

# Electronic Payment System (EPS): Facilitating the Development and Adoption in Nigeria

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## Abstract

Parties conducting electronic businesses and transactions have usually never seen each other face-to-face, nor exchanged currency or hard copies of documents hand-to-hand. The society at large prefers transactions that involve physical contact of people, cash and cheques to that which is done over a telecommunication network such as the Internet. However, security, trust and convenience are among the major contending factors affecting the adoption of e-payment systems in Nigeria. This paper presents issues on the factors necessary to facilitate the development of EPS in Nigeria and devise ways to enhance its adoption by users.

**Keywords:** *Electronic payment system, e-money, and e-payment, Internet.*

## 1. Introduction

The worldwide proliferation of the Internet has led to the recent birth of electronic payment system: a payment service solution-software that enables monetary value to be transferred digitally. Today, electronic payment system is flourishing due to the openness, speed, anonymity, digitization, and global accessibility characteristics of the Internet [12], which has facilitated real-time payment transactions and other business activities.

In this paper, we considered some critical examinations on the existing payment structure in Nigeria. Also reviewed, was different related literatures on e-payment system, and data from research reports. Technical journals, newspapers, and magazines were likewise examined..

## 2. A Brief Review of the General Payment System in Nigeria

In a country like Nigeria, where almost eighty percent of its population rely on physical cash rather than electronic payment, it is not so simple just for people and employers

of labour, to consider and decide on the basis of cost and benefit of using e-payment systems [2]. In the course of preparing this research, we had the opportunity of visiting few/remote places to find out the perception of the people about electronic money. It was observed that most people have no common knowledge about the Internet, let alone the existence of e-payments. People are quite far from all the ICT developments taking place in banking. What people know about banking is the use of physical cash for deposit and payment, but not electronic payments.

The existing structure of the Nigerian payment system is fully based on traditional payment instruments of cash and cheques [18]. Even for large-value payments, like sale and purchase of land and building, people prefer physical cash rather than receiving any other form of payment. This also applies to the general population. In businesses, people prefer using cheques and drafts. Thus, Apex Bank (Central Bank of Nigeria – CBN) operates a clearing house, with many network centres for performing cheque clearing throughout the country. The clearing house renders services to the member banks and financial institutions only. Generally, all the banks and financial institutions are members of the clearing house.

### 2.1 Electronic Payment Initiative in Nigeria

Electronic Payment initiative began recently in Nigeria. Not all the banks and financial institutions are participating in the e-payment system [11]. Although to date, most of the commercial banks have engaged in providing some form of e-banking services. It is to be noted that not all of these institutions extend their e-banking facilities to their entire branch network. The e-payment services are mostly provided in the capital city and some bigger cities nationwide.

As mentioned, the e-payment facilities available in Nigeria are Automated Teller Machine (ATM) service, debit card, credit card, mobile banking and Internet banking [5]. Interswitch Nigeria Ltd provides the switching and settlement facilities for transactions performed on ATM;

and eTransact Nig. Ltd provides mobile e-payment solutions switching and service provider. Banks purchased their software from different vendors to provide all these services to their customers. Authenticity, inter-operability, validity and confidence solely depend on the supplier of that software [3]. However, the central bank of Nigeria and the supervisory authority of the Nigerian financial system, has thus initiated steps towards the regulation of electronic payment systems in Nigeria [2].

Electronic payment system has also experienced a lot of setback in recent years due to limited availability of ATM services [5]. These machines are only made available to few bank branches and clients, while the demand for the card is higher than the services provided. Infrastructure and Information Technology (IT) constraints also contributed to some of the setbacks experienced (such as: high cost of internet connectivity, energy challenges, banks not fully automated, banks not ready for electronic payment services, and contentedness of people with the existing system because of lack of awareness on the benefit of the new technology [11].

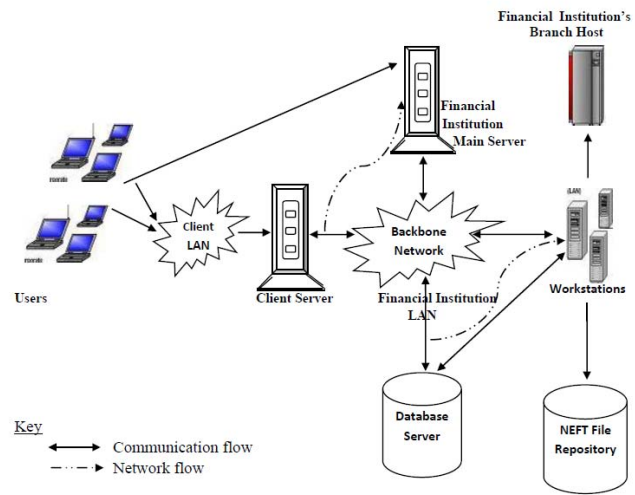
The Federal Government of Nigeria, from January 2009 adopted electronic payment to monitor her budget and to coordinate the activities of all the Ministries, Departments and Agencies (MDAs) [18]. The government indicated that "Recurrent expenditure on personnel will be controlled with the deployment of information technology, by way of the Integrated Personnel and Payroll Information System (IPPIS), to all the MDAs" [2]. Already, three of the country's leading information technology companies are now involved to control most of the electronic payment accounts of the MDAs. The companies are:

- a. Systemspecs Ltd - West Africa's leading human resource and payroll solutions maker;
- b. Interswitch Nigeria Ltd- Nigeria's leading electronic payment switching and transaction provider; and
- c. eTranzact Nigeria Ltd - mobile electronic payment solutions switching and service provider.

Each of them have their own distinct electronic payment solution packages targeted at meeting the federal government's resolve to implement an e-payment system whereby all salaries and contract payments would be done electronically.

With these new initiatives by the federal government to coordinate the activities of all MDAs using e-payment system, this paper intended to serve as a catalyst to proffer innovative ways that will assist the government towards implementing the e-payment system to the grass root. A

general structured model of the new EPS can be seen in figure 1.



**Figure 1** Model of the new Electronic Payment Systems

In Figure 1, the users connect to the client server through the client's Local Area Network (LAN), and route their data through this network to the Financial Institution's server residing in the main station. These users can access the main server via internet, where all the data from all clients to the main server are housed in the Database Server, and only accessible via the backbone network. Each workstation has an installed customized payment modules that helps to access the database server via backbone network and facilitate direct transfer of monetary values to beneficiaries that have accounts with the financial institution's branches, while values for other banks are sent through inter-switch or NEFT (Nigerian inter-bank settlement scheme (Nibss) Electronic Fund Transfer) for onward forwarding to other banks' processes.

## 2.2 Factors Affecting E-Payment Development and Adoption

The main concern with electronic payment is the level of security in each step of the transaction, because money and merchandise are transferred while there is no direct contact between the parties involved in the transaction. If there is the slightest possibility that payment system may not be secure, trust and confidence in this system will begin to erode, destroying the infrastructure needed for electronic payment system.

The factors among other, that affect the development of e-payment in Nigeria include:

- i. Peoples' Behaviour: The people in Nigeria are accustomed to physical cash and cheque. Few

people have confidence using e-payment. One feels safe having cash on him / her. Carrying a chip representing thousands of naira or dollars in the wallet does not give people the same feeling as they are carrying hard cash [11]. The question of 'who adopts the new payment system' is an on-going concern to developers of e-payment software, and this has hinders the fast improvement on development.

- ii. **Infrastructural Development:** poor infrastructural management in the power sector and telecommunication industries in the country affects the speedy deployment of electronic payment [6].
- iii. **Development of ICT:** The development of information and communication technology in Nigeria is the major factor for e-payment development. Since ICT is in its infancy, the country faces difficulty promoting e-payment development and its adoption [6].
- iv. **Computerisation of Banks:** Around twenty percent (20%) of total bank branches in Nigeria's banking system are computerised. It means that the other eighty percent (80%) of the bank branches do not meet the minimum logistical requirement needed to support electronic banking [11].
- v. **Initiatives from the Banking Sector:** Some of the commercial banks are spearheading the developments of e-payment in Nigeria. These banking institutions are acquiring software which is compatible for performing e-payments. Yet, the reliability and prudence of such software need to be verified by the Authority [17]. To date, the impact of e-money on the overall payment system is in its infancy as e-money is not so much in use in Nigeria.
- vi. **Regulatory Arrangement:** With the enactment of the Apex Bank Act, 1991 (CBN Decree 24 and Banks and Other Financial Institutions –BOFI Decree 25 both of 1991), many regulations have been formulated to strengthen the banking and financial system in Nigeria. Under the provision of the aforementioned Act, the central bank of Nigeria is empowered to issue regulatory directives for promoting the e-payment system in Nigeria. This can be viewed as a positive contributory factor.

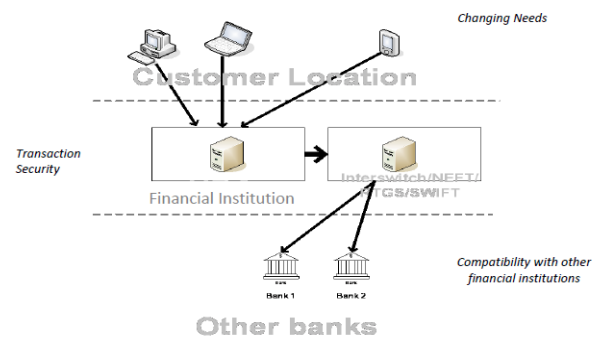
### 3. Assessment criteria for e-payment system adoption in Nigeria

In this paper, four types of assessment criteria were used to check-mate the users' interest in adopting e-payment [3, 12, 13, 14 and 17]. These assessments are also to encourage users to adopt EPS for efficient and effective management of human resources. The assessments and their descriptions [3,12,13,14,17] are as follows:

- (a) The technological and security aspect,
- (b) The social aspect,
- (c) The economic aspect,
- (d) The institutional and regulatory aspect.

#### 3.1 Technological aspect

The figure below indicates that, users feel satisfied when they can have safe control of various types of payments to/from any location over the Internet. Figure 2 below depict the overview of the new e-payment technology.



**Figure 2:** General overview of the proposed e-payment technology

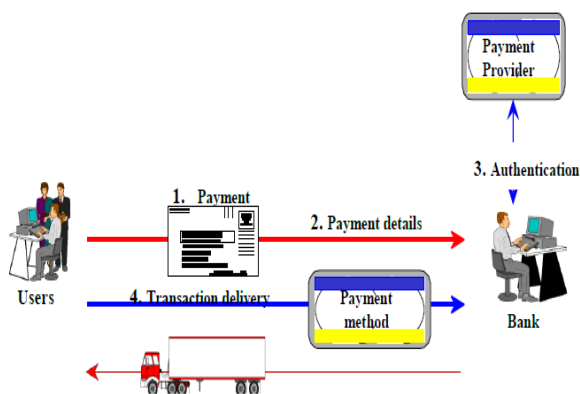
In other words, when designing an e-payment system, the system's ability to adapt to users' changing needs, the security of each transaction, the degree of compatibility among other payment systems, and the complexity in adapting to the system, all need to be taken into account.

The Secure Electronic Transaction (SET) is a protocol co-developed by MasterCard and Visa for secure bankcard transactions [9, 19]. The Secure Socket Layer (SSL) is a session layer protocol proposed by Netscape for securing exchanges between a client and a server [8,9,15]. The degree of security involves: users' security when depositing or withdrawing money; security of application programs and databases; security during transactions and payments; security of the Internet and system; and security

maintenance and management. Among these, the security of transactions and payments is one of the utmost concerns for users.

However, transaction and payment security needs to satisfy the following requirements:

1. **Validity:** Also referred to as authentication. This is one of the most important things to take into consideration in e-payment system. The purpose is to verify the claimed identities of all, and to prevent third parties from sabotaging information or making unauthorized transfers. Figure 3 below illustrates the transaction flow pattern of an e-payment system. In this model, when a user makes a payment, the Bank authenticates the validity of the user's e-payment. This authentication can be in form of checking the validity of the credit card number; or the online real-time check of the account details; or the e-payment system provider. The nature of the authentication check generally varies depending on the level of risk involved.
2. **Privacy:** The purpose is to protect information that is sent via the Internet, and to prevent unauthorized personnel or users from accessing confidential information.
3. **Integrity:** This includes the prevention of tampered transactions, making mistakes when sending information, and avoids accidentally sending a transaction twice, or with false information. This will help to prevent users from either denying their involvement in a transaction, or from changing information in the transaction.
4. **Non-repudiation:** The e-payment system must be designed in such a way that users will be unable to deny their participation in a transaction if they were involved. Therefore, records of details, such as the time of the transaction, the information involved in the transaction, etc., must be kept in a secure database.



**Figure 3:** Transaction flow pattern of an e-payment system

### 3.2 Social aspect

In addition to satisfying the needs associated with the technical and security aspects of the electronic payment system, the system still needs to address the social needs if society is to trust and adopt it. The social needs include:

- i. To protect the privacy of the user, and to prevent companies or financial institutions from tracing user information.
- ii. Degree of acceptability: The electronic payment system should be simple and user-friendly. The degree of user friendliness is a factor when users decide which system to adopt and use, especially for micro payments.
- iii. Mobility: Users do not necessarily always use the same computer when accessing the Internet. In the case of families or public computer centres, many people often share the same computer. Therefore, it would be unwise and impractical to store payment methods on hardware. Electronic payment methods should have mobility, and should be able to be accessible anywhere. This is another factor that will affect a user's decision in adopting a payment system.

### 3.3. Economic aspect

The economic needs can be divided into two categories: one is associated with the real currency value aspect; the other is related to the degree of widespread use of the Internet. The preceding two factors can be used to analyze the economic needs that include:

1. **The cost of transactions:** This refers to the cost paid by the users involved in a transaction. The cost can be divided into direct and indirect cost. However, in choosing the e-payment system for micro payments, the cost of the transaction will be a deciding factor.
2. **Financial risk:** All Internet users in the society are very concerned about the degree of security involved in online transactions. So, in addition to added security measures, to prevent information from being hacked or made public, the question of what will happen if private information is made public should be considered when developing and adopting an e-payment system.

### 3.4. Institution and law aspects

In addition to satisfying the technical, economic, and social needs; the payment system must abide by governmental regulations and the law. Currently, some of the concerns associated with law include: digital

signatures, digital transfers and the legality of payments, technical standards, etc. Owing to the fact that intuitions and laws are related to the government, each district and nation has its own set of policies. Therefore, the e-payment system must abide by the respective policies of the district and country.

#### 4. Policy Response to E-Payment System Adoption

The Apex Bank (CBN), which is the sole authority designated to regulate and supervise the financial sector, is taking the first step in formulating and implementing a policy regarding e-payment in Nigeria. With the inception of various e-payment modes, such as debit card, credit card, Internet banking and others, it has become imperative for our Apex Bank to consider streamlining these products [5, 16].

The Apex Bank should also focus on the following issues to promote e-payment development, wider user adoption and usage among the general public: (a)General Legal Issue (b)Relevant Security Issue (c)Provider Issue (d)Payment System Issue (e)Supervisory Issue (f) Law Enforcement Issue (g) Public Awareness.

- a. General Legal Issue: there should be laws and regulations promulgated to cover the legal status and issues of e-payments in Nigeria. The CBN should however placed the matter as high priority in any of its recent papers or workshops, or meetings and also establish a framework to regulate and streamline the modes of e-payment in Nigeria. This will bring confidence to users, knowing full well that the government is in control.
- b. Relevant Security Issue: The CBN and its Bank Supervision Department and Financial Institutions Supervision Department should lay down specific criteria to be used for evaluating the adequacy of the security features of new e-products. The Bank and/or financial institutions launch new products on their own often procuring the solutions from a renowned foreign supplier. For instance, some ATMs in Nigeria are run by a service provider, the security features of the technology used may not have been inspected by the CBN appropriate Authority in Nigeria.
- c. Provider Issue: The issue of provider of ICT solutions in the banking and financial sector should be properly addressed. The operation of e-payment system in Nigeria, as of date, is based on confidence in the system provider without verification by the central bank.

- d. Payment System Issue: Only debit/credit cards are in use. There are no e-money schemes operating in Nigeria as yet. The CBN should develop a mechanism to address the development of a payment system in electronic mode and interoperability of various cards in use for making payments. This will enhance the users' choices of e-payment systems in Nigeria.
- e. Supervisory Issue: Under the provision of the Apex Bank Act, 2002, the CBN is responsible for supervising banks and financial institutions. With this, CBN should implement regulation that will cover the operation of e-payment and e-money. It should not be only the payment and settlement system based on cash and cheques that will come under the oversight of the CBN.
- f. Law Enforcement Issue: Law enforcement is a top policy priority of the CBN. Law enforcement regarding e-payments plays a vital role in the success of e-payment systems.
- g. The Issue of Public Awareness: The public education and awareness is high on the list of policy priorities since the general population lacks awareness on usage of e-payments as an alternative to making payments by cash.

Nevertheless, the Apex Bank should consciously strive to encourage electronic payment system. Besides, they should plan to introduce a framework for the smooth running of the electronic payment system by the end of fiscal year 2011/2012.

#### 5. Future Directive of Electronic Payment

To forecast the future direction of e-payment development, it is important to review the present status of e-payment. Presently, Nigeria has a card-based payment system and some form of Internet e-payment for payment of utility bills, etc. Before planning the future, the Apex Bank should regulate the existing card-based payment system. The use of e-money will be the next stage of development. The networking of all banks and financial institutions with a regulatory body is a function which needs to be done for the development of e-payment schemes. Enactments to provide for user protection, electronic signature, building up of public confidence in e-money, and generation of accurate data, are some of the functions that need to be planned.

One of the important future functions of the apex bank is to be a catalyst in creating conducive environment for e-payment development [4]. This includes creating interoperability for automated teller machine cards (ATM cards), inception of e-money, which is widely used in

twenty-first century financial world to facilitate the development of the payment system in the presence of new innovations (i.e. electronic payments by chips and network money, etc.). Side by side, it is important to anticipate potential fraud, provide safeguards, identify gaps and close loopholes when making policies. Users' protection and electronic signature validation are some of the legal issues, to name but a few that need to be addressed. The generation, storage and publishing of accurate data are another issue for future direction.

## Conclusion

With the implementation of the above directives, the confidence in developing and adopting e-payment system among the citizenry will become acceptable as e-payment system has already taken a centre stage in the economic activities of countries of the world [5]. Having adopted e-payment system in her bid to catch up with this trend in the world, Nigeria is one of the gold-spots in Africa and with believes, it will lead the biggest market in the future. As she has already set the first step, we can thus visualise the future use of e-payment very bright [1].

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