

Decision to Use Electronic Banking by Bank Customers in a Rural Economy

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Authors' contributions

This work was carried out in collaboration between both authors. Author NAAE designed the study, wrote the protocol and wrote the first draft of the manuscript. Author GEE managed the literature searches, analyses of the study performed the spectroscopy analysis. Author NAAE managed the experimental process and author GEE identified the species of plant. Both authors read and approved the final manuscript.

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ABSTRACT

An empirical study of bank customers decision to adopt electronic banking was investigated using cross sectional data set. Using the multi-stage sampling procedure, a total of 120 customers were selected. With the aid of questionnaire, primary data were obtained for a period of 3 months. Data were analyzed using univariate probit regression model. Results revealed that whereas age, monthly income, education and distance to nearest bank of customers were significant and positively related to the willingness of bank customers to adopt electronic banking, household size was significant ($p < 0.05$) and negatively related to the customers willingness to use electronic banking. Findings suggest the need to increase the number and proximity of automated teller machines (ATM) located in the rural communities and households to encourage customers use of electronic banking facilities.

Keywords: Electronic bank; willingness; probit; customers.

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1. INTRODUCTION

Banks have been significantly affected by the evaluation of technology and competition between banks has forced them to find new market to expand, and the number of financial institutions that offer electronic banking products increased [1]. From the customers, point of view, electronic banking allows customers easier, faster and more reliable access to financial services and time saving in managing their finance [2,3,4]. Electronic banking (e-banking) is the newest delivery channel for banking services [5] and varies in definition among researchers partially because electronic banking refers to several types of services through which bank customers can request information and carry out most retail banking services through computer, television or mobile phone [6,7,8].

Electronic services that allow customers to check the balances in their work accounts, transfer funds among accounts, pay bills electronically as well as apply for loans, download information

about accounts into their own computers, trade stocks or mutual funds, look at images of cheques and deposit slips [9].

Customers can do their daily banking services any time without having to queue or wait on hold for banking services. At an advanced stage, internet banking is called transactional online banking, because it involves the provision of facilities such as accessing accounts, transfer of funds and buying financial products or services online [8]. The terms internet banking and online banking are often used interchangeably in literature. Besides, electronic banking is said to have three different means of delivery. According to [6], four different channels of electronic banking which are PC banking, internet banking, managed network and TV based banking exist. The international monetary fund further explained the concept of electronic banking diagrammatically and to show the place of internet banking in the broad spectrum of electronic banking as shown below.

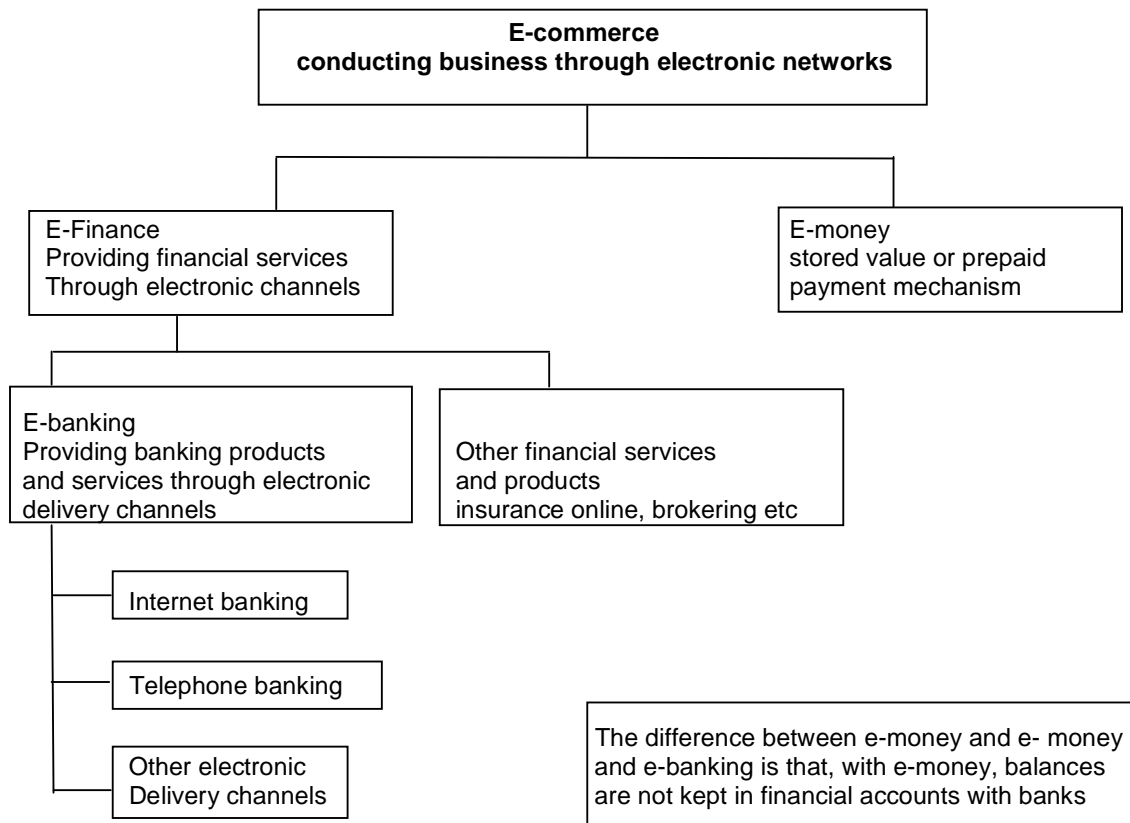


Fig. 1. Meaning of electronic banking

Source: Adapted from Nasri (2011)

E-banking has become increasingly prevalent, employed by many financial institutions to reduce costs associated with having personnel, serve customers physically, shorten processing periods, increase speed, improve the flexibility of business transactions and provide better service overall [10]. A review of electronic banking adoption studies shows that a large portion of the published research was conducted in developed and industrialized countries [11,12,13,14]; and [15]. On the contrary, little is written in developing countries [16,17]. Adoption of tele-banking [18] as well as internet banking [19,20,21] has received research attention in recent years. Much of the research in electronic banking services has adopted an organizational perspective [6] on a distribution channel [22,23] and [24]. Customers using these products and services have been focused in a large array of recent researches. Nonetheless, customer behaviour in mobile banking and factors influencing the use of electronic banking have remained unsurveyed. This paper aims to fill this lacuna by giving information on the general usage of electronic banking and in particular on influence of socioeconomic characteristics on usage. This study was therefore conducted to identify the factors affecting the decision to adopt electronic banking by bank customers.

2. METHODOLOGY

The study was conducted in Akwa Ibom, South South Nigeria. The state is located between latitude 4°33' and 5°53' North and longitude 7°25' and 8°25' East and occupies a total land area of 8,412 square kilometers. According to [25] it has an estimated population of about 3.9 million. The state is bounded to the north by Abia State, to the east by Cross River State. To the West by River State and to the south by the Atlantic Ocean. The area is in the rainforest vegetative

zone and has two distinct seasons namely - the rainy season and short dry season. Farming in the area is rainfed and the annual rainfall ranges from 2000-3000 mm. According to [26] the inhabitants of rural communities in the study area are predominantly farmers and the crop commonly cultivated include cassava, oil palm, water-melon, maize, yam, cocoyam, fluted pumpkin, okra, water-leaf, bitter-leaf. Although some of the rural dwellers are government employees, they take to part-time farming as a means of augmenting family income.

2.1 Data Source and Method of Data Collection

Data used for this study were primary. Intensive itinerary survey provided the basic cross-sectional data from 120 customers in the study area. Data were collected from bank customers heads using questionnaire. Primary data included data on educational level, household size, monthly income, transaction cost and marital status.

2.2 Sampling Procedure

Multi-stage sampling procedure was employed in selecting the representative customers used for the study. The first stage involved purposive selection 3 senatorial districts in State. The second stage sampling was the random selection of 10 communities per district to make 30 villages. Finally, 4 customers were randomly selected to have 120 customers.

2.3 Theoretical Model

A univariate PROBIT regression model was used to identify critical factors most likely to affect the willingness to use electronic banking by customers. This model has founded several

Table 1. Description of variables

Variables	Description
Dependent	
Willingness to use	Willingness to use e-banking (1= yes, 0 = No)
Independent	
Sex	Sex of customers (1 = male, 0 = female)
Age	Age of customer in years
Marital status	Marital status of bank customers (1 = married, 0 = otherwise)
Education	Years of formal education
Household size	Number of family members
Transaction cost	Cost incurred in naira using electronic banking
Distance to nearest bank	Distance to the nearest bank in kilometer

empirical applications in the literature [27,28,29] and [30]. Probit model is mathematically represented as:

$$\Phi(\beta xi) = \int_{-\infty}^{\beta xi} \frac{1}{\sqrt{2\pi}} \exp\left(-\frac{t^2}{2}\right) dt$$

Where $\Phi(\beta xi)$ is normally distributed and represents the probability that the *i*th individual will decide to use a given product, β is a vector of unknown coefficients; xi is a vector of characteristics of the *i*th individual; t is a random variable distributed as a standard normal deviate; \exp is the exponential function. The probability of using in a new product is the area under the standard normal distribution curve lying between $-\infty$ and βxi , the more likely an individual is willing to decide to use a new banking product.

2.4 Empirical Specification

The invariate PROBIT model is used to identify key factors likely to affect households decision to use a new banking product. Identification of key factors reported by households to affect their decision to use a new banking product would be useful for product development, adoption and commercialization.

The empirical model for decision to use in a new banking product is specified as:

$$Y_i^* = P(Y_i = 1) \beta xi + \epsilon_i$$

Where Y_i is the “willingness to use (WTU) a new banking product; Y_i^* is the estimated value of Y_i ($Y_i^* = 1$) if $Y_i > 0$, and ϵ_i is the error term which follows a normal distribution (mean $\mu = 0$, variance $\sigma = 1$). P is the probability function, β is the vector of parameter to be estimated. Xi is the matrix of explanation variables that affects the *i*th households decision to use a new banking product.

The dependent variable Y_i or WTU take a value of 1 for farmers who are willing to use a new banking product and otherwise.

3. RESULTS AND DISCUSSION

3.1 Test Result for Multicollinearity among Specified Explanatory Variables

Table 2 presents the VIF test result for multicollinearity among explanatory variables

used in the probit regression model. The result revealed that there was no significant multicollinearity among the specified explanatory and dependent variables in the model. The result implies that the probit model estimates has minimum variances, consistent and probably unbiased.

3.2 Test for Collinearity among Explanatory Variables Used in the Model

Multi-collinearity is among prominent econometric problems of cross sectional data. This property of econometric was tested among explanatory variables to ensure the consistency and unbiasedness of the probit model estimates. The variance inflation factor (VIF) was used. For VIF, the minimum possible value is 1.0; while value greater than 10 indicates a probably collinearity problem. VIF was estimated using the formula stated below:

$$VIF_i = \frac{1}{1 - R_i^2}$$

Where R_i^2 ; is the multiple correlation coefficient between variable; and another specified explanatory variables.

Table 2. The variance inflation factor (VIF) test for multicollinearity of variables used in the analysis

Explanatory variables	VIF estimates
Age	2.015
Education	4.028
Household size	3.172
Monthly income	2.561
Transaction cost	3.105
Distance to the nearest bank	1.834

3.3 Socio-economic Attributes of Bank Customers

Fig. 2 reveals that 40 percent of the bank customers were between the age ranges of 40-49 years, 23 percent were between 30-39 years, 17 percent were between 50-59 years. Only 2 percent were above 70 years of age. Result suggest that majority of customers were within economically active age.

Most (52 percent) of the customer were men while 38 percent were women as shown in Fig. 3.

Result in figures reveals that majority (49 percent) of customers were married, 40 percent were single, 8percent were widowed while only 3 percent were divorced.

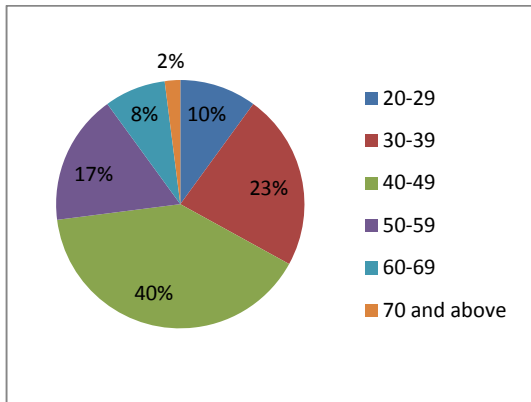


Fig. 2. Age of customers

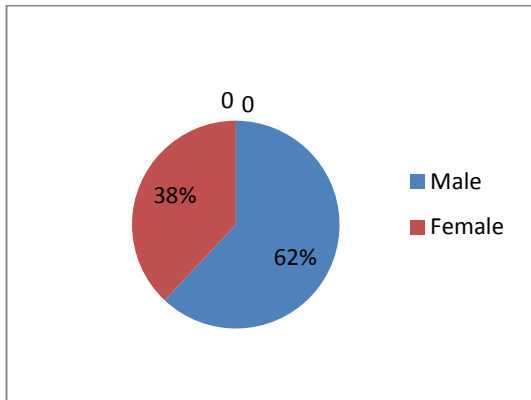


Fig. 3. Sex of customers

The educational level of the customers was impressive. Fig. 5 shows that 49 percent of the customers had tertiary education, 23 percent had secondary education, 20 percent had primary education whereas only 8% did not have formal

education. Result suggests that majority of the customers were literate and this could hasten the adoption of new product by the bank.

Fig. 5 shows the average monthly income of the customers. About 40 percent of the customers earned between ₦1,000 – ₦20,999, 35percent earned between ₦30,000 – ₦59,999, 15percent earned ₦60,000 - ₦79,999 whereas only 2 percent earned between ₦80,000 – 99,999 percent monthly. Result simply that majority of the customers were low income earners. This may be attributable to the fact that being a rural economy, most customers were not skilled and therefore earned lower incomes from unskilled jobs.

Fig. 6 shows the size of households. Majority (53 percent) of the customers had 1-4 members, 45 percent had 5 to 9 members whereas only 2 percent of the customers had more than 10 members.

Table 3 shows customers valid/active and inactive bank accounts. From the table, 75 percent of customers had viable accounts in respective banks whereas only 25 percent did not have viable bank accounts. The facts that most customers had viable accounts imply that they were familiar with products of electronic banking.

Table 3. Ownership of active bank account

Active bank account	Frequency	Percentage
Yes	90	75
No	830	25
Total	120	100

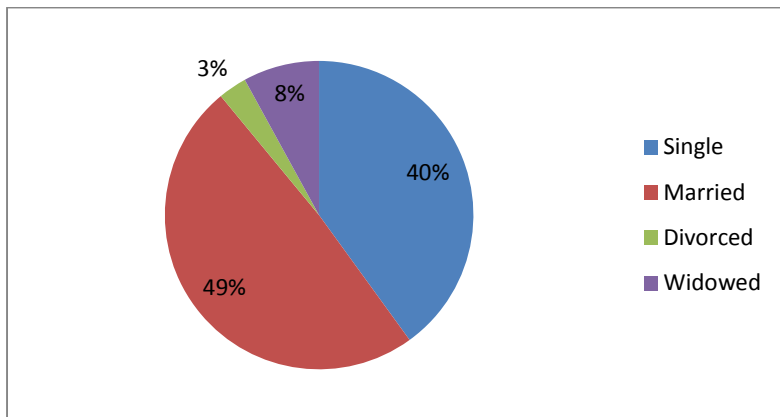


Fig. 4. Marital status of customers

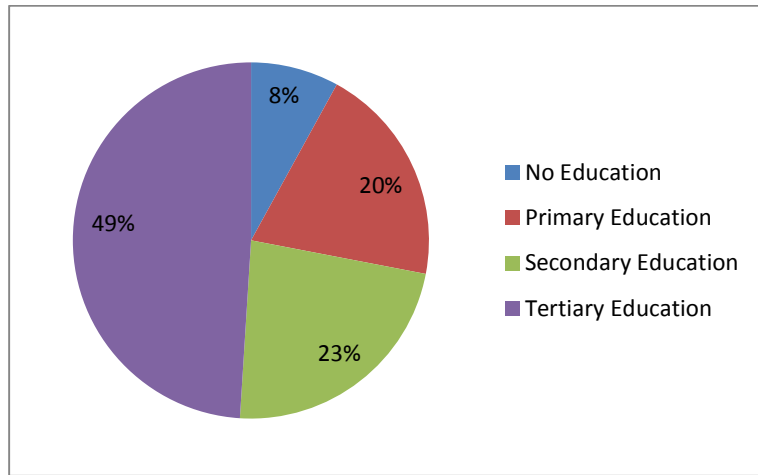


Fig. 5. Educational level of customers

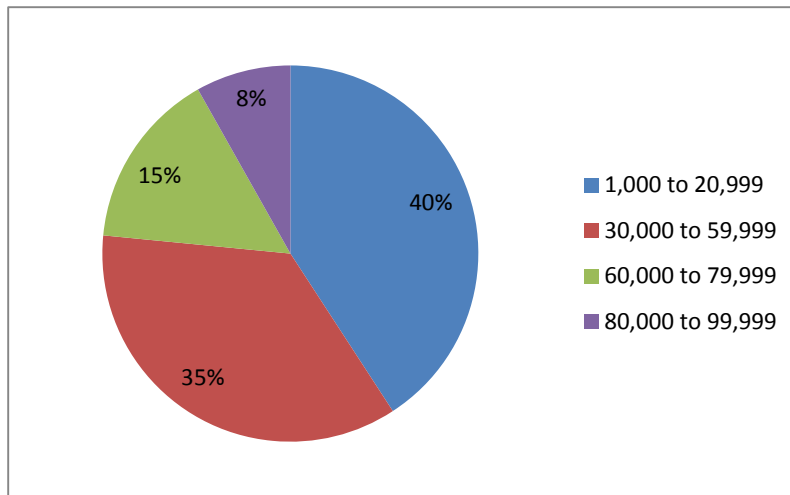


Fig. 6. Average monthly income of customers

Fig. 7 shows the different products of electronic banking. The figure reveals a varied picture of the products. The most widely used product is ATM and the least used product is e-wallet). The fact that most customers used ATM shows that being a typically rural economy, they were mostly concerned with cash withdrawal than internet or mobile banking.

3.4 Determinants of Decision to Adopt Electronic Bank by Bank Customers

Age of customers could have either a positive or negative effect on the willingness of customers to use electronic banking as documented by several empirical studies. Younger customers

are more likely to use electronic banking and vice versa. In this study, as revealed in Table 4; age is significant ($p < 0.05$) and positively impacts on the willingness of customers to use electronic banking. Age indexes experience and services as evidence for human capital meaning that customers with more years of banking experience acquired accumulated years of observation and experimentation with various banking products were likely to adopt and willing to use electronic banking faster than customers with less experience in banking transactions. Finding of this study corroborate earlier findings by [31,32,33,34] and [30] who reported that increased experience enhances critical evaluation and better decisions in adoption.

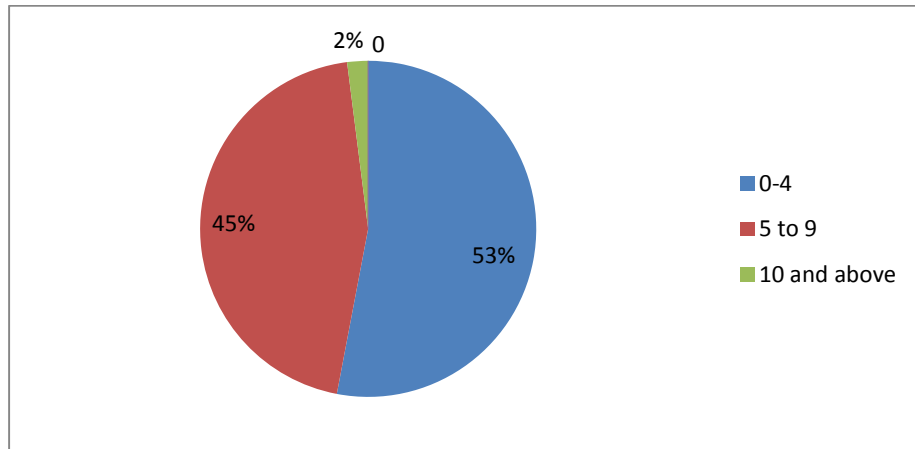


Fig. 7. Household size of customers

Table 4. Probit model estimates of the determinants of decision to use electronic banking

Variables	Coefficient	Standard error	Z-value	Marginal effect
Constant	-11.3668	5.4883	-2.0711	
Age	0.0637	0.0256	2.4882**	0.0281
Sex	-0.1855	0.5862	-0.3164	-0.0230
Education	0.9438	0.4098	2.3031**	0.1131
Marital status	0.9067	0.6381	1.4210	-0.1063
Household size	-1.6903	0.6802	-2.395**	-0.1952
Monthly income	0.3112	0.1400	2.222**	0.0372
Transaction cost	0.8174	0.6951	1.1759	0.0815
Distance to nearest bank	0.0661	0.0210	3.1446****	0.2135

Education has a coefficient of 0.94438 and significant ($p < 0.05$). This means that bank customers who have acquired some form of education are more likely to adopt and use electronic banking earlier and faster than the uneducated ones. Result conform the earlier empirical studies by [35,36,37] and [30]. Findings of this study support the hypothesis that human capital plays a positive role in the acquisition and evaluation of new ideas [38] and education hasten the turning and willingness to adopt innovation [39,40].

The coefficient of household size is negative and significant ($p < 0.01$) implying that customers with larger sized family members are less likely to adopt new product or ideas and use electronic banking and vice versa. The marginal effect of 0.1952 suggest that a unit increase in household member will reduce the probability or willingness of bank customers to adopt electronic banking.

The coefficient of monthly is positive and significant ($p < 0.05$) signaling that customers with higher monthly income are more likely to adopt

and use electronic banking than those customers with lower monthly income. The marginal effect of 0.03730 imply that a unit increase in monthly income by 3.73 percent will raise the probability and likelihood of using electronic banking.

The variable, distance to the nearest bank has a coefficient of 0.0661 and is significant ($p < 0.01$). This implies that a kilometer increase in walking time to the nearest bank is likely to increase the willingness of customers to use electronic banking by 6.61 percent.

4. CONCLUSION

Bank customers were empirically studied in the rural communities to determine the factors influencing their willingness to adopt electronic banking. The most critical determinants of customers likelihood to affect adopt of electronic banking in the locality were age, educational level, household size, monthly income of customers and distance of nearest bank to customer's residence. Automated teller machines

located close to rural residence would encourage rural banking.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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