

# Electronic Payment Systems Adoption by SMEs in Nigeria: A Literature Review

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*pp 150-165*

## ABSTRACT

This paper provides a background understanding of the factors capable of influencing the adoption and extent of use of e-payment systems in Nigeria. It was argued that the adoption and intensive use of e-payment systems in Nigeria will not only be of great benefits to the individual adopter, but will in addition enhance Nigeria's ability to massively participate in the global internet business and by implication enhance her economic growth and global competitiveness. Through government's action, one can deduce that Nigeria is ready to stimulate its economic growth through the instrumentality of improved EPS infrastructure. Since 2012 when the cashless policy began, a lot has happened that require this kind of research given the statistics being put in the public domain by government institutions (the Central Bank of Nigeria and the Bureau of Statistics) and the various commercial Banks. Based on earlier studies and reports on Nigeria, the e-payment systems adoption has been dominated by the larger organisations and recently individuals rather than the SMEs.

**Key words:** Electronic payment, SMEs, e-payment systems, ICT

## Introduction

Electronic payment (E-payment) refers to payments for goods and services (Ifinedo, 2011) and other financial transactions involving businesses, individuals, and governments through electronic networks (Sumanjeet, 2009; Kim & Lee, 2008). Examples of such networks include the internet with modern technologies and devices like credit/debit cards, electronic funds transfer (EFT), point of sale (POS) machine, automated teller machine (ATM), and mobile phones. Currently, many large and small organisations in the United States of America, United Kingdom, Japan, Western Europe, and some emerging economies like Brazil, Mexico, Malaysia, China, India and South Africa are extensively and successfully increasing their use of e-payment systems to improve their participation in global trading and business activities (Akintola, Akinyede & Agbonifo, 2011). In addition to contributing to economic growth (Sumanjeet, 2009), e-payment also saves time of doing business, it is convenient, and comfortable to use (Harris, Guru, & Avvari, 2011; Winn, 2003). Studies have it that e-payment system is the future of global trade with its capacity to effectively unbundle nationally confined markets through global generic payment systems (Poon and Chau, 2001; Igudia, 2016).

E-payment is most regularly categorised into four major groups – online credit card payment, electronic cash (e-cash), electronic cheques (e-cheque), and small or smart card-based electronic payment systems (Kim, Wang, Shin, & Kim, 2010; Raja, 2008, 1997). The categorisation reflects the different types of payment methods or channels used and transaction environments involved in the process. According to Ayo and Ukpere (2010), the common e-Payment channels include: the automated teller machines (ATM), automated clearing house (ACH), payment cards (debit or credit), point of sales (POS) terminals, online web portals, mobile phones, direct debit/deposit and real time gross settlement (RTGS) systems. The application of each of these platforms depends on the nature of transaction and value of order. Such transactions usually involve business and business (B2B), business and consumer (B2C), consumer and consumer (C2C) (or person and person (P2P)), business and government (B2G), government and consumer (G2C), and business and employee (B2E) (Ayo, 2006).

SMEs play dual roles in e-payment adoption process. They also play important role in the breadth and depth (extent of use) of e-payment use. SMEs perform the roles of both the consumer and

merchant at all times and therefore are either making payments or passing payment information for goods and services involving B2B, B2G, and B2C, or paying taxes (B2G), royalty (B2G), and fines (B2G) to government, or making payments to employees either as salaries or wages (B2E), or receiving payments for goods sold and services rendered involving it and other parties. Given this fact, and given the fact that the SME is the unit of analysis in this study, this paper focuses only on e-payments that involve B2B, B2G, and B2E.

Nigeria has been using different forms of e-payment solution channels ranging from the ATM, mobile banking/payments, internet banking, POS terminal to electronic funds transfer (EFT) (CBN, 2011) especially since 2012 when the government adopted the cashless monetary policy. Although the adoption of e-payment systems has progressed very steadily (CBN, 2017) generally, but in specific terms, it has progressed very slowly among the SMEs (Ifinedo, 2011; Ayo, Adewole & Oni, 2010). The general lag has created a lacuna in e-business resulting in slow economic growth in the country (Ifinedo, 2005a; Akintola et al, 2011). One major suggestion to reverse the trend is that government should create an enabling environment for SMEs to adopt and extensively use e-payment solutions so that SMEs can participate in the internet economy (Adesola and Adeyinka, 2008; Ayo et al, 2008). This is because SMEs have been found to accelerate the process of industrialization and general economic growth in both developed and developing countries (OECD, 2005; Ojukwu, 2005). Literature reveals that SMEs contribute to national per capita-income, real GDP, employment generation, and serve as effective channels for the utilization of local resource inputs that are critical to engineer economic growth and development (Adesola and Adeyinka, 2008). However, SMEs in Nigeria, as in all economies, are caught in a vicious circle of small market shares and poverty of resources (Thong & Yap, 1995; Apulu and Latham, 2009) due to poor infrastructural development (poor electricity supply, low level information technology (IT) infrastructure (Adesola and Adeyinka, 2008). SMEs also have perceived security challenges associated with e-payment systems (Lin & Nguyen, 2011), and lack adequate knowledge about the likely benefits of e-payment (Ifinedo, 2011).

Literature reveals that the intensity of financial and commercial activities resulting from e-business due to e-payments has positive correlation with a country's economic growth and citizens' well-being (EIU, 2010). Conversely, slow e-payment activities in a country can slow down e-business development and thus making competition impossible at the global

trade level (WEF, 2011). Therefore, the development and reorientation of the total Nigerian population, but in particular the SMEs, towards e-payment systems adoption and encouraging them to extensively use the technology in Nigeria will be a veritable strategy for the achievement of wider economic growth as envisioned by vision 20:2020.

Research in several developing countries including China, Brazil, India, Malaysia, and Singapore and countries in the sub-Saharan Africa like South Africa (SSA), Nigeria, Egypt, and Ghana among others shows that the adoption of e-business and e-payment systems among SMEs is growing but largely lagging behind those in advanced countries

like US, UK, Japan, and Western Europe (see Lin and Ngyem, 2011; Kok et al, 2011; Ifinedo, 2011; Sumanjeet, 2009; Kim et al, 2010). The most likely reasons for this are that developing countries particularly those in sub-Saharan Africa (SSA) are constrained by social economic problems such as low income, low-level human capital development, low IT knowledge and skills, and very weak economy making it impossible to acquire and deploy the needed and necessary technologies (Ojukwu, 2009; Okoli and Mbarika, 2003). The disparity in the usage of internet (a primary channel for e-business/e-payment) between developed and developing countries for the period 2000-2005 is clearly illustrated in table 1.

**Table 1: Internet usage between developed and developing countries for the period 2000-2008**

World Region (1)	Population (2006 Estimate) (2)	Population (Percentage of world Population) (%) (3)	Internet Usage (Data as at 2008) (4)	Internet penetration (%) (5)	Usage as % of World Usage (%) (6)	Usage Growth rate between 2000-2005 (%) (7)
Africa	915,210,928	14.1	23,649,000	2.6	2.3	423.9
Asia	3,667,774,066	56.4	380,400,713	10.4	36.5	232.8
Europe	807,289,020	12.4	294,101,844	36.4	28.2	179.8
Latin America/Caribbean	553,908,632	8.5	79,962,809	14.7	7.8	350.5
Middle East	190,084,161	2.9	18,203,500	9.6	1.7	454.2
North America	331,473,276	5.1	227,470,713	68.6	21.8	110.4
Oceanic/Australia	33,956,877	0.5	17,872,707	52.6	1.7	134.6
<b>World Total</b>	<b>6,499,697,060</b>	<b>100</b>	<b>1,043,104,886</b>	<b>16.0</b>	<b>100</b>	<b>189.0</b>

Source: Arreymbi et al, 2008

The internet penetration and internet usage in columns 5 and 6 of the table respectively clearly show that developing countries are far behind developed countries in terms of the number of people who have access to the internet which is the main means by which e-business/e-payment activities are conducted.

Nigeria, although a developing country, is a strong regional economic power being the second largest economy in the Sub-Saharan Africa (SSA) and a leading economy in West Africa as it contributes 41% of the region's GDP (World Bank, 2004). With strong prospect for growth, a citigroup report in 2011 indicated that Nigeria will have the world's highest average GDP growth rate between 2010 and 2050. With the vast human and material resources, Nigeria has the potential to be a major player in the cyberspace economy (Akintola et al, 2011). But regrettably, Nigeria is far from achieving her full economic potential as the country's economic growth seems not to be a true reflection of her endowed capabilities (Chiemeke & Ewwiekpaefe, 2011). One area of underperformance is the spread

of e-business activities. Nigeria records low e-business activities (Chiemeke & Ewwiekpaefe, 2011). One possible reason for this is lack of efficient payment systems (e-payment) (Ayo et al, 2008). Nigerian businesses are still largely dependent on the traditional payment systems of cash and paper cheques (Ayo & Ukpere, 2010).

Unfortunately, there has been a great challenge in understanding the adoption and extent of use of e-payment technology in Nigeria as there is limited research in this regard (Chiemeke & Ewwiekpaefe, 2011). Although there is a large body of literature on e-payment systems use (Sadeghi and Schneider, 2003) in general, however, there is limited systematic study on the factors that determine the adoption and extent of use of e-payment systems. There is sparse empirical research especially on the factors determining the extent of use of e-payment technology particularly among SMEs in developing countries whose economies are largely cash-based due to existing socio-cultural characteristics and low level of development. Existing studies have concentrated more on the classification, importance,

design, security, and consumers' acceptance of e-payment systems (see Kim et al, 2010; Ayo & Ukpere, 2010; Sumanjeet, 2009; Rigopoulos & Askounis, 2007; Stroborn et al, 2004). Thus, the objective of this study is to fill the gap by exploiting and advancing the literature on the factors that can determine the adoption and extent of use of e-payment technological innovation among SMEs in Nigeria. Given the objective of study, this paper intends to address the following research questions.

1. What are the factors that can influence the adoption of e-payment systems in Nigeria?
2. What factors can influence the extent of use of e-payment systems by SMEs in Nigeria?

## Literature Review

### Conceptual Framework

In the past 30 years, ICT has received a great deal of diverse research attention both theoretically and empirically (Premkumar et al, 1994; Igudia, 2016). Although the foundations of adoption and diffusion research were laid over a hundred years ago (Hultman, 2007), it was not until around the second half of the twentieth century (1960s) that the actual empirical studies on adoption began (Rogers, 1995). Prior research on IS/IT innovations adoption and diffusion in organisations have cited a large body of theories such as Diffusion of Innovation Theory (DOI) (Rogers, 1983), Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975), Diffusion and Implementation Model (Kwon and Zmud, 1987), Technology Acceptance Model (TAM) (Davis, 1989), Technology-Organisation-Environment Framework (TOE) (Tornatzky & Fleischer, 1990), Theory of Planned Behaviour (TPB) (Ajzen, 1991), Perceived Characteristics of Innovation (PCI) (Moore and Benbasat, 1991), Tri-Core Model of IS Innovation (Swanson, 1994), Social-Cognitive Theory (Compeau & Higgins, 1995), Modified Technology Acceptance Model (TAM2) (Venkatesh, 2000), Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al, 2003), etc.

By and large, the most frequently cited and arguably the most prominent of these theories is the DOI (Hultman, 2007). Other frequently cited generic theories and frameworks include the TAM and TOE (Igudia, 2017). While DOI explains how innovations diffuse and identifies the characteristics that influence the diffusion process, TAM focuses on the reasons a new technology is acceptable to individual users. TOE, a broader framework than DOI and TAM in terms of organisational adoption, studies three organisational contexts that influence the decision of an organisation to adopt a new

technological innovation. This paper focuses on DOI theory and TOE framework for its theoretical foundation in view of the object of study. Several prior innovation adoption and diffusion studies have relied on DOI theory as generic theoretical foundation just as the TOE has been used to provide the framework for technological innovation adoption by organisations.

### Theoretical Nexus: Diffusion of Innovation Theory (DOI)

Rogers (1995) defines innovation as the process of inventing or introducing something new. The term innovation includes new products or services, new process technologies, new organisational structures or administrative systems, or new plans or programming pertaining to organisational members (Moore & Benbasat, 1991). Innovation brings about changes in 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 notwithstanding that the innovation itself may not necessarily be new in terms of time of invention or discovery (Thong, 1999). It is called innovation as long as it facilitates renewal of organisational process through technology, thought or action (Thong and Yap, 1995).

Rogers (1995) found that innovation will diffuse fast if the innovation possesses five characteristics (relative advantage, compatibility, complexity, trialability, and Observability). Rogers (1995) defines relative advantage as the degree to which an innovation is perceived as being better than the one it is replacing. The higher the relative advantage the greater the perceived economic returns, improved social status, and similar benefits likely to accrue from adopting such innovation. Therefore, relative advantage basically involves a cost-benefit analysis (Fichman, 2004) which underscores the economic perspective of adoption in relation to trade-off between a new innovation and the old one it is replacing (Orr, 2003). Compatibility is the degree to which an innovation is perceived as consistent with the existing norm, values and procedures including the needs of the potential adopters within the social system (Rogers, 1995). Complexity on the other hand refers to the degree to which an innovation is perceived as relatively difficult to understand and use (He et al, 2006). Rogers (2003) explains that "the complexity of an innovation, as perceived by members of a social system, is negatively related to its rate of adoption" (p. 257). Trialability is the degree to which an innovation is perceived as experimentable within a limited time period



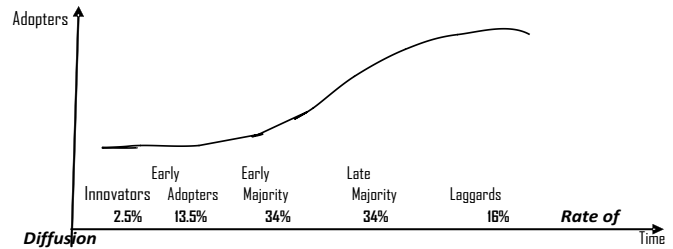
(Ramdani and Kawalek, 2007). It expresses the period of time an idea or innovation may be tried or experimented on before it is adopted. Thus, the higher the trialability of an innovation, the quicker the rate of adoption and diffusion. Observability is the degree to which the effects of an innovation are visible to people. Some innovations or ideas are easier to observe or explained than others. For example, while it is easy to observe hardware components of a desktop computer, it is rather not easy to observe or explain software components like programming of a computer system (Rogers, 1995).

The degree to which an adopter perceives each of these five innovations attributes determines the earliness to adopt an innovation (Looi, 2005). The perception of the adopter about the five embedded characteristics of a technological innovation was joined by Rogers to determine between 49% and 87% of the variance of the rate of adoption (Rogers, 1995). The nature of communication and relationships within a social group plays a fundamental role in the process of ICT diffusion in DOI theory. The S-shaped curve is the outcome of the cumulative number of adopting individuals plotted over time to yield a normal or bell-shaped curve (Rogers, 1995). The s-shape illustrates the ideal rate of diffusion of an innovation over time after running its full course. In other words, the s-

shaped curve is the resultant effect of the plotting of the cumulative number of adopters over time as depicted in figure 1.

Several studies have examined either the success or

Figure 1 Innovation Diffusion Map over Time



failure of innovation adoption and diffusion based on the five perceived characteristics of innovation at both individual and organisations levels (see Kimberly & Evanisko, 1981; Tornatzky & Fleischer, 1990; Premkumar et al, 1994; Thong & Yap, 1995; Agarwal & Prasad, 1999; Thong, 1999; Venkatesh et al, 2003; Fichman, 2004). Some of the attributes have been found to impact adoption behaviours stronger than others or out-richtly inconsistent from one study to another (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

Table 2: Examples of Inconsistencies in Results of the Impact of Innovation Characteristics on Innovation Adoption

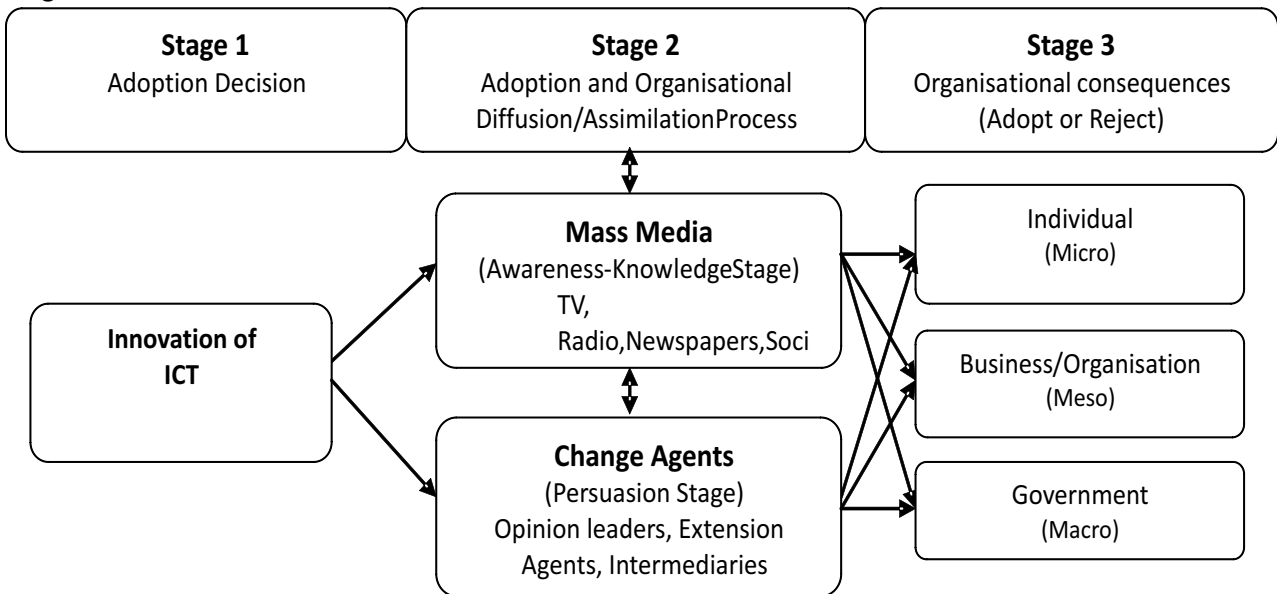
Construct	Studies	Conflicting Findings	
		Relationship	No Relationship
Relative Advantage (+)	Premkumar et al, 1994 Tan et. al. (2011), Tan and Teo (2000) He et al (2006) Premkumar and Roberts (1999) Plouffe et al (2001) Chong (2006)	(+) (+) (+) (+) (+) (+) (+)	(0)
Complexity (-)	Tan et. al. (2011), He et al (2006) Premkumar and Roberts (1999)	(-)	(0) (0)
Compatibility (+)	Premkumar et al, 1994 Tan et. al. (2011), Tan and Teo (2000), Zmud, 1982 He et al (2006) Premkumar and Roberts (1999) Kim et al (2010) Plouffe et al (2001) Premkumar (2003)	(+) (+) (+) (+) (+) (+) (+)	(0) (0) (0)
Trialability (+)	Tan and Teo (2000) He et al (2006) Chong (2006)	(+) (-)	(0)
Observability (+)	Tan et. al. (2011), He et al (2006) Chong (2006)	(+) (+)	(0)

Note: (+) = positive relationship. (-) = negative relationship. (0) = no relationship

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). Consistent with table 2, the metal study by Jeyaraj et al (2006) also reveals that some of the innovation characteristics are more investigated by researchers than others, the least investigated being trialability (Jeyaraj et al, 2006). The observed inconsistent findings prompted researchers to seek ways to modify the DOI for effectiveness and better predictive powers (Premkumar et al, 1994; Agarwal & Prasad, 1999; Venkatesh et al, 2003). Thus, new perspectives like individual 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 & Fleischer, 1990; Thong & Yap, 1995; Thong, 1999) were integrated with the original Rogers' innovation characteristics to overcome some of the limitations of the theory that make it ineffective in the context of organisational adoption studies.

The major criticism of DOI is that the theory presents innovation diffusion as a very straight forward and easy process (Aleke et al, 2011; Fichman, 1992). Critics argue that innovation diffusion within different classes of social group 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. Although DOI attempted to explain how innovations diffuse, the theory tends to over simplify how such changes occur within a specified population (Aleke et al, 2011; Orr, 2003). Thus, figure 2 suggests an alternative scenario of a more complex diffusion process required to assuage the uncertainty and fear of potential adopters about a new innovation through a social process. The opinion leaders in stage 2 represent the opinion moulders within the social class. They make the initial innovation decision in stage 1 which then rubs off on and determines the aggregate decisions of the critical mass within the social grouping in stage 3 revealing a complex process using various communication channels in stage 2.

Figure 2: Diffusion of Innovation Framework



Adapted from Aleke et al, 2011; Gallivan, 2001

Another criticism of DOI is that it basically sees diffusion as the primary responsibility of an individual thus suggesting that, for example, employee's adoption behaviour represents the organisational adoption decision (Fichman, 2004; Gallivan, 2001). Fichman (1999) however argues that

when the locus of innovation adoption is the formal organisation, the perception of leaders and key decision makers of the adopting organisation is what matters. It is only after that stage that it then becomes the discretion of the individual employee to decide whether to use it or not and how (Leonard-Barton and

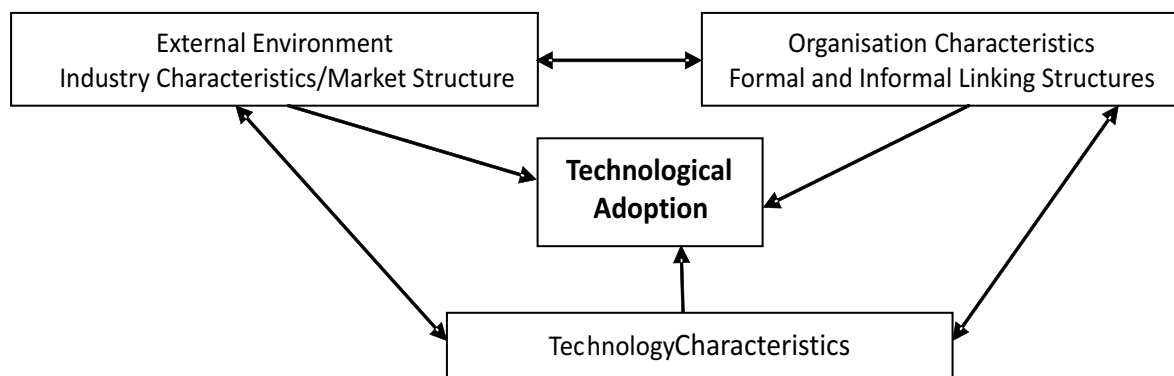
Deschamps, 1988b cited in Fichman, 1999). The DOI theory is criticised for its concentration on individual adoption thus neglecting organisational adoption behaviour (Fichman, 1992; Gallivan, 2001). These limitations of DOI in relation to organisational adoption decision prompted the development of TOE.

## 2.2. Technological-Organizational-Environmental Framework (TOE)

Drawing from the innovation diffusion theory, Tornatzky and Fleischer (1990) developed the Technology-Organization-Environment (T-O-E) framework to study IT innovation adoption by organisations (Kok et al, 2011). T-O-E framework 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, 2002). The organizational context is defined in terms of the characteristics and resources of the firm which include 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). 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.

Figure 3: **Technology-Organization-Environment (T-O-E) Framework**



Source: Adapted from Tornatzky and Fleischer (1990)

TOE has been validated by several researchers. For example, Tan (2010) adopted the TOE framework to investigate how its construct (original factors espoused by Tornatzky and Fleischer, 1990 within the three broad context of an organisation) influenced IT adoption by SMEs. Results showed that TOE framework was very useful in predicting IT innovation adoption in SMEs. Kuan & Chau (2001) using the TOE framework investigated six predictors of EDI adoption and confirmed the usefulness of the TOE framework in studying technological innovation adoption in organisations. TOE has since been either modified or integrated with other theories or frameworks to suit various research purposes (see for example Kok et al, 2011; Tan, 2010; Skoko et al, 2008; Tan et al, 2007; Lertwongsatien et al, 2004;

Xhu et al, 2004; Zhu et al, 2003; Kuan & Chau, 2001; Hatrup & Kozlowski, 1993). The TOE framework has been criticised for not having a unifying constructs within the three contexts as they have been found to almost always differ from one study to another (see table 3). There is hardly any single factor that has been universally tested in every technological innovation research as the identification of factors to be included depends on the specificity of the innovation studied (Kok et al, 2011). This led researchers to the modification and integration of the framework with other theories and/or frameworks with the intention to develop frameworks that have stronger predictive powers. One of such modifications is due to Thong who in 1999 developed an integrated model and identified

technological characteristics, organisational characteristics, environmental characteristics, and CEO's characteristics as the key constructs to IT innovation adoption by organisations. Thong (1999) like Kimberly and Evanisko (19982) identified the CEO's characteristics because in small firms, which were the focus of his study, the CEO who usually is the owner-manager is also the decision maker. He argues that the characteristics of the CEO are crucial

in determining the innovative attitude of small businesses since their (CEOs) abilities and inclinations, and extent to which they are prepared to devolve management greatly determine the rate of change that occurs in small firms as much as factors like financial resources, size, and market forces. Table 3 presents varying constructs within the three organisational contexts of TOE.

**Table 3: Research conducted based on TOE Framework**

References	IT Innovation Studied	Constructs
Gibbs and Kraemer (2004)	E-Commerce	<b>Technology</b> : technology resources, perceived benefits <b>Organisation</b> :lack of organisatio nal compatibility, financial resources, firm size, <b>Environment</b> : external pressure, government promotion, legislative barriers
Hong and Zhu (2006)	E-Commerce	<b>Technology</b> :technology integration, web functionalities, EDI use <b>Organisation</b> :web spending, perceived obstacles <b>Environment</b> : partner usage
Kuan and Chau (2001)	ValuNet EDI	<b>Technology</b> : perceived direct benefits, perceived indirect benefits <b>Organisation</b> : perceived financial cost, perceived technical competence <b>Environment</b> : perceived industry pressure, perceived government pressure
Lertwongsatien et al (2004)	E-commerce	<b>Technology</b> : perceived benefits, perceived compatibility <b>Organisation</b> : size, top management support, IT emphasis, existence of IT department <b>Environment</b> : competitiveness
Lin and Lin (2008)	E-Business	<b>Technology</b> : IS infrastructure, IS expertise, expected benefits and <b>Organisation</b> :organisational compatibility, expected benefits of e -business <b>Environment</b> : competitive pressure, trading partner readiness
Pan and Jang (2008)	Enterprise Resource planning (ERP)	<b>Technology</b> : IT infrastructure, technology readiness <b>Organisation</b> : size, perceived barriers <b>Environment</b> : production and operations improvement, enhancement of products and services, competitive pressure, regulatory policy
Scupola, (2003)	Internet E-Commerce	<b>Technology</b> : E-commerce barriers, E-commerce Benefits, related Technology <b>Organisation</b> : financial and technological resources, Employees IS knowledge, innovation champion, company size <b>Environment</b> : pressure from competitors, buyers and seller, role of government, technology support infrastructure.
Seyal et al (2004)	E-Commerce	<b>Technology</b> : perceived benefits, task variety <b>Organisation</b> : organisational culture, management support, motivation to use E -Commerce <b>Environment</b> : government support
Wang et al (2010)	RFID	<b>Technology</b> : relative advantage, complexity, compatibility <b>Organisation</b> :top management support, firm size, tech competence <b>Environment</b> : competitive pressure, trade partner pressure, informati on intensity
Xhu et al (2004)	E - business	<b>Technology</b> : technology competence <b>Organisation</b> : firm size, global scope, enterprise integration <b>Environment</b> : competition intensity, regulatory environment
Zhu et al (2006)	E-Business	<b>Technology</b> :relative advantage, compatibility, costs and security concern <b>Organisation</b> :technology competence, organisational size <b>Environment</b> : competitive intensity, partner readiness

Empirical Studies onIT Innovation Adoption among SMEs in Developing Countries

E-payment technology enhances financial and commercial transactions between businesses (B2B),

business and employees (B2E), business and government (B2G), and business and consumers (B2C) (Yu et al, 2002). It also enables competitiveness in e-business activities both locally and globally (Sumanjeet, 2009). Given the fact that e-payment is part and parcel of e-business/e-commerce



activities, trading between countries is facilitated by e-payment (Winn, 2003). However, the trend of e-business activities has been found to differ between countries as no two countries have the same level of infrastructure and manpower to facilitate adoption on equal pedestal (UNCTAD, 2004). The inequality in infrastructure and manpower has been fingered as the cause of the obvious digital divide between developed and developing countries leading to the rich in technology getting richer and the poor in technology getting poorer with implications for e-business/e-payment activities for the developing countries (Okoli and Mbarika, 2003). The countries that are usually ranked high in e-business/e-commerce activities include US, Western Europe, and Japan because of their well-developed infrastructure and manpower (EIU, 2006). The story is not the same in developing countries like the sub-Saharan Africa (SSA), Latin America, Middle East, and some Asian countries as they have been found to lag behind the developed economies due mainly to poor infrastructural development (Almeida et al, 2006). For example, the SSA region is characterised by low income and low manpower resource development in addition to stern structural, socio-political and economic mismanagement (Austin, 1990). Coupled with this is the endemic destructive and rampaging civil and tribal warfare raging in the region leading to hunger and starvation. Given these facts, it is therefore not surprising that the level of technological innovation adoption in the SSA region has been slow (Okoli and Mbarika, 2003).

Studies abound on the factors that impact adoption behaviour among SMEs in developing countries. What may look like a summary of the plethora of problems confronting and hindering SMEs in developing countries from adopting technological innovations was offered by Rao (2003) who listed among others capital, connectivity, commerce, culture and capacity as impediments to e-readiness. The notable indicators of e-readiness are computer and network (internet) penetrations which gladly have been on the rise in many developing countries like China, Brazil, India, Malaysia, South Africa, and Nigeria among others. There is a direct correlation between PC and internet penetrations and e-business readiness. It is heartening to note that e-business has also been on the rise though slowly in recent years in some of these areas including Nigeria. To enhance the competitive capacity of SMEs in developing countries in the global internet economy, there is need to understand what factors that influence the adoption of new technologies such as e-payment which facilitates internet economy through e-business and e-commerce in developing countries.

Using either the DOI theory or TOE framework discussed earlier, several IT studies have identified many variables that are possible determinants of innovation adoption by organisations. Several of these studies were on IT innovation adoption with focus on small firms in developing countries. Examples of the factors empirically investigated and found to influence IT adoption in small businesses are enumerated in table 4.

**Table 4: Examples of Studies using the TOE Framework**

Author and Dates	IT Innovation,	Independent Variables Investigated
Iacovou et al., 1995	EDI	perceived benefits, organisational readiness, and external pressures
Looi, 2005	E-Commerce	IT knowledge, competitive pressure, security, relative advantage and government support
Mao and Palvia, 2006	IT	perceived usefulness, compatibility, visibility, and result demonstrability
Tan et al, 2011	ICT	relative advantage, compatibility, observability, security, and cost
Tan et al, 2000	Internet Banking)	relative advantage, compatibility, trialability, risk, experience, and needs
Thong, 1999	IOS	CEO's innovativeness, business size, IS knowledge, complexity, competitive pressure
Wu and Wang, 2004	Mobile Commerce	perceived risk, perceived cost, perceived usefulness, and compatibility
Zhu and Kraemer, 2005	E-Business	technology competence, firm size, financial commitment, competitive pressure, and regulatory support
Karahanna, et al, 2006	IT	perceived usefulness, ease of use, result demonstrability, visibility, and trialability

Scholars identify certain adoption factors to reflect the level of development especially in the area of national infrastructure (Molla and Licker, 2005; Looi,

2005). For example, Travica (2002) listed customer e-commerce propensity, e-payment, software industry, telecommunication delivery and

transportation as some of the factors impacting e-commerce adoption and diffusion in Costa Rica. While some of these factors might look ordinary and simple to achieve in a developed country, they are impediments to technological adoption in developed countries. In a related development, the level of stability or otherwise of electricity supply from a country's national grid has been found to be a vital determinant of not only the adoption of a technology but also the extent to which the technology is used in developing countries such as Nigeria (Adenikinju, 2005). While in developed countries electricity supply is not mentioned as an influencing factor of adoption of technological innovation because it is regular and therefore has no visible adverse implication on both economic and social activities, in developing countries electricity supply is a major determinant of adoption of technological innovation because of its irregular supply and this instability in supply has affected both business and social activities in these countries (Ghalami, et al, 2010; Chiemeka and Ewwiekpaefe, 2011). According to Ihua (2009), the state of electricity supply has posed a major challenge and hindrance to business activities in the Sub-Saharan Africa (SSA) and Nigeria in particular. Empirical studies by Onyema (2011), Akintola, et al (2011), Akpan-Obong (2007), Folorunsho et al (2006), and Adenikinju (2005) found that irregular or unstable power supply impact the general business activities including e-business and e-commerce in the sub-Saharan Africa in general and Nigeria in particular. Specifically, Adesola and Adeyinka (2008) posit that since internet economy strives on infrastructure, it is very unlikely to succeed in Nigeria due to "epileptic and worsening electricity supply in the country" (p. 9). Studies show that the same type of factors can influence IT innovation adoption across countries and cultures. For example, Beck et al (2003) using data from questionnaire survey of 151 SMEs found that IT infrastructure, business concentration, and government regulations influenced IT diffusion among SMEs in Germany, Denmark, France and USA in a similar way. This means that some of the factors found to have influenced the adoption of some IT innovations in other countries could influence the adoption of e-payment systems in Nigeria.

There is limited research on e-payment systems adoption per se especially at the organisational level. The few possible exceptions are studies by He et al (2006), Ifinedo (2011), Harris et al (2011), and Plouffe et al (2001). He et al's study examined five innovation characteristics: relative advantage, complexity, compatibility, trialability and

observability. Results revealed that only compatibility significantly influenced online e-payment adoption by Chinese companies. One of the drawbacks of the study was the low response rate of 7.3% which tended to question the reliability and validity of the study (Chau & Tam, 1997). On the other hand, Ifinedo (2011) employed an integrated framework of TOE and TAM. He found that perceived usefulness, organisational readiness, top management support, and IS vendor support positively influenced the intention to expand the use of e-business payment systems in Nigerian small firms. However, the study recorded a low R<sup>2</sup> of 21% signifying an overall poor construct validity (Chau & Tam, 1997). Study by Harris et al (2011) found that flexibility, functionality, data management, privacy and perceived security are significant predictors of perceived e-payment systems use by firms in Malaysia. On their part, Plouffe et al (2001) found that relative advantage and compatibility were the most important characteristics of e-payment systems adoption by both consumers and sellers.

Several factors have been identified as e-payment characteristics and empirically examined previously (Abrazhevich, 2004). Such characteristics include: perceived risk, anonymity, privacy, applicability, authorisation, convertibility, efficiency, interoperability, reliability, scalability, perceived security, perceived trust, usability, traceability and linkability (Abrazhevich, 2004; Medvinsky & Neuman, 1995). Some of these factors have been found statistically significant in predicting e-payment systems adoption by consumers in developing countries (see Harris et al, 2011; Lin & Nguyen, 2011; Kim et al, 2010; Ozkan, 2010; Rigopoulos & Askounis, 2007). For example, perceived security and trust were found to positively influence e-payment systems adoption and degree of use by Korean consumers (Kim et al, 2010). In their study, Lin and Nguyen (2011) found that perceived ease of use, perceived usefulness, perceived risk, and information significantly impacted the consumers' adoption of e-payment systems in both Taiwan and Vietnam.

Literature has shown that there is no uniformity of innovation adoption theories and frameworks. This is because innovations differ and adoption contexts also differ (Thong, 1999). For example, innovation studies reveal that innovations can be product-based or process-based. Innovations can also be administrative-based or technical-based (Fichman and Kemerer, 1997). Literature shows that there are variations between adoption contexts. Contexts of adoption can be at individual level or organisational

level. It can also be within a competitive environment or non-competitive environment (Fichman, 1992). Therefore, to focus on each of these variants may require a different study approach thereby making it impossible to have a one-fit-all theory and framework in innovation adoption research such as this. In the past, researchers have tempted to reduce the knowledge burden created by these different types of innovation and adoption contexts by attempting to identify distinctive characteristics of contexts in the development of theories and frameworks (see Thong, 1999; Fichman & Kemerer, 1993; Fichman, 1992; Tornatzky & Fleischer, 1990; Kimberly & Evanisko, 1981). Thong (1999), for example, argued that Rogers' generic innovation theory identified innovation characteristics context which was supported by Prescott and Conger (1995). While this may serve as an important context, IT scholars have pointed out that more structural contexts are required for the study of organisational adoption. Thus, scholars suggested that there should be an integration of various theories including DOI to develop better predictive theories and frameworks (Chau & Tam, 1997).

In the case of technological innovation adoption within the organisational context, Tornatzky and Fleischer's (1990) study is frequently cited perhaps for providing two additional contexts to Rogers' innovation characteristics for the study of innovation adoption by organisations (Chau & Tam, 1997). The TOE has been validated by several scholars who have used it to study small business adoption of variety of IT innovations (see table 2). Scholars like Thong (1999) and Ifinedo (2011) integrated the TOE framework with other frameworks perhaps in response to the suggestion by Chau and Tam (1997) that the TOE framework should be extended to examine different IT innovations. Kimberley and Evanisko's (1981) study which is based on DOI theory identified organisational leaders' characteristics, organisational characteristics, and environmental characteristics as three clusters of variables that influence organisational innovations adoption. Looking through the TOE framework and Kimberly and Evanisko's clusters of variables, one can identify four distinct and relevant SME contexts – technological, organisational, environmental, and owner-manager characteristics – appropriate for this present study.

The owner-manager context has been identified in this study as a separate context as a result of the role owner-managers play in small businesses. Previous research had focused on owner-managers (CEOs) in executive leadership positions based on the assumption that the formal and symbolic power of

CEOs within the context of an organisation has significant impact on both the activities and performance of that organisation (Rajagopalan & Datta, 1996). The formal roles and managerial control of owner-managers are even more profoundly critical within the SME context (Thong, 1999). Owner managers allocate organisational resources and impose sanctions on other members of the organisation (Kimberly & Evanisko, 1981). Owner-managers also determine if the organisation requires an innovation and, if so, which and when to adopt (Thong & Yap, 1995). Therefore, since this study is investigating the adoption decision of the SME which falls within the prerogative of the owner-manager, understanding how they (owner/managers) perceive innovation adoption within the context of their characteristics will help to better understand the decision process of the SMEs (Martin, 2005). Hence this study has made the owner-manager's characteristics a separate context within the organisational structure of the SME.

Several studies have used similar frameworks to examine IT innovation adoption behaviour among SMEs (see Kok et al, 2011; Thong, 1999). Although several studies have examined the relationship between CEO's characteristics and organisational factors (Rajagopalan & Datta, 1996; Thong & Yap, 1995; Kimberly & Evanisko, 1981), little attention has been paid to other contexts of the organisation such as the environmental and technological contexts as envisaged by Tornatzky and Fleischer (1990). We shall after confirming using convergence and discriminant validity tests, introduce some relevant control variables such as the age, gender or ethnicity/tribe of owner-manager as these factors have equally been found to strongly influence technology adoption by organisations (see Carpenter et al, 2004; Rajagopalan & Datta, 1996; Palvia et al, 1994; Hambrick & Manson, 1984).

The developed framework will enable the examination of the factors that influence the adoption and extent of adoption of e-payments by SMEs in Nigeria. The original intension of this study is not to develop a new theory but rather to formulate hypotheses for variables that had been found to predict IT innovation adoption by SMEs in the past. However, while the findings of prior studies reveal various factors that predict different IT innovations adoption and extent of use, it is not unlikely that the same factors may not have equal or similar impacts on the adoption and extent of adoption of e-payment systems by SMEs in Nigeria given the likely differences in culture, political behaviour, and level of economic and infrastructural developments between Nigeria and those countries.

**Theoretical Framework**

After reviewing the IT adoption literature, it is obvious that there is a wide range of IT innovations

and this arguably suggests why it is not possible to use a single adoption model (Ramdani & Kawalek, 2007) for all innovation adoption studies. In this present study, a new research framework was developed (see figure 4) resulting from the integration of Kimberley & Evanisko's (1981) study and TOE framework. The new research framework has four distinct structural taxonomies of an SME consisting technological, organisational, environmental, and owner-manager characteristics

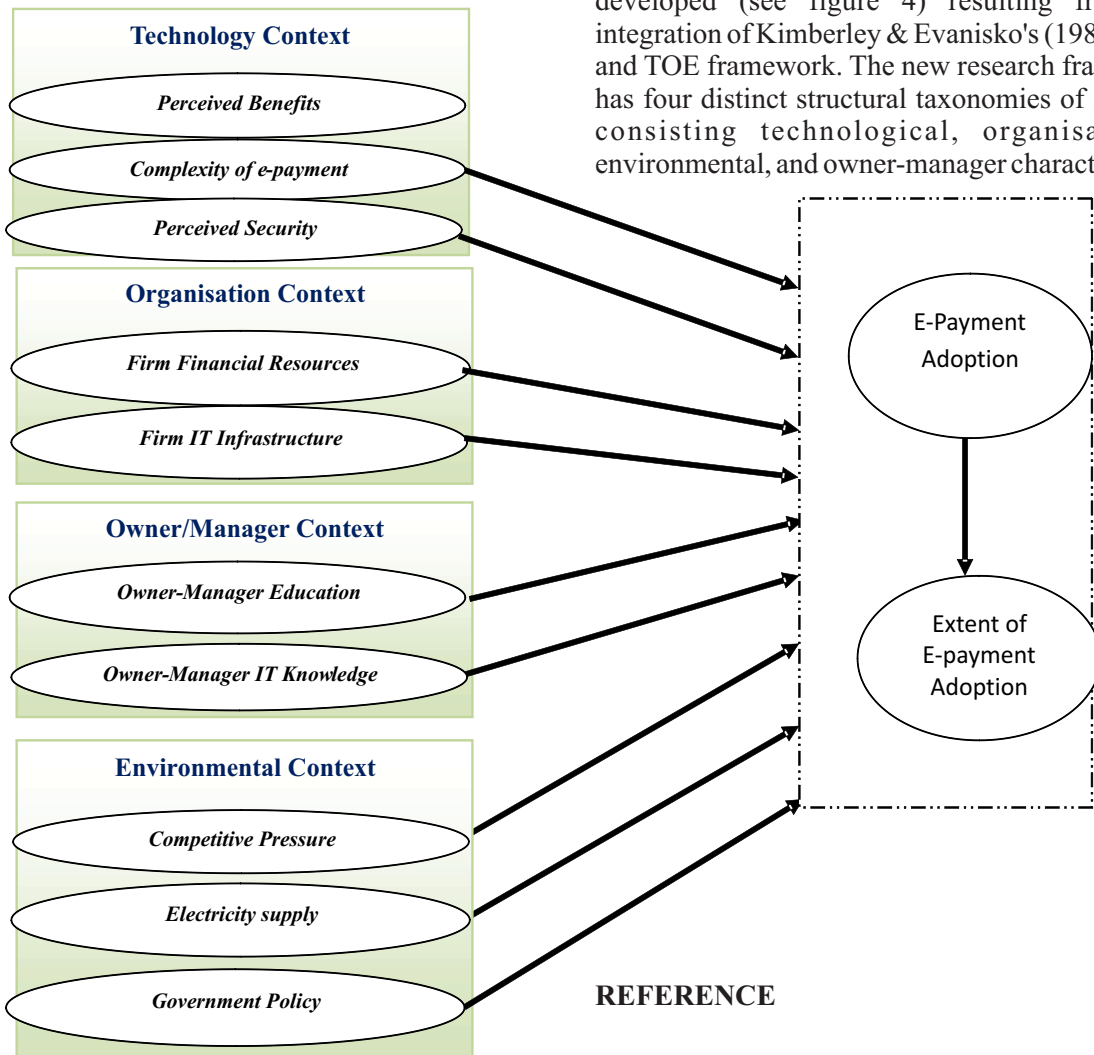


Figure 4: Research Framework

The four contexts with their identified variables from the literature review will be discussed in the next publication with justifications for their choice.

**Conclusions**

Having provided the background study to underscore the importance of this study, undertaken a comprehensive review of previous IS/IT literature to provide a theoretical foundation and developed the research model, the next logical stage is to explain each of the selected factors and develop hypotheses based on these factors before proceeding to research methodology, go to the field to gather data and analyse such data. But because this exercise is essentially literature review, my next paper would deal with all of that and conclude the research.

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