PREDICTION OF CUSTOMER ACCESSIBILITY OF ELECTRONIC BANKING LOGISTIC REGRESSION IN NIGERIA

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ABSTRACT
This research is an attempt to investigate an empirical relationship between E-Banking Products and Customers' satisfaction of accessibility. Questionnaires were used to collect the data from a random sample of 3400 customers across the branches of First Bank Plc, Guarantee Trust Bank and Fidelity Bank in Sokoto, Kebbi and Zamfara States of Nigeria. The technique of logistic regression analysis was adopted in the data analysis. The results of the analysis shows that customer satisfaction of accessibility is positively and significantly influenced by E-Banking components in the dimension of Internet Banking, Electronic Fund Transfer, Home Banking, Point of Sale and Mobile Banking, but positively and insignificantly influenced by Automated Teller Machine and Telephone Banking services of E-Banking. It was also found those Automated Teller Machines, Internet Banking, Electronic Fund Transfer, Home Banking, Point of Sale, Mobile Banking and Telephone Banking as E-Banking components were identified as good predictors of customers' accessibility. In Nigerian banking, customers were generally not satisfied with the way these services are offered.

Keywords: E-Banking, Customer Satisfaction, Accessibility, Logistic Regression, Customers

1.0 INTRODUCTION
The banking sector is one of the most important service providers for a nation's economy. Today, modern, highly industrialized and technology driven economies are threatened by higher risks more than ever, and individuals' needs to protect themselves against private risks have escalated. From a banks' viewpoint, use of Internet banking is expected to lead to reduced costs and improved competitiveness. This service delivery channel is seen as powerful because it can retain current web-based customers, who continue using banking services from all locations. Moreover, Internet banking provides opportunities for a bank to develop its market by creating a new customer base from existing Internet users.

Given the fact that banks invest billion dollars in the internet infrastructure, customer satisfaction and customer retention are increasingly developing into key success factors in e-banking [1]. But low customer satisfaction is a major encumbrance to depress development of e-banking service in Chinese commercial bank sector. Patricio et al.'s [2] focus-group study found that customers with different patterns of use (e.g., frequency of use and type of operations performed) for an e-banking service tend to value different web-site attributes, several of which are related to website quality. Therefore, website quality has significance relationship with e-banking customer satisfaction. Website quality is a key factor to affect e-banking customer satisfaction [3].

A customer satisfaction is an ambiguous and abstract concept. Actual manifestation of the state of satisfaction will vary from person to person, product to product and service to service. The state of satisfaction depends on a number of factors which consolidate as psychological, economic and physical factors. Recent ten years evidenced that electronic based business models are replacing conventional ones and organizations are rethinking business process designs and customer relationship management strategies. Banks are no exception to this transformation; use of Information and Communication Technology (ICT) is revolutionizing the banking services through various unthinkable innovations [4]. Now Nigerian banks are investing money in ICT infrastructure to provide e-banking services to their customers. It provides various alternative e-channels to use banking services e.g. ATM, credit card, debit card, internet banking, home banking, mobile banking, point of sale, electronic fund transfer, electronic clearing services etc. However, as per as Nigerian e-banking scenario ATM is most acknowledged e-banking channel as compared to other e-channels.

1.1 Accessibility
Accessibility defines as the ability of users to access information and services from the web is dependent on many factors. These include the content format; the user's hardware, software and settings; internet connections; the environmental conditions and the user's abilities and disabilities [5 & 7]. The term "web
accessibility" generally relates to the implementation of website content in such a way as to maximize the ability of users with disabilities to access it. For example, providing a text equivalent for image content of a web page, allows users with some visual disabilities access to the information via a screen reader. The techniques and approaches that create more accessible web pages for people with disabilities also address many other access issues such as download speed and discoverability [5, 6 & 7].

[8] Revealed reliable/prompt responses, attentiveness, and ease of use had considerable impacts on both customers perceived overall service quality and satisfaction. It also indicated that there is a significant positive relationship between overall service quality and satisfaction. Yang and Jun [9] redefined the traditional service quality dimensions in the context of online services, and suggested an instrument consisting of seven online service dimensions (reliability, access, ease of use, personalization, security, credibility, and responsiveness). Joseph et al [10] considered banking service quality with respect to technology use, such as ATMs, telephone, and the internet and identified six dimensions. They were convenience/accuracy, feedback/complaint management, efficiency, queue management, accessibility, and customization. Therefore, it is hypothesized that accessibility has positive effect on customer satisfaction.

1.2 Review of Literature
Available literature regarding to customer satisfaction in service industry evident that service quality is a more specific judgment which can lead to a broad evaluation of customer satisfaction [11, 12 & 13]. However, [14 & 15] posited that e-service quality is important to assess customer satisfaction in the e-service setting. [13] developed SERVQUAL instrument to assess service equality of traditional services or non-electronic service which containing five dimensions i.e. Reliability, Responsiveness, Assurance, Empathy and [16] in a study of ATM users in Canada, established that major reasons for using ATM were accessibility, freedom to do banking at all times, and to avoid waiting lines. The study also found that the users' apprehension about the risk associated with its use and complexity of the machine in executing the transaction. [17] Studied the perceived attributes of ATM service quality and marketing implication. They found that convenience, reliability, and ease of use are important aspects, whereas complexity and unreliability (risk) were causes of dissatisfaction. However, according to [14] mentioned that apart from Reliability, Responsiveness, Assurance/trust and Security/Privacy there are another important dimensions i.e. Access, Flexibility, Ease of navigation, Efficiency, Price knowledge, Site aesthetics and Customization/Personalization. [18] Examined the satisfaction level of ATM card holders of a leading bank (HBSC) in Bangladesh. The study found significant relationship of ATM service quality with customers' satisfaction. The study identified that location, personnel response, quality of currency notes, promptness of card delivery and performance of ATM were positively and significantly related to customers' satisfaction. The security, frequent breakdown of machine, and insufficient number of ATM were the major contributors of customers' dissatisfaction. In another study in Bangladesh, [19] found that 24 hours service, accuracy, and convenient locations were the main predictors of customer satisfaction. The study also indicated lack of privacy in executing the transaction, fear of safety and complexity of the machine were the major concern for the customer. [20] Reported that adequate number of ATMs, convenient and secure location and user-friendly system, speed, minimum errors, high uptime, cash backup, cost, and service coverage is essential quality aspect of ATM service. [21] Investigated an empirical relationship between ATM service quality and customer satisfaction in Pakistani Banks. The study found that convenience, efficient operation, security and privacy, reliability and responsiveness are significant dimensions of ATM service quality and ATM service quality positively and significantly contributes toward customer satisfaction. [22]Mentioned that ATM system of delivering banking services not only contribute to the increasing rate of bank fraud but equally lures Nigerians in to profligate expenditure.

After reviewing the literature intensively, it is observed that there currently exists no generally no statistically accepted model for predicting satisfaction of customers using Internet Banking in term of accessibility. This study is also unique in the sense that it tried to model service quality using logistic regression analysis. Thus, considering the customer status of satisfaction as satisfied or not. Therefore, the following hypothesis is formulated: There is no significance relationship between customer satisfaction of accessibility and Electronic Banking Components of Automated Teller Machine (ATM), Internet Banking (IB), Electronic transfer Fund (EFT), Point of sale (POS), Telephone Banking (TB), Mobile Banking (MB) and Home Banking (HB).

2.0 MATERIALS AND METHODS
A quantitative study, involving the administration of a survey was conducted in order to validate the identified factors of E-banking service quality. The primary data was obtained from 3400 customers operating with First Bank plc, Guarantee trust Bank and Fidelity Bank in Sokoto, Kebbi and Zamfara States of Nigeria. The customers who were assigned questionnaire to fill were randomly selected and the Banks from which these
customers were selected were conveniently selected. In the selection of the customers, the banks were visited by the researcher with the copy of the questionnaires, which is later issued to those customers who also happen to visit the bank for any transaction. This continues until the number questionnaires are exhausted. Respondents were asked to give their perception of the service quality level of E-services on a 5-point like scale (5=strongly agree, 4=Agree, 3=Neutral, 2=Disagree, 1=strongly disagree) a total of 2852 questionnaires were collected. The data were analyzed using SPSS 20.0 software. As per as the requirements of the reliability test conducted and only those dimensions has been conducted for further analysis which having Cronbach's alpha above 0.70, logistic regression was used to identify predictors of customer satisfaction.

2.1 Logistic Regression Model Specification

Logistic regression analysis (LRA) extends the techniques of multiple regression analysis to research situations in which the outcome variable is categorical. In practice, situations involving categorical outcomes are quite common. In the setting of evaluating an educational program, for example, predictions may be made for the dichotomous outcome of success/failure or improved/not-improved. Similarly, in a medical setting, an outcome might be presence/absence of disease. In this research the outcome is the customer satisfaction which is also categorical. This is because customer can either be satisfied or not.

In logistic regression, the success occurs with probability $P$ given as below:

$$ P = \frac{e^{a_0+a_1x_1+a_2x_2+...+a_kx_k}}{1 + e^{a_0+a_1x_1+a_2x_2+...+a_kx_k}} \quad \text{(1)}$$

Now the equation establishing the estimated relationship between the explanatory variable and the odd in favor of success is given below:

$$ \ln \left( \frac{P}{1-P} \right) = a_0 + a_1x_1 + a_2x_2 + ... + a_kx_k \quad \text{(2)}$$

Equation (2) can particularly be modified to suit the situation of this research as follows:

$$ \ln \left( \frac{P}{1-P} \right) = a_0 + a_1x_1 + a_2x_2 + a_3x_3 + a_4x_4 + a_5x_5 \quad \text{(3)}$$

Where, $1_n\left( \frac{P}{1-P} \right) = y$ is the dependent variable in as follow

$$ y = \begin{cases} 1 & \text{if the customer is satisfied with accessibility} \\ 0 & \text{if the customer is not satisfied with accessibility} \end{cases} \quad \text{(4)}$$

And $x$ is the independent variable defined as follows:

- $x_1$ ATM as an E-Banking component
- $x_2$ IB as an E-Banking component
- $x_3$ EFT as an E-Banking component
- $x_4$ HB as an E-Banking component
- $x_5$ POS as an E-Banking component
- $x_6$ TB as an E-Banking component
- $x_7$ MB as an E-Banking component

3.0 RESULTS AND DISCUSSION

3.1 Reliability Analysis

| Table 3.1: Reliability statistics |
|-------------------|------------------|------------------|
| **SN** | Construct | Items | Cronbach's Alpha |
| 1 | Automated Teller Machine (ATM) | 5 | 0.821 |
| 2 | Internet Banking (IB) | 5 | 0.878 |
| 3 | Electronic transfer Fund (EFT) | 5 | 0.720 |
| 4 | Home Banking (HB) | 5 | 0.732 |
| 5 | Point of Sale (POS) | 5 | 0.780 |
| 6 | Telephone Banking (TB) | 5 | 0.791 |
| 7 | Mobile Banking (MB) | 5 | 0.822 |

3.2 Relationship between e-banking service quality and overall customer accessibility

The Cronbach's alpha reliability test has been used to identify the validity of items used in survey. According [17 and 18] the alpha of a scale should be greater than 0.700 for items to be used together as a scale. Therefore minimum 0.700 coefficient alpha values accepted to finalize the item validity. As per as Table 3.1 shows that all dimensions have appropriate reliability.

This study investigated the extent to which Customers of E-Banking services are satisfied in the dimensions of accessibility of the E-Banking Products Proxy by ATM, IB, EFT, HB, POS, TB and MB. The results of the null hypothesis formulated as ada $H_0$. There is no significance relationship between customer satisfaction of accessibility and Electronic Banking Components of Automated Teller Machine (ATM), Internet Banking (IB), Electronic transfer Fund (EFT), Point of sale (POS), Telephone Banking (TB), Mobile Banking (MB) and Home Banking (HB) were shown in table 2. The results indicated that the impact of E-Banking Quality Services in terms of IB,EFT,HB,POS and MB is positive and significant on the Customers' accessibility at 5% level. Whereas the E-Banking
quality service in terms of ATM and TB have positive but insignificant impact on Customers' accessibility at 5% level. ATM services in the dimensions of its Charges and Speed is positive and significant at 1% level. However, the result also indicated that the impact of ATM services in the dimension of its accessibility is positive and significant at 5% level. The positive impact implies that the more the improvement of these services quality the more the customers' satisfaction of accessibility.

The values 0.77,0.261,0.212,0.369,0.221,0.181,1.123 and 1.576 are the unit level of how these services in the dimensions ATM,IB,EFT,HB,POS,TB and MB can respectively change the customer satisfaction positively. The impact of the E-Banking quality service towards customer satisfaction being statistically significant implies that the impact of that service cannot be equated to zero and similarly the insignificant impact of the E-Banking quality service means that there is no satisfaction on the part customer in it. However, the odds ratios in the last column of table2 are interpreted as follows: the odds ratios of 1.088 for ATM as E-Banking products means for any additional unit in the improvement of its quality, the odds of a customer accessibility of the service increases by 8% (a factor1.08) and similar manner all other components are interpreted.

The summary of the model is reported in table 3. According to Cox & Snell R Square and Nagelkerke R Square, the model is good. This is because R Square is a measure of how best the independent variable explained variation in the dependent variable. Therefore, Cox & Snell R Square coefficient of 0.564 means that the considered E-products explained about 56% variation in the customer accessibility. Similarly, Nagelkerke R Square coefficient of 0.711 indicates that the considered E-products explained up to 71% variation in the customer accessibility. The goodness of fits test indicates good fit since p-values are all smaller than the level of significance i.e. 0.05 and hence the null hypothesis which states that the fitness of the model is good is rejected.

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### Table 3.2: Variables in the Equation (Accessibility)

<table>
<thead>
<tr>
<th>Step</th>
<th>ATM</th>
<th>IB</th>
<th>EFT</th>
<th>HB</th>
<th>POS</th>
<th>TB</th>
<th>MB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.77</td>
<td>0.261</td>
<td>0.212</td>
<td>0.369</td>
<td>0.221</td>
<td>0.181</td>
<td>1.123</td>
</tr>
</tbody>
</table>

### Table 3.4: Goodness of fit tests

<table>
<thead>
<tr>
<th>Method</th>
<th>Chi-square</th>
<th>Df</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson</td>
<td>1156.71</td>
<td>529</td>
<td>0.00</td>
</tr>
<tr>
<td>Deviance</td>
<td>1208.53</td>
<td>529</td>
<td>0.00</td>
</tr>
<tr>
<td>Homer-Lameshow</td>
<td>154.85</td>
<td>5</td>
<td>0.00</td>
</tr>
</tbody>
</table>

### 4.0 CONCLUSION

A result of data analysis and hypothesis tests indicated that the customer satisfaction of accessibility is positively and significantly influenced by E-Banking components in the dimension of Internet Banking, Electronic Fund Transfer, Home Banking, Point of Sale and Mobile Banking, but positively and insignificantly influenced by Automated Teller Machine and Telephone Banking services of E-Banking. This therefore indicates that the more the level of improvement in the quality services of E-Banking Components, the more level of satisfaction customers derived from these services. It was also found that Automated Teller Machines, Internet Banking, Electronic Fund Transfer, Home Banking, Point of Sale, Mobile Banking and Telephone Banking as E-Banking components were identified as good predictors of customers' accessibility. In Nigeria, it is also observed most of the banks offering e-banking products to customers need to at least improve these services as the most of customers are not generally satisfied with the services are offered.

### REFERENCES


[6]. Hackett, S., Parmanto, B. and Zeng, X. 2004: Accessibility of Internet Websites through Time. Association for Computing Machinery, Atlanta, USA.


