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## **Socio-economic Determinants of the Adoption of Electronic Banking in Abia State of Nigeria**

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### **Authors' contributions**

*This work was carried out in collaboration between all authors. Author POON designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors JAM and CPON managed the analyses of the study and the literature searches. All authors read and approved the final manuscript.*

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### **ABSTRACT**

This study was conducted to examine the socio-economic determinants of e-banking in Abia State of Nigeria. The specific objectives were to (a) examine the level of awareness of the various products of e-banking (b) examine the socio-economic determinants of users (c) identify the challenges associated with the adoption of e-banking. Data for the study were collected from 90 bank customers drawn from Aba metropolis of Abia State. The data were analyzed using mean, frequency table, percentage and discriminate model. The result of the discriminate analysis indicates that the two most important socio-economic variables that explain group difference were ability to use e-banking and level of education with discriminate score of 1.398 and 1.086 respectively. It is therefore recommended that Central Bank of Nigeria (CBN) should carryout adequate public enlightenment to educate the people on how to use the various e-banking products and services.

**Keywords:** *Socio-economic; adoption; banking; Nigeria.*

## **1. INTRODUCTION**

Globally, banking services have shifted from cash-based method of transaction to electronic banking with the view of meeting up with the challenges of the 21<sup>st</sup> century [1,2]. Electronic banking which is the use of technology to communicate instructions and receive information from a financial institution where an account is held [3] is associated with so many merits especially in Nigeria economy that is heavily cash oriented in all transactions [2,4].

According to Musiime and Ramadhan [5], the major advantages of electronic banking include reduction of operational costs of banking sector which will further cut down charges to bank customers such as lending rates and charge on other transaction. Sanusi [2] opined that operational cost is a major component of banking expenditure due to significant costs incurred in cash management, frequency printing of currency note as well as payment of wages of employees. Available statistics reveal that direct cost of cash management to the banking industry is estimated to be about N192 billion in 2012 alone. This whopping amount could be used in the development of other sectors of the economy if e-banking is fully adopted.

Obisi and Nto [6] further stated that e-banking reduces the risks involved in keeping and moving large volume of cash such as high incidence of robberies and corruption by public officers. E-banking also improves customer service delivery, reduce branch traffic and also eliminate geographical and time barrier associated with traditional banking system [7,8].

Musiime and Ramadhan [5] reviewed the importance of e-banking to the bank customer to be that of banking transaction without visiting the brick and mortar bank institution through the use of Automated Teller Machines (ATMs), Point of Sale (PoS), Cheques, Internet banking, Mobile banking, Mobile money, master card and other non-cash-based transactions. For example, the customer can perform bank transactions like transfers and payments; access of latest balance; viewing of statement and account details; as well as downloading and obtaining statement on all account linked to the bank customers [9,10,11].

Aliyu et al. [3], lamented that despite the growing trend of e-banking all over the world as well as its over whelming importance to the banks and society, not many customers have adopted it as a medium of payment and banking transactions. People still prefer cash transactions in spite of inherent problems associated with it like encouragement of fraud related transaction such as payment of ransom to kidnappers and armed robbery. Ovia [4] clearly stated that of over 140 million population of Nigeria, only about 8 million people have accessed and adopted e-banking. A situation that may be attributed to low internet and telecommunication penetration [6], thus leading to inadequate e-Banking facilities. Asaolu et al. [11], observed that the number of business outlets is still grossly inadequate. There is also general poor public perception and apathy to e-banking due to illiteracy and ignorance, a situation that has led to large percentage of fund in the Nigerian economy residing outside the banking sector. Available statistics reveal that about 65% of the cash in circulation in the Nigerian economy is outside the banking system as against developed economies where money in circulation is for example 4% in USA and 9% in United Kingdom [9,2,10,12].

According to Ovia [4] the scenario is more disheartening when value of transactions through e-banking of 3.4 billion dollars in Nigeria is compared to 136.4 billion dollars (USA), 127.5 billion dollars (China), 100 billion dollars (India) and 78.9 billion dollars (United Kingdom). This ugly trend severely limits the tendency of Nigeria being ranked among the twenty top economies of the world by 2020. However, the government through the activities of Central

Bank of Nigeria (CBN) may have taken several steps in ensuring price and economic stabilization by formulating policies that are supposed to domesticate the e-banking, yet this medium of transaction seems not to have been fully adopted by the people. The cashless and e-payment policies of the CBN are still viewed as aberration even by the government structures and agencies in most of the States [8,13,6].

According to Ovia [14], e-banking transaction is still at the early stage of adoption in Nigeria. Obisi and Nto [6] stressed that ever since the introduction of e-banking in Nigeria, the adoption has remained slow among users. Despite this, no significant study has focused on socio-economic characteristics of the users. The identification of this socio-economic attributes related to the adoption of e-banking is critical for designing policies aimed at stepping up the acceptability and usage of e-banking products. This is basic, following, Aliyu et al. [3], which emphasized that adoption of new technology like e-banking often comes across a certain level of resistance to change from present way of operation, hence the need for a study of this nature. Oladejo and Akanbi [9] revealed that the level of users' acceptance and adoption of e-banking will be greatly determined by their socio-economic status of the users. It is on this premise that this paper aim to (a) examine the level of awareness of the various products of e-banking, (b) examine the socio-economic determinants of users and (c) identify the challenges associated with the adoption of e-banking. Studies consulted reveal that not much has been done in this direction in Nigeria at this era of banking globalization. But in countries like United Kingdom and Ireland, Daniel [15] revealed that decision to adopt e-banking is led by a corporate vision of the future in which the banking market becomes even more competitive, while consumers demand greater accessibility, functionality and service at a low price.

However, Abdulrasheed and Etudaiye-Muhtar [7] explained that e-banking suffers a lot of challenges in Nigeria which made Imiefoh [1] to add that both the banks and customers are not e-ready thus limiting adoption E-banking cannot be fully maximized without access to efficient and adequate internet and telephone facilities which are grossly under-developed especially in the rural areas of Nigeria. Ovia [14] stressed that e-banking cannot be adopted and utilized in a society like Nigeria which still lack suitable legal framework and security instrument to checkmate hackers. Ovia [14] observed that it is practically impossible to move financial products and services from the banking hall to e-platform without adequate and reliable electronic communication infrastructure. These challenges limit customers want to transact their banking transaction at any time and location convenient for their life style, hence, restraining the adoption of e-banking in Nigeria.

The findings that e-banking facilities are not adequate for customers contradict that of Oladejo and Akanbi [9] which stated that at present, all the commercial banks in Nigeria set up their own ATM networks, issue debit and credit cards and have joined ATM switch network but these are not fully adopted by customers [9]. Thus, several studies have been conducted on the factors that enhance customer's adoption of these e-banking products. Aliyu et al. [3], noted factors that significantly impact the adoption of e-banking are cost/price factors, customers accessibility, perceived ease of use, customer reluctant to change, customer awareness and security concern. This study did not focus on the specific socio-economic attributes of customers that enhance adoption of e-banking so cannot be used to formulate policy based on the characteristics of clients that drive e-banking like age, level of education, sex, location, job affiliation etc.

According to Musiime and Ramadhan [5] in a study conducted on the adoption of e-banking in Uganda indicated that factors such as accessing of account, usage of account,

advantages accruing from the usage and use of account were very significant in influencing customers in adoption of e-banking. The study area though offered some useful guides but was not centred on socio-economic characteristics which this study intends to examine.

## 2. METHODOLOGY

The study was conducted in Aba commercial city of Abia State of Nigeria. The city is located in the Southern part of Abia State. It lies between longitude 04°45' and 06°17' North and latitude 07°00' and 08°10' East. It is about 596 kilometres from Lagos and about 498 kilometres from Abuja Federal Capital Territory. The city was selected for the study because of its cosmopolitan nature which gives opportunity to select respondents that have excellent reflection of socio-economic characteristics of Nigerians. Aba is among the areas selected for the second phase of pilot zone of the cashless policy of the Central Bank of Nigeria. It houses branches and area of offices of the 24 consolidated commercial banks in the country [16,17].

In the selection of respondents for the study, a visit was made to the area offices of the 24 banks in Aba zone where the list of customers were requested for. Out of the banks visited, 10 banks gave the list of customers while no success was recorded in the other 14 banks. Simple random sampling procedure was adopted in selecting at least 10 respondents from each of the banks. A total of 90 respondents were administered with well structured and pretested survey instruments. The survey instrument covered such key areas as annual income, types of e-banking facilities used and amount of transaction through the e-banking facilities and socio-economic characteristics of the respondents.

Objective 1 was analysed using descriptive statistics, while objective 2 was realised with discriminate model. The model is explicitly specified thus following Nto and Mbanasor [18] and Nto et al. [19].

$$Z = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9$$

Where:

Z = Discriminate score of the canonical Discriminate function for each group.

a = Constant

b<sub>1</sub> = Discriminate coefficient of the independent variables

X<sub>1</sub> = Level of education (Years)

X<sub>2</sub> = Age (Years)

X<sub>3</sub> = Level of income (N)

X<sub>4</sub> = Location of residence (0=rural, 1=urban)

X<sub>5</sub> = Distance to the nearest bank (km)

X<sub>6</sub> = Availability of internet and phone facility (0=Non, 1=Available)

X<sub>7</sub> = Transaction cost (N)

X<sub>8</sub> = Economic status (0=Informal, 1=Formal)

X<sub>9</sub> = Ability to use E-Banking (1= Able, 0= not able)

Z = Group Membership

In line with previous studies, the procedure starts with categorization of the customers-respondents into two groups: e-banking compliant and non-compliant based on percentage of income related to e-banking transaction.

Thus, U ≥ 60% group 1: e-banking compliant while U < 60% group 2: non compliant.

The test of significant of Discriminate function was done with wilk's lambda which was further subjected to confirmatory test by first converting it into an approximation of the chi-square [20,18,19,16].

### 3. RESULTS AND DISCUSSION

The results and discussions started with the level of awareness of various products of e-banking by the respondents. The result presented in Table 1 indicates that 100% of the respondents were aware of the use of ATM in e-banking transaction. This is in line with apriori expectation given that ATMs which is operated with the use of debit and credit cards are scattered in all parts of Aba metropolis to allow customers easier access to their accounts without visiting the banking hall.

**Table 1. Distribution of respondents based on level of awareness to E-banking products**

<b>E-banking</b>	<b>Frequency</b>	<b>Percentage</b>
ATM	90	100
Mobile banking	30	33.33
Mobile money	32	35.56
Internet banking	25	27.76
Point of sale	60	66.67

*\*Field survey Data 2013\*Multiple responses recorded*

Reasonable proportions of the respondents (66.67%) were aware of point of sale (PoS) as a medium of e-banking. According to Obisi and Nto [6] PoS terminal is a portable device that allows local debit cardholders make payment for goods and services in a retail environment. It performs printing of mini statements, cash advance and balance enquiry etc. The result also shows that about 35.56% and 33.33% of the respondents noted that mobile money and mobile banking respectively were among the methods of e-banking in the area. While 27.76% observed that they are aware of internet banking as e-banking method.

The process of discriminate analysis which predicts a group membership starts with the examination of whether there exist significant differences between groups on each of the independent variables. Nto and Mbanasor [18] opined that if there are no significant group differences, it is not worthwhile proceeding any further with the analysis.

Using the group means and Analysis of Variance (ANOVA) as specified in Table 2 which was the group statistics, it could be inferred that there were significant group differences hence, making it worthwhile to proceed on further analysis. A rough examination of variables that may be of important in the table could be obtained by inspecting the group means and standard deviation

For instance mean difference between  $X_1$  and  $X_2$  in group 1 and that of  $X_1$  (group 1) and  $X_1$  (group 2) as depicted in Table 2 suggest that these may be good discriminators as the separations are large. The study thus proceeded to test overall model fit and significance, given the high mean difference and standard deviation, among variables in table.

**Table 2. Group statistics of the respondents**

Z	Variables	Mean	Std.deviation	Valid N (List-wise)	
				Unweighted	Weighted
1	X <sub>1</sub>	35.1429	12.25854	42	42.00
	X <sub>2</sub>	16.8571	2.64641	42	42.00
	X <sub>3</sub>	2.2643E6	2.05780E6	42	42.00
	X <sub>4</sub>	1.0000	.00000	42	42.00
	X <sub>5</sub>	7.5714	3.68347	42	42.00
	X <sub>6</sub>	.9286	.26066	42	42.00
	X <sub>7</sub>	1.0000E4	9829.64655	42	42.00
	X <sub>8</sub>	.9286	.26066	42	42.00
	X <sub>9</sub>	.8571	.35417	42	42.00
2	X <sub>1</sub>	46.3125	15.55246	48	48.00
	X <sub>2</sub>	13.9375	2.75531	48	48.00
	X <sub>3</sub>	9.6950E6	2.41443E7	48	48.00
	X <sub>4</sub>	.6875	.46842	48	48.00
	X <sub>5</sub>	10.6250	6.38024	48	48.00
	X <sub>6</sub>	.5000	.50529	48	48.00
	X <sub>7</sub>	5.5125E4	1.20098E5	48	48.00
	X <sub>8</sub>	.3750	.48925	48	48.00
	X <sub>9</sub>	.1250	.33422	48	48.00
Total	X <sub>1</sub>	41.1000	15.11161	90	90.00
	X <sub>2</sub>	15.3000	3.06283	90	90.00
	X <sub>3</sub>	6.1807E6	1.80020E7	90	90.00
	X <sub>4</sub>	.8333	.3744	90	90.00
	X <sub>5</sub>	9.2000	5.48583	90	90.00
	X <sub>6</sub>	.7000	.46082	90	90.00
	X <sub>7</sub>	3.4067E4	90409.78743	90	90.00
	X <sub>8</sub>	.6333	.48459	90	90.00
	X <sub>9</sub>	.4667	.50168	90	90.00

*\*Calculated from Field survey data 2013*

The result of the statistical test of significance of the function is presented in Table 3. The table indicated that the Eigenvalue of the model was 3.116. A low Eigenvalue obtained in the result is an indication of near linear dependencies in the data. Nto and Mbanasor [18], Gujarati and Sangeetha [21] hence, there is no room for problem of multi-collinearity in the discriminate model.

**Table 3. Statistical test of significance for the discriminate function model**

Test of function	Result
Eigen Value	3.166
Wilks' Lambda	0.243
Canonical Correlation	0.870
Chi Square	118.151
Degree of Freedom	9
Significance level	0.000***

*Calculated from field survey data 2013 \*\*\*=Significant at 1% probability level*

The high canonical correlation of 0.870 gives an insight to the index of overall model fit which is interpreted as being the proportion of variance explained. The canonical correlation also measures the association between the discriminate score and set of independent variables.

Table 3 shows that, Wilks Lambda which is the proportion of the total variance in the discriminate score not explained by the differences among groups is 0.243. The low value of the wilks lambda is desirable since only 24% of the variance was not explained by group difference. This is an indication of significance of the discriminate function. The Chi-Square statistic of 118.151 corresponding to the Wilks lambda is statistically significant at 1% probability level at degree of freedom of 9. Hence, it could be concluded that there was a relationship between the dependent variable and the independent variables.

Following Baldwin et al. [22], which opined that significance of each estimated discriminate function lies on the magnitude of the linear weight (Parameters) associated with each variable, the weight of the variable provides an index of the importance of each predicted.

The parameters might be positive or negative with the view of determining the direction of the relationship. Thus, Table 4 reveals that 'ability to use e-banking' was the strongest predictor while 'level of education' was next in importance as a predictor.

**Table 4. Product contribution of individual variables to the total standardized canonical discriminate score**

	<b>Variables</b>	<b>Function</b>
X <sub>1</sub>	Level of education	1.086
X <sub>2</sub>	Age	-.095
X <sub>3</sub>	Level of income	.554
X <sub>4</sub>	Location of residence	-.773
X <sub>5</sub>	Distance to the nearest bank	-.401
X <sub>6</sub>	Availability of internet and phone facility	.712
X <sub>7</sub>	Transaction cost	-.836
X <sub>8</sub>	Economic status	.735
X <sub>9</sub>	Ability to use E-Banking	1.398
Group	1 Centroid	1.868
Group	2 Centroid	-1.633

*\*Calculated from field survey data 2013*

These two variables with large coefficients of 1.398 and 1.086 respectively stood out as those that strongly predict membership of group of e-banking complaints or non-e-banking compliant. The two variables made positive contribution to the membership of e-banking compliant group.

This is expected as education is an important tool in customers' decision making towards adoption of e-banking since it is a guide in verifying the gain or loss experienced in using e-banking as an alternative to other payment methods. The ability to use e-banking facilities also depends on level of education of the customers [6]. Also Nto et al. [19] added the education is a propelling force in the adoption of an innovation. It is a catalyst in attitudinal positive change of an individual. Variables such as, level of income, availability of internet and phone facilities as well as economic status of the respondents were less successful as predictors which made positive impact in the discrimination of the groups. The positive sign

implies that the customers' chance of belonging to group of e-banking complaints improves with increase in the coefficient of the aforementioned variables vice versa. Hence, the two variables with the largest coefficients stand as those that strongly predict membership of any group thus should be taken seriously in the implementation of cashless policy of the Central Bank of Nigeria.

However, variables like age, location of residence, distance to nearest bank and transaction cost made negative contribution in the group discrimination. The negative sign is an indication that e-banking compliance has inverse relationship with the coefficient of the variables.

A further way of interpreting discriminate analysis result is to describe each group in terms of its profile, using the group (centroid) means of the predictive variables. Furthermore, Table 4 reveals that the group centroids were 1.868 and -1.633 for group 1 and 2 respectively. This means that the higher the composite score of any bank customer, the higher the probability of being e-banking compliant vice versa. So, cases with scores near to a centroid are predicted as belonging to that group.

The classification result presented in Table 5 reveals that 93.3% of the respondents were classified correctly into e-banking compliant and non e-banking compliant groups. However, e-banking complaints were classified with slightly better accuracy (92.9%) than non compliant group (93.8%).

**Table 5. Classification result**

Original	Count	Z	Group 1	Group 2	Total
		1	39	3	45
	%	1	92.9	7.1	100
		2	6.2	93.8	100
Percentage of group cases correctly classified					93.3%

*\*Calculated from field survey data 2013*

Originally, in using the classification procedure where at least 60% income of customers are related to e-banking transaction (group 1), it was discovered that 42 respondents were e-banking compliant while 48 respondents whose less than 60% income were related to e-banking transaction were non-compliant (group 2). But on application of the discriminate model to perform the classification, it was observed that 3 respondents (7.1) in group 2 were erroneously classified as belonging to group 1 while 6.2% of group 1 were erroneously classified to belong to group 2. This misclassification error may cause serious problem through in given room to biased policy targets. Following the high classification performance of the model which is 93.3%, the result was considered adequate thus making the identified socio-economic variables adequate and reliable for policy formulation.

Table 6 indicates that the distribution of respondents based on challenges encountered in the adoption of e-banking in the area. According to the table, 100% of the respondents observed that major constraints in the adoption of e-banking were inadequate facilities, poor infrastructure, poor internet security and incidence of fraud respectively. According to Obisi and Nto [6] and Ovia [4], inadequate e-banking facilities as well as poor infrastructure are related to poorly developed telecommunication infrastructure (especially beyond the urban



areas), unreliable power supply and inadequate e-platform (such as number of networks linking customers to banks and payment switch centres).

**Table 6. Distribution of respondents based on challenges encountered in the adoption of E-banking**

Challenges encountered	Frequency	Percentage
Poor public perception	85	94.44
Inadequate facilities	90	100.00
Lack of suitable legal system	60	66.60
Poor infrastructure	90	100.00
Poor internet security	90	100.00
Incidence of fraud	90	100.00
Loss of human contact	45	50.00
High cost and charges	50	55.50

*\*Multiple responses were recorded field survey data 2013*

Also poor internet security and incidence of fraud which grossly hinder the adoption of e-banking in the area are associated with cyber crimes, activities of hackers on the net to manipulate customer's account balance, virus attack on banking application servers and other fraudulent activities [5].

Table 6 further reveals that about 94% of the respondents noted that the major challenge in the adoption of e-banking was poor public perception. This is due to high level of illiteracy and ignorance in the study area. The result opined that about 67%, 56% and 50% of the respondents attributed the problems in adoption of e-banking in the area to lack of suitable legal system, high cost and charges for using e-banking facilities as well as loss of human contact respectively.

#### 4. CONCLUSION

The study was conducted to examine the socio-economic determinants of e-banking in Abia State of Nigeria. Abia State was selected for the study as it is among the pilot states in the second phase of cashless policy of the Central Bank of Nigeria. The specific objectives were to examine the level of awareness of the adoption of e-banking products in the area, examine the socio-economic determinants of users and identify the challenges associated with the adoption.

The results of the discriminate function analysis indicate that only 24.3% of the variation was explained by the variables in the model. Variables like 'ability to use e-banking' and 'level of education' with discriminate score of 1.398 and 1.086 respectively made the highest contributions to the total standardized canonical discriminate score. The result also depicted that 93.3% of the respondents were classified correctly into e-banking compliant and non e-banking compliant groups.

The policy implication points to the fact that the on-going education sensitization programme of the Central Bank of Nigeria in the area should be strengthened with a view to getting the general public acquainted on how to use e-banking products. The implementation strategies to be adopted should be symposium, seminar, meeting, rally and television advertisement. It should be targeted more on the illiterate members of the public in such areas as market

places, town hall meetings etc. Various commercial banks should collaborate with Central Bank of Nigeria (CBN) in training their customers on how to use the e-banking facilities.

## **COMPETING INTERESTS**

Authors have declared that no competing interests exist.

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