

## Factors Influencing Consumers Adoption of Point of Sale Terminals in Nigeria

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### Abstract

*Following efforts at reducing excess cash flow in the economy necessitated the introduction point of sale terminal to the consumers by financial regulatory body in Nigeria; this study investigates the factors influencing the decision to adopt Point of sale terminals by consumers. Using probit model applied to primary data collected from 650 consumers, the study finds that factors such as nativity, security, ease of use, availability, convenience, intention to use, complexity of the technology are among the factors influencing the use of POS terminals. Efforts at improving the security of transactions, availability of the technology and convenience of use is recommended in order to drastically reduce excess cash flow especially in developing economies.*

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**Keywords:** point of sale terminals, probit model, consumers, Nigeria

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### INTRODUCTION

Most economies of sub Saharan Africa countries is cash based. This is often associated with high cost of cash management in these countries. For example in Nigeria, over 90 per cent of funds circulate outside the banking sector (Ojo, 2004, Ovia, 2003). According to Central Bank of Nigeria (CBN, 2011), the cost of cash management in 2009 was N114.6billion and grew to N135billion and N166billion in 2010 and 2011 respectively. The apex institution projected that the cost of managing cash will hit N192 billion by 2012. These cost arises from frequent printing of currency notes, currency sorting, cash movement, keeping large amount of cash, security cost of checking high incidences of robbery and burglaries to mention a few. This has made Nigeria cash-dependent, cash loving and cash carrying society, as an average Nigeria businessman prefer cash transactions. Reliance on cash based economy has however been found to be risky and cumbersome because money outside the banks cannot be subjected to regulatory and operational procedures, and the ability of monetary policy to achieve set objectives in the presence of sizeable currency out of Bank (COB) is therefore limited. According to Iroh (2011) one only need to understand the psychology of money to know that a greater percentage of problems within the economies of most developing countries is attributable to the cash carrying nature of their economy. This cash carrying character of the economy is also responsible for large pool of money in the hands of the unbanked citizens.

In order to reduce the volume of cash in circulation and reduce the risk of going about with cash, the

CBN introduced electronic payment system such as payment cards (smart card) and paper- based instrument to the country. This has encouraged e-payment initiatives such as the establishment of switching companies that facilitate interconnectivity, introduction of payment instruments such as point of sale (POS) terminal and Automated teller machine (ATM) which gave rise to significant growth in the use of electronic payment systems (Salimon, 2006). Generally, electronic payment system (e-Payment) refers to an electronic means of making payments for goods and services procured online or in supermarkets and shopping malls. It enables websites and shopping malls to securely process transactions in real time. It operates on a smartcard that stores information on microchips. The microchip contains a purse in which monetary value is held electronically. The electronic payment system takes several forms. This payment system provides a better audit trail than transactions that involve physical cash and thus reduce the amount of currency in circulation. The CBN strategic plan on payment system is to ensure that a larger proportion of currency in circulation is captured within the banking system, thereby enhancing the efficacy of monetary policy operations and economic stabilization measures. While there is volume of studies on e-payment system such as ATM, there has been dearth of literature on POS especially factors influencing its adoption among the consumers. The motivation for this study emanates from the fact that while there has been general increase in adoption of various form of e-payment instruments, the rate of adoption and use of POS is still relatively low when compared to the rest of e-payment system (CBN, 2009).

This study therefore, investigates the motivational factors affecting the adoption of POS in Nigeria and test the hypothesis that the null hypothesis that motivational factors do not significantly affect adoption of POS terminals.

### METHODOLOGY

The study was carried out in Lagos State. The state represents one of the most urbanized zones in Nigeria where electronic payment system is mostly being used. Lagos is Nigeria's financial, commercial and industrial nerve center with over 2,000 manufacturing firms and over 200 financial institutions including the nation's premier stock exchange, the Nigeria Stock Exchange.

Primary data was used for this study through the use of a pre-tested, structured questionnaire on adoption of electronic payment system. The questionnaire covered aspects of socio-economics of consumers, description of technology being used, and factors influencing the adoption of POS. The sampling frame consists of bank customers in Lagos state that operated either savings or current accounts and who usually buy goods and services from business organizations who operate POS facilities. The POS terminal outlets in Lagos state include- super markets, hotels, petrol stations, eateries, airlines, schools, companies and pharmaceutical stores. These establishments accept the use of POS. Multistage sampling technique was used. Five local governments' area of Lagos state where the use of POS is concentrated was purposively selected. These included Lagos Island, Lagos Mainland, Ikeja, Victoria Island and Ibeju Lekki. This constituted first stage of sampling. Then the consumers were stratified into two: the first group was bank customers with savings or current account patronizing merchants with POS terminals, while the second group was other electronic payments users. This constitutes second stage of sampling. The last stage of sampling procedure involved random sampling of consumers from the merchants' customers having savings or current account using POS in the selected local governments' area and the second group who constitute other electronic payments users. A total of 650 respondents were sampled for this study. 400 consumers were sampled from the merchants' customers having savings or current account using POS in the selected local governments' area while 250 was sampled among the second group who constitute other electronic payments users. Data collected were analyzed using probit model because of the binary characteristics of the dependent variables which allows for the categorization of consumers into adopters and non adopters.

#### Probit Model

The probit model is a widely used statistical model for technology adoption study. Its employment in the

social sciences goes back at least to econometrics in the early 1960s (see Maddala, 1983). Probit models are generalized linear models with a probit link:

$$\eta = \Phi^{-1}(\mu)$$

The inverse of the normal CDF is in effect a standardized variable, or a Z score. As with the logit model, the probit model is used for studying a binary outcome variable. We may express probit model in probability as:

$$\text{Prob}(y=1) = 1 - F\left[-\sum_{k=1}^K \beta_k x_k\right] = F\left[\sum_{k=1}^K \beta_k x_k\right] = \Phi\left[\sum_{k=1}^K \beta_k x_k\right]$$

where the more general form of distributive function, F, is replaced by the standard normal cumulative distribution function,  $\Phi$ . Unlike the logit model, which may take on two major forms – one expressing the model in logit (and a transformed version expressed in odds) and the other expressing the model in event probability – the probit model takes on only one intuitively meaningful form, because a probit model expressed in  $\eta$  is a linear regression of the Z score of the event probability. The equation for probability of movement is then

$$\text{Prob}(y=0) = 1 - \Phi\left[\sum_{k=1}^K \beta_k x_k\right]$$

The equation can be readily derived from Equation 3.10, because the response is a binary outcome.

$$\text{POS adoption} = b_0 + b_1a_1 + b_2a_2 + b_3a_3 + b_4a_4 + b_5a_5 + b_6a_6 + b_7a_7 + b_8a_8 + b_9a_9 + b_{10}a_{10} + b_{11}a_{11} \dots b_{15}a_{15}$$

#### Description and Measurement of Variables

The variables of this study were measured on binary, likert, as well as on continuous scales. The dependent variable; degree of POS adoption was categorized into two (1=user; 0=non-user). The independent variables involved a mixture of continuous variables such as age, income; binary variables such as being male or female, as well as variables such as class categorization of educational attainment and other socio- demographics of respondents. The description and measurement of variables is described in Table 1.

#### RESULTS AND DISCUSSION

The diagnostics tests for the probit model such as Pseudo R<sup>2</sup>, Likelihood Ratio, Chi-Square and estimated value for the Log-likelihood functions are also reported in the table. All the explanatory variables accounted for about 53% of the variations in the probability that a consumer would decide to adopt the point of sale terminals. The overall fit, expressed by the likelihood test, is high and significant. This demonstrates that the variables included in the model are relevant influences of the adoption decisions of the sampled consumers regarding the adoption of point of sale terminals in the study area.

Table 2. Estimated Probit Model of Factors Influencing Adoption of POS

Variables	Coefficient	Standard error	p- Value
Age	-57.4982	0.082057	1.35
Gender	-2.49817	0.0294301	1.61
Nativity	1.16117	0.1469537	4.29***
Education	7.14286	0.0314953	-0.03
Security	-6.23443	0.0244152	-4.13***
Ease of use	5.84615	0.0385716	3.44***
Availability	4.93211	0.027651	5.35***
Convenience	27.2527	0.072128	5.28***
Intention to use	1.38462	0.0949179	-4.93***
Complexity	-0.1331	0.031495	-4.13***
Time	1.64835	0.1009746	2.63***
LR chi2(10)	84.69		5.68***
Prob > chi2	0.0000		
Log likelihood	-79.189638		
R <sup>2</sup>	0.5315		
Number of obs	540		

Source: Field Survey, 2011

### Gender

The influence of gender on the probability of adopting point of sale terminal was found to be negative and insignificant in determining the adoption of POS. Although a substantial literature supports the likelihood of gender-related differences in risk aversion (Sapienza et al. 2009; Byrnes et al. 1999; Borghans et al. 2009; Bajtelsmit and Bernasek 1996), it seems likely that many payments choices are made at the household level Mann (2011).

### Age of the Consumers

Age of the consumers was found to be negative and not a significant influence of point of sale terminals. This negative suggests at least the possibility of an artefact of age itself, reflecting differing attitudes to risk of adoption related to the differing positions in the life course (Aguiar and Hurst 2007; Mann, 2011). Studies on e-payment adoption suggest obvious reasons age of the consumers might not significantly related to the adoption of electronics technology. This could be a cohort effect if e-payments choices are driven in large part by habits formed in youth, older consumers was less likely than younger consumers to use instruments that became common in recent decades (Ching, 2010). This possible decision of older consumers may affect the non-significance of the variable especially when the variable data is not disaggregated (Mann 2006; Manning 2000).

### Nativity of the Consumers

Nativity was found to be positive and significantly influence the adoption of point of sale terminal. Nativity refers to birth or origin, especially the place, process or circumstance of birth of consumers as applicable in this study. The existing literature offers obvious reasons why the consumer origin might be associated with payments-related choices (Scholz and Seshadri, 2009). The result of this finding shows that the consumers born in metropolitan area such as Lagos may have higher probability of adopting new electronics technology. This could be due to the

general level of civilization in the areas. Among other things, it seems likely that limited access to electronic and banking related services for consumers born and bred in a non-civilized place is at least a partial explanation or because they have less robust relationships with the institutions where electronic transaction takes place (Barr 2009; Osili and Paulson 2007).

### Conveniences

Convenience of use of POS was found to be positive and statistically significant in influencing the adoption of POS. This finding implies that the higher the level of convenience perceived by consumers, the higher the probability of adopting the POS. Convenience refers to the consumer perception of lesser need of carrying cash in small transactions and increasing the availability of purchase possibilities. E-payments are commonly expected to increase consumer convenience by reducing the burden of carrying cash. This finding necessitate a need for the policy makers in charge of implementing cashless economy to ensure absolute reduction in various forms of inconvenience that could be associated with point of terminal technology that would be imported for consumer transactions in Nigeria. This is because limitations in mobile device features diminish the usability and user-friendliness of electronic technologies (Siau et al., 2004). Typical limitations include small displays and keypads, limited transmission speed and memory, and short battery life.

### Security Problem

Security is found to be negative but significantly influence the adoption of point of sale terminals. Security is associated with privacy risks such as robbery and could be defined as a threat which creates circumstance, condition, or event with the potential to cause economic hardship to data or network resources in the form of destruction, disclosure, modification of data, denial of service and/or fraud. Under this definition, in the context of e-payment such as POS, threats can be made either through network and data transaction attacks or through unauthorized access to the account by means of false or defective authentication. The finding of this study show that the higher the level of insecurity of transactions perceived by the POS consumers would decrease the probability of adoption of POS. According to Milind (1999), security risk is a significant impediment to the adoption of online related technology. Further, it has been stated in numerous studies that the greatest challenge to the electronic transactions was winning the trust of customers over the issues of privacy and security (Bestavros, 2000). Similar studies defined the security problem as a potential loss due to fraud or a hacker compromising the security of point of sale terminal. This problem also related to phishing which

is a new crime skill by which phishers attempt to fraudulently acquire sensitive information, such as usernames, passwords and credit/debit card details, by masquerading as a trust worthy entity in an electronic communication (Reavley, 2005). Both fraud and hacker intrusion not only lead to users' monetary loss, but also violate users' privacy, a major concern of many e-payment users. Many consumers believe that they are vulnerable to identity theft while using online banking services (Littler and Melanthiou, 2006).

#### **Ease of Use**

Ease of use of POS was found to be positive and statistically significant in influencing the adoption of point of sale terminals. Ease of use is defined as the degree to which a person believes that using the technology would be free of effort (Davis, 1989; Taylor and Todd, 1995). This finding implies that as the perception of consumers on the ease of using the POS increases, probability of adopting the POS increases. This finding corroborates the findings of Adesina and Ayo, 2010 that perceived ease of use positively affects customer decisions on the adoption of e-payment system. Earlier studies had also asserted that ease of use is a major factor that influences customers' decisions towards the use of a technological system. The result of this study clearly reflects the need for the stakeholders (such as CBN) involved in the recommendation of POS to consumers to make the technology free of effort.

#### **Time Saving**

The perceived time saving benefit of POS was found to be positive and statistically significant in influencing the probability of adopting point of sale terminals. The result showed that as consumers' perception of time saving benefit of POS increases adoption of POS increases. Studies such as Lee (2008) found the variable to be a significant predictor of electronic payment behaviour of the consumers. Other studies found that "harried" consumers were more likely to purchase over the electronic system in order to save time. This study similarly assert that some consumers are very time sensitive and concerned about potential risks of "wasting time" in transactions. These time-conscious consumers would likely guard against the possible loss of time, and are more likely to adopt an e-payment that they consider to have time value (Featherman and Pavlou, 2003). Also, the faster transaction speed obviously means that time can be saved since transaction with POS does not need other than receipt of payment; the processing of which can be done in a twinkling of an eye.

#### **Complexity**

This refers to degree to which a system is perceived as relatively difficult to understand and use (Thompson et al. 1991). It also refers to extent of

how difficult (complex) it is for an adopter to understand and use the innovation. The variable is found to be negative but statistically significant in influencing the probability of adopting POS. This implies that the higher the relative difficulty of using the POS, the lower the probability of adoption would be. Earlier studies have found this variable as a contributory factor to the low adoption of a variety of e-payment systems (Lee, 2008).

#### **CONCLUSION**

The study examined the influence of motivational factors on the decision to adopt Point of Sale terminals among consumers. Using probit model, the study finds that factors such as nativity, security, ease of use, availability, convenience, intention to use, complexity of the technology are among the factors influencing the use of POS terminals. Efforts at improving the security of transactions, availability of the technology and convenience of use is recommended in order to drastically reduce excess cash flow especially in developing economies.

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**APPENDIX**

Table1. Description and Measurement of Variables

Variable Description	Measurement
POS use option	Equal 1 if POS is being used by respondent, 0 if not being used
Age	Respondent's age (continuous)
Family size	Number of dependents on the respondent (continuous)
Monthly expenditure	Respondent's monthly consumption expenditure (N) (continuous)
Marital status	Equals 1 if respondent is single; 2 if married; 3 otherwise = 0
Gender	If respondent is male = 1; otherwise = 2
Education	Equals 1 if highest qualification is post primary; 2 if a degree holder; 3 if graduate degree holder
Home ownership	Equals 1 if the respondent owns the house; otherwise 0
Employment Status	1 if respondent belongs to top level management cadre; 0, otherwise
Work experience	Number of years since respondent was employed (continuous)
Other motivation factors such as self-efficacy perceived credibility perceived ease of use, perceived usefulness consumer attitude	Continuous and Likert scale

Source: Authors computation, 2011