(RESEARCH ARTICLE)

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The Relationship between the growth in Automated Teller Machine (ATM) terminal and values of ATM services in Nigeria

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Abstract

The study was aimed at assessing the relationship between the growth in automated teller machine (ATM) terminal and values of ATM services in Nigeria. The study provided some evidence that the ATM has now been accepted by customers in the industry as it has gained a positive impact on service delivery to customers. Introduction of the ATM facility and directives by management of DMBs that checking of balance and withdrawal of cash less than a certain amount over the counter would attract a fee has not only helped reduced long queues in the banking halls but has also helped customers to have control over their monies and its management. Tangibility, Reliability, Responsiveness, Assurance, Empathy, Efficiency and Accuracy were the variables considered to determine customers' satisfaction/dissatisfaction with respect to adoption and usage of the ATM service.

Keywords: Growth; Automated Teller Machine; Terminal; Values

1. Introduction

For several decades, Nigeria as a predominant consuming society was not disposed to buying goods on credit or with credit cards (Dapo, 2019). The norm has been to operate exclusively with cash. This approach seemed to be more conservative and members tend to think more carefully before spending their money. Today, the tide has changed as many banks now extend credit cards to individuals, qualified customers, courtesy of automobile functional Automated Teller Machine systems. The automated teller machine (ATM) can be defined according to Agboola, (2019) as a machine outside the bank that you can use to get money from your account. ATMs are self-service banking machines which are linked directly to a computer. They permit bank customers to withdraw money up to a certain amount. Customers are also allowed to deposit money into their accounts (Abdelaziz, Hegazy & Elabbassy, 2019). Deposits are often made by placing the money in special container after the amount has been keyed into the terminal by the customer. Withdrawals are performed by customer entering the amount of money desired through a keyboard. The currency enclosed in clips can be dispensed to the customer through the machine. Automated teller machine or the cash machine was developed by Luther Simjian (1905-1997), a Turkish by origin in1939, when he came up with the idea of creating a "hole-in-the-wall machine" that would allow customers to make financial transactions. (Ogbuji, 2019).

Automated Teller Machines (ATM) was introduced into the Nigerian market in 1989, as a matter of fact; the very first ATM in Nigeria was installed by National Cash Registers (NCR) for the defunct Societe Generale Bank Nigeria (SGBN) in 1989. Banks in the country are now adopting Self Service (ATMs) technology because it is cost effective in the long run. In the past few years, Nigerian banks and the financial services industry in particular, have embraced the concept of e-money. Changes are beginning to take place in the Nigerian financial landscape and customers are increasingly raising the hope of expectations for quality customer services (Oruma, 2018). ATMs are placed not only in bank premises but also in locations such as shopping malls, airports, campuses, restaurants and any large places where commercial

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activities seems to be taking place. Consumers gain access to the use of ATMs through the ATMs plastic card with a magnetic stripe, codes and owner's names encrypt on it. The encryption serves as user identification, where a four-digit authentication numbers possess only by the owner is used for withdrawals of funds. (Abdullahi, 2020).

The emergence of this machine has given customers 24 hours every day easy access to his or her cash deposit at the bank thereby increasing his or her spending rate, consumption pattern and also volume of transaction. It has also to some extent reduced exchange and transaction cost greatly, since it can be used as a means of withdrawing fund and also as a means of payment. ATMs can be used to perform so many transactions namely- Interbank Transfer services like Cash withdrawal, Account Balance Inquiry, Airtime Recharge, Fund Prepaid, Credit Transfer, Payment of Bills e.g. PHCN, MTN, DSTV, ZAIN,HITV and many more. (Bitange, Wang & Obara, 2015).

Between January and August 2020, ATM transactions in Nigeria were worth 12 trillion Nigerian Naira (Jegede, 2020). Over the last years, the value of transactions increased steadily, as this figure amounted to 3,970 billion Naira. The overall number of transactions grew as well, adding up to some 840 million in 2019. The total volume of electronic transactions categorized under direct debits increased to 849 million in the third quarter of 2020, representing a 54% increase when compared to the second quarter. This is contained in the latest Banking Sector Report by the National Bureau of Statistics. Direct debits involve standing instructions between a bank and customers approving transfers of money to third parties at a scheduled date during the money. Direct debits are a feature in most developed economies and are relied upon to pay for utility bills and other forms of third party credit related commitments. Apart from the total volume of transactions, the value of transfers under direct debits was N633.5 billion down from N792.7 billion in the second quarter of the year, when most Nigerians were still on lockdown. According to NIBSS about N320.9 billion in direct debit transactions occurred in 2017. The rise in transaction volume for direct debits suggests more Nigerians are adopting direct debit as a form of payment. For example, most microfinance banks rely on it for payment of unsecured loan transactions and could be the major factor for the increased adoption rate in Nigeria. (Katono, 2020).

Investment in IT by commercial banks has served to streamline operations, improve competitiveness, and increase the variety and quality of services provided. According to (Yasuharu, 2017), implementation of information technology and communication networking has brought revolution in the functioning of the banks and the financial institutions. It is argued that dramatic structural changes are in store for financial services industry as a result of the Internet revolution; others see a continuation of trends already under way. Arguably, the most revolutionary electronic innovation in this country and the world over has been the Automated Teller Machine (ATM) and Nigeria is not an exception. Most banks currently operate ATMs in Nigeria. The ATM has been the most successful delivery medium for consumer / retail banking in this country; As (Abor, 2018) puts it, the ATM is the most widely used electronic delivery channel for banks in Nigeria. Customers consider the ATM as an important service and this influences their choice of banks, and banks that have delayed the implementation of their ATM systems, have suffered irreparably to this service. Jordan and Katz, (2015) stated that the introduction of the ATM has made the distribution of banks services more efficient. ATMs have been able to entrench the "one-branch" philosophy in this country by being networked, so people do not necessarily have to go to their branch to do some banking. Before ATMs, withdrawals, inquiries, internal funds transfers, mini statement inquiry, among others, all required the face-to-face interaction between the consumer and the bank teller. Networking ATM's has therefore increased banking services to customers.

According to data from the Nigerian Inter-bank Settle System (NIBSS), the total number of Automated Teller Machines (ATMs) in Nigeria as at September, 2018 is 18,321. While the total number of transactions performed is 650.06 million, the transaction value is N4.76 trillion. As of September 2017, the total number of ATMs across the country was 17,051, while the total number of transactions performed was 560.86 million and the transaction value was N4.61 trillion. This interprets that compared to the total number of ATMs in 2018 there was an addition of 1,270 ATMs, thereby increasing the number of transactions performed by 89.20 million, and transaction value by N15 billion. (Jattani, 2018).

Commercial banks have automated their services by use of Automated Teller Machines (ATMs).The aim has been to schedule employees' duties with ease, reduce the building up of queues and increase employees' efficiency. Other reasons for adopting ATMs include; reduction of customer service delivery time, improvement of quality of service, bringing services closer to customers and cutting on cost of operations. The use of ATM is not only safe but is also convenient. This safety and convenience, unfortunately, has an evil side as well that do not originate from the use of plastic money but rather by the misuse of the same.

This evil side is reflected in the form of "ATM frauds" that is a global problem. In an effort to obtain actual cards, criminals have used a variety of card trapping devices comprised of slim mechanical devices, often encased in a plastic transparent film, inserted into the card reader throat. Hooks are attached to the probes preventing the card from being returned to the consumer at the end of the transaction. When the ATM terminal user shows concern due to the captured card, the

criminal, usually in close proximity of the ATM, will offer support, suggesting the user enter the PIN again, so that he or she is able to view the entry and remember the PIN. After the consumer leaves the area, believing their card to have been captured by the ATM, the criminal will then use a probe (fishing device) to extract the card. Having viewed the customers PIN and now having the card in hand, the criminal can easily withdraw money from the unsuspecting user's account. The use of plastic money is increasing day by day for payment of shopping bills, electricity bills, school fees, phone bills, insurance premium, traveling bills and even petrol bills. The convenience and safety that credit cards carry with its use has been instrumental in increasing both credit card volumes and usage. The world at large is struggling to increase the convenience and safety on the one hand and to reduce its misuse on the other. An effective remedy for prevention of ATM frauds, however, cannot be provided unless we understand the true nature of the problem.

The value of Automated Teller Machine (ATM) transactions, on quarterly basis dropped by N67 billion to N4.82 trillion in the fourth quarter of last year (Q4'20) from N5.49 trillion in the previous quarter, Q3'20. However, the volume of transactions rose by 21 percent to 242.3 million in Q4'20 from 200.94 million in Q3'20. Stakeholders in the banking sector have attributed the decline to impairment in income, loss of job, problems due to the negative impact of COVID'19 pandemic, recession and problems associated with ATM terminals cash dispenser error. The number of active ATMs in Nigeria dropped to 17,518 in December, 2019. This is a loss of about 1,213 from the 18,731 ATMs recorded in March 2019, according to data from by the Nigeria Interbank Settlement System (NIBSS). With the population of Nigeria above 200 million, the country's ATM per Capita (number of Automatic Teller Machines per 100,000 Adults) as at December 2019 fell to about 8.75. This is down from the 16.92 ATM per Capita recorded by the WorldBank in 2018. Similar to the number of ATM, the volume of ATM transactions in December 2019 also dropped to 839.8 Million. This is a drop of 35.7 million from the 875.5 million recorded in 2018. The value of ATM transaction remained unchanged at N6.5 trillion in 2019 from what was recorded in 2018. Hence this study seeks to examine the relationship between the growth in automated teller machine (ATM) terminal and values of ATM services in Nigeria.

2. Literature Review

Few researchers have discussed the relationship between the growth in automated teller machine (ATM) terminal and values of ATM services in Nigeria and other parts of the world, with a number of such studies. In this study, a number of studies are examined to illicit the opinions of researchers on the topic.

According to Odusina (2014) while investigating the level of ATM usage and customers satisfaction in Nigeria using comparative analyzes of three banks in Ogun State Metropolis of Nigeria. The study employed primary data, sourced through questionnaires which were administered to a total of 200 respondents, cutting across the three banks. The data were analyzed using the Chi-square statistical tool, the study thus revealed that there is a positive and significant relationship between ATM usage and customers' satisfaction.

Alex (2014) examined the impact of e-banking on customer services and profitability of banks in Ghana. The random sampling technique was used to select ten banks and two hundred and fifty customers all in Accra for the study. The study found that e-banking has impacted positively on customer service and profitability of banks, though the study identified a number of challenges, it thus recommended among others that there should be 24/7 monitoring of ATMs so that any failure is addressed as soon as possible to guarantee customer retention.

Ogunlowore and Oladele (2014) also examined the impact of electronic banking on satisfaction of corporate bank customers in Nigeria. Data were collected with a structured questionnaire and also analyzed with descriptive statistics while the hypotheses of the study was tested using Chi-square technique. The study revealed that there is a significant relationship between electronic banking and customers' satisfaction and also suggested that critical infrastructure like power, security and telecommunication should be strengthened to ensure the application of electronic banking in Nigeria and optimum satisfaction on the part of customers.

Alabar (2012) conducted research in electronic banking services and customers' satisfaction in the Nigerian banking industry. He sampled 400 respondents of some selected banks across the six geo-political zones of the country. Using regression analysis, the study revealed that electronic banking services has significant effect on customers' satisfaction in Nigeria.

Similarly, Ebiringa (2010) investigated the effect of ATM infrastructure on the success of e-payment. The analysis of the study was based on primary data collected from the users of ATMs. A total of 1141 users of ATM were sampled. The data were analyzed using the factor analysis simulation model. The study also modelled five strategic decision clusters, in which inadequate availability of quality infrastructure was identified as the most critical limitation to the efficient e-payment via ATMs. The study thus concluded that provision of adequate infrastructure such as power is critical for

effective integration of the Nigerian banking system to the global network of electronic payment via ATMs; and for this to be possible, the study advocated for concerted effort by stakeholders to resolve the lingering crises in the energy sector.

Contrarily, Chinedu, et al (2012) analyzed the negative effect of the ATM as a channel for delivery banking services in Nigeria. Using a sample of 600 respondents, conveniently selected from two states of the federation. The data were analyzed using Chi-square. The study found that the ATM system of delivery banking service not only contribute to the increasing rate of bank fraud, but equally lures Nigerians into profligate expenditures. They therefore recommended that banks should strive to increase their security layers to subvert the tricks of web scammers and limit the amount which customers may be allowed to withdraw at a time.

In another instance, Alabar and Agema (2013) also investigated the effect of information and communication technology and customer satisfaction in the Nigerian banking industry. The study employed primary data and four hundred banks' customers were served with questionnaire and the regression analysis was used in testing the hypothesis. The study discovered that the present state of ICT had significant influence on customer satisfaction. They therefore suggested that banks should raise the standard of ICT based services to customers in the country.

Fenuga and Oladejo (2010) investigated the effect of electronic payment on customer service delivery in Nigerian banks. 100 respondents were stratified proportionately amongst customers of the selected banks with the aid of questionnaire which was randomly administered to customers of four selected commercial banks in the country. Chi-square and regression analysis were employed to analyze the data. The study concluded that electronic payment has significant impact on the services rendered by the banking industry in Nigeria.

Adewoye (2013) equally examined the impact of mobile banking on service delivery in the Nigerian banks. The study employed primary data sourced through questionnaires, which were administered to staff and customers of some selected banks in the country. The data collected were analyzed using Chi-square statistical technique. The results of the findings shows that mobile banking improve banks service delivery in a form of transactional convenience, saving time and so on. To this end, the study recommended that banks management should create awareness to inform the public about the benefits delivered on the e-banking service products.

Also, Jegede (2014) investigated the effect of ATM on the performance of Nigerian banks. Questionnaires were used to collect the data from a convenience sample of 125 employees of five selected banks in Lagos state with Interswitch network. The data were analyzed statistically using the Chi-square technique, which was done electronically via the Software Package for Social Science (SPSS version 20.0). The result therefore indicated that less than the benefits, the deployment of ATMs terminals have averagely improved the performance of Nigerian banks. The researcher thus recommended in conformity with Chinedu, et al (2012) recommendations, that banks should strive to increase their security layers so as to subvert the tricks of web scammers and also limit the amount which customers may be allowed to withdraw at a time and the provisions of extra security layer that can prevent third party from making use of someone else's ATM card for unauthorized withdrawals.

Olanipekun et al (2013) examined the impact of e-banking on human resources performance and customer satisfaction. Primary data was adopted for the study which was sourced via a structured questionnaire administered to fifty randomly selected respondents. The Chi-square technique was used to analyze the data. The study revealed that introduction of electronic banking has impacted positively on the bank's human resource performance and has also enhanced customers' satisfaction. They therefore recommended that critical infrastructure that will aid the usage of e-banking products should be provided.

Lastly, Ray and Ghosh (2014) empirically examined the impact of internet banking service quality dimensions on customer satisfaction. The study employed pre-structured questionnaire in collecting the primary data from a sample of 120 respondents through personal contact, field survey and email. The data were analyzed through SPSS version 21.0. The analysis revealed that there are three dimensions of service quality, namely; Assured service, Service efficiency and convenient service, which impact customer satisfaction and that customers are more satisfied with additional service dimensions like trustworthiness, sincerity, accessibility and awareness. Meanwhile, from the previous research efforts, one could say with all modest that the relationship between ATM usage and the level of satisfaction derived by banks' customers has received a fair share of empirical studies and a number of recommendations from both administrative and monetary analysts across the globe. However, as it is observed, none of these studies have investigated the relationship between customers' satisfaction and ATM usage in the Ilorin metropolis thus creating a research gap, which necessitated the study.

Corradi and Swanson (2005) studied 13 OECD members from 1988 to 2003 and demonstrate that using ATMs face a decrease with a daily increase in using POS devices. Amromin and Chakravorti (2006) insert that in many economies, ATMs are primarily considered as a wallet for consumers with which people have access to cash. With an increase in POS usage by businesses, the rate of credit card usage increased and people showed less tendancy toward carrying cash with themselves. With all these, the authors believe that final selection of each device depends on consumers' attitude toward ATM and POS accesibility. In a study entitled "Payment Systems' Copetitor Technologies: POS and ATM

A Demand For Cash", Carbo and Rodriguez (2008) investigate the adoption and diffusion of ATM and POS in companies. The experimental research results shows that competitors network and marlet authority directly influences the selection of each technology by individuals and companies. Also, the results shows that when demand for ATM machines is growing, the demand for POS devices decreases.

In a study by Owh et al, (2009) entitled "Effect of Numerous ATMs on Cost Efficiency: An Empirical Study of Taiwan", the effect of ATMs on banks' cost efficiency was studied and insert that using ATMs could decrease costs and via cost reduction, banks could obtain a higher performance. Chin believes that using ATMs leads to a decrease in operational costs by removing manual operation.

Chan and Lu (2004) insert that perceived ease of usefulness by customer indirectly influences individuals' intent for deciding and/or continuously using electronic banking. Also, Guriting and Ndubisi (2006) insert that ease of usefulness and preliminary instructions equally has an indirect effect on using electronic banking.

In another study in Parsian Bank, the researcher investigates the required contexts for electronic banking and introduces a suitable approach from approaches for transforming traditional banking to electronic banking. He believes that technology, managerial, organizational and cost factors are the factors mostly influence the establishment and development of electronic banking in Parsian Banks. In another study by Su and Han (2005), two factors of ease of use and usefulness of services are significant in ATM acceptance by customers. In a study performed by Olowookere and Olowookere (2014), they found out that ATMs are extensively used by people so that %93 of individuals studied are using this system. High accessibility to these systems makes them more acceptable while high transaction fees and high fraud risks decreases the usage rate

Abbas et al (2015) figured out that most significant factor influencing services presented by ATM and POS systems are reliability, responsiveness and assurance. They suggest that by promoting ICT infrastructure in a country trustworthiness increases.

In a study by Ozbeka et al. (2014) entitled "The Impact of Personality on Technology Acceptance: A Study on Smart Phone Users", they studied the impact of personality on technology acceptance. They set their study on 401 university student and the results shows that perceived usabilty and user's behavioral intent are influenced by users' personality.

Laforet and Li (2015) suggests that banks' marekting managers apply suitable explorative marketing research and find out the reason behind this phenomenon. Also, with regard to the procedure of service assimilation performed in most banks, he suggests to bank managers that they have to merge ATM services with services that private sector employees benefit and must encourage that group of customers to use ATM technology services.

Akinmayowa and Ogbeide (2014) used survey data and applied regression analysis and SPSS 20.5 to examine the effect of Automated Teller Machine service quality on customer satisfaction in the banking sector of Nigeria. The study found that convenience, efficient operations, security and privacy, reliability and responsiveness are significance dimensions of ATM service quality, adding that ATM service quality has a significant positive relationship with customer satisfaction. It was equally found that findings from this study are relevant in improving ATM service quality by banks management to stimulate broad-based customers' satisfaction.

John and John and Rotimi (2014) examined the effect of electronic banking on customer satisfaction in Nigeria. Using survey data, descriptive statistics and Chi-square test, they found that there is a significant relationship between electronic banking and customers' satisfaction. The study further reveals that e-banking has become popular due to its convenience and flexibility, transportation related benefits like speed, efficiency and accessibility.

In the same vein, Adeoye and Lawanson (2012) utilized primary data, descriptive and explanatory survey design methods to evaluate customers satisfaction and its implications for banks performance in Nigeria. Findings reveal that although customers enjoy electronic banking services, they are not satisfied with the quality and efficiency of the

services, judging from the number of times they physically visit banks and the length of time spent before the services are received.

Similarly, Danlami and Mayowa (2014) carried out an empirical investigation of Automated Teller Machine (ATMs) and customers satisfaction in Nigeria, A case study of Ilorin Kwara State. In the study, three commercial banks (First Bank of Nigeria Plc, Guaranty Trust Bank Plc and First City Monument Bank Plc) purposively selected and a sample size of 180, 60 from each bank selected randomly at the banks' ATM terminals during transaction while tables, percentages, charts and the Chi-square statistical tools were used to analyse the data collected. Findings reveal that there is a significant relationship between ATM usage and customer satisfaction.

Also, Adeniran and Junaidu (2014), undertook an empirical study of Automated Teller Machine (ATM) and user satisfaction in Nigeria using United Bank for Africa (UBA) Sokoto as case study, Cross-sectional survey design with questions on ATM services, customers of UBA within Sokoto metropolis as the population, sample size of 100 customers who are users of ATM services while the data collected were analyzed using Multiple Logistic Regression Analysis. It was found that the impact of ATM services in terms of their perceived ease of use, transaction cost and service security is positive and significant.

With questionnaires to collect data from a sample of 125 employees conveniently selected from five banks in Lagos State with interswitch network, Software Package for Social Science (SPSS version 20.0 for Student Version) and Chi-square Statistical Technique, Jegede (2014) examined the effects of Automated Teller Machine on the performance of Nigerian banks. Findings reveal that the employment of ATMs terminals have averagely improved the performance of the Nigerian banks because of the alarming rate of ATM fraud.

Ebere, Udoka and Caloria (2015) undertook a gap analysis of Automated Teller Machine (ATM) service quality and customer satisfaction using a Sample of 162 respondents who were customers of banks with ATM services in Owerri, South East, Nigeria, interval scaled data analyzed using gap analysis and Multiple Regression Analysis. Their findings reveal that although convenience, efficient operation, security and privacy, reliability and responsiveness do influence customers' satisfaction, they are not the only factors that do so, adding that other factors such as trust, value and image of the bank equally contribute to customers' satisfaction.

Using a 25-items closed-ended questionnaire based on Parasuranman et al. (1988) five dimensions of service quality, five banks randomly selected from Asaba, Delta State South-South Geopolitical Zone of Nigeria, a sample size of 240 respondents having account with the banks and an ANOVA to analyze the data collected, Salami and Olannye (2013), investigated customer perception about the service quality in selected banks in Asaba Delta State. The study found that the dimensions of empathy, tangibility, assurance and responsiveness significantly affect customer perception of service quality at a significantly level of 0.01.

3. Methodology

This study being an empirical analysis examines the relationship between the growth in automated teller machine (ATM) terminal and values of ATM services in Nigeria and employs *ex-post facto* research design. This is because the independent and dependent variables used for the study involved data already compiled. Hence the researcher cannot exert any control on them. The data used for the research work is secondary data. The data was sourced from CBN statistical bulletin from 2011– 2020.

This research adopted the model used by Turku and Bilkisu (2014) which was adopted from Kim and Lim (2010), who examined the relationship between the growth in automated teller machine (ATM) terminal and values of ATM services in Nigeria.

The theoretical model is given as:

$Y_{it} = \alpha_0 + \beta_1 X_{1it} + \mu_{it}$...Eqn 3.1

For the purpose of this research, the model has been adjusted; the empirical model is stated below:

$GATM = \alpha_0 + \beta_1 VATM_{it} + \mu_{it}$...Eqn 3.2

Where:

GATM = growth in automated teller machine (ATM) terminal
VATM=values of ATM services
α_0 = the constant intercept
μ= The error component
it= Time Series

The need to enhance easy comprehension and analysis prompted the use of Pearson product moment correlation coefficient and student t-test statistics. Therefore the formula are stated thus:

Pearson Product Moment Correlation Coefficient

$$r = \frac{n(\Sigma XY)-(\Sigma X)(\Sigma Y)}{\sqrt{[n\Sigma X^2-(\Sigma X)^2[n\Sigma Y^2-(\Sigma Y^2)]}}$$

where

r = correlation coefficient
n =number of observation
ΣXY =summation of growth in automated teller machine (ATM) terminal
and values of ATM services
ΣX =summation of values of ATM services
ΣY=summation of growth in automated teller machine (ATM) terminal
ΣX^2=sum of square of values of ATM services
ΣY^2 =sum of square of growth in automated teller machine (ATM)

terminal

Nevertheless, T-test for test of significance was adopted to equally estimate for the significance of the coefficient and to ascertain whether the claim of the null or alternative hypothesis would still remain valid after the test.

$$\text{T-test} = r\sqrt{\frac{n-2}{1-(r)^2}}$$

where

n =number of observation
1=Constant
R=value of Pearson Product Moment Correlation

4. Results

Table 1 below shows growth in automated teller machine (ATM) terminal and values of ATM services. From the above table we infer that growth in automated teller machine (ATM) terminal recorded a higher volume in 2020 with 968,433,479 and was lower in 2013 with 295,292,940. In 2020 values of ATM services was N12,004.06 billion naira but fell in 2011 with N1,561.74 billion Naira.

Table 1 Dependent and independent variables

YEAR	GATM	VATM Val (₦' Billion)
2011	347,569,999	1,561.74
2012	375,487,756	1,984.66
2013	295,292,940	2,828.94
2014	400,102,507	3,679.88
2015	433,587,623	3,970.25

2016	590,238,934	4,988.13
2017	800,549,099	6,437.59
2018	875,519,307	6,480.09
2019	839,819,922	6,512.60
2020	968,433,479	12,004.06

Source: CBN Statistical Bulletin from 2011 - 2020

The coefficient of reliability (r) was computed using Pearson Product Moment Correlation Coefficient as shown in the table below:

Table 2 The coefficient of reliability (r) was computed using Pearson Product Moment Correlation Coefficient

Item	X(GATM)	Y (VATM)	X²	Y²	XY
1	347,569	1,561.74	120,804,209,761	2,440,593.57	294,833,977,5716.77
2	375,487	1,984.66	140,990,487,169	3,940,859.98	555,623,768,445.62
3	295,292	2,828.94	87,197,365,264	8,005,730.46	698,078,603,125.44
4	400,102	3,679.88	160,081,610,404	13,545,196.69	216,833,689,937.76
5	433,587	3,970.25	187,997,686,569	15,766,855.31	296,413,232,274.39
6	590,238	4,988.13	348,380,896,644	24,886,429.03	866,995,645,973.3
7	800,549	6,437.59	640,878,701,401	41,449,002.60	265,637,829,606.6
8	875,519	6,480.09	766,533,519,361	41,998,046.50	321,929,103,899.5
9	839,819	6,512.60	705,295,952,761	42,420,471.36	299,189,867,644.96
10	968,433	12,004.06	937,862,475,489	144,109,460.54	135,154,855,403.06
n=10	ΣX = 5,926,595	ΣY = 50,447.94	ΣX² = 4,096,022,904,823	ΣY² = 338,562,646.04	ΣXY = 1,269,520,749,159.67

n = 10

ΣX =5,926,595

ΣY =50,447.94

ΣX² =4,096,022,904,823

ΣY² =338,562,646.04

ΣXY=1,269,520,749,159.67

Pearson Product Moment Correlation Coefficient

$$r = \frac{n(\Sigma XY) - (\Sigma X)(\Sigma Y)}{\sqrt{[n\Sigma X^2 - (\Sigma X)^2[n\Sigma Y^2 - (\Sigma Y^2)]}}$$

$$r = \frac{10(1,269,520,749,159.67) - (5,926,595 \times 50,447.94)}{\sqrt{10[4,096,022,904,823] - (5,926,595)^2]10[50,447.94] - [50,447.94)^2]}}$$

$$r = \frac{12695207491596.7 - 298984508964.3}{\sqrt{(409602290048230 - 35124528294025)(504479.4 - 2544994650.2436)}}$$

$$r = \frac{12396222982632.4}{\sqrt{(5835700754205)(-2544490170.8436)}}$$

$$r = \frac{12396222982632.4}{\sqrt{14848883209059205821097.338}}$$

$$r = \frac{12396222982632.4}{38534248.67447035}$$

r=321693.64

4.1. Rule of Thumb

A rule of thumb for interpreting Correlation Coefficient is:

Less than 0.60 (unacceptably low correlation), 0.60–0.69 (marginally/minimally correlation), 0.70–0.79 (correlation), 0.80–0.90 (highly correlation) and greater than 0.90 (very high correlation).

4.2. Decision

From the above result Pearson Product Moment Correlation Coefficient is 321693.64 which fall within Less than 0.90 (very high correlation), the study concludes that there is non- significant relationship between Scholarship cost (SCC)and return on asset of consumer goods companies in Nigeria.

Nevertheless, there was a need to

equally estimate for the significance of the coefficient and to ascertain whether the claim of the null

hypothesis would still remain valid after the test. T-test for test of significance was adopted as follows:

$$T_{\text{-cal}} = r\sqrt{\frac{n-2}{1-(r)^2}}$$

$$T_{\text{-cal}} = 321693.64\sqrt{\frac{10-2}{1-(321693.64)^2}}$$

$$T_{\text{-cal}} = 321693.64\sqrt{7.7305}$$

$$T_{\text{-cal}} = 321693.64 * 2.7804$$

$$T_{\text{-cal}} = 894436.996656$$

Therefore the null hypothesis was rejected since Tcal= 894436 > Ttab=2.35, and the alternative which suggest that Growth in automated teller machine (ATM) terminal has positive and significant relationship with values of ATM services in Nigeria.

5. Conclusion and Recommendations

The study was aimed at assessing the relationship between the growth in automated teller machine (ATM) terminal and values of ATM services in Nigeria. The study provided some evidence that the ATM has now been accepted by customers in the industry as it has gained a positive impact on service delivery to customers. Introduction of the ATM facility and directives by management of DMBs that checking of balance and withdrawal of cash less than a certain amount over the counter would attract a fee has not only helped reduced long queues in the banking halls but has also helped customers to have control over their monies and its management. Tangibility, Reliability, Responsiveness, Assurance, Empathy, Efficiency and Accuracy were the variables considered to determine customers' satisfaction/dissatisfaction with respect to adoption and usage of the ATM service.

Customers are generally considered satisfied with ATM services offered to them by DMBS. This study has demonstrated that the ATM plays critical role in banking service delivery. The introduction of ATMs by DMBS is primary to integrate technology so as to effectively and efficiently serve their customers better. Banks must therefore continue to provide

ATMs at various strategic locations which are safe and convenient to its customers. It is also clear that the introduction of ATM services into banking activities by DMBS is basically to be able to compete favorably in today's competitive business environment. The introduction of this product has had a tremendous positive impact on customers.

From the findings of the study, it is believed that the following recommendations would help banks and customers realize the full benefit of the ATM as a service delivery channel. Banks should develop new user friendly, competitive systems and applications that will enable customers harness the full benefit of the ATM. Additionally, banks should play a key role not only in developing the infrastructure which are going to make ATM usage convenient to its customers but also provide an incentive that will be convincing enough to customers to continue using the provide various services such as the cash deposit, funds transfer and cardless ATM withdrawals among others.

Banks must also offer programs which would reassure customers' safety with regards to ATM fraud through sensitization, workshops and durbars and also support the skills development among bank personnel to be security conscious. This would alert them to act promptly if customers report dubious transactions on their accounts. The central monitoring unit that checks the operation of all the banks ATMs must be appropriately resourced so as to deal expeditiously with customers' issues such as debits without dispensing, connectivity issues and remote monitoring of the ATMs across the country in other to provide customer satisfaction. Lastly, banks must educate customers to patronize their local banks ATMs and to use the ATMs closer to their community in other to minimize the stress that they go through in getting issues reported on and getting them resolved promptly. Customer education must also emphasize that ATM transactions are voluminous and must therefore be reported promptly so as to get them resolved in time in the instance whereby that transaction eludes the supervisor.

Compliance with ethical standards

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