Designing a Reliable E-payment System: Nigeria a Case Study
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Abstract

The Nigerian economy is largely cash based with a lot of money residing outside the banking system. To a greater extent, this has hindered the participation of the citizens in e-commerce because e-payment is the acceptable means of settling transactions. This paper reviews the e-readiness of Nigeria as a country; the available payment methods; the challenges facing its adoption; for e-commerce, and the challenges motivating its wider applications. Our purpose is to establish linkages among the stakeholders and government to guide the operations of the scheme; a public-private partnership (PPP) to ensure the entire system works to guarantee security, efficiency and effective control. A whole of government approach is needed.

Keywords: E-payment, E-commerce, PPP, Credit/Debit Cards, Fingerscans, PIN, and Security

1. Introduction

In Nigeria, the modernization of the payment process started with the introduction of the MICR. This was followed by the establishment of ATMs for cash dispensing, account balance inquiry and payment of utility charges.

In 1991, the Central Bank of Nigeria (CBN) introduced the use of point of sale terminals and paper-based instrument. Similarly in 2004, CBN introduced a fraud control guidelines on eBanking which included the introduction of ATM, e-money products such as credit and debit cards,黯m. (2004).

The problems in e-payment and the need for a reliable payment system have been persistent. However, recent studies have been critical in assessing the role of evolving an efficient payment system among them are: System failure and event risk in Nigeria’s electronic payment sector (Babatunde, 2005), Speeding up Nigeria’s e-payment system: the role of InterSwitch (Ayo, 2005), and the Nigerian e-payment system: a look at its potential and challenges (Ojo, 2006).

2. Statement of Problems

Babatunde (2005) attributes the slow pace of development of e-payment to lack of adequate infrastructure, low Internet penetration, absence of open standards among banks and payment processors, which is a situation typical of developing nations. InterSwitch (2004) notes that the slow growth was due to lack of security awareness, under-developed payment systems, and lack of security consciousness and appreciation of merits of digital payment (Ojo, 2005).

The government had instituted a number of regulatory measures to curb the tide of frauds. These include: the National Drug Law Enforcement Agency (NDLEA) Act of 1994; the Failed Bank (Recovery of Debt and Financial Malpractice) Act of 1994; the Money Laundering Act of 1995; and the Anti-corruption Act of 1999 (Ezeoha, 2006b). The government had instituted a number of regulatory measures to curb the tide of frauds. These include: the National Drug Law Enforcement Agency (NDLEA) Act of 1994; the Failed Bank (Recovery of Debt and Financial Malpractice) Act of 1994; the Money Laundering Act of 1995; and the Anti-corruption Act of 1999 (Ezeoha, 2006b). Similarly, the other banks followed suit which led to the creation of the National Information Sharing System (NISSCO) and the Economic and Financial Crimes Commission (EFCC) among others. All these have not yielded much fruits because it takes more than legislation and enforcement to effect a change, but it also demands general attitudinal, cultural and social change on the part of all stakeholders.

However, the banks have recognized a number of systems in the Internet marketplace and banks experimentation to individual. The systems include: the Nigerian Internet Banking System (NIBBS), the Nigerian Electronic Funds Transfer (NEFT); the Nigerian Automated Clearing System (NACS); and the Society of Worldwide Interbank Financial Telecommunication (SWIFT), of which Nigeria is a member.

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Currently, there is a real-time gross settlement (RTGS) system that eliminates the risk involved in large-value payment. However, not much result have been achieved in terms of evolving an efficient payment system among them are: System failure and event risk in Nigeria’s electronic payment sector (Babatunde, 2005), Speeding up Nigeria’s e-payment system: the role of InterSwitch (Ayo, 2005), and the Nigerian e-payment system: a look at its potential and challenges (Ojo, 2006).

The Service Providers

We recognize two major groups in the e-payment industry. One of them is the service providers which include the banks, telecoms, cards manufacturers and switching companies. The second group is the customers, and is considered the primary user of the services. The major tasks for collecting data are personal observation, interview and questionnaire.

The Service Providers

Currently, most of the existing 25 banks in Nigeria engage in one form of e-payment or the other. The variables in the questionnaire include the name of the payment card; the origin: indigenous or foreign; the denomination of account; means of authentication and security; and the customer base. In this group are the card producers and the switching companies. Currently, most of the existing 25 banks in Nigeria engage in one form of e-payment or the other. The variables in the questionnaire include the name of the payment card; the origin: indigenous or foreign; the denomination of account; means of authentication and security; and the customer base. In this group are the card producers and the switching companies.

The Customers

A set of questionnaire was administered randomly to individuals in Lagos State of Nigeria, which is the commercial nerve centre of the country. The respondents included individuals that are resident in Lagos State and some others in no-means towns/transit areas in the others.

The variables in the questionnaire include type of employment, nature of business, location of business, availability of financial facilities, possession of payment card and as well as the level of usage.

Method of Analysis

The collected data was analysed based on descriptive statistics using frequency and cross-tabulation. The statistical package for social sciences (SPSS) was used.

Research Questions

1. What is the level of patronage of e-commerce?
2. What are the characteristics of e-payment cards?
3. What is the level of participation in e-commerce in Nigeria?
4. What is the level of availability of the payment card?
### 6. Analysis of Results

#### 6.1 Availability of IT Facilities

The table below presents the distribution of IT facilities in Nigeria.

<table>
<thead>
<tr>
<th>Facility</th>
<th>Number</th>
<th>Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of PCs</td>
<td>867,000</td>
<td></td>
</tr>
<tr>
<td>Number of Telephone Lines</td>
<td>22,912,917</td>
<td></td>
</tr>
<tr>
<td>Number of Internet Users</td>
<td>1,769,661</td>
<td></td>
</tr>
<tr>
<td>Number of Payment Cards</td>
<td>600,000</td>
<td></td>
</tr>
</tbody>
</table>

#### 6.2 Available Payment Instruments

Out of the available 25 banks in the country, only 20 of them responded to the administered questionnaires. The banks that responded included the major IT leaders in the banking industry. Our finding are as follows:

1. Seventeen (17) banks responded with a range of payment cards.
2. Two (2) pay instruments include: MasterCard, Visa Card, and ATM card with a number of trusted payment cards.
3. Five of the 5 banks that did not participate in the survey were because of the denominations of e-cards.
4. Eight (8) of the 8 banks that declined to participate in the survey were due to the nature of business being influenced by the level of e-commerce.

#### 6.3 Analysis of Research Hypotheses

- **Research Hypothesis 1**: The level of e-commerce is negatively influenced by the denomination of the card.
- **Research Hypothesis 2**: The level of e-commerce is positively influenced by the denomination of the card.

Calculated value is 7.63

Table value at 95% Significant Level is given as 12.59

From the above statistics, the level of facilities and participation is rather low for a country of a population between 130 and 150 million. There is need for an awareness campaign to sensitize the populace, while government has the major task of making available the needed infrastructures for efficient and effective implementations.

#### 6.4 Analysis of Research Questions

1. **Research Question 1**: What is the level of patronage of e-commerce?
2. **Research Question 2**: What is the level of availability of e-payment cards?
3. **Research Question 3**: What is the level of participation in e-commerce in Nigeria?
4. **Research Question 4**: What is the level of availability of e-commerce cards?

A total of 500 questionnaires were administered but only 354 were submitted. 140 (35.8%) of the respondents possessed a payment card, 244 (71.8%) do not possess one, while 7 (2.0%) did not answer the question.

Out of the 354 respondents, 66 (23.8%) of them have engaged in online purchases, while 288 (81.3%) have not used the medium. The remaining 7 (1.7%) respondents did not answer the question.

<table>
<thead>
<tr>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>7.630</td>
<td>6</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>.772</td>
<td>1</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>9.022</td>
<td>6</td>
</tr>
</tbody>
</table>

#### 6.5 Analysis of Results

- **Table 1**: IT Facilities
- **Table 2**: Nature of Business
- **Table 3**: Chi-Square Tests

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**References**

2. http://www.internetworldstats.com/africa.htm#ng,
The architecture is composed of three modules: The Customer, the Merchant, and the Central Hub modules. The Central Hub module is the only module in the existing e-payment architecture that is fully modified. The Central Hub module is the P2P management entity. It is composed of the banks (the issuers and the acquirers), the switching company, the national data bank (NDB), and the stakeholders. We propose a smartcard-based payment card with fingerprint scanner. The card is based on a two-factor authentication (PIN and fingerprint) but primarily fingerprint activated. The NDB contains the biometric of the citizenary maintained by the government. The stakeholders include: Central Bank, Card manufacturers, IT professionals, Government officials (NIGFRA, NITC, NSCIC), and Buhari/Biyi faction.

Fig. 1: Secure Payment Architecture

The activities labeled A to F are described as follows:

A. The Customer indicates intention to purchase product/services. The Merchant requests the personal and payment card information.

B. The Merchant embarks on Customer identity authentication and creditworthiness.

C. The identity of the Customer is verified and authenticated.

D. The identity of the client is further clarified with the NDB.

E. The amount of money is set aside, and the acquirer advises the Merchant to proceed with the transaction.

F. Stakeholders (designated government officials, Card manufacturers, Banks, IT firms, Security agent) manages and controls the activities of the system. They regulate and formulate policies as may be deemed fit.

8. Conclusion

The number of available facilities as presented in table 5 is continually improving. An improvement in an administrative development is deemed to be a payment participation where banks have a significant level of acceptance and are expanding their operations (over 95%) and have none. This has further confirmed the fact that there are less than 10% of banks with no connection between the front office and back office. From the formulated hypotheses, it was proved that the nature of business is influenced by the level e-commerce and vice versa, and the level of e-commerce in the country is influenced by the denomination of the e-cards. To improve the level of patronage, the citizen must be motivated by offering a secure, fraud-free, and efficient system.

From the formulated hypotheses, it was proved that: the nature of business is influenced by the level e-commerce and vise versa; and the level of e-commerce in the country is influenced by the denomination of e-payment cards. Enormous opportunities abound for e-payment patronage, but for low ability and motivation. To improve the level of patronage, the citizens must be motivated by offering a secure, fraud-free, and efficient system. The calculated value is less than the table value, therefore, we accept the null hypothesis. Therefore, the level of e-commerce is positively influenced by the denomination of the e-cards.

Table 5: Chi-square Tests

<table>
<thead>
<tr>
<th>Value df</th>
<th>Pearson Chi Square</th>
<th>Likelihood Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P</td>
<td>Sig. (2-sided)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>11.313</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>11.313</td>
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<tr>
<td></td>
<td>3</td>
<td>11.313</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>11.313</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>11.313</td>
</tr>
</tbody>
</table>

Table value at 95% Significant Level is given as 12.59

Calculated value is 11.39

The calculated value is less than the table value, therefore, we accept the null hypothesis. Therefore, the level of e-commerce is positively influenced by the denomination of the e-cards.