.

Keywords: E-payment adoption, e-payment in Nigeria, IT/IS adoption by SMEs

1. Introduction

The era of monetary exchange for goods and services started after the elimination of trade by barter (Sadeghi and Schneider, 2001). In barter, goods exchanged for goods directly. Ever since then, money and other forms of abstract media such as bank notes, payment orders, cheques and credit cards, over time have gradually been accepted as an abstract value for goods and services to facilitate exchange. The long list of exchange media has included in the most recent history the electronic payment systems (EPS).

Electronic payment system (EPS) refers to the transaction of goods and services using electronic payment means such as computer networks, the internet, and digital systems to transfer money electronically or digitally between two parties (Wyllie et al., 2010:5). The recent EPS phenomenon was occasioned by the advent of technological revolution in trade and commerce. The brick and mortar payment techniques by banks (Ovia, 2002) in offering financial products and services to their customers have indeed changed. The previously used cash and cheque payment instruments by customers are thus either slowly but steadily being replaced in developing countries or completely overtaken by e-platforms in developed countries irrespective of the nature, distance, time, and place of business. Large and small organisations in developed economies like US, UK, Japan, Europe, and the emerging BRIC economies (Brazil, Russia, India and China) have over the years extensively and successfully increased the use of EPS to improve their participation in global trade and business activities (Akintola et al., 2011). However, the same cannot be said about many developing countries especially in sub-Saharan Africa such as Nigeria. It is even more so with SMEs in the sub-Saharan African countries. Literature indicates that SMEs in these countries are reluctant in adopting and using new technologies in general and EPS in particular.

There are several reasons why SMEs in developing countries are reluctant to adopt and use the EPS despite its acclaimed importance. Some of such reasons include the high cost of acquiring telecommunication facilities (like computers, mobile phones, Internet subscription, etc.) and inadequate national infrastructure (such as lack of stable power supply and irregular and very slow internet services). Others include lack of perceived safety and security of money and payment information, high level of illiteracy, lack of adequate technical

extant laws on s in Nigeria are slow to adopting the EPS notwithstanding the fact that in recent past, there has been an improvement in the rate of adoption. Literature reveals that SMEs in Nigeria are slowly but steadily adopting the cards payments (Tooki, 2006), mobile phone payments (Jimoh, 2013), and ATM payments (Adeoti, 2011) even in the face of some reputation crises involving identity theft scourge with which the country has been associated.

Without a doubt, EPS is important to the growth of economies as it helps to perform the monetary function, financial stabilisation function and the overall economic management function. Aside these three functions, EPS also facilitates trade (Sumanjeet, 2009) through e-commerce and e-business transactions, and makes payments very convenient, fast and easy (Winn, 2003, Ozkan, 2010). Despite its importance, empirical research stream relating to EPS in developing countries has been nothing but scanty (Kahn and Roberds, 2009; Gerdes and Walton, 2002). It is quite obvious from the literature review that the subject has not been sufficiently addressed to expose its importance to the understanding of the developing countries (Ifinedo, 2011). Hence, the importance of secure and efficient EPS to economic growth and development has so far not yet been given

adequate attention and not sufficiently understood. Also, literature reveals that despite some amount of research work on EPS, majority of which are in developed countries, little is known about what factors influence the extent of EPS usage both in developed and developing countries. Therefore, this paper attempts to fill these gaps by examining the factors influencing the adoption and extent of use of EPS by SMEs in Nigeria. This paper poses the following three research questions to accomplish the research objectives.

1. What are the major factors influencing the adoption of EPS by SMEs in Nigeria?
2. What are the major factors influencing the extent of use of EPS by SMEs in Nigeria?

This paper is divided into five sections as follows. Section 2 provides a brief literature review, develops an integrated framework and specifies a set of research hypotheses to be tested. Section 3 describes the research methodology. In section 4, hypotheses are tested and analysed with discussion and section 5 concludes.

2. Theoretical Background

Based on the diffusion of innovation (DOI) model by Rogers (1995) and the technology-organisation-environment (T-O-E) framework by Tornatzky and Fleischer (1990), this study proposed an integrated conceptual model for e-payment systems adoption by SMEs as illustrated in figure 2. The integrated conceptual model suggests fourteen predictors for e-payment adoption and extent of use within a four-contextual SME as seen especially in developing countries. DOI ascribes the intention to adopt technology to five attributes of such technology (perceived complexity, perceived benefits, perceived compatibility, perceived trialability and perceived observability). Conversely, TOE postulates that three contexts (technological, organisational and environmental contexts) determine organisational adoption of technology.

2.1. Theory of Diffusion of Innovation (DOI)

Rogers propounded the DOI theory in 1962 based on the work of Gabriel Tharde in 1890. Since then, DOI theory has found huge support from several innovation researchers in predicting the how, why and at what rate innovation is adopted and diffused through social systems (Nwankwo and Eze, 2013). Rogers (1995) defines innovation as the process of inventing/introducing something new. The term innovation includes new products/services, new process technologies, or new organisational structures or administrative systems (Moore and Benbasat, 1991). Innovation brings about changes in the organisation either in response to changes in the external environment or as a proactive action to influence the environment (Lertwongsatien et al., 2004). It is a way of doing something new not necessarily as a new phenomenon in terms of time of invention or discovery (Thong, 1999).

Rogers (1995) argued that the speed of innovation diffusion depends on five innovation attributes – relative advantage, compatibility, complexity, trialability, and observability. DOI has been criticised on the ground that it presents innovation diffusion as a very straight forward and easy process. The argument is that innovation diffusion within different classes of social groups cannot be as simplistic as presented in DOI and that the complex nature of diffusion processes within different groups or actors of adoption requires different patterns of communications and relationships especially in a complex context such as the organisation (Aleke et al., 2011; Fichman, 1999; Downs and Mohr, 1976).

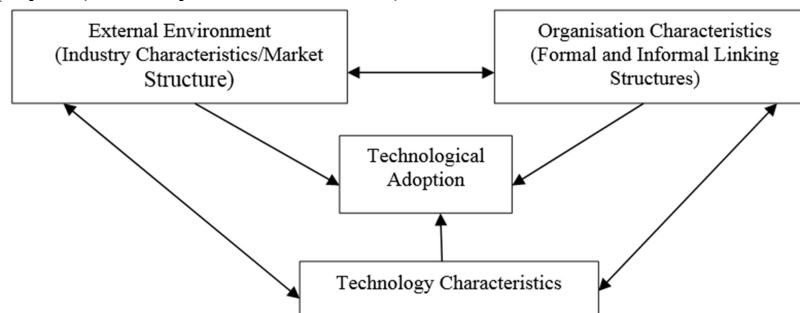
But despite the criticisms, DOI has been widely used to examine the adoption of various IT/IS innovations ranging from Website (Beatty et al, 2001) to spreadsheets (Brancheau and Wetherbe, 1990), and from e-commerce activities (Li et al, 2011; Wu and Wang, 2005; Teo and Pok, 2003; Rashid and Al-Qirim, 2001) to e-payment systems (Nwankwo and Eze, 2013; Ifinedo, 2011; Ayo and Ukpere, 2010; Gholami et al, 2010; He et al, 2006) either at individual level (Agarwal and Prasad, 1997; Premkumar et al, 1994; Leonard-Barton and Deschamps, 1988) or at organisational level (He et al, 2006; Kwon and Zmud, 1987). Some of the attributes have been found to impact adoption behaviours much stronger than others, and in some cases the findings are inconsistent (Jeyaraj et al., 2006; Fichman, 1992; Tornatzky and Klein, 1982). For example, Tornatzky and Klein (1982) in a meta-analysis of 78 innovation studies found that three of the five innovation characteristics – compatibility, relative advantage and complexity – were relatively more consistently related to innovation adoption than observability and trialability. Also, in a meta-analysis of 135 innovation studies, Jeyaraj et al (2006) found that only 15 out of 24 studies found relative advantage to be a predictor. Inconsistent results were also found for complexity (9 out of 18 studies), compatibility (10 out of 18), observability (4 out of 6) and trialability (1 out of 2). Jeyaraj et al (2006) also reveal that some of the innovation characteristics are more investigated by researchers than others, the least investigated being trialability. These inconsistencies are attributable to several reasons including the context of research, interest of the researcher and type of innovation itself (Jeyaraj et al, 2006). As a result, there have been suggestions that future researchers should either modify the model or integrate it with others as intended by this present paper.

2.2. Technological-Organizational-Environmental (TOE) Framework

Based on researchers' constant questioning of the validity of the applicability of DOI model to organisational

adoption (Attewell, 1992; Brancheau and Wetherbe, 1990), other models such as the technology-organisation-environment framework began to spring up. It led to calls by researchers for more rigorous empirical studies to develop a unifying theory of innovation adoption to improve the predictive capacity of DOI that could be used to predict organisational level innovation adoption. Several researchers including Zmud (1982), Tornatzky and Fleischer (1990), and Fichman and Kemerer (1993) then began to incorporate distinctive characteristics of contexts in the development of what could be called “strong theory” (Thong, 1999) to study innovation adoption at the organization level. Thus, new perspectives like individual (CEO) characteristics (Premkumar et al, 1994; Venkatesh et al, 2003; Fichman, 2004), characteristics of the organisational leadership (Kimberly and Evanisko, 1981) and organisational and environmental characteristics (Tornatzky and Fleischer, 1990; Thong and Yap, 1995; Thong, 1999) were integrated with the original Rogers’ classical innovation characteristics to overcome some of the observed limitations.

In particular, Tornatzky and Fleischer (1990) thus developed the Technology-Organization-Environment (T-O-E) framework to study IT innovation adoption by organisations (Kok et al, 2011). T-O-E framework (see figure 1) is premised on the argument that the willingness of a firm to adopt a technological innovation is determined by three contexts of the organization namely: technological context, organizational context, and environmental context (Tornatzky and Fleischer, 1990). The internal and external technologies within the technological context are defined by both equipment and processes that are relevant to the firm (Zhu et al, 2003). The organizational context is defined in terms of the characteristics and resources of the firm which include size, the level of centralisation, depth of formalisation, configuration of its managerial hierarchy, structure of the human resources, amount of available loose (slack) resources internal to it, and internal linkages amongst its employees (Tornatzky and Fleischer, 1990).



Source: Adapted from Tornatzky and Fleischer (1990)

Figure 1: **Technology-Organization-Environment (T-O-E) Framework**

The environmental context is about the composition of the firm’s operating milieu which is essentially external, and it includes the size and structure of the industry, its competitors, the macroeconomic context, and the regulatory environment which involves government legislations (Tornatzky and Fleischer, 1990). According to Tornatzky and Fleischer (1990), the three elements present both constraints and opportunities for technological innovation adoption by a firm. Literature shows that TOE has been widely used and variously validated by several researchers for the adoption of IT in both developed and developing countries. However, the TOE framework has been criticised for not having a unified construct within the three organisational contexts as they have been found to almost always differ from one study to another. There is hardly any single factor that has been tested consistently by innovation researchers. It would seem that the identification of factors to be included using the TOE framework depends largely on the specificity of the innovation studied (Kok et al, 2011).

2.3. Integrated Model and Hypotheses Specification

Literature revealed that most of the success stories about either DOI or TOE model relate mostly to organisations in developed countries as most of the early streams of research using either DOI and TOE were in and for developed countries (see for example, Gibbs and Kraemer, 2004; Zhu et al, 2003; Scupola, 2003; Tornatzky and Fleischer, 1990). A large number of researchers have integrated TOE with other theoretical frameworks (see Kok et al, 2011; Ifinedo, 2011; Gholami et al, 2010; Gibbs and Kraemer, 2004; Thong, 1999). In particular, Chwelos et. al. (2001) modified TOE to test the intention to adopt EDI using perception-based model among purchasing managers in Canadian firms and confirmed that the framework was useful. Also, Zhu et al. (2003) modified the TOE framework to examine the determinants of e-business adoption intent in some selected European countries. Evidence from literature indicates that the original TOE had been integrated with other frameworks because, on its own, the TOE may not provide the needed solution for the phenomena under study (Alzougool and Kurnia, 2008). Therefore, given that this study is about innovation adoption at organisational level, and given examples of the successful application of such integrated models for developed countries, this researcher modifies the

integrated model developed by Thongs (1999) to examine the factors influencing e-payment systems adoption and use among SMEs in Nigeria, a developing country. With this, the study thus responds to the call by researchers to develop an integrated model/framework that will offer a stronger predictive power of technology adoption and usage.

Thong (1999) integrated the TOE with DOI to investigate the adoption of information systems in Singaporean small businesses and found the integrated model useful. Therefore, this study has adapted the very model with some modifications to fit our context. The adaptation and modification of the integrated TOE model by Thong (1999) is not by accident. Thong (1999) developed an organisation with four contexts: technology-organisation-environmental-CEO's characteristics as against the original T-O-E framework developed by Tornatzky and Fleischer (1990) in examining IS/IT adoption in small businesses in Singapore. In the conceptual framework, Thong (1999) identified the decision-makers characteristics separate from the organisational context based on the work of Kimberly and Evanisko (1981). The choice and examination of the CEO's characteristics as predictors were based on the fact that in small firms, the CEO who usually is the owner and/or manager is also the decision maker. Thong argued that the characteristics of the CEO are crucial in determining the innovative attitude of small businesses since the CEO's abilities and inclinations, and the extent to which he is prepared to devolve management functions greatly determine the rate of change that occurs in small firms. He further argued that such great influence compares with the influence wielded by financial resources, firm size, and market forces in the adoption decision of small business. For this reason he suggested that the attributes of the CEO/owner of a small firm should be separate from the other factors within the internal resources of the organisation leading to the upgrading of an SME's structural framework from three as specified in the original TOE to four contexts.

The task of this paper therefore, is to extend the application of the theory and framework to a developing country – Nigeria – to enrich knowledge and contribute to the on-going debate on IS/IT innovation adoption and diffusion in general and EPS in particular in a developing country.

2.3.1. Model Development

Although literature has shown that there is no uniformity in factors influencing technology innovation adoption and usage because of the differences in innovations and adoption contexts (Thong, 1999), nonetheless, some of the factors found to influence innovation adoption and diffusion in some contexts may also likely be efficacious in other contexts such as SMEs in Nigeria.

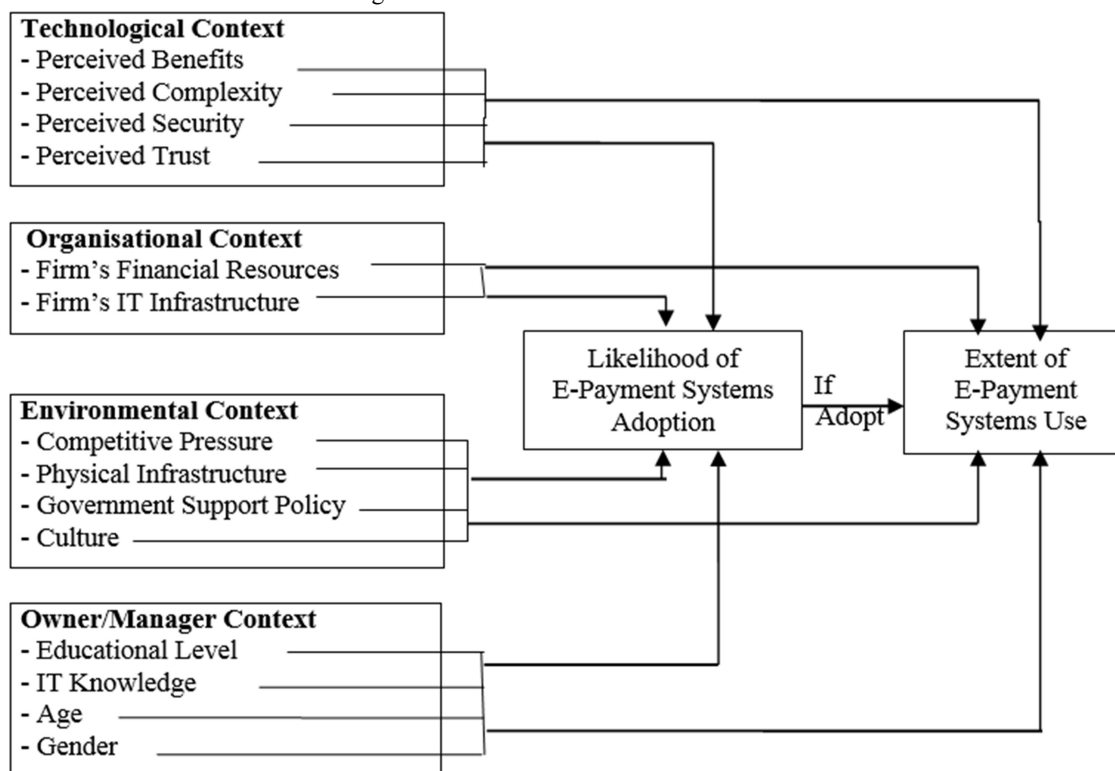


Figure 2: Research Framework

2.3.2. Hypotheses Specification

Technological Context

Within the technological context, Rogers (1995) demonstrates that innovation is adopted and diffused much quicker due to five perceived embedded attributes of the technology being adopted. For our context, the most frequently reported predictors of adoption of financial innovation include perceived benefits, perceived complexity, perceived trust and perceived security (see Kim et al, 2010; Looi, 2005; Chau and Tam, 2001; Iacovou et al, 1995).

Perceived benefits refer to the anticipated rewards of adopting an innovation (Seyal et al, 2007; Lertwongsatien and Wongpinunwatana, 2003). They depict the likely returns on investment in innovation (Chwelos et al, 2001). Since adoption costs money, a rational adopter would only invest in an innovation that would either help the organisation to resolve some existing problems or provide new business opportunities (Beatty et al, 2001). Hence it is argued that the higher the perceived benefits, the more willing the investor is prepared to allocate resources needed to adopt (Lertwongsatien and Wongpinunwatana, 2003) and use it more. Such benefits in this case may include reduction of costs of printing and producing payment vouchers, ledgers, and all paper works and bills posting (Ozkan, 2009) by an SME; increase in labour savings arising from employment of fewer hands; and shorter order cycle for the needs of the firm (Iacovou et al, 1995). Perceived benefits would also include convenience of payment (Ozkan, 2009; Puri, 1997), speed in payment methods (Smith, 1998) as payment is activated at the click of the mouse (Ozkan, 2009), the elimination of risks associated with handling cash (World Bank, 1994), and greater scope of business transactions including competitive powers (Kuan and Chau, 2001; Iacovou et al, 1995). Specifically, Gibbs and Kraemer (2004), Seyal et al (2004), Kuan and Chau (2001), and Lertwongsatien et al (2004) have found that perceived benefits positively influence IT innovation adoption in organisations.

Relying on the reported findings of previous studies indicating positive relationships between perceived benefits and adoption of technological innovations (Zhu et al, 2006; Gibbs and Kraemer, 2004; Seyal et al, 2004; Kuan and Chau, 2001; Lertwongsatien et al, 2004; Thong, 1999, we hypothesise that:

H_{1a}: The perceived benefits of e-payment systems innovation are positively related to its adoption by SMEs in Nigeria.

H_{1b}: The perceived benefits of e-payment systems innovation are positively related to extent of use by SMEs in Nigeria.

Complexity is the “degree to which an innovation is relatively difficult to understand and use” (Rogers, 2003: 257). The longer it takes to understand and operate an object, the more complex the object is said to be (Rogers, 1995). The more complex a technology is, the less certain is its adoption (Premkumar and Roberts, 1999). Hence, the relationship between adoption and complexity is negative (Rogers, 2003). Several IS/IT research streams have found that complexity impacts IT innovation adoption (see for example Cooper and Zmud, 1990; Premkumar and Roberts, 1999; He et al, 2006; Tan et al, 2009). E-payment technology belongs to the group of communication technologies which use standards and protocols with multiplicity of hardware and software all of which makes its implementation in organisations complex (Premkumar and Roberts, 1999). Research has shown that firms are more reluctant to adopt a technological innovation that requires new skills that are higher than what its current employees possess (Beatty et al, 2001). Extant studies on the impact of complexity on e-payment systems adoption reveal mixed findings which tend to suggest that it is context dependent. For example, while it was found that the less the perceived complexity the higher the adoption of e-payment systems among Korean consumers (Kim et al, 2010) and Vietnamese and Taiwanese consumers (Lin and Nguyen, 2011), complexity had no such impact on e-payment adoption in Nigerian small firms (Ifinedo, 2011), Chinese organisations (He et al, 2006) and Canadian consumers and merchants (Plouffe et al, 2001). This therefore demands the need to further investigate the impact of complexity on e-payment systems adoption by SMEs in Nigeria. Studies (Lin and Nguyen, 2011 for e-payment system in Taiwan and Vietnam and Ayo et al, 2010 for e-banking in Nigeria) found that ease of use (which stands for non-complex) is positively related to the extent of use of technological innovation. However, Thong (1999) found no relationship between complexity and the extent of adoption of IOS technology among Singaporean small businesses. In this present study, we propose that complexity would have negative impact on both the adoption and extent of use of e-payment systems. Resulting from the foregoing empirical studies, the author hypothesises that:

H_{2a}: Perceived complexity of e-payment systems is negatively associated with its adoption by SMEs in Nigeria.

H_{2b}: Perceived complexity of e-payment systems is negatively associated with its extent of use by SMEs in Nigeria.

Security refers to the degree to which an object is protected from an unauthorised access (Chiemeke and Ewwiekpaefe, 2011). With regard to e-payment systems, perceived security can be described as consumer’s sub-conscious opinion that the use of e-payment systems may or may not be safe (Linck et al, 2006). It means the subjective evaluation that the user’s online payments will not be accessed, altered, or stolen by unauthorised persons (Olusegun, 2006). There are a number of studies on the security concern of online payment systems and how it influences e-payment systems adoption. Security has been found to be the single most important predictor

of e-payment systems adoption (Wai-Ching et al, 2009; Kurnia and Benjamin, 2007; Mukherjeet and Nath, 2003) and has thus attracted considerable research attention (Abrazhevich, 2004) hence it has been included as a separate factor in this study. Harris et al (2011) found positive relationship between perceived security and e-payment systems adoption among Malaysian firms. This positive relationship was confirmed by Kim et al (2009) among Korean consumers. Ayo and Okpere (2010) found security to significantly influence the adoption of single ATM card among consumers in Nigeria. Perceived security has also been confirmed to influence the extent of usage of a technology by a firm (Kim et al, 2010). In separate studies, Harris et al (2011) and Kim et al (2010) found that the higher the associated perceived security of the future use, the higher the extent of usage of e-payment systems. Kim and Lee (2008) and Lee and Kim (2007) also found a positive relationship between perceived security and the extent of use of EDI and Internet-based information systems (IIS) respectively in Korea. Following the results of prior empirical studies, this study hypothesises that:

H_{3a}: Perceived security is positively related to the adoption of e-payment systems technology by SMEs in Nigeria.

H_{3b}: Perceived security is positively related to the extent of e-payment systems usage by SMEs in Nigeria.

The concepts of trust and perceived trust have increasingly been analysed in literature interchangeably. While some researchers see it simply as trust (Hanzaee and Alinejad, 2012; Ozkan, 2009; Lim et al, 2007), others embed it within perceived security (Harris et al, 2011; Chung and Kwon, 2009; Kim et al. (2009; Mallat, 2007). Yet, some others examine it from the perspective of specific contexts. For example, technology trust (Pavlou, 2002), trust in business partners (Pavlou, 2002), and for the purpose of e-payment and e-commerce transactions, trust in the payment channels (Pavlou, 2002). Whether trust or perceived trust, it is a kind of believe-based terminology (Mayer et al., 1995) expressing expected confidence held by someone in something or in another person hence Buttner and Goritz (2008) refer to trust as perceived trustworthiness. Trust concerns a set of beliefs of the person trusting (trustor) about certain qualities the person being trusted (trustee) either possesses or lacks (Mayer, et al, 1995). These beliefs according to Buttner and Goritz (2008) are cognitive evaluations that result from what Fishbein and Ajzen (1975) referred to as attribution processes. Trust naturally develops over time by repeated interactions. Trust can also emerge from a first encounter between buyer and seller or between customer and company. In this case, trust becomes a perception that is based on customers' first impression of a seller or company as in the case of e-commerce payment system over the internet.

Perceived trust can be defined as the level of confidence exhibited by a potential adopter of e-payment system that his/her money and/or personal information will not be used by someone else in such a manner as to adversely affect his/her personal interest (Ozkan, 2009). Even if the systems in use were to be imperfect, perceived trust can reduce all doubts and improve the belief and confidence of the potential adopter that e-payment technology vendors, the banks and switching companies including the card producers (companies) will not misuse their personal information (Ozkan, 2009). For a first time encounter in e-payment systems adoption by an SME, perceived trust would mean the anticipated level of confidence of a potential SME adopter and/or user in the various e-payment channels that will not compromise the interest of the SME via an unwholesome manipulation of the firms' money and vital information by someone else as to adversely affect the SME. It also concerns the anticipated level of confidence that the payment channels in use, the trading partner, e-payment technology vendors including the gamut of other independent bodies along the transaction chain, and customers will show ability, integrity, and benevolence in the course of conducting online transactions and using e-payment systems.

Literature shows that lack of perceived trust is one of the three most significant areas impeding success in the implementation of e-payment systems globally (Harris et al, 2011) or adopt online transactions (Lim et al, 2007; Dekleva, 2000; Hanzaee and Alinejad, 2012). Trust is vital in e/m-commerce (Juan et al, 2009; Buttner and Goritz, 2008; Mallat, 2007; Lim et. al., 2007; Chau and Poon, 2003) because it involves spatial interaction between buyers and sellers in which the buyer's vital personal information including telephone and credit/debit card numbers are required by the seller (Grabner-Krauter and Kaluscha, 2003). In view of these findings, it is postulated that:

H_{4a}: Perceived trust is positively related to the adoption of e-payment systems by SMEs in Nigeria.

H_{4b}: Perceived trust is positively related to the extent of use of e-payment systems by SMEs in Nigeria.

Organizational Factors

Several organisation adoption studies have examined the influence of organisational factors on innovation adoption (Ramdani and Kawalek, 2007). Among factors investigated and found to strongly impact the adoption of technological innovation in organisations are organisational readiness factors which include: internal technical infrastructure, human infrastructure (Ramdani and Kawalek, 2007; Lee, 2004; Thong and Yap, 1995) and financial resources (Kuan and Chau, 2001; Iacovou et al, 1995). Organisational readiness in this study refers to firm's financial resources, and firm's IT infrastructure. Financial resources and firm IT infrastructure represent

some of the core organisational resources found by prior studies (see Iacovou et al, 1995; Chang et al, 2005; Molla and Likert, 2005; Looi, 2005) to have strong impact on the adoption and extent of use of technological innovations by organisations.

H_{5a}: Financial resources of an SME are positively related to the adoption of e-payment systems.

H_{5b}: Financial resources of an SME are positively related to the extent of use of e-payment systems.

H_{6a}: Firm's IT infrastructure is positively associated with the adoption of e-payment systems innovation by SMEs in Nigeria.

H_{6b}: Firm's IT infrastructure is positively associated with the extent of use of e-payment systems innovation by SMEs in Nigeria.

Environmental Context

External organisational environment can be seen as the milieu in which an organisation conducts its business (Zhu et al, 2002; Chau and Tam, 1997). The ability of any organisation to adopt and implement a technology-based innovation in its operations is dependent upon the needs and dictates of its environment (Awa et al, 2010; Grover and Goslar, 1993) which is usually in a continuous flux. Organisational environment can be either internal or external. In this study, we focus exclusively on the external environment. The external organisational environment consists of many factors that either positively or negatively influence the operations of firms (Sophonthummapharn, 2008) but which are outside the immediate and long term control of the firms. The environmental factors present constraints and opportunities for technological innovations (Chau and Tam, 1997). External environmental factors according to Lefebvre and Lefebvre (1996) exist at three levels, namely, industry, macroeconomic, and national policy level. Dholakia and Kshetri (2004) in their study identified infrastructure and business related factors and competition related factors as part of the external environmental factors in US SMEs. Dess and Beard (1984) investigated three external environmental factors in their study. These are: business costs (i.e. the costs of doing business), labour availability, and competitive hostility among businesses in Singapore. They found all three factors to be good predictors of IT innovation adoption. Chooprayoon (2007) and some other writers identified competitive pressures (Crum, Premkumar and Ramamurthy, 1996; Iacovou, et al. 1995), government rules and regulations, readiness of suppliers for electronic business; adoption of e-commerce technology by business partners, continually increasing availability of online access by the population in both urban and rural areas as factors influencing e-commerce adoption.

Other external environments also identified in literature include competitors, government policies, legislations/legal instruments, national culture of a country, economic, and the physical national infrastructure among others. All these external environments whether individually and collectively influence the organizations (Aldrich, 1979). To be able to face and overcome the complex and rapidly changing external environments, it will seem reasonable for organisations to adopt an IT innovation (Pfeffer and Leblebici, 1977). Given its impact on organisational success, there is need for a greater understanding of the interplay between the external environment and organisational capabilities. Ward et al, (1995) posit that the fit between the external environment and organisational capabilities and resources is very germane because the external environment is the source of several organisational unforeseen challenges, which in consequence, require proactive, continuous and consistent managerial attention and strategies to overcome. External environment influences how resources are obtained by the organization.

Literature demonstrates that external environmental factors in general support growth of organizations within it (Ward et al, 1995). In their study, Dholakia and Kshetri (2004) for example, found national infrastructure and some business related factors such as business environment to positively influence the level of involvement of firms in the Internet e-commerce adoption. They also found competition-related factors such as customer-service as a determinant of both adoption and implementation of e-commerce while environmental monitoring was found to influence adoption only. There are also several extant IT studies that have examined the impact of other types of environmental factors on the adoption of IT innovation by organisations (see Macharia and Nyakwende, 2009; Galliano and Roux, 2008; Bayo-Moriones and Lera-Lopez, 2007; Forman, 2005; Zhu and Kraemer, 2005; Zhu et al, 2002; Galliano et al, 2001).

Erumban and DeJong (2006) critically examined the effect of culture on ICT adoption. The finding demonstrated that the national culture and the ICT adoption rate of a country are closely related. Some prominent researchers on the effects of national culture (Srite and Elena Karahanna, 2006; Straub, 2004; Hofstede, 2001, Veiga et al, 2001, etc) also found some aspects of culture to positively impact the decision to adopt and implement IT innovation. Uncertainty avoidance for example has been found to play a significant role in determining how groups potentially adopt and diffuse information and communications technologies. The logic of the streams of studies on national culture is that those whose cultures do not permit the adoption and use of IT innovations uncertainty will be less likely to adopt and use new technologies. Following these overwhelming results, it is suspected that Nigeria's national culture which is very diverse including religious persuasions could influence the adoption of e-payment systems in Nigeria.

Another external environmental factor chosen for this study is government intervention. Research shows that government intervention promotes IT innovation including e-commerce (Irefin et al, 2012) and Internet technological innovation (Seyal et al 2004). Tan et al (2007) argued that enabling government policies, such as trade and telecommunications liberalization, will likely have the biggest impact on the adoption of e-Commerce. Government policies have been found to make ICT and Internet access more affordable, as well as increase pressure on businesses to adopt e-Commerce as a tool for competition (Gibbs et al, 2003). Governments can provide guidance on policy making, financial investment, infrastructure development, education, human resources development, market transforming and service improvement with the intention to promote adoption of a chosen or preferred technology (Wang, 2001). Favourable policies, laws and regulations for the governing of telecommunication, Internet services, power supply, electronic information and other service areas that help to provide the technical platform for IT innovations such as e-payments can be at the instant of a willing and interested government.

National IT infrastructure was another external environmental factor chosen for this study following an overwhelming literature support which indicates that national IT infrastructure influences IT innovation in organisations and particularly the SMEs. Arreymbi, et al. (2008) in their study submitted that lack of adequate IT infrastructure was part of the reasons why there is a slow uptake of ICT in SMEs in Cameroon as an emerging economy. Irefin, et al, (2012) and Kapurubandara and Lawson (2006) separately found national infrastructure as positively determining the adoption and usage of IT (e-commerce) in Nigeria and developing countries respectively.

In a study of the adoption of telecommunications technologies among U.S. organizations, Grover and Goslar (1993) found significant relationships between environmental characteristics such as competitive pressure and IT adoption. Literature reveals that among the external environmental factors, competitive pressure, national physical infrastructure (mainly electricity supply and internet connectivity which are peculiar to developing countries), governmental policy and culture are the most examined. These factors also seem to be very interesting to developing countries such as Nigeria. Thus, this paper examines the effect of competitive pressure, national physical infrastructure, government policy and culture on the adoption of e-payment systems among SMEs in Nigeria to determine if the results found for the developed countries will apply to Nigeria and e-payment systems among SMEs. Given these evidence, we postulate as follows:

H_{7a}: Competitive pressure will positively influence the adoption of e-payment systems by SMEs in Nigeria.

H_{7b}: Competitive pressure will positively influence the adoption and extent of use of e-payment systems by SMEs in Nigeria.

H_{8a}: Adequate physical infrastructure supply is positively associated with the adoption of e-payment systems by SMEs in Nigeria.

H_{8b}: Adequate physical infrastructure supply is positively associated with the extent of use of e-payment systems by SMEs in Nigeria.

H_{9a}: Government Policy will influence the adoption of e-payment systems by SMEs in Nigeria.

H_{9b}: Government Policy will influence the extent of use of e-payment systems by SMEs in Nigeria.

H_{10a}: Culture will influence the adoption of e-payment systems by SMEs in Nigeria.

H_{10b}: Culture will influence the extent of use of e-payment systems by SMEs in Nigeria.

Owner/Manager's Context

In SMEs, the role of the owner/manager cannot be overemphasised. In an SME, the owner is usually the manager (Thong, 1999). He/she is the entrepreneur and takes decisions for the firm which may also include a decision on innovation adoption (Thong and Yap, 1995). Studies indicate that owners/managers of SMEs influence the adoption behaviour of the firm as they often define institutional norms and values (Chatterjee et al, 2002). To date, there is just a handful of systematic empirical research that has explored the owner/manager's influence of organisational level adoption (Thong, 1999; Barker and Mueller, 2002). Studies have found positive association between certain CEO's characteristics and IT adoption. Generally, owner/manager characteristics examined most in prior studies include age, gender, education, ethnicity, IT knowledge, experience, skills (see Carpenter et al, 2004; Barker and Mueller, 2002; Rajagopalan and Datta, 1996; Thong, 1999; Thong and Yap, 1995; Palvia and Palvia, 1994; Hambrick and Manson, 1984). In specific terms, some of the owner/manager's characteristics found in literature to have positively influenced IT innovation adoption include *inter alia*: CEO's innovativeness and CEO's IT knowledge (Thong, 1999); owner's educational level (Kimberly and Evanisko (1981); owner's age, ethnic background, and personal Internet experience (Weltevreden and Boschma, 2008). The argument is that an innovative owner/manager would explore ways to leverage on technologies for the benefits of his/her firm (Chatterjee et al, 2002). The perception of an owner/manager is influenced by his/her characteristics (Barker and Mueller, 2002). As established by Brenner et al (1988), sex has significant effect on the importance of intrinsic outcomes. They found in their study that women in managerial roles/positions within their current organisation place more importance on the content and challenges of their jobs and on the degree of

recognition provided for good job performance than did their men counterparts. Thus, women owners and men owners are expected to adopt and use the e-payment systems differently in Nigeria. Hence, there is need to understand how the aforementioned characteristics of the owner/manager would influence his/her IT adoption and usage behaviour.

Age, gender, educational level and IT knowledge have all been found to show very strong predictive powers of various IT innovation adoption (see Barker and Mueller, 2002; Rajagopalan and Datta, 1996; Kimberly and Evanisko, 1981). Palvia and Palvia (1999) in their study presented business owner-related characteristics such as age, gender, ethnicity, education and computing/internet skills that can influence Internet adoption in SMEs. Education, for instance, is perceived in management literature as an indicator of owner/manager's broad cognitive orientations towards the adoption and use of a technology. For example, the education of an owner/manager is assumed to enable such an owner to rationally determine the importance of a piece of technology to his/her organisation (Rajagopalan and Datta, 1996). Also, the level of education will enable an owner/manager to rationally determine which of an Internet-based technology such as e-payment systems, e-business and e-commerce to adopt and use, and how much such a technology can assist the functioning of his/her organisation. On the other hand, IT knowledge concerns the degree to which an owner/manager is acquainted with a technology (Hambrick and Manson, 1984). This speaks to the degree of familiarity that the owner/manager has had with the technology. It is suspected that the more acquainted the adopter, the more likely it is that the technology will be adopted and used. Sequel to these arguments from literature, four hypotheses will be developed concerning how the four factors might influence the owners/managers of SMEs in the adoption and extent of use of e-payment technology in Nigeria.

H_{11a}: Educational level of the owner/manager will be positively associated with the adoption of e-payment systems by SMEs in Nigeria.

H_{11b}: Educational level of the owner/manager will be positively associated with the extent of use of e-payment systems by SMEs in Nigeria.

H_{12a}: Owner/manager's IT knowledge will positively influence the adoption of e-payment systems by SMEs in Nigeria.

H_{12b}: Owner/manager's IT knowledge will positively influence the extent of use of e-payment systems by SMEs in Nigeria.

H_{13a}: Owner/manager's age will inversely influence the adoption of e-payment systems by SMEs in Nigeria.

H_{13b}: Owner/manager's age will inversely influence the extent of use of e-payment systems by SMEs in Nigeria.

H_{14a}: Owner/manager's gender will influence the adoption of e-payment systems by SMEs in Nigeria.

H_{14b}: Owner/manager's gender will influence the extent of use of e-payment systems by SMEs in Nigeria.

3.0. Research Methodology

3.1. Operationalisation and Measurement of Variables

To operationalise the variables identified in the theoretical framework, the researcher adapted multi-item standard instruments found in existing technology studies (see appendix 1). All independent variables except four – owner/manager educational level, age, gender and firm's financial resources – were measured with 5-point Likert scales ranging from 1 (strongly disagree) to 5 (strongly agree). A 5-point Likert scale was used in this study to measure the perceptions of managers/owners about the e-payment technology in relation to their businesses before adopting and using the technology *vis-a-vis* five selected perception options. Following Barker and Mueller (2002), owner/manager educational level was measured on a 5 point scale ranging from no education to PhD. Modifying Ifinedo (2011), Xiaolin et al (2011) and Zhu et al (2006), firm financial resources were measured by the annual turnover (in Nigeria naira) of each SME. Age ranged from 21 years to above 60 years categorised into five age groups while gender was binary (either male or female).

Consistent with existing literature on organisational adoption, adoption was measured as a binary variable to determine adopter SMEs and non-adopter SMEs (see Kuan and Chau, 2001; Thong, 1999; Chau and Tam, 1997; Thong and Yap, 1995). Following Thong (1999) and Chau and Tam (1997), an adopter SME is one which has either incorporated the e-payment technology in its operations or has plan to do so within the next one year.

3.2 Data Collection Process

The population from which the sample was drawn contained 1,344 SMEs in a database developed by the Pan-African University in conjunction with the International Finance Corporation (IFC) – a member of the World Bank Group, IBM and Lagos Business School. The database which was last updated in 2012 has firm names,

addresses, phone numbers, emails, websites, location and business type. Lagos state was chosen because it is the commercial capital and most populated city in Nigeria (Ifinedo, 2011; Eze, 2007). It contributes 20% of the country's GDP and also generates 59% of the non-oil revenue for the country (Ayo, 2010, Gbolami et al, 2010). The city is host to about 60% of the nation's SMEs (NBS, 2011). We focused on the SMEs in Lagos state alone also because, as at the time of data collection, the implementation of the cashless policy was being implemented only in Lagos state while the rest of the country was yet to commence implementation. This study used the two largest and interrelated sectors: the service and wholesale/retail distribution sectors both of which aggregately contain 996 (86.53.47%) out of the total officially registered SMEs in Lagos State.

3.3. Choosing a Sample Size

Using the proportionate stratified sampling technique, the study selected 309 SMEs as the sample size while the actual picking of the individual SMEs from the sample frame was by simple random sample giving every SME equal opportunity to be selected (Field, 2005). Questionnaire was developed based on the research framework and literature review and targeted at owners and/or managers of the 309 SMEs. It has three main sections. Section 1 captured detailed profile of the respondents and the firms. Section 2 was on the extent to which the SMEs had used e-payment technology, in particular the number of channels adopted and the use of these channels in relation to routine transactions. Section 3 relates to the perception of owners and/or managers on the factors influencing the adoption or lack of adoption of e-payment by the respondents.

Prior to the main survey, the questionnaire went through several stages of pretesting to improve its design: a process consistent with literature that data collection instrument should never be administered without an adequate pre-testing of the questionnaire (Churchill, 2001) because such data collection instrument needs to undergo some fine-tuning with series of tests (Dillman, 2000). This process of refining the questionnaire also served to validate the instrument used for our fieldwork and ensure content validity too (Vogt, 2007). The fine-tuning of the questionnaire for this study was done in three stages: (1) inputs from some Nigerian academics in Nigeria and Canada. (2) Pretesting with some PhD students in Business Administration in a Nigerian University and (3) Piloting with owners or managers of SMEs in Nigeria from the database the outcome of which was not included in the final analysis. Having effected all the corrections and adjustments, a clearer, comprehensive and acceptable version of the questionnaire was finally ready to be administered. Overall, piloting helped to refine the framework, detect questions that were initially ambiguous, poorly constructed and ordered.

This study employed the drop-off and call-back approach (Webster, 1997; Lovelock et al., 1996) to administer the questionnaires. The strategy was intended to reduce the possible low response rate associated with other forms of questionnaire delivery channels like email and postage (Armstrong and Overton, 1977; Filion, 1976; Lovelock et al, 1976). The tactic was chosen because email and postage surveys are not advisable for reasons of apathy on the part of respondents to fill questionnaires for persons unknown to them. There are also the issues of lack of adequate internet services (Gholami et al, 2010) and access to computers, significant privacy and security concerns (Conway and Thomas, 2003), as well as confusion as to the real intention of the survey as respondents often have difficulty to distinguish between research and commercial surveys (Schonlau et al., 2002). Hand delivery was thus chosen. Existing studies show that hand-delivery strategy has been successfully used in similar surveys in Nigeria in the past (See Ifinedo, 2012; Ayo; 2010; Gholamu et al, 2010 Ayo and Ukpere, 2008), and that it is the most effective strategy in research where high response rate is desired (Spike, 2007).

All 309 questionnaires were successfully administered. A copy of a letter of introduction was attached to each questionnaire meant for each of the participating SMEs informing them of the objectives of the study and soliciting their cooperation. The letter also assured participants of the utmost confidentiality of any information they might volunteer in the course of the survey. Attached was also a consent form.

3.4. Validation of Survey Data – Reliability and Validity Analyses

Some important tests were conducted to determine the reliability and validity of our measurement scales. Cronbach coefficient Alpha (α) was used to test the internal consistency (reliability) while construct validity (convergent and discriminant) tests were conducted to test validity. Reliability refers to the degree to which a variable is consistent in measuring what it is intended to measure (Hair et al 2006) such that it is capable of yielding stable results (Peter, 1979). Cronbach's coefficient alpha is the index of the internal consistency of multiple-item measures of a construct (Cortina, 1993).

Factor/Construct	Initial Number of Items	Number of Items (After Items Deletions)	Initial Cronbach's Alpha	Cronbach's Alpha (After Items Deletions)
Perceived Complexity	5	5	0.866	0.866
Perceived Benefit	5	4	0.736	0.821
Perceived Trust	5	4	0.831	0.833

Perceived Security	5	5	0.817	0.817
Firm's IT Infrastructure	6	5	0.784	0.801
Government Policy	5	4	0.806	0.869
Competitive Pressure	3	2	0.804	0.910
Physical Infrastructure	7	5	0.761	0.784
National Culture	5	5	0.739	0.739

Table 1: Summary of the Final Cronbach Alpha Reliability test Results

Table 1 reveals that the Cronbach alpha coefficients for all the constructs were higher than 0.7 recommended by several researchers at different times (see for example Peterson, 1994; Murphy and Davidshofer, 1988; Kaplan and Saccuzzo, 1982; Nunnally, 1978, 1967; Davis, 1964). With the reported results of the present tests for the current study, we are confident that the measurement items have high internal consistency and so, can now proceed to determine the construct validity of measures using principal component (factor) analysis technique.

3.5. Test of Construct Validity Using Principal Component (Factor) Analysis

Apart from ensuring that variables or items are reliable, there is also the need to ensure that it is valid, meaning, it measures what it is intended to measure. There are two ways of demonstrating this – convergent and discriminant validity tests. Convergent validity establishes the extent to which items that measure the same factor cluster highly well-together with one another (Kuan and Chau, 2001; Chau and Tam, 1997). Discriminant validity, on the other hand, is demonstrated if an item correlates more highly with items intended to measure the same factor than with items used to measure a different factor (Kuan and Chau, 2001; Chau and Tam, 1997; Kerlinger, 1986; Churchill, 1979). The correlation matrix showed a preponderance of correlation coefficients of 0.3 and above (table 2). The KMO's MSA value was 0.791, which exceeded the recommended cut-off value of 0.50 (Nunnally, 1967) and the Bartlett's Test of Sphericity was statistically significant at $p = 0.0001$ ($p < 0.05$). Eleven components whose eigenvalues either equaled or exceeded 1 were extracted using both latent root (eigenvalue) and scree plot criteria (figure 3). The nine-component solution explained a total of 70.089%.

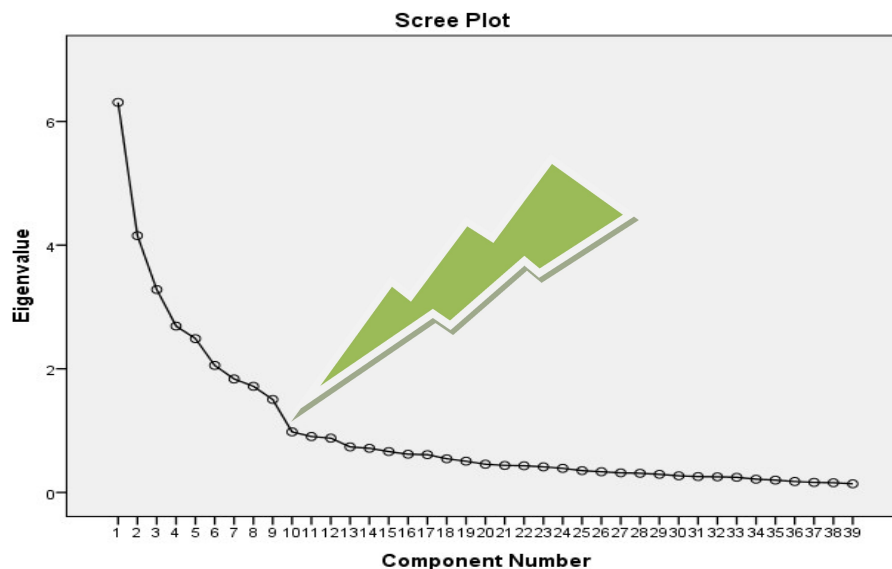


Figure 3: The Scree Plot Criterion for Factor Extraction

The varimax orthogonal rotation technique conducted showed the presence of simple structure with all variables loading substantially on only one each of the nine components (table 2). With the high loadings, both convergent and discriminant validities of the measurement scales were achieved. The convergent validity was demonstrated with items loading very highly on their associated factors. Discriminant validity was also achieved with the items loading stronger on their associated factors (with which they had theoretical relationships) than on factors with which they do not have any theoretical relationship (Kuan and Chau, 2001).

	Component									
	Perceived Complexity	Government Support Policy	Perceived Benefits	Perceived Trust	Firm's IT Infrastructure	Physical Infrastructure	Perceived Security	Culture	Competitive Pressure	
PerCpxty2	.805									
PerCpxty1	.792									
PerCpxty5	.780									
PerCpxty3	.750									
PerCpxty4	.738									
GovtPoly2		.903								
GovtPoly1		.827								
GovtPoly3		.803								
GovtPoly4		.731								
PerBen2			.788							
PerBen3			.740							
PerBen4			.723							
PerBen5			.693							
PerTrst1				.891						
PerTrst2				.747						
PerTrst3				.658						
PerTrst5				.583						
FITInfra2					.856					
FITInfra3					.826					
FITInfra1					.637					
FITInfra5					.614					
PhyInfra4						.841				
PhyInfra3						.749				
PhyInfra5						.735				
PhyInfra6						.639				
PerSety1							.859			
PerSety2							.844			
PerSety3							.798			
NatCult2								.881		
NatCult3								.797		
NatCult1								.745		
ComPre2										.893
ComPre1										.891

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 6 iterations.

Table 2: Rotated Component Matrix Using the Varimax Orthogonal Rotation Method

3.6. Representativeness of the Sample

To ensure representativeness of the sample, we used the stratified sampling technique. The study also satisfied the rule of thumb regarding the selection of a sample size based on the number of explanatory variables in the study (Brace et al, 2003). The rule of thumb suggests that any sample size as many as between five times (5) and twenty (20) times the number of explanatory variables is sufficient. The distribution pattern was another step taken to ensure representativeness of the sample. Using a systematic replacement method in which participants, who, for one reason or the other, could not be reached, were replaced with another respondent from the same stratum. This was a deliberate measure to ensure that the sample was neither depleted nor skewed. Above all, the researcher also performed a common method bias check employing the Harman's single-factor test (see Aulakh and Gencturk, 2000; Organ and Greene, 1981; Sriesheim, 1979 for details) to determine whether or not the data collected through survey had any errors attributable to the measurement methods adopted in the data collection process rather than to the constructs the measures represent (Podsakoff et al, 2003).

Bias

Factors	Eigenvalues	Extraction Sums of Squared Loadings	
		% of Variance	Cumulative %
1	8.538	18.562	18.562
2	4.125	8.968	27.530
3	2.961	6.437	33.967
4	2.493	5.419	39.386
5	2.323	5.051	44.436
6	2.086	4.534	48.970
7	1.955	4.250	53.221
8	1.768	3.844	57.065
9	1.488	3.234	60.299
10	1.277	2.777	63.075
11	1.166	2.535	65.610
12	1.153	2.507	68.118
13	1.044	2.269	70.386

Table 3: Harman’s Single-Factor Test of Common Method

The results as shown in table 3 indicate that out of the 46 variables, 13 factors had eigenvalues ≥ 1 . A total of 70.39% of the covariances was recorded for the 13 factor solution out of which no single factor contributed majority of the covariance ($\geq 50\%$) thus, indicating that there is no evidence of the presence of a common method bias capable of affecting the outcome of the study.

The results of the logistic regression were checked for multicollinearity by checking for the variance inflation factor (VIF) and tolerance of the predictor variables in the model (Menard, 1995). Results (see table 4) show that all tolerance values are far greater than 0.1 ranging from 0.825 to 0.993 and all VIF values are far below 10 ranging from 1.007 to 1.212. These results are indications that the model is free from any multicollinearity problems.

Model	Collinearity Statistics	
	Tolerance	VIF
Owner/Manager’s Age	.887	1.127
Owner/Manager’s Gender	.872	1.147
Owner/Manager Educational Level	.949	1.054
Owner/Manager’s IT Knowledge	.881	1.136
Firm’s Financial Resources	.825	1.212
Perceived Complexity	.879	1.137
Government Policy	.964	1.037
Perceived Benefits	.906	1.104
Perceived Trust	.952	1.050
Firm’s IT Infrastructure	.936	1.068
Physical Infrastructure	.990	1.010
Perceived Security	.993	1.007
Culture	.957	1.045
Competitive Pressure	.958	1.044

a. Dependent Variable: Adoption Status

Table 4: Results of Multicollinearity Test

4. Data analysis

Logistic regression was the statistical package used to test fourteen hypotheses formulated in section 3 relating to the adoption and another fourteen relating to the extent of e-payment systems usage. Based on the constructs, research question one: “*What are the major factors influencing e-payment systems adoption among SMEs in Nigeria?*” was tested using the binary logistic regression. Using the same set of variables, research question two: “*What major factors influence the extent of e-payment systems use among SMEs in Nigeria?*” was also tested using the multinomial logistic regression. This second research question was addressed from two angles: breadth and volume of use in separate sections.

The logistic regression, a multivariate statistical technique, was the appropriate statistical technique chosen to analyse the data over multiple regression and discriminant analytical methods because this study deals with a dependent variable (adoption) that is dichotomous (adopters and non-adopters) and that also deals with two different dependent variables (breadth and volume of use) which individually has been broken into three categories (low/narrow, moderate/medium and extensive/wide) consistent with the works of previous researchers such as Zhu et al. (2003), Kuan and Chau (2001), Thong (1999), Chau and Tam (1997). With the said nature of dependent variables, it will be difficult to use the multiple regression technique without violating some of the

vital assumptions of multiple regression such as the normality distribution assumption for hypothesis testing as some of the data in this study are not normally distributed as well as containing categorical and a combination of both interval ratios and categorical. Also, although discriminant analytical technique could be used when the dependent variable is categorical as in this study, discriminant technique requires that all the independent variables must be interval scale (Hair et al, 2006; Agresti, 1996). Since the study's independent variables are a mixture of both interval scale and categorical variables, the logistic regression technique appears to be more robust for this study as it tends to have more options for controlling equation-building than discriminant technique. Researchers agree that even when the assumptions in discriminant technique are all met, the logistic regression still performs more robustly (Hair et al, 2006; Kuan and Chau, 2001; Thong, 1999; Chau and Tam, 1997).

4.2. Results of Hypotheses Testing

Table 5 shows the results of the estimated Logit model on the full sample. The result of the full model containing all fourteen predictors against the result of the model containing constant-only was statistically significant at χ^2 (14, N = 239) = 230.174, $p < 0.0001$. This is an indication that the overall model significantly differentiated adopting-SMEs from non-adopting SMEs (Tabachnick and Fidell, 2013; Zhu et al, 2006; Chau and Tam, 1997). Hosmer and Lemeshow statistic was 51.503 with p-value of 0.782 indicating that the proposed model is not significantly different from a perfect model that can correctly classify observations into discrete groups (Zhu et al, 2003; Chau and Tam, 1997). The model as a whole explained between 61.8% (Cox & Snell R-Square) and 89.3% (Nagelkerke R-Square) of the variance in e-payment systems adoption status.

The full model also correctly and impressively classified 89.4% of non-adopters and 98.8% of adopters for an overall success rate of 96.2% of all cases which is better than the 72.4% initial classification achieved by constant-only model. On the other hand, since there are 173 adopters and 66 non-adopters, the random guess classification accuracy would have been $[(173/239)^2 + (66/239)^2] = 60.02\%$. In conclusion, the Logit full model classification has greater discriminating power than the other two methods.

The results supported hypotheses 1a, 2a, 3a, 4a, 6a, 7a, 9a, 11a, 12a, 13a while hypotheses 5a, 8a, 10a and 14a were not supported. Thus, ten out of the fourteen predictors (perceived benefits, perceived complexity, perceived security, perceived trust, firm IT infrastructure, competitive pressure, government policy, owner/manager educational level, owner/manager IT knowledge, and owner/manager age) were statistically associated with the decision to adopt e-payment systems by SMEs in Nigeria whereas firm financial resources, owner/manager gender, national physical infrastructure and culture were not statistically related to the decision to adopt e-payment systems in Nigeria.

The second set of hypothesis testing relating to the extent of e-payment systems usage in terms of volume and breadth as illustrated in the research framework was conducted using multinomial logistic regression. Multinomial logistic regression analysis of volume of use was performed on the basis of one firm and four demographic characteristics. Following this, the nine perception predictors were added to the model. An earlier evaluation of adequacy of expected frequencies for the categorical variables was carried out and no violation of linearity in the Logit was found. There was a good model fit as the model discriminated among the three groups on the basis of one firm and four demographic variables alone, χ^2 (114, N = 173) = 170.96, $p = 0.891$, using the deviance criterion.

<i>Factors</i>	<i>Coefficients (b)</i>	<i>Odds Ratios [Exp(b)]</i>	<i>Wald Statistics</i>	<i>P-Values</i>
Age	-0.130	0.878	5.229	0.022**
Gender	1.539	4.660	2.848	0.091***
Educational Level	3.264	26.166	5.622	0.018**
IT Knowledge	3.145	23.215	5.492	0.019**
Financial Resources	0.999	2.716	0.979	0.322
Perceived Complexity	-3.001	0.050	12.929	0.000*
Government Policy	-2.502	0.082	11.170	0.001*
Perceived Benefits	4.156	63.800	12.875	0.000*
Perceived Trust	2.745	15.564	7.623	0.006**
Firm's IT Infrastructure	2.552	12.832	9.902	0.002**
Physical Infrastructure	0.369	1.447	0.664	0.415
Perceived Security	1.314	3.722	6.918	0.009**
Culture	0.315	1.371	0.458	0.498
Competitive Pressure	-1.210	0.298	5.876	0.015**
Constant	0.656	1.926	0.066	0.797

* *significant at 1%*; ** *Significant at 5%*; ****Significant at 10%*
-2 log Likelihood: Chi-square = χ^2 (14, N = 239) = 230.174; p = 0.000

Goodness of Fit:

Hosmer and Lemeshow Statistic: Chi-square = 51.502 (d.f. = 8); $p = 0.782$ Pseudo R^2 s: Cox and Snell- $R^2 = 0.618$; Nagelkerke- $R^2 = 0.893$

Discriminatory Power

Observed		Predicted		Percentage Correct
		Adoption Status		
		Adopters	Non-Adopters	
Adoption Status	Non-Adopters	59	7	89.4
	Adopters	2	171	98.8
Overall Percentage				96.2

Table 5: **Results of Hypotheses Testing Using Binary Logistic Regression**

The results of the multinomial regression using only firm financial resources, owner/manager IT knowledge, educational level, age and gender are in appendix. The addition of nine perception predictors to the model produced a new model showing: χ^2 (308, N = 173) = 210.545, $p = 1.000$, Nagelkerke $R^2 = 0.804$ with 95% confidence interval. Comparing the log-likelihood ratios (-2LL) of the two models (model with and model without perception variables) as presented in table 6 revealed that there was statistically significant improvement of the model by the addition of perception predictors as χ^2 (18, N = 173) = 39.59, $p < 0.05$. Generally, the final classification with all variables was relatively an evenly distributed classification except for the moderate-volume users group where the performance of the model was weaker (see table 8).

Variables	Chi-square (χ^2) Values	df	Model (χ^2) Fit
Demographic/Firm			
Gender	4.347	2	
Age of Respondents	12.442	4	
Educational Level	28.978	4	
IT Knowledge	55.189	4	
Firm Financial Resources	51.790	4	
Demographic and Firm Variables only			170.96
Perception Variables			
Perceived Complexity	0.160	2	
Government Support Policy	19.382	2	
Perceived Benefits	10.788	2	
Perceived Trust	4.625	2	
Firm IT Infrastructure	0.870	2	
Physical Infrastructure	4.111	2	
Perceived Security	1.366	2	
Culture	5.817	2	
Competitive Competition	3.226	2	
All Variables (demographic, Firm and Perception)			210.545

Table 6: **Volume of E-Payment Systems Use as a Function of Independent Variables**

Analysis of the Breadth of E-Payment Systems Usage

In this section, the dependent variable is breadth of use, categorised into low-breadth, moderate-breadth and extensive-breadth users. As earlier highlighted, although the categorisation tends to literally suggest an ordinal arrangement, the focus here was actually to determine which of the identified 14 independent variables most significantly influenced the SMEs to belong to any of the three categories which by implication influenced the user-groups. Multinomial logistic regression analysis was first performed with firm financial resources, owner/manager IT knowledge, educational level, age and gender after which nine perception predictors were added to the model. Earlier, an evaluation of adequacy of expected frequencies for the categorical variables was performed and no violation of linearity in the Logit was found. The results of the multinomial regression using only firm financial resources, owner/manager IT knowledge, educational level, age and gender are in table 7.

There was a good model fit as the model discriminated among the three groups on the basis of the four demographic and firm predictors alone, χ^2 (114, N = 173) = 100.186, $p = 0.819$, using the deviance criterion. After adding nine perception predictors, the new model showed that χ^2 (308, N = 173) = 208.556, $p = 1.000$, Nagelkerke $R^2 = 0.698$ at 95% confidence interval. Comparing the log-likelihood ratios of the two models as presented in table 9 for models with and without perception variables, there was statistically significant improvement of the initial model by the addition of perception predictors, χ^2 (18, N = 173) = 30.79, $p < 0.05$.

The overall classification of the model with all predictor variables (see table 8) was fairly strong when compared with the model with intercept only but less than the results for volume of usage. The classification of

the model intercept only was 41.6% for low-breadth users, 30.1% for medium-breadth users, and 28.3% for extensive-breadth users.

Variables	Chi-Square (χ^2) Values	df	Model (χ^2) Fit
Demographic			
Gender	2.589	2	
Age of Respondents	21.764	4	
Educational Level	28.069	4	
IT Knowledge	33.369	4	
Firm Financial Resources	40.941	4	
Demographic and Firm Variables		100.186	
Perception Variables			
Perceived Complexity	4.921	2	
Government Support Policy	7.469	2	
Perceived Benefits	1.325	2	
Perceived Trust	2.124	2	
Firm IT Infrastructure	1.342	2	
Physical Infrastructure	1.064	2	
Perceived Security	4.469	2	
Culture	2.968	2	
Competitive Competition	7.409	2	
All Variables (demographic, firm and perception)		208.556	

Table 7: **Breadth of E-Payment Systems Use as a Function of Independent Variables**

Generally, the final classification with all variables was relatively an evenly distributed classification albeit the medium-breadth users group. In the table, the results for the last class of each demographic predictor variable is zero due to redundancy hence no value is included in the table for such variables. This has no effect whatsoever on analysis as it stands only to serve as reference.

Predictor Variables	Medium-Volume Users Vs Narrow-Volume Users ^a			Wide-Volume Users Vs. Narrow-Volume Users ^a			Wide-Volume Users Vs. Medium-Volume Users ^a		
	B	Odds Ratio	Sig.	B	Odds Ratio	Sig.	B	Odds Ratio	Sig.
Government Policy	-0.409	0.664	0.064***	-1.856	0.156	0.000*	-1.447	0.235	0.000*
Perceived Benefits				2.170	8.756	0.000*	2.034	7.647	0.000*
Perceived Trust				1.352	3.866	0.003**	1.031	2.805	0.019**
Physical Infrastructure	0.490	1.633	0.054***	-0.890	2.434	0.006**			
Perceived Security				-0.603.	0.547	0.098***			
Culture				-0.984	0.374	0.002**	-0.711	0.491	0.008**
Competitive Pressure	-0.505	0.604	0.024**	-0.640	0.527	0.042**			
Age									
Between 21-35 years	2.230	9.302	0.000*	3.888	48.802	0.000*	1.658	5.247	0.091***
Between 36-50 years				1.735	5.667	0.077			
51 Years and Above	-			-			-		
Gender									
Female				-1.834	0.160	0.004**	-1.278	0.279	0.027**
Male				-			-		
Educational Level									
Not Educated	-3.603	0.027	0.005**	-3.847	0.056	0.000*	-2.245	0.232	0.000*
Basic Education	-2.035	0.131	0.000*	-4.093	0.017	0.000*	-2.058	0.128	0.011**

Higher Education	-	-	-	-	-	-	-	-	-
IT Knowledge									
No IT Knowledge	-2.483	0.083	0.007**	-7.560	0.001	0.000*	-5.077	0.006	0.000*
Basic IT Knowledge				-3.201	0.041	0.000*	-4.227	0.015	0.000*
IT Professionals	-			-			-		
Financial Resources									
Low Fin. Resources	-2.641	0.071	0.001*	-4.516	0.011	0.000*	-1.875	0.153	0.048**
Medium Fin. Resources	-4.279	0.014	0.000*	-6.719	0.001	0.000*	-2.440	0.087	0.000*
High Fin. Resources	-			-			-		
a. The reference category Observed									
	Predicted								
	Narrow-Volume		Moderate-Volume		Wide-Volume		Percent Correct		
Narrow-Volume	74		8		1		89.2%		
Moderate-Volume	12		18		5		51.4%		
Wide-Volume	3		3		49		89.1%		
Overall Percentage	51.4%		16.8%		31.8%		81.5%		

Classification of the Predicted Volume of E-Payment Systems User Groups

- * Significant at 1% significance level
- ** Significant at 5% significance level
- *** Significant at 10% significance level

Table 8: Predicted Likelihood of Volume of E-Payment Systems Use By SMEs

The results as illustrated in table 8 indicate that for the volume of use, hypotheses 1b, 4b and 13b were supported while the rest hypotheses did not have any statistical relationship with the extent of use decision at 5% significance level. For breadth of use, hypotheses 2b, 7b and 13b were supported at 5% significance level. The overall percentage prediction for the volume was 81.5% while for breadth of use, the model predicted 75.7%. The two models showed overall discriminating powers among the three discrete groups of user categories.

Predictor Variables	Moderate-Breadth Users Vs Low-Breadth Users ^a			Extensive-Breadth Users Vs. Low-Breadth Users ^a			Extensive-Breadth Users Vs. Moderate-Breadth Users ^a		
	B	Odds Ratio	Sig.	B	Odds Ratio	Sig.	B	Odds Ratio	Sig.
	Perceived Complexity				0.869	2.386	0.013**	0.638	1.893
Government Policy	-0.580	0.560	0.009**	-0.800	0.449	0.003**			
Perceived Trust				0.696	2.005	0.082***			
Perceived Security	-0.636	0.530	0.035**				0.508	1.661	0.076***
Culture				-0.550	0.577	0.041**			
Competitive Pressure	-0.515	0.598	.021**				0.692	1.997	0.005**
Age									
Between 21-35 years	2.339	10.376	0.001*	3.345	28.374	0.000*			
Between 36-50 years	1.511	4.533	0.013**				-1.602	0.202	0.053***
51 Years and Above	-			-			-		
Gender									
Female				-1.078	0.340	0.064***			
Male				-					
Educational Level									
Not Educated	-1.593	0.203	0.029**	-3.895	0.360	0.000*	-2.130	0.210	0.000*
Basic Education	-0.963	0.382	0.052***	-3.225	0.040	0.053***	-2.262	0.104	0.003**
Higher Education	-			-			-		
IT Knowledge									
No IT Knowledge	-1.473	0.229	0.041**	-5.573	0.004	0.000*	-4.100	0.017	0.000*
Basic IT Knowledge							-1.134	0.322	0.021**
IT Professionals	-			-			-		
Financial Resources									
Low Fin. Resources	-3.709	0.025	0.000*	-4.927	0.007	0.000*	-1.179	0.308	0.040**
Medium Fin. Resources	-3.579	0.028	0.000*	-4.757	0.000	0.009**	-		
High Fin. Resources	-			-			-		

a. The reference category

Classification of the Predicted Breadth of E-Payment Systems User Groups

Observed	Predicted			Percent Correct
	Low-Breadth Users	Medium-Breadth Users	Extensive-Breadth Users	
Low-Breadth	63	9	0	87.5%
Medium-Breadth	13	31	8	59.6%
Extensive-Breadth	5	7	37	75.5%
Overall Percentage	46.8%	27.2%	26.0%	75.7%

- * Significant at 1% significance level
- ** Significant at 5% significance level
- *** Significant at 10% significance level

Table 9: Predicted Likelihood of Breadth of E-Payment Systems Use By SMEs

5.0. Discussion of Findings and Conclusion

For the results of the hypotheses testing relating to adoption, using the four broad contexts of an SME as contained in the research model (figure 2) we can summarise the findings as following:

1. All four **technological factors** (perceived complexity, perceived benefits, perceived security, and perceived trust) significantly influenced the adoption of e-payment systems among SMEs in Nigeria with perceived benefits dominating. While perceived benefits perceived trust and perceived security were facilitators, perceived complexity was a marginal inhibitor.
2. Only one of the two **organizational factors** (firm’s IT Infrastructure) was found to be statistically significant and a facilitator of e-payment systems adoption in Nigeria. On the contrary, Firm’s financial resources factor was not statistically significant and would be further investigated.
3. Two of the four **environmental factors** (lack of government support policy and competitive pressure) were found to statistically inhibit e-payment adoption in Nigeria while culture and physical infrastructure do not have any influence and would need to be investigated further.
4. Three out of four **owner/manager’s characteristics** (age, IT knowledge and educational level) statistically influenced e-payment systems adoption in Nigeria while gender which is to be further investigated had no statistical influence (at 5% significance level) on the adoption status. Whereas IT knowledge and educational level are facilitators with substantial impact on e-payment adoption, age acted as an inhibitor as the owner/manager became older.
5. Three major factors were found to influence e-payment adoption in Nigeria. Perceived benefits factor was the highest followed by owner/manager’s educational level and IT knowledge respectively. Two other factors – perceived trust and firm’s IT infrastructure followed while competitive pressure was the major inhibitor judging by the odds ratio. But in terms of the coefficient, perceived complexity showed the highest sign of inhibition.

Three sets of hypotheses testing were conducted in this section to address the research questions the summary of which are as follows:

Perceived benefits, owner/manager’s educational level, owner/manager’s IT knowledge, perceived trust, and firm’s IT infrastructure are the major positively influencing factors of e-payment systems adoption by SMEs in Nigeria. Perceived complexity, lack of government policy, competitive pressure and age in that order are the major inhibitors of e-payment systems adoption by SMEs in Nigeria. In terms of their impact on e-payment adoption, perceived benefit is the greatest facilitator of e-payment technology adoption in Nigeria. It is closely followed by owner’s educational level and IT knowledge while perceived trust and firm IT infrastructure follow. With coefficients of -3 and -2.5, perceived complexity and government policy are the major factors inhibiting EPS adoption by SMEs in Nigeria.

All three categories of both volume and breadth of e-payment systems users have been largely influenced by some SME and Owner/Manager characteristics and perception variables. Perceived complexity influenced low users to extensive users’ category and from moderate to extensive users’ category also at 5% significance level. In the same, competitive pressure motivate moderate users to want to advance to extensive users’ category at 5% significance level. However, perceived trust influences low breadth users to extensive breadth users while perceived security influence moderate breadth users to extensive users’ category at 10% significance level. Since our study was based on 5% significance level, we can conclude that two perception factors (perceived complexity and competitive pressure) and one owner/manager’s characteristics (age) impact breadth of e-payment usage in Nigeria. Therefore, age is the major factor influencing breadth of EPS usage followed by perceived complexity. In terms of volume of use, two perceived innovation characteristics (perceived benefits and perceived trust), one environmental (national physical infrastructure) and one owner/manager (age) characteristics influenced volume of EPS usage by SMEs in Nigeria. Perceived benefits influenced both narrow and medium users to wide volume users’ category at 5% significance level. Also,

perceived trust positively influenced both narrow and medium users to wide volume users' category at 5% significance level. Age influenced narrow users to both medium and wide users' categories at 5% significance level. However, age positively influenced medium users to wide volume users' category at 10% significance level. National physical infrastructure only influenced narrow to medium volume users' category at 10% significance level. Since the analysis was based on 5% significance level, we conclude that age, perceived benefits and perceived trust positively facilitate volume of e-payment systems usage among SMEs in Nigeria. Thus, while age is the major influencing factor of volume of usage, it is immediately followed by perceived benefits and perceived trust.

Comparatively, taking a glance at the four structural contexts of an SME, two hypotheses relating to of the four technology factors (perceived benefits and perceived trust) influenced volume of use while one (perceived complexity) influenced breadth of use. In the case of organizational factors, none of the hypotheses was supported. This may be so because most of the needed infrastructures to implement e-payment technology adoption and usage were provided by government, banks and allied firms for free. Another reason may be that majority of the SMEs already acquired some of the infrastructures such as computers and mobile phones as at the time they adopted internet banking. None of the hypotheses relating to the four environmental factors influenced the volume of use while only one (competitive pressure) of the four hypotheses was found to have influenced breadth of usage. And finally, only the age hypothesis out of the four hypotheses relating to owner/manager's characteristics was supported as age was found to influence both volume and breadth of EPS use. From the analysis, age, perceived benefits and perceived trust strongly influenced volume of use of EPS by SMEs in Nigeria while age, perceived complexity and competitive pressure influenced breadth of use.

References

- Abrazhevich, D. (2004), *Electronic Payment Systems: A User-Centred Perspective and Interaction Design*, An Unpublished PhD Thesis, Eindhoven University of Technology, Netherlands.
- Adeoti, J.O. (2011), *Automated Teller Machine (ATM) Frauds in Nigeria: The Way Out*, Journal of Social Science, 27(1), pp. 53-58.
- Agarwal, R. and Prasad, J. (1997), *The Role of Innovation Characteristics and Perceived Voluntariness in the Acceptance of Information Technology*, Decision Sciences, 28(3), pp. 557-581.
- Agarwal, R. and Prasad, J. (1999), *Are Individual Differences Germane to the Acceptance to New Information Technologies?* Decision Sciences, 30(2), pp. 361-391.
- Agresti, A. (1996), *An Introduction to Categorical Data Analysis*, John Wiley and Sons.
- Akintola, K.G.I., Akinyede, R.O., and Agbonifo, C. O. (2011), *Appraising Nigeria Readiness for Ecommerce Towards Achieving Vision 20:2020*, IJRRAS, 9(2), PP. 330-340.
- Aldrich, H.E. (1979), *Organizations and Environments*, Englewood Cliffs, NJ: Prentice-Hall cited in Dess, G.G. and Beard, D.W. (1984), *Dimensions of organizational task environments*. Administrative Science Quarterly, 29(1), pp. 52-73.
- Aleke, B. et al (2011), *ICT Adoption in Developing Countries: Perspectives from Small-Scale Agribusiness*, Journal of Enterprise Information Management, 24(1), pp. 68-84.
- Alzougool, B. and Kurnia, S. (2008), *Electronic Commerce Technologies Adoption by SMEs: A Conceptual Study*, Conference paper and Proceedings, 19th Australian Conference on Information Systems, 3-5 December.
- Armstrong, J.S. and Overton, T.S. (1977), *Estimating Non-Response Bias in Mail Surveys*, Journal of Marketing Research, 14(3), pp. 396-402.
- Arreymbi, J., Agbor, E.A., Adnan, A. (2008), *Critical Analysis of Why ICT Uptake is Slow in Emerging Economies – The Case of Cameroon*, Proceedings of Advances in Computing and Technology, (AC&T), The School of Computing and Technology 3rd Annual Conference, University of East London, pp.165-178.
- Attewell, P (1992), *Technology Diffusion and Organisational Learning: The Case of Business Computing*, Organization Science, 3(1), pp. 1-19.
- Awa, H.O. et al, (2010), *The Uptake of Electronic Commerce By SMEs: A Meta Theoretical Framework Expanding the Determining Constructs of TAM and TOE Frameworks*, Journal of Global Business and Technology, 6(1), pp. 1-27.
- Ayo, C.K. and Ukpere, W.I. (2010), *Design of a Unified E-Payment System in Nigeria: A Case Study*, African Journal of Business Management, 4(9), pp. 1753-1760.
- Ayo, C.K., Adewoye, J.O., and Oni, A.A. (2010), *The State of E-Banking Implementation in Nigeria: A Post-Consolidation Review*, Journal of Emerging Trends in Economics and Management Sciences (JETEMS), 1(1), pp. 37-45.
- Babbie, E. (2007), *The Practice of Social Research*, 11th ed, Belmont, Wadsworth, USA
- Barker, V. and Mueller, G.C. (2002), *CEO Characteristics and Firm R&D Spending*, Management Science,

- 48(6), pp. 782-801
- Bayo-Moriones, A. and Lera-Lopez, F. (2007), *A Firm-Level Analysis of Determinants of ICT Adoption in Spain*, *Technovation*, 27(6-7), pp. 352-366.
- Beatty, R.C., Shim, J.P. and Jones, M.C. (2001), *Factors Influencing Corporate Web Site Adoption: A Time-Based Assessment*, *Information and Management*, 38, pp. 337-354.
- Brace, N., Kemp, R. and Snelger, R. (2003), *SPSS Psychologists: A Guide to Data Analysis Using SPSS for Windows*, 2nd edition, Revised and Expanded, Palgrave Macmillan, London.
- Brancheau, J.C.; Janz, B.D.; and Wetherbe, J.C. (1996), *Key issues in information systems management: 1994-95 SIM Delphi results*. *MIS Quarterly*, 20(2), pp. 225-242.
- Brenner, O.C., Blazini, A.P., and Greenhaus, J.H. (1988), *An Examination of Race and Sex Differences in Managerial Work Value*, *Journal of Vocational Behaviour*, 32, pp. 336-344.
- Buttner, O.B. and Goritz, A.S. (2008), *Perceived Trustworthiness of Online Shops*, *Journal of Consumer Behaviour*, 7, pp. 35-50
- Carpenter, M.A., Geletkanycz, M.A., Sanders, W.G. (2004), *Upper Echelons Research Revisited: Antecedents, Elements, and Consequences of Top Management Team Composition*, *Journal of Management*, 30(6), pp. 749-778.
- CBN (2012), *Industry Policy on Retail Cash Collection and Lodgement (IITB/C/001)*, Circular letter number COD/DIR/GEN/CIT/05/031 as amended with another circular letter number BPS/DIR/GEN/CIR/01/003.
- Chang, T.M., Liao, L.L. and Hsiao, W.F. (2005), *An Empirical Study on the E-CRM Performance Influence Model for Service Sectors in Taiwan*, IEEE International Conference paper, pp. 240-245. Online resource accessed on 21/05/2012 at http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=1402302&tag=1
- Chatterjee, D., Grewal, R. and Sambamurthy, V. (2002), *Shaping Up for E-Commerce: Institutional Enablers of the Organisational Assimilation of Web Technologies*, *MIS Quarterly*, 26(2), pp. 65-89.
- Chau, P.Y.K. and Poon, S. (2003), *Octopus: An E-Cash Payment System Success Story*, *Communications of the ACM*, 46(9), pp. 129-133.
- Chau, P.Y.K. and Tam, K.Y. (1997), *Factors Affecting the Adoption of Open Systems: An Exploratory Study*, *MIS Quarterly*, 21(1), pp. 1-24.
- Chiemeke, S.C. and Ewwiekpaefe, A.E. (2011), *A Conceptual Framework of a Modified Unified Theory of Acceptance and Use of Technology (UTUAT) Model with Nigerian Factors in E-Commerce Adoption*, *Educational Research*, 2(12), pp. 1719-1726.
- Chooprayoon, V. (2011), *A Study of Factors Influencing the Adoption of E-Commerce Technology in Small and Medium Enterprises (SMEs) in the Kingdom of Thailand*, PhD Thesis, Murdoch University, Australia.
- Chwelos, P., Benbasat, I. and Dexter A.S. (2001), *Research report: Empirical test of an EDI adoption model*, *Information Systems Research*, 12(3), ABI/INFORM Global, pp. 304-321.
- Cooper, R.B. and Zmud, R.W. (1990), *Information Technology Implementation Research: A Technological Diffusion Approach*, *Management Science*, 36(2), pp. 123-139
- Davis, F. D. (1989), *Perceived Usefulness, Perceived Ease of Use, and User Acceptance*, *Journal of MIS Quarterly*, 13(3), pp. 319-340.
- Dekleva, S. (2000), *Electronic Commerce: A Half Empty Glass?* *Communications of the Association for Information Systems*, 3(18), pp. 120-127.
- Dess, G.G. and Beard, D.W. (1984), *Dimensions of organizational task environments*. *Administrative Science Quarterly*, 29(1), pp. 52-73.
- Dholakia, R.R. and Kshetri, N. (2004), *Factors Impacting the Adoption of the Internet Among SMEs*, *Small Business Economics*, 23, pp. 311-322.
- Erumban, A.A. and De Jong, S.B. (2006), *Cross-Country Differences in ICT Adoption: A Consequence of Culture?* *Journal of World Business*, 41, pp. 302-314.
- Eze, U.C. (2008), *E-Business Deployments in Nigerian Financial Firms: An Empirical Analysis of Key factors*, *International Journal of E-Business Research*, 4(2), pp. 29-47.
- Fichman, R.G. (1992), *Information Technology Diffusion: A Review of Empirical Research*, A paper presented at the Thirteenth International Conference on Information Systems, USA, pp. 195-206
- _____ (1999), *The Diffusion and Assimilation of Information Technology Innovations*, in Zmud, R.W. (ed.) *Framing the Domains of IT Management: Projecting the Future Through the Past*, Cincinnati, OH: Pinnaflex Educational Resources, Inc.
- Fichman R.G. (2004), *Going Beyond the Dominant Paradigm for Information Technology Innovation Research: Emerging Concepts and Methods*, *Journal of the AIS*, 5(8), pp. 314-355.
- Fichman, R.G. and Kemerer, C.F. (1993), *Toward a Theory of the Adoption and Diffusion of Software Process Innovations*, In L. Levine (eds), *Proceedings of IFIP Conference on Diffusion, Transfer, and*

- Implementation of Information Technology*, pp. 23-40.
- (1997), *The Assimilation of Software Process Innovations: An Organisational Learning Perspective*, Management Science, Vol. 43, No. 10 (Oct., 1997), pp. 1345-1363
- Field, A. (2005), *Discovering Statistics Using SPSS*, Sage Publications Ltd, 2nd Edition
- Filion, F.J. (1976). *Estimating Bias Due to Nonresponse in Mail Surveys*, Public Opinion Quarterly, 40, pp. 482-492.
- Fint, A. (2003), *How to Sample in Surveys: The Survey Kit*, Second Edition, London, Sage Publications LTD.
- Fishbein, M and Ajzen, I. (1975), *Belief, Attitude, Intension and Behaviour: An Introduction to Theory and Research*, Reading, MA: Addison-Wesley Publishing Company
- Foreman, C. (2005), *The Corporate Digital Divide: Determinants of Internet Adoption*, Management Science, 51(4), pp. 641-654.
- Galliano and Roux, (2008), *Organisational Motives and Spatial Effects in Internet Adoption and Intensity of Use: Evidence From French Industrial Firms*, Ann Reg Sci, 42, pp. 425-448
- Galliano, D., Roux, P. and Filippi, M. (2001), *Organisational and Spatial Determinants of ICT Adoption: The Case of French Industrial Firms*, Environment and Planning, 33, pp. 1643-1663.
- Gallivan, M. (2001), *Organisational Adoption and Assimilation of Complex Technological Innovations: Development and Application of a New Framework*, Database, 32(3), pp. 51-85.
- Gholami, R., Ogun, A., Koh, E. and Lim, J. (2010), Factors Affecting E-Payment Adoption in Nigeria, Journal of Electronic Commerce in Organisations, 8(4), pp. 51-67.
- Gibbs, J., Kraemer, K.L., and Dedrick, J. (2003), *Environment and policy factors shaping Global E-Commerce Diffusion: A Cross-Country Comparison*, The Information Society, 19, pp. 5-18.
- Gibbs, J.L. and Kraemer, K.L. (2004), A Cross-Country Investigation of the Determinants of Scope of E-commerce Use: An Institutional Approach, Electronic Markets, 14 (2), pp. 124-137.
- Grabner-Krauter, S. and Kaluscha, E.A. (2003), *Empirical Research in Online Trust: A Review and Critical Assessment*, International Journal of Human-Computer Studies, 58(6), pp. 783-812.
- Grover, V. and Goslar, M. (1993), *The Initiation, Adoption, and Implementation of Telecommunications Technologies in U.S. Organisations*, Journal of Management Information Systems, 10(1), pp. 141-164.
- Hair, J.F. et al (2006), *Multivariate Data Analysis*, Sixth Edition, Pearson Prentice Hall, New Jersey, USA.
- Hambrick, D.C. and Mason, P. (1984), *Upper Echelon: The Organisation as a Reflection of its Top Managers*, Academy of Management Review, 9, pp. 193-206.
- Hanzaee, K.H. and Alinejad, S. (2012), *An Investigation about Customers Perceptions of Security and Trust in E-Payment Systems among Iranian Online Consumers*, Journal of Basic and Applied Scientific Research, 2(2), pp. 1575-1581.
- Harris, H., Guru, B.K., and Avvari, M.V. (2011), *Evidence of Firms' Perception Towards Electronic Payment Systems (EPY) in Malaysia*, International Journal of Business and Information, 6(2), pp. 226-245.
- He, Q., Duan, Y., Fu, Z. and Li, D. (2006), *An Innovation Adoption Study of Online E-Payment in Chinese Companies*, Journal of Electronic Commerce in Organisations, 4(1), pp. 48-69.
- Hofstede, G. (2001), *Culture's Consequences: Comparing values, behaviours, Institutions, and Organizations Across Nations*, (2nd ed.), Thousand Oaks, CA: Sage Press, cited in Gallivan, M. and Srite, M. (2005), *Information Technology and Culture: Identifying Fragmentary and Holistic Perspectives of Culture*, Information and Organization, 15, pp. 295-338.
- Iacovou, C.L., Banbasat, I. and Dexter, A.S. (1995), *Electronic Data Interchange and Small Organisations: Adoption and Impact of Technology*, MIS Quarterly, 19(4), pp. 465-485.
- Ifinedo, P. (2011), *Facilitating the Intention to Expand E-Business Payment Systems use in Nigerian Small Firms: An Empirical Analysis*, in P. Ifinedo (2011), *E-Business: Applications and Global Acceptance*, InTech Open Access publisher, Croatia, pp. 1-22.
- Irefin, I. A., Abdul-Azeez, I. A., and Tijani, A. A. (2012), *An Investigative Study of the Factors Affecting the Adoption of Information and Communication Technology in Small And Medium Scale Enterprises in Nigeria*, Australian Journal of Business and Management Research 2(2), pp. 1-9.
- Jeyaraj, A., Rottman, J.W. and Lacity, M.C. (2006), *A Review of the Predictors, Linkages, and Biases in IT Innovation Adoption Research*, Journal of Information Technology, 21, pp. 1-23.
- Jimoh, M.I. (2013), *Mobile Money and TelCo Regulation in Nigeria*, Central Bank of Nigeria (CBN).
- Juan, C.R., Juan, J.G., and Juan, J. de la (2009), *The Importance of Perceived Trust, Security and Privacy in Online Trading Systems*, Information Management and Computer Security, 17(2), pp. 96-113.
- Kahn C., M. and Roberds W., (2009), *Why Pay? An Introduction to Payment Economics*, Journal of Financial Intermediation, 18, pp. 1-23.
- Kapurubandara, M., and Lawson, R. (2006), *Barriers Adopting ICT and E-commerce with SMEs in Developing Countries: An Exploratory Study in Sri Lanka*, COLLECTeR.
- Kim, B.G. and Lee, S. (2008), *Factors Affecting the Implementation of Electronic Data Interchange in Korea*,

- Computer in Human Behaviour, 24, pp. 263-283.
- Kim, C., Tao, W., Shin, N., and Kim, K.S. (2010), *An Empirical Study of Customers' Perceptions of Security and Trust in E-Payment Systems*, *Electronic Commerce Research and Applications*, 9, pp. 84-95.
- Kimberly, J.R. and Evanisko, M.J. (1981), *Organisational Innovation: The Influence of Individual, Organisational, and Contextual Factors on Hospital Adoption of Technological and Administrative Innovations*, *Academy of Management Journal*, 24(4), pp. 689-713.
- Kok, C.H., Kee, P.L., Ping, A.H., Khalid, S.A. & Yu, C.C. (2011), *Determinants of Internet Adoption in Malaysia Audit Firms*, *International Conference on E-Business, Management and Economics (IPEDR)*, Volume 3, pp. 302-307.
- Kuan, K.K.Y. and Chau, P.Y.K. (2001), *A Perception-Based Model for EDI Adoption in Small Business Using a Technology-Organisation-Environment Framework*, *Information Management*, 38(18), pp. 507-521.
- Kurnia, S. and Benjamin, L. (2007), *Exploring the Reasons for a Failure of Electronic Payment Systems: A Case Study of an Australian Company*, *Journal of Research and Practice in Information Technology*, 39(4), pp. 34-67.
- Kwon, T.H., and Zmud, R.W. (1987), *Unifying the fragmented models of information systems implementation*, In R.J. Boland and R.A. Hirschheim (eds.), *Critical Issues in Information Systems Research*, New York: John Wiley, pp. 257-252.
- Lal, K. (2007), *Globalisation and the Adoption of ICTs in Nigerian SMEs*, *Science Technology Society*, 12, pp. 217-244.
- Lee, J. (2004), *Discriminant Analysis of Technology Adoption Behaviour: A Case of Internet Technologies In Small Businesses*, *The Journal of Computer Information Systems*, 44(4), ABI/INFORM Global, pp. 57-66.
- Lee, S. and Kim, K.J. (2007), *Factors Affecting the Implementation Success of Internet-Based Information Systems*, *Computer in Human Behaviour*, 23, pp. 1853-1880
- Lefebvre, E. and Lefebvre, L.A. (1996), *Factors Affecting Adoption*, in *Information and Telecommunication Technologies: The Impact of Their Adoption on Small and Medium-sized Enterprises*, IDRC, An Online Resource Available at <http://www.idrc.ca/books/focus/807> Accessed on 18/08/2013.
- Lertwongsatien, C. and Wongpinunwatana, N. (2003), *E-Commerce Adoption in Thailand: An Empirical Study of Small and Medium Enterprises*: *Journal on Global Information Management*, 6(3), pp. 67-83
- Lertwongsatien, C. Wongpinunwatana, N., and Achakulwisut, A. (2004), *Factors Influencing Electronic Commerce Adoption in Small and Medium Businesses: An Empirical Study in Thailand*, Idea Group Incorporated.
- Li, D, Lai, F. and Wang, J. (2011), *E-Business Assimilation in China's International Trade Firms: The Technology-Organisation-Environment Framework*, *Journal of Global Information Management*, 18(1), pp. 39-65.
- Lim, B., Lee, H., Kurnia, S. (2007), *Exploring the Reasons for a Failure of Electronic Payment Systems: A Case Study of an Australian Company*, *Journal of Research and Practice in Information Technology*, 39(4), pp. 231-243.
- Lin, C. and Nguyen, C. (2011), *Exploring E-Payment Adoption in Vietnam and Taiwan*, *Journal of Computer Information Systems*, pp. 41-52.
- Looi, H. C. (2005), *E-Commerce Adoption in Brunei Darussalam: A Quantitative Analysis of Factors Influencing its Adoption*, *Communications of the Association for Information Systems*, Volume 15, pp. 61-81.
- Lovelock, C.H., Stiff, R., Cullwick, D. and Kaufman, I.M. (1976), *An Evaluation of the Effectiveness of Drop-Off Questionnaire Delivery*, *Journal of Marketing Research*, 13, pp. 358-364.
- Macharia, J. and Nyakwende, E. (2009), *Factors Affecting the Adoption and Diffusion of Internet in Higher Educational Institutions in Kenya*, *Journal of Language, Technology and Entrepreneurship in Africa*, 1(2), pp. 6-22.
- Mallat, N. (2007), *Exploring Consumer Adoption of Mobile Payments – A Qualitative Study*, *Journal of Strategic Information Systems*, 16, pp. 413-432.
- Mayer, R.C., Davis, J.H., and Schoorman F.D. (1995), *An Integrative Model of Organizational Trust*. *Academy of Management Review*, 20(3), pp. 709-734.
- Menard, S. (1995), *Applied Logistic Regression Analysis*, SAGE: Thousand Oaks CA.
- Molla, A. and Licker, P.S. (2005), *Perceived E-Readiness Factors in E-commerce Adoption: An Empirical Investigation in a Developing Country*, *International Journal of Electronic Commerce*, 10(1), pp. 83-110).
- Moore, G.C. and Benbasat, I. (1991), *Development of the Instrument to Measure the Perceptions of Adopting an Information Technology Innovation*, *Information Systems Research*, 2(3), pp. 192-222.
- NBS (2012), *A Preliminary Survey Report on Micro, Small and Medium Enterprises (MSNEs) in Nigeria, 2010*

- National MSME Collaborative Survey between the National Bureau of Statistics (NBS) and Small and Medium Enterprise Development Agency of Nigeria (SMEDAN) accessed at <http://www.nigerianstat.gov.ng/pages/download/67> on 22/05/2013.
- Nunnally, J. C. (1978), *Psychometric Theory*. New York, McGraw-Hill.
- Orr, G. (2003), *Diffusion of Innovation*, Reviewed, March 18, On-line resources accessed at www.stanford.edu/class/symbssys205/Diffusion%2520of%2520Innovations/htm on 02/10/2011
- Ovia, J. (2002), *Payment System and Financial Innovation*, A Paper Presented at the CBN Organised Annual Monetary Policy Conference, November.
- Ozkan, S. (2010), *Facilitating the Adoption of E-Payment Systems: Theoretical; Constructs and Empirical Analysis*, *Journal of Enterprise Management*, 23(3), pp. 305-325.
- Palvia, P., Means, D.B. and Jackson, W.M. (1994), *Determinants of Computing in very Small Businesses*, *Information and Management*, 27, pp. 161-174.
- Palvia, P.C. and Palvia, S.C. (1999), *An Examination of the IT Satisfaction of Small-Business Users*, *Information and Management*, 35, pp. 127-137.
- Pavlou, P. (2002), *The Importance of Technology Trust for B2B Electronic Commerce*, BLED Proceedings, p.43. An online Resource Accessed on 23/10/2014 at <http://aiselaisnet.org/bled2002/43>.
- Peter, J. Paul (1979), *Reliability: A Review of Psychometric Basics and Recent Marketing Practices*, *Journal of Marketing Research*, 16, pp. 6-17.
- Peterson, R.A. (1994), *A Meta-analysis of Cronbach's Coefficient Alpha*, *Journal of Consumer Research*, 21(2), pp. 381-391.
- Pfeffer, J. and Leblebici, H. (1977), *Information Technology and Organizational Structure*, *Pacific Sociological Review*, 20(2), pp. 241-261.
- Pike, G.R. (2007), *Adjusting for Nonresponse in Surveys*, in J.C. Smart (ed) (2007), *Higher Education: Handbook of Theory and Research*, 22, pp. 411-449.
- Plouffe, C.R., Vandenbosch, M. and Hulland, J. (2001), *Intermediating Technologies and Multi-Group Adoption: A Comparison of Consumer and Merchant Adoption Intentions Toward a New Electronic Payment System*, *The Journal of Product Innovation Management*, 18, pp. 65-81
- Premkumar, G., Ramamurthy, K., and Nilakanta, S. (1994), *Implementation of Electronic Data Interchange: An Innovation Diffusion Perspective*, *Journal of Management Information Systems*, 11(2), Armonk: Fall, pp. 157- 187
- Premkumar, G., Ramamurthy, K., and Crum, M. (1997), *Determinants of EDI Adoption in the Transportation Industry*, *European Journal of Information Systems*, 6(2), pp. 107-121.
- Premkumar, G. and Roberts, M. (1999), *Adoption of New Information Technologies in Rural Small Businesses*, *Omega*, 27(4), Pp. 467-484.
- Puri, V. (1997), *Smart Cards: The Smart Way for the Banks to go?* *International Journal of Bank Marketing*, 15(4)pp. 134-139.
- Rajagopalan, N. and Datta, D.K. (1996), *CEO Characteristics: Does Industry matter?* *The Academy of Management Journal*, 39(1), pp. 197-215.
- Ramdani, B. and Kawalek, P. (2007), *SME Adoption of Enterprises Systems in the Northwest of England: An Environmental, Technological and Organisational Perspective*, in International Federation for Information Processing (IFIP), Volume 235, *Organisational Dynamics of Technology-Based Innovation: Diversifying the Research Agenda*, eds. McMasrter, T., Wastell, D., Femeley, E., and DeGross, J. (Boston: Springer), pp. 409-430.
- Rashid, M.A. and Al-Qirim, N.A. (2001), *E-commerce Technology Adoption Framework by New Zealand Small to Medium-Sized Enterprises*, *Research Letters Information Mathematics Science (RLIMS)*, 2, pp. 63-70.
- Rogers, E.M. (1983), *Diffusion of Innovation*, New York: The Free Press.
- Rogers, E.M. (1995), *Diffusion of Innovation*, New York: The Free Press.
- Rogers, E.M. (2003), *Diffusion of Innovation*, New York: The Free Press.
- Saunders M. et al (2007), *Research Methods for Business Students*, Fourth Edition, Prentice Hall.
- Schonlau, M., Fricker, R. and Elliott, M. (2002), *Conducting research surveys Via e-mail and the Web*, Canada, RAND.
- Scupola, A. (2003), *The Adoption of Internet Commerce by SMEs in the South of Italy: An Environmental, Technological and Organizational Perspective*, *Journal of Global Information Technology Management*, 6(1), pp. 51-71.
- Seyal, A.H., Awais, M.M., Shamil, S. and Abbas, A. (2004), *Determinants of Electronic Commerce in Pakistan: Preliminary Evidence from Small and Medium Enterprises*, *Electronic Markets*, 14(4), pp. 372-387.
- Seyal, A.H., Rahman, M.N.A. and Mohammad, H.A.Y. (2007) *A Quantitative Analysis of Factors Contributing*

- Electronic Data Interchange Adoption among Bruneian SMEs: A Pilot Study*, Journal of Business Process Management, 13(5), pp. 728-746.
- Sophonthummapharn, K. (2008), *The Adoption of Techno-Relationship Innovations: A Framework for Electronic Customer Relationship Management*, Marketing Intelligence and Planning (MIP), 27(3), pp. 380-412.
- Srite, M. and Karahanna, E. (2006), *The Role of Espoused National Cultural Values in Technology Acceptance*, MIS Quarterly, 30(3), pp. 679-704.
- Straub, D.W. (1994), *The Effect of Culture on IT Diffusion: E-Mail & Fax in Japan and the US*, Information Systems Research, 5(1), pp. 23-47.
- Sumanjeet, S. (2009), *Emergence of Payment Systems in the Age of Electronic Commerce: The State of Art*, Global Journal of International Business Research, 2(2), pp. 17-36.
- Tan, J., Tyler, K., and Manica, A. (2007), *Business-To-Business Adoption of E-Commerce in China*, Information and Management, 44, pp. 332-351.
- Tan, S.T., Chong, S.C., Lin, B., and Eze, U.C. (2009), *Internet-Based ICT Adoption Among SMEs: Demographic Versus Benefits, Barriers, and Adoption Intention*, Journal of Enterprise Information Management, 23(1), pp. 27-55.
- Thong, J.Y.L. and Yap, C.S. (1995), *CEO Characteristics, Organisational Characteristics and Information Technology Adoption in Small Businesses*, International Journal of Management Science, 23(4), pp. 429-442.
- Thong, J.Y.L. (1999), *An Integrated Model of Information Systems Adoption in Small Business*, Journal of Management Information Systems, 15(4), pp. 187-214.
- Tooki, A. (2006), *Intermac Moves to Stem Rejection of Nigeria's E-Payment Abroad*, Financial Standard, 7(21), pp. 3-18.
- Tornatzky, L.G. and Klein, K.J. (1982), *Innovation characteristics and innovation adoption-implementation: A Meta Analysis of Findings*, IEEE Transactions on Engineering Management, 29(1), pp. 28-45.
- Tornatzky, L.G. and Fleischer, M. (1990), *The Processes of Technological Innovation*, MA: Lexington Books.
- Veiga, J.F., Floyd, S., and Dechant, K. (2001), *Towards modelling the effects of national culture on IT implementation and acceptance*, Journal of Information Technology, 16, pp. 145-158
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D., (2003), *User Acceptance of Information Technology: Toward a Unified View*, Journal of Management Information Systems, Quarterly, 27(3), pp. 425-478.
- Vogt, W. (2007), *Quantitative research methods for professionals*, London, Pearson Education, Inc.
- Wang, Z.Z. (2002), *The Status of Chinese B2B E-Commerce and Analysis on Social Eco-Environment*, Information Science, 20(6), pp. 669-672.
- Ward, P.T., Duray, R., Leong, G.K., and Sum, C.C. (1995), *Business Environment, Operations Strategy, and Performance: An Empirical Study of Singapore Manufacturers*, Journal of Operations Management, 13(2), pp. 99-115.
- Webster, C. (1997), *Effects of Researcher Presence and Appeal on Response Quality in Hand-Delivered, Self-Administered Survey*, Journal of Business Research, 38, pp. 105-114.
- Weltevreden, J.W.J. and Boschma, R.A. (2008), *The Influence of Firm Owner Characteristics on Internet Adoption by Independent Retailers: A Business Survey*, International Journal of Internet Science, 3(1), pp. 34-54.
- Winn, J.K. (2003), *Electronic Payment Systems*, Encyclopaedia of Information Systems, 2, Elsevier Science, pp. 71-86.
- World Bank (1994), *World debt Tables: External Finance for Developing Countries*, Vol. 1, Washington, D.C.
- Wu, J.H. and Wang, S.C. (2005), *What Drives Mobile Commerce? An Empirical Evaluation of the Revised Technology Acceptance Model*, Information & Management, 42(5), pp. 719-729
- Wyllie, J., handler, E, and Kaja, K. (2010), *E-Payments Project: Supporting Blind and Partially Sighted People*, Royal National Institute of Blind People (RNIB), Final Report on Initial Project Work, pp. 1-68.
- Zhu, K., Kraemer, K.L. Gurbaxani, V. and Xu, S. (2002), *A Cross-Country Study of Electronic Business Adoption Using the Technology-Organisation-Environment Framework*, Centre for Research on Information Technology and Organizations (CRITO), UC Irvine: Retrieved from: <http://escholarship.org/uc/item/6gw3d0rs> on 15th November, 2011.
- Zhu, K., Kraemer, K. and Xu, S., (2003), *Electronic Business Adoption by European Firms: A Cross-Country Assessment of the Facilitators and Inhibitors*, European Journal of Information Systems, 12(4), pp. 251.
- Zhu, K. and Kraemer, K.L. (2005), *Post-Adoption variations in Usage and Value of E-Business by Organisations*, Information Systems Research, 16(1), pp. 61-84, ABI/INFORM.
- Zhu, K., Kraemer, K.L. Gurbaxani, V. and Xu, S. (2006), *Migration to Open-Standard Interorganisational Systems: Network Effects, Switching Costs, and Path Dependency*, Centre For Research on Information

Technology and Organisations (CRITO), UC Irvine, Online Resource Accessed on 26/03/2012 at <http://esscholarship.org/uc/item/7ws3n2jw>.
 Zmud, R.W. (1982), *Diffusion of modern Software Practices: Influence of Centralisation and Formalisation*, Management Science, 28(12), pp. 1421-1431.

Appendix
Operationalisation of Variables

Constructs	References	Measurements
EXPLANATORY VARIABLES		
Complexity (PERCPXTY)	He et al, (2006); Thompson et al (1991)	E-Payment system is difficult to set up E-Payment system is difficult to maintain E-payment is difficult to operate It takes my company a lot of efforts to get e-payments to work It is difficult to learn how to use e-payment to make it worth the effort
Perceived Benefits (PERBEN)	Iacovou et al (1995); Kuan and Chau (2001)	E-payment reduces paperwork and saves labour cost E-payment facilitates higher customer patronage and increase in rate of turnover E-payment makes payment system faster and better to monitor cash flows E-payment reduces transaction time E-payment provides opportunity to trade with people outside your immediate environment E-payment allows payment to be made at any time and place
Perceived Security (PERSETY)	Kim et al (2010); Kim et al (2009) Looi (2005)	I believe that no unauthorised persons can use the information I provide to steal my firm's money I believe that my payment information during and after every e-payment transaction is secure I believe that my personal information such as my name and contact details is anonymous I believe that unauthorized persons cannot access, use, interpret or understand my payment data
Perceived Trust (PERTRST)	Gholami et al (2010); Kim et al (2009); Kim and Probhakar (2000)	I trust that all the channels of e-payment used by my firm can protect our confidential data. I trust that the information provided during e-payment process will be reliable. I trust that e-payment services will be available at all times I trust that the use of e-payment will earn my firm some goodwill I trust that my customers and other participants in the e-payment systems' process will be fair
Firm's IT Infrastructure (FITINFRA)	Lin and Lin (2008)	My firm has adequate e-payment systems infrastructure. My firm shares integrated databases with other firms for various e-payment systems transactions My firm has integrated e-payment technology applications covering different channels of e-payment systems My employees have adequate ICT knowledge and skills required for successful e-payment operations My employees have been well trained in e-payment systems operations and use
Physical Infrastructure (PHYINFRA)	Okoli, (2003); Eze (2002); Bingi et al (2000)	There is regular electric power supply from the national grid There is adequate number of vital E-payment facilities like ATM, POS machines, and others available for use by SMEs Computers, internet access and other e-payment facilities are at affordable prices to SMEs There is adequate and easy access to the internet whether at home, workplace, cyber-cafes and other locations in the country There is adequate ICT equipment and services available to SMEs in the country There is adequate number of ICT workers in the country who are skilled in developing and maintaining E-payment equipment, and training others on how to operate and use the E-payment facilities There is adequate number of national and international long distance phone and data circuit with inter-connectivity There is adequate number of interoperable Banks with adequate internet services that have network interconnectivity
Competitive Pressure (COMPRES)	Premkumar and Roberts (1999); Thong and Yap (1995)	I believe I will lose my current customers to my competitors if I do not adopt the e-payment systems I believe adopting the e-payment systems will enable my firm attract more customers I adopted the e-payment system because my products/services in the market have close substitutes

		I believe adopting e-payment systems will help my firm to compete better
Government Support Policy (GOVTPOLY)	Ifinedo (2011)	Government is taking the lead in e-payment adoption in Nigeria Government has developed infrastructure to support the e-payment technology in Nigeria The cashless policy of government in relation to e-payment encouraged me to adopt it Government has done enough concerning e-payment systems to help business in the country Government forced me to adopt the e-payment systems
Culture (CULT)	Ojukwu (2009); Straub et al (2002); Schein (1985); Hofstede (1980)	Lack of face-to-face interaction between my firm and my customers in e-payment is against our business culture Exerting power and control over my partners in e-payment process is difficult Our national language culture does not support e-Payment practices My religion is against the use of e-payment in transactions My ethnicity does not support the use of e-payment process in financial transactions
Owner/Manager's IT Knowledge (ITKNW)	Chau and Jim (2002); Thong (1999); DeLone (1988)	I attended ICT training programme/classes I have used some ICT devices similar to the e-payment technology in the past I have used computer whether at work place, home or other places to trade I have formal qualifications in ICT None
Owner/manager Educational Level (EDULEV)	Barker and Mueller (2002)	What is your highest level of education? 0 = None 1 = Primary/School Certificate 2 = OND/NCE/Equivalent 3 = HND/Degree 4 = Postgraduate 5 = PhD
DEPENDENT VARIABLES		
INTENT TO ADOPT		
E-Payment Adoption (ADOPT)	Ifinedo (2012); Gholami et al (2010)	My firm is using e-payment technology presently My firm will use e-Payment technology in the immediate future not exceeding 12 months from now
EXTENT OF USAGE		
Breadth (BRTH)	Thong (1999); Zhu et al, (2006)	My firm uses one type of e-payment channel for different types of transactions My firm uses two types of e-payment channels for different types of transactions My firm uses three types of e-payment channels for different types of transactions My firm uses four types of e-payment channels for different types of transactions My firm uses five types of e-payment channels for different types of transactions
Volume (VOL)	Bassetti and Zmud (1996); Thong (1999); Thi (2006)	My firm uses POS every day, once a week, once a month, not at all My firm uses ATM every day, once a week, once a month, not at all My firm uses MP every day, once a week, once a month, not at all My firm uses EFT every day, once a week, once a month, not at all My firm uses EC every day, once a week, once a month, not at all