Mediating Effect Of Perceived Usefulness And Ease Of Use On Attitude Towards Using E-Banking Among Bank Customers In Katsina State, Nigeria

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Abstract
E-banking has gained prominence not only in Nigeria but worldwide. In order to manage and sustain that, commercial banks need to achieve operational efficiency, enhance their customers' base etc. In this regard, the banks have devised many strategies, among them are automated teller machine, online banking among others. Therefore, it is important to assess the readiness of the customers by assessing the mediating effect of perceived usefulness and ease of use on attitude towards using e-banking among commercial bank customers in Katsina State using Technology Acceptance Model (TAM). Two hypotheses were formulated to guide the study. The population used for the study was all bank customers inKatsina State. Four hundred bank customers were randomly selected as a sample for the study. Questionnaires were used as means of data collection. Data collected were subjected to statistical analysis using frequencies and percentages and analyzed using conditional inference tree modeling through data mining technique using robust software "r". The result concluded that the model had established a mediating relationship between perceived usefulness, ease of use and attitude toward using e-banking in Nigerian conventional banks. It also concluded that a positive attitude toward the use of e-banking in Nigerian conventional banks can influence the behavioral intention to use it and to even recommend it to others. These findings could be useful to policymakers and stakeholders in the banking industry to design more effective strategies to promote e-banking and encourage its adoption among Nigerian consumers. The study recommended that Nigerian conventional banks can improve the adoption and usage of e-banking services by improving perceived ease of use and usefulness of their platforms through provision of user-friendly interface.
Keywords: Mediating, Perceived usefulness, Perceived ease of use, attitude towards use, e-banking, customers

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I. Introduction

Banking industry plays a very crucial role in economic development as it lubricates the engine of economic activities of any country. In the past, banking transactions in Nigeria were conducted based on a traditional banking system where transactions between customers and banks were done manually. It is therefore worth noting that the emergence of information and communications technology has changed for the better how things are being done. It is as a result of this emerging phenomenon that people now have to struggle to know and understand terms such as e-education, e-governance, e-commerce, e-learning, e-medicine, and of course, e-banking.

E-banking is an electronic payment system that enables customers of a bank or other financial institutions to conduct a range of financial transactions through the financial institutions' websites. E-banking allows banking institutions and their clients to gain access to their accounts and obtain the needed information immediately as well as make any financial transactions via a private or public network (Prakash and Malik, 2008).

Despite the numerous benefits of e-banking to customers, there is justification for conducting this research.The researchers believe that having access to a particular type of technology may not necessarily mean the acceptance of that technology. For instance, even in the well-established conventional banking industry in Nigeria, e-banking seems to be in existence for some time but not all bank customers accept and use it. So, even though they have access to use the facility, the customers do not accept and use it.

It may be interesting therefore to note that the researchers want to assess the mediating effect of technology acceptance model variables which are perceived usefulness and ease of use in relation to promoting

or frustrating the attitude towards accepting e-banking in commercial banks in Katsina State. Given that this study intends to validate the mediating effect of TAM in the context of e-banking, the same variables in the original TAM model may still be adopted albeit in a different context.

However as a further contribution to the model, in the original TAM, what was referred to as external variables may need to be adjusted. So even in previous studies for instance Sinnappan, Chua, and Ong (2022); Bashir andMadhavaiah (2015); and Ahmad, Bhatti, and Hwang (2020); among others, have used perceived usefulness and ease of use, attitude, intention and actual use as they are in the original Technology Acceptance Model. The only difference is the external variables as researchers may have varied perspectives depending on the context they are studying.

II. Objectives of the Study

The main objective of the study is to assess the mediating effect of technology acceptance model variables such as perceived usefulness, ease of use, and attitudes towards the acceptability of e-banking among commercial bank customers in Katsina State. The specific objectives of this empirical research are
1. Ascertain whether there is mediating relationship between perceived usefulness and attitude towards accepting e-banking among commercial bank customers in Katsina State.
2. Ascertain whether there is a mediating relationship between perceived ease of use and attitudes towards accepting e-banking among commercial bank customers in Katsina State.

III. Literature Review and Theoretical Framework of the Study

Technology Acceptance Model (TAM) was chosen as the reference paradigm within which the proposed theoretical framework was developed in this study. The model was originally specified by Fishbein (1967) and extensively analyzed and developed by Fishbein and Ajzen (1975) as the Theory of Reasoned Action (TRA). Davis later modified it and formulated his model of technology acceptance model between 1980 and 1985.

The two models are the most widely studied model of attitudes and human behavior. Their models received broad support in empirical studies of consumer behaviour, decision-making, literature on social psychology, and technology acceptance (Phatthana and Mat 2011; Echchabi and Olaniyi 2012; Mansour, Shariff, and Abdulmanap, 2013; Li-Ming, Wai, Hussin, and Mat, 2013; Sharma and Govindaluri 2014; Rawashdeh, 2015; Alalwan, Dwivedi, Rana, and Williams 2016, etc).

In addition, TAM is a widely used and proven model by many scholars among them are Guritno and Siringoringo (2013), Bashir and Madhavaiah (2015); and Ahmad, Bhatti, and Hwang (2020). The model below is the research model of this study. It was extended from the original TAM developed by Davis (1980-1985) which was expanded or extended as TAM2 by (Venkatesh, 2000 and Davis, 2003).

Figure 1 *Technology Acceptance Model*
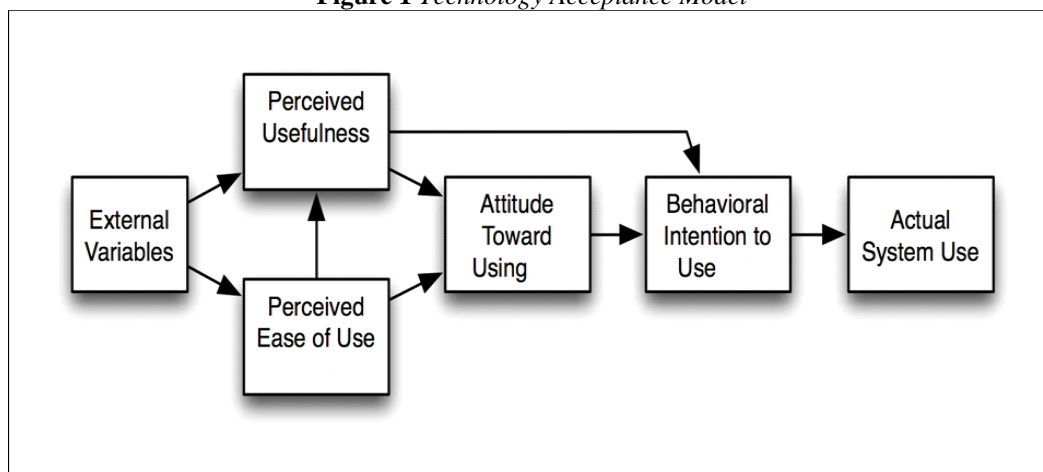
In the present study, perceived usefulness, ease of use, attitudes towards use, and behavioral intention were the mediating variables whilst actual use was the dependent variable. All of these mediating and dependent variables are also referred to as the internal variables of TAM.

IV. Empirical Review of the Study

Literature Summary of Mediating Variables of the Study

The mediating variables of this study are Behavioral Intention (BI), Attitude Towards Use(ATU), Perceived Ease of Use (PEOU), and Perceived Usefulness (PU). Therefore, past literature was reviewed on their relationships as follows:

Relationship between Perceived Usefulness, Perceived Ease of Use, and Attitude TowardUsing E-Banking

Attitude towards using something will be determined by the qualities and characteristics of the products or services. In the case of e-banking, the qualities of the electronic services will greatly determine the attitude of the customers towards using it. That is, if the services rendered by e-banking are worthwhile, the consumers' attitudes towards e-banking will be positive and vice-versa. Due to this, it is important to assess the relationship between the customers' perceived usefulness and ease of use and their attitudes toward usage.

Determinants of the customers' attitude and behavioral intention to use internet banking services were assessed by Bashir and Madhavaiah (2015) in India. They extended the technology acceptance model (TAM) with trust, perceived risk, perceived enjoyment, perceived website design and social influence. The population consist of all internet banking users in India, with a 697 as sample size. The structural equation modelling technique was used to analyze their data which was collected through an online survey.

Their results revealed that there is mediating relationship between perceived usefulness, perceived ease of use and customers' attitude towards using internet banking. This finding is consistent with the findings of Singh (2012), and Chiou and Shen (2012). This finding is also in agreement with the study of Medyawati, Christiyanti, and Yunanto(2011) who found that perceived ease of use mediates attitude towards use. Similarly attitude towards use was found to mediate the relationship between perceived risk, perceived enjoyment, trust and behavioral intentions to use internet banking.

Guritno and Siringoringo (2013) carried out a study to confirm whether the perceived usefulness and ease of use have mediating relationship with attitudes towards usability of online airline tickets purchase. Their analysis was conducted with Structural Equation Modeling (SEM). Their results show that perceived usefulness had mediating relationship with attitudes towards usability of airlines ticket reservation. This finding is similar to that of Njuguna, Ritho, Olweny, and Wanderi(2012), Singh (2012), Bashir andMadhavaiah (2015) and ChiouandShen (2012). This is in sharp contrast to Medyawatiand et al (2011) who found that there was no mediating relationship between perceived usefulness and attitude towards use.

However, Guritno and Siringoringo (2013) further revealed that perceived ease of use did not have mediating relationship with attitude towards using airlines tickets. This is in contrast to the studies of Singh (2012), Bashir andMadhavaiah (2015), ChiouandShen (2012), and Medyawatiand others (2011).

Ahmad, Bhatti, and Hwang (2020) assessed the effect of e-service quality on the actual use of e-banking services using the Technology Acceptance Model in Pakistan. Four hundred and ninety three questionnaires were used for the study.Their data was analyzed using AMOS 20 and SPSS 20. The results of their study indicated that e-service quality positively affects perceived usefulness.

While perceived ease of use and usefulness mediates attitude towards using e-banking. This is in line withNjuguna et.al, (2012), Singh (2012), Bashir andMadhavaiah (2015) and ChiouandShen (2012). This means perceived ease of use affects attitudes towards e-banking positively whichaffect behavioral intentions to use e-banking and behavioral intentions further positively affect actual use of e-banking.

V. Hypotheses of the Study

According to TAM, both the perceived ease of use and the perceived usefulness' are influential elements for the acceptance and use of new technologies. Hence, it is assumed that individuals will use e-banking if they perceive that it will help them attain a desired performance. Therefore, the following hypotheses (H_1 and H_2) were proposed based on the previous literature of Ahmad, Bhatti, and Hwang, 2020, and Bashir andMadhavaiah 2015 to guide the study.Hence from the foregoing literature it is hypothesized that:

a. H_1:There is mediating relationship between perceived usefulness and attitude towards using e-banking among Nigerian conventional bank customers in Katsina State.

b. H_2: There is mediating relationship between perceived ease of use and attitude towards using e-banking system among Nigerian conventional bank customers in Katsina State.

VI. Methodology

Population

The population used for the study was all the banking customers spread across the three Senatorial Zones of Katsina State (Daura Zone, Funtua Zone, and Katsina Zone).

Sample and Sampling Procedure

Convenience sampling was used to select two local governments from each zone. The researchers randomly selected banks from two Local Governments. Convenience sampling is a type of sampling whereby respondents were selected because they are often readily and easily available. Convenience sampling tends to be a favored sampling technique as it is inexpensive and easy to use compared to other Cronbach's Alpha limitations associated with research (Taherdoost 2016).

Five hundred (500) bank customers were used as sample which is in line with the recommendation of Krejcie and Morgan (1970) which provided that for a population of 1,000,000 and above, a sample size of a minimum of 384 is adequate.

Katsina Zone was allocated two hundred and fifty (250) questionnaires, followed by Funtua Zone with one hundred and fifty (150) and Daura Zone has one hundred (100) questionnaires. A total of five hundred questionnaires (500). The two local governments selected from Katsina Zone are Katsina and Dutsinma local governments. In Daura Zone, Daura and Kankia local governments while in Funtua Zone, Funtua and Malumfashi local governments were selected. Simple random sampling was used in selecting bank branches from the sampled local governments.

Data Collection Procedure

The data was collected during a one month period in January 2023. After the researchers trained their research assistants, a total of five hundred (500) questionnaires were distributed to some selected bank customers in three senatorial zones of Katsina State. The researchers visited all the selected banks in order to coordinate smooth data collection exercise with the assistance from various branch managers and our research assistants.

The researchers with their research assistants embraced a personal on the spot administration of the questionnaire. During the data collection exercise, any customer who came to transact business was requested to fill in one questionnaire. In order to avoid being bias in the data collection exercise questionnaires were distributed in the morning, afternoon and in the evening toward the closing hours. This is done in order to get all categories of retail customers i.e. workers, students, business people etc.

Method of Data Analysis

By the end of January 2023, out of the five hundred (500) questionnaires distributed, four hundred and twelve (412) were retrieved, representing eighty two percent (82%) response rate. Twelve questionnaires were exempted from the analysis because they were not fully completed. The data collected was subjected to statistical analysis using frequencies and percentages and analyzed using conditional inference tree modeling through data mining technique using robust software "r".

Data presentation

The table below represents the demographic information and analysis of respondents in respect of gender, age, educational level, estimated monthly income, and occupation.

Table 1: Demographic Analysis of Respondents

Distribution of Respondents by Gender		
Gender	*f*	**%**
Male	263	65.75
Female	137	34.25
Total	**400**	**100**
Distribution of Respondents by Age		
Age Group	*f*	**%**
18-28 years	147	36.75
29-38 years	114	28.50
39-48 years	84	21
49 years and above	55	13.75
Total	**400**	**100**
Distribution of Respondents by Educational Level		
Educational Level	*f*	**%**
Islamic School	43	10.75
Primary School	25	6.25
Secondary School	69	17.25
Diploma/NCE	131	32.75
First Degree	91	22.75
Postgraduate	41	10.25
Total	**400**	**100**
Distribution of Respondents by Estimated Monthly Income		

Monthly Income	f	%
Less than ₦30,000	107	26.75
₦30,000 to less than ₦40,000	58	14.5
₦40,000 to less than ₦50,000	39	9.75
₦50,000 to less than ₦60,000	50	12.5
₦60,000 and above	146	36.5
Total	**400**	**100**
Distribution of Respondents by Occupation		
Occupational Categories	f	%
Private	217	54.25
Public	183	45.75
Total	**400**	**100**

Distribution of Respondents by Gender
Table 1 shows that there were 263 respondents representing 66% of the male respondents that participated in the study and 137 respondents representing 34% of the female respondents.However, it is important to note that gender of respondents doesn't make any serious impact on this study.

Distribution of Respondents by Age
Table 1 shows that, 147 respondents representing 36.75% are into age group of 18 to 28 years, i.e. young population. Similarly, 114 respondents representing 28.5% belongs to age group of 29 to 38, 84 respondents representing 21% were at the age interval of 39 to 48 years and rest of 55 respondents representing 13.75% of the respondents are 49 and above years old as shown in Table 7.2 above. This shows that majority of the respondents are within the age bracket of 18 – 36 years.

Distribution of Respondents by Educational Level
According to Table 1, 43 of the respondents representing 10.75% attended Islamic school, 25 of the respondents representing 6.25% obtained primary school qualification. However, 69 of the respondents representing 17.25% were secondary school certificate holders. Similarly, 131 respondents representing 32.75% obtained either Diploma or NCE results, 91 of the respondents representing 22.75% were first degree holders while 41 respondents representing 10.25% were postgraduates as shown in Table 7.3 above. This shows that majority 65.75% attended higher institution.

Distribution of Respondents by Estimated Monthly Income
Table 1 shows that 107 of the respondents representing 26.75% were earning less than ₦30,000, 58 of the respondents representing 14.5% were earning between ₦30,000 to less than ₦40,000. Similarly, 39 of the respondents representing 9.75% were earning between ₦40,000 to less than ₦50,000, 50 of the respondents representing 12.5% were earning between ₦50,000 to less than ₦60,000 while 146 of the respondents representing 36.5% were earning ₦60,000 or above every month. This shows that the majority of the respondents were earning below N60,000 per month.

Distribution of Respondents by Occupation
Table 1 shows that, there are 217(54.25%) of the respondents that worked on private occupational organizations while 183(45.75%) of the respondents are working with the public organizations as shown in Table 7.5 above.

VII.   Data Analyses, Interpretation, and Discussion

Analysis of Conditional Inference Tree Model of Perceived Usefulness and Attitude Toward Use (ATU)
Below is the analysis of Conditional Inference Tree Model of Perceived Usefulness and Attitude Toward Use (ATU).
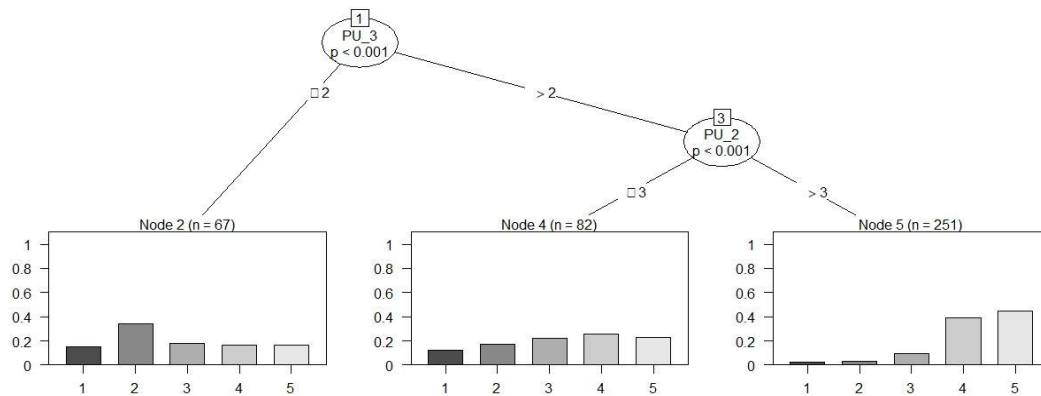
Fig. 1.0: Decision Tree model of perceived usefulness and attitude toward use (ATU)

Response: ATU
Inputs: PU_1, PU_2, PU_3, PU_4
Number of observations: 400
1) PU_3 <= 2; criterion = 1, statistic = 71.854
  2)* weights = 67
1) PU_3 > 2
  3) PU_2 <= 3; criterion = 1, statistic = 40.691
   4)* weights = 82
  3) PU_2 > 3
   5)* weights = 251

Interpretation of the Result

The decision tree has shown that among the four mediating variables (perceived usefulness), the model has chosen two variables to explain the relationship between perceived usefulness and attitude toward using (i.e. using e-banking in Nigerian conventional banks is desirable). It is also interesting to note that the mean probabilities of the relationship between the mediating variables and the attitude toward using are as follows: Strongly Disagree 0.094 (9.4%), Disagree 0.184 (18.4%), Neutral 0.136 (13.6%), Agree 0.277 (27.7%), and Strongly Agree 0.27 (27%).

Discussion of the Result

However, the mediating variables represented by different questions on perceived usefulness for using e-banking in Nigerian conventional banks have shown that 'Agree' has the highest probability. Hence, it can be further stated that attitude toward using has a mediating relationship with perceived usefulness since the respondents Agree that using e-banking in Nigerian conventional banks is desirable.

Based on the given information, the decision tree model has identified two mediating variables that explain the relationship between perceived usefulness and attitude toward using e-banking in Nigerian conventional banks. The mean probabilities of the relationship between the mediating variables perceived usefulness and the attitude toward using have been calculated for different levels of Agreement, and it is found that the highest probability of Agreement is associated with the mediating variable representing perceived usefulness for using e-banking in Nigerian conventional banks. This suggests that the respondents generally consider using e-banking in Nigerian conventional banks as desirable.

Therefore, the results suggest that attitude toward using e-banking has a mediating relationship with perceived usefulness, as respondents who Agree that using e-banking in Nigerian conventional banks is desirable are likely to perceive e-banking as useful. This finding is consistent with findings of Ahmad, Bhatti, and Hwang (2020), Njuguna et.al, (2012), Singh (2012), Bashir and Madhavaiah (2015) and ChiouandShen (2012). This indicates that the perception of usefulness is a significant factor in shaping the attitude toward using e-banking in Nigerian conventional banks.

Analysis of Conditional Inference Tree Model of Perceived Ease of Use and Attitude Toward Use (ATU).

Below is the analysis of Conditional Inference Tree Model of Perceived Ease of Use and Attitude Toward Use (ATU).
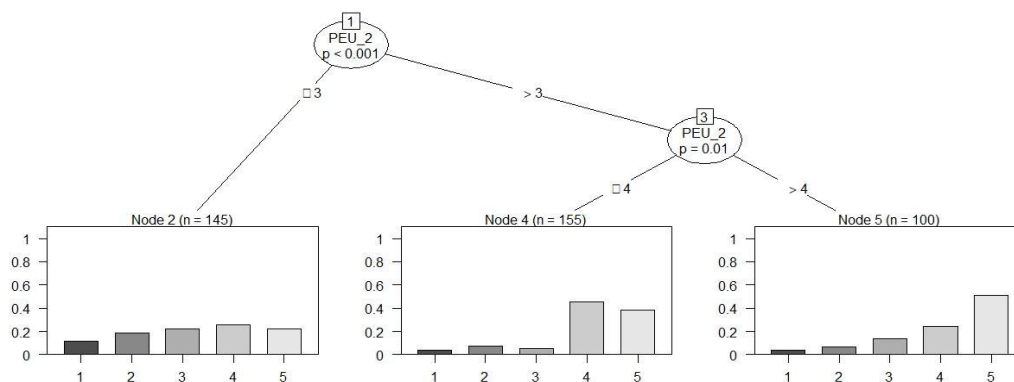
Fig. 2.0: Decision Tree Model of Perceived Ease of Use and Attitude Toward Use (ATU)

Response: ATU
Inputs: PEU_1, PEU_2
Number of observations: 400
1) PEU_2 <= 3; criterion = 1, statistic = 33.136
  2)* weights = 145
1) PEU_2 > 3
  3) PEU_2 <= 4; criterion = 0.99, statistic = 14.942
    4)* weights = 155
  3) PEU_2 > 4
    5)* weights = 100

Interpretation of the Result

The decision tree has shown that the model has chosen one mediating variable to explain the relationship between perceived ease of use and attitude toward using e-banking in Nigerian conventional banks. It is also interesting to note that the mean probabilities of the relationship between the mediating variable and the attitude toward use are as follows: Strongly Disagree 0.057 (5.7%), Disagree 0.059 (5.9%), Neutral 0.11 (11%), Agree 0.307 (30.7%), and Strongly Agree 0.367 (36.7%). However, the mediating variables represented by different questions on perceived ease of use for using e-banking in Nigerian conventional banks have shown that 'Strongly Agree' has the highest probability. Hence, it can be further stated that the attitude toward using has a strong mediating relationship with perceived ease of use since the respondents Strongly Agree that using e-banking in Nigerian conventional banks is desirable.

Discussion of the Result

Therefore, the results suggest that the attitude toward using e-banking has a strong mediating relationship with perceived ease of use, as respondents who Strongly Agree that using e-banking in Nigerian conventional banks is desirable are likely to perceive e-banking as easy to use. This finding is consistent with the study of Njuguna et.al, (2012), Singh (2012), Bashir andMadhavaiah (2015) and ChiouandShen (2012) andMedyawati et.al, (2011). Also it is in contrast with Guritno and Siringoringo (2013) who revealed that perceived ease of use did not have mediating relationship with attitude towards using airlines tickets. This indicates that the perception of ease of use is a significant factor in shaping the attitude toward using e-banking in Nigerian conventional banks.

Overall, the results provide valuable insights into the factors that influence the adoption of e-banking in Nigerian conventional banks and can be used to develop strategies that can promote the adoption of e-banking in this context. In particular, efforts can be focused on improving the perceived ease of use of e-banking to enhance the adoption of e-banking.

VIII. Conclusion

Therefore, it can be concluded that perceived usefulness is an important factor in influencing attitudes toward using e-banking in Nigerian conventional banks. Similarly it has been found that enhancing the ease of use of e-banking services in Nigerian conventional banks could lead to a more positive attitude towards using them. Based on the data collected, it can be concluded that the model has established a mediating relationship between perceived usefulness, ease of use and attitude toward use to use e-banking in Nigerian conventional banks. It can also be concluded that a positive attitude toward the use of e-banking in Nigerian conventional banks can influence the behavioral intention to use it and to even recommend it to others.

Overall, the analysis suggests that perceived ease of use and perceived usefulness are important factors that influence the attitude and behavioral intention to use or accept e-banking in Nigerian conventional banks.

IX. Recommendations

These findings could be useful for policymakers and stakeholders in the banking industry to design more effective strategies to promote e-banking and encourage its adoption among Nigerian consumers. Similarly Nigerian conventional banks can improve the adoption and usage of e-banking services by improving the perceived ease of use and perceived usefulness of their platforms in the following ways:

a. By providing user-friendly interface.
b. By offering incentives for using their e-banking services.
c. By improving the reliability and security of their platforms.

By doing so, banks can increase customer satisfaction, which in turn can lead to a positive attitude toward and a higher intention to use or accepting e-banking in the future.

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