AN EMPIRICAL STUDY OF AUTOMATED TELLER MACHINE SERVICE QUALITY ON CUSTOMER SATISFACTION
(A CASE STUDY OF UNITED BANK OF AFRICA [UBA])

Adeleye Idowu Olusanya, Department of Management Information system
Cyprus International University
Haspolat -Mersin 10-Turkey, North Cyprus
E-mail: richarddw6@gmail.com

Samson Oluwaseun Fadiya, Department of Management Information system
Girne American University
Girne-Mersin 10-Turkey, North Cyprus
E-mail: greaterachiever@yahoo.com

Abstratct. The Nigerian Banking sector over the years has been experiencing significant changes and development in its Information and Communication Technology. Among the development is the introduction of Automated Teller Machine (ATM) that intends to reduce the number of customers in the banking halls as customers now can go to the closest ATM to do their banking transactions such as: withdrawals, deposits, bill payments, and funds transfer. The purpose of this paper was to measure customer satisfaction as regards to ATM services. The research was carried through survey design which questioned respondents on ATM services. The population of study mainly constituted of customers of United Bank for Africa within Lagos. The sample in this study consisted of 200 respondents who are users of the ATM services. The data collected was analyzed by use of multiple logistic regression analysis and Pearson correlation. The findings revealed that, necessary input to the bank management to increase customers' satisfaction through improving ATM service quality. The focus should not be on ATM service quality dimensions only. This aspect should be augmented and integrated with other aspects of the service quality of banks for satisfaction of customers. This research concentrated on determinants of ATM service quality and its impact on consumer loyalty. Notwithstanding, the exploration did not examine the relationship between consumer loyalty and customer retention.

Keyword: Accessibility, ATM, Customer, HCI, Reliability, Quality.

Corresponding Author
Adeleye Idowu Olusanya, Department of Management Information system, Cyprus International University Haspolat -Mersin 10-Turkey, North Cyprus
E-mail: richarddw6@gmail.com

1. INTRODUCTION

In recent years, banks have made their services increasingly convenient through electronic banking. Electronic banking service makes use of computers to do money transactions. Donell (2003) viewed electronic banking service as a service that consumers can access, by using Network framework or an Internet service to a bank's computer center, to perform banking tasks, receive and pay bills, and so forth. Many other financial services can be gained access through the Internet. To most people, electronic banking service means 24-hour access to cash through an ATM or paychecks deposited directly into checking or savings accounts (Hillier, 2002). Diniz (1998) in his view states that Electronic banking encompasses a broad range of established and emerging technologies. Some are ''front end'' products and services that consumers choose, such as ATM cards and electronic banking services; others are ''back end'' technologies used by financial institutions to process money transactions. Some are tied to a consumer bank account; others are indifferent to a bank account but on the other hand store monetary value in a data warehouse or directly on a card.

2. LITERATURE REVIEW

In Nigeria the deployment of ATM by banks and its use by bank customers is just gaining ground and has burgeoned in recently. This happened after the recent consolidation of banks, which has in all probability, made it possible for more banks to afford to deploy ATMs or at least become part of shared networks (Fasan, 2007). The increased deployment of ATMs in the banking sector has made the issue of technology relevance important. ATM awareness also ranked higher than awareness level about current accounts slightly below savings account (Omankhanlen, 2007).

In order to encourage customers to embrace the technology and overcome their fears of putting their checks into a machine's slot rather than a teller's hand, banks originally did not charge customers any fees for using ATMs. In time, some banks started charging customers for not using ATMs, through so-called "human teller fees"- a charge for each time a customer uses a teller for a service that could be performed by an ATM. Banks that embraced the ATM profited handsomely, often growing far faster. At first, a bank's ATMs could only be used by customers who already had current or savings accounts with that bank, through the bank's proprietary ATM network (Ugwu, 2008).

A recent study by Intermarc Consulting Limited showed that ATM services provided by banks and non-financial institutions stood as the most popular e-business platform in Nigeria (Intermarc, 2007).

2.1. Service Quality

The definition of service quality involves determining whether perceived service delivery meets, exceeds or fail to meet customer expectation. Ladda and Sukhothai (2007). According to Parauraman, Zeithmal and Berry (1988) service quality is the degree and direction of discrepancy between the customer's perception and expectation or the extent to which a service meets or exceeds customer expectations. Service quality perception result from a comparison of customer expectation with actual service performance and service quality is a measure of how well the service level delivered matches customer expectation.

2.2. Concept of Customer Satisfaction

The academic literature postulates that customer satisfaction is a function of the discrepancy between a consumer's prior expectations and his or her perception regarding the purchase (Churchill and Surprenant, 1982; Oliver, 1977; Tse and Wilton, 1988; Yi, 1990).' At the point when an experience is superior to what the customers expects, there is thought to be certain disconfirmation of the desire, and an ideal client assessment is anticipated.

3. OBJECTIVE OF THE STUDY

An automated teller machine (ATM) service continues to grow in importance in the banking sector. From the customer's perspective ATM services has significantly reduced the amount of queues in banks, time spent, and cost of searching for a particular bank to make transaction and also increased convenience. The satisfaction of customers is of great importance to any organization. Many commercial banks now make use of ATM service as a means of satisfying their customer through convenience and availability of services. The objective of the study

1. One of the objectives of the study is to understand the expectations of the customers as regards to creating a secure environment and ensure that there is a level of privacy for the purpose of reducing the cost involved in using the ATM.

2. Another objective is constructing the automated teller machine in the most simple and easiest way to use by every customer. According to Preece (1994) he explains that usability is concerned with making systems easy to learn and easy to use. (Preece, 1994) also states Human-Computer Interaction (HCI) is about designing computer systems

that support people so that they can carry out their activities productively and safely. Therefore it will be a wise decision if commercial banks can make their ATM machines more users friendly to ensure efficiency of operation which will in turn yield an effective service delivery.

3. Determine whether the speed of operation of the automated teller machine has an effect on its reliability to customers.

4. To examine how the ease in accessing the location of the automated teller machine will be of convenience to the bank customers.

3.1. Scope of The Study

The area of coverage for this study is limited to employees and customers of United Bank of Nigeria (UBA) that have an ATM card and make use of the ATM operating in Opebi, Ikeja, Lagos state of Nigeria and within the period ATM became prominent among commercial banks in Nigeria. The rationale behind the choice of Opebi, Ikeja, Lagos state is to have a reasonable amount of respondent and to enable ease in administering the questionnaire. The operational period of 2007-2010 was chosen because it was the peak period when the automated teller machine (ATM) became prominent in Nigeria.

4. METHODOLOGY

For this research, administering of questionnaire to commercial bank customers that hold ATM cards would be considered the most appropriate data collection instrument. For the purpose of this study a newly formulated questionnaire will be adopted. The variables used in this study was measured on a five point likert scale anchored by 1(strongly disagree), 2(disagree), 3(undecided), 4(Agree), 5(strong agree). The questionnaire will be divided into different sections which measured four dimensions of ATM service quality and its effect on customer satisfaction; Section A contains information about the respondent's background.

Section B contains the four dimensions; security and privacy dimension contains 4 (items); Efficiency of operation contains 4 (items); Speed of operation contains 4(items); Convenience contains 6 (items); Cost involved in the use of ATM contains 3(items); Effective service delivery contains 5(items); Reliability contains 5 (items) and Accessibility contains 3 (items). The questions that were contained in the questionnaire were all in close ended.

Hypothesis 1

$H_{0:}$ Security and privacy of ATM does not affect cost involved in the use of ATM.

$H_{1:}$ Security and privacy affects cost involved in the use of ATM

Hypothesis 2

$H_{0:}$ Efficiency of operation does not have a significant impact on effectiveness of service delivery.

$H_{1:}$ Efficiency of operation has a significant impact on the effectiveness of service delivery.

Hypothesis 3

$H_{0:}$ There is no relationship between speed of operation and reliability of service provided.

$H_{1:}$ There is a relationship between speed of operation and reliability of service provided

Hypothesis 4

$H_{0:}$ There is no relationship between convenience and the accessibility of the ATM.

$H_{1:}$ There is a relationship between convenience and the accessibility of the ATM.

4.1. Test Used For Data Analysis

SPSS (Statistical Package for Social Science) version 21.0 was used to compute and analyze the data.

4.2. Result And Analysis

The Pearson correlation was used to establish the relationship between the dependent and independent variables. The regression analysis measured the contribution of the independent variable to the dependent variable.

Hypothesis 1

$H_{0:}$ Security and privacy of ATM does

not affect cost involved in the use of ATM.

H_1: Security and privacy affects cost involved in the use of ATM

Objective: the standard multiple regression was used to generate results that will indicate how well the set of variables representing security and privacy of ATM and how it will affect the cost involve in the use of the ATM.

Table 1: Model Summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.333a	.111	.093	1.854

a. Predictors: (Constant), THERE IS NO INTRUTION WHILE I MAKE TRANSACTION, THE LOCATION OF THE ATM IS SECURE FOR TRANSACTION, MY ACCOUNT CAN ONLY BE ACCESSED BY ME, I FEEL SAVE WHILE MAKING USE OF THE ATM AT ANYTIME OF THE DAY

The model summary. It shows how much of the variance in the dependent variable (cost involved in the use of the ATM) is explained by the model (there is no intrusion while I make transaction, the location of the ATM is secure for transaction, my account can only be accessed by me, I feel save while making use of the ATM at any time of the day). In this case the R square is 0.111 expressed by a percentage, this explains 11.1% of the variance in the cost involved in the use of the ATM.

Table 2: ANOVA

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	83.536	4	20.884	6.078	.000a
	Residual	670.059	195	3.436		
	Total	753.595	199			

a. Predictors: (Constant), THERE IS NO INTRUTION WHILE I MAKE TRANSACTION, THE LOCATION OF THE ATM IS SECURE FOR TRANSACTION, MY ACCOUNT CA ONLY BE ACCESSED BY ME, I FEEL SAVE WHILE MAKING USE OF THE ATM AT ANYTIME OF THE DAY

b. Dependent Variable: COST INVOLVED IN THE USE OF THE ATM

Dependent Variable; cost involved in the use of the ATM

Since F cal (6.078) > (1.97) at 0.000 level of significance, therefore we accept our alternative hypothesis H_1 and reject the null hypothesis H_0. This implies that security and privacy affects cost involved in the use of ATM.

Table 3: Coefficients

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	9.900	.684		14.463	.000
	I FEEL SAVE WHILE MAKING USE OF THE ATM AT ANYTIME OF THE DAY	.043	.161	.022	.268	.789
	THE LOCATION OF THE ATM IS SECURE FOR TRANSACTION	.452	.164	.221	2.753	.006
	MY ACCOUNT CAN ONLY BE ACCESSED BY ME	.382	.140	.215	2.726	.007
	THERE IS NO INTRUTION WHILE I MAKE TRANSACTION	-.297	.136	-.175	-2.187	.030

a. Dependent Variable: COST INVOLVED IN THE USE OF THE ATM

The B coefficient shows a positive relationship between security and privacy and the cost involved in the use of ATM. The table shows which of the variables included in the model contributed to the prediction of the dependent variable; therefore beta values are used for the comparison. In this table, the largest beta coefficient is 0.221 which shows that the location of the ATM is secure for transaction. This means that the location of the bank's ATM will determine the security of customers when using the machine. This is because it makes the strongest unique contribution to explaining the dependent variable (cost involved in the use of the ATM).

Decision: based on the analysis above for which all calculated values are above the critical values, the null hypothesis (H_0) is therefore rejected while the alternative hypothesis (H_1) is accepted; which states that security and privacy affects cost involved in the use of ATM.

Hypothesis 2

H_0: Efficiency of operation does not have a significant impact on effectiveness of service delivery.

H_1: Efficiency of operation has a significant impact on the effectiveness of service delivery.

Objective: the standard multiple regression was used to generate results that will indicate how well the set of variables representing efficiency of operation and its impact on the effectiveness of service delivery.

Table 4: Model Summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.471a	.222	.206	3.494

a. Predictors: (Constant), THE EFFECIENCY OF THE ATM IS A DETERMINANT OF CUSTOMER SATISFACTION, THE ATM FUNCTIONS PERFECTLY, THE ATM OFTEN BREAKDOWN, THE USER-FRIENDLINESS OF THE ATM AS AN EFFECT ON YOUR PERCEPTION OF SERVICE QUALITY

The model summary. It shows how much of the variance in the dependent variable (efficiency of operation) is explained by the model (the efficiency of the ATM is a determinant of customer satisfaction, the ATM functions perfectly, the ATM often breakdown, the user-friendliness of the ATM as an effect on your perception of service quality). In this case the R square value is 0.222 expressed in a percentage; this explains 22.2% of the variance in the efficiency of operation.

Table 5: ANOVA

ANOVAb

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	677.451	4	169.363	13.874	.000a
	Residual	2380.369	195	12.207		
	Total	3057.820	199			

a. Predictors: (Constant), THE EFFECIENCY OF THE ATM IS A DETERMINANT OF CUSTOMER SATISFACTION, THE ATM FUNCTIONS PERFECTLY, THE ATM OFTEN BREAKDOWN, THE USER-FRIENDLINESS OF THE ATM AS AN EFFECT ON YOUR PERCEPTION OF SERVICE QUALITY

b. Dependent Variable: EFFECTIVE SERVICE DELIVERY

Dependent Variable; effective service delivery

Since F cal (13.874) > (1.97) at 0.000 level of significance, therefore we accept our alternative hypothesis H_1 and reject the null hypothesis H_0. This implies that efficiency of operation has a significant impact on the effectiveness of service delivery.

Table 6: Coefficients

Coefficientsa

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	8.972	1.911		4.695	.000
	THE USER-FRIENDLINESS OF THE ATM AS AN EFFECT ON YOUR PERCEPTION OF SERVICE QUALITY	.467	.317	.102	1.474	.142
	THE ATM OFTEN BREAKDOWN	-.231	.274	-.055	-.842	.401
	THE ATM FUNCTIONS PERFECTLY	1.235	.210	.392	5.883	.000
	THE EFFECIENCY OF THE ATM IS A DETERMINANT OF CUSTOMER SATISFACTION	.435	.280	.104	1.556	.121

a. Dependent Variable: EFFECTIVE SERVICE DELIVERY

The B coefficient shows a positive re-

lationship between effective service delivery and efficiency of operation. The table shows which of the variables included in the model contributed to the prediction of the dependent variable; therefore beta values are used for the comparison. In this table, the largest beta coefficient is 0.392 which shows that the ATM functions perfectly. This means that the ATM functions at a level that satisfies the customers. This is because it makes the strongest unique contribution to explaining the dependent variable (effective service delivery).

Decision: based on the analysis above for which all calculated values are above the critical values, the null hypothesis (H_0) is therefore rejected while the alternative hypothesis (H_1) is accepted; Efficiency of operation has a significant impact on the effectiveness of service delivery.

Hypothesis 3

H_0: There is no relationship between speed of operation and reliability of service provided.

H_1: There is a relationship between speed of operation and reliability of service provided.

Table 7: Correlation

Correlations

		SPEED OF OPERATION	RELIABILITY
SPEED OF OPERATION	Pearson Correlation	1	.178*
	Sig. (2-tailed)		.011
	N	200	200
RELIABILITY	Pearson Correlation	.178*	1
	Sig. (2-tailed)	.011	
	N	200	200

*. Correlation is significant at the 0.05 level (2-tailed).

The correlation r = 0.178 means that 3.17% shared variance between reliability and speed of operation. This means that reliability helps to explain 3.17% of variance in the respondent's scores.

Interpretation: the significant relationship between reliability and speed of operation was investigated using the Pearson's correlation coefficient. There is a positive relationship between the two variables (r = 0.178, n = 200), with significant level of reliability being associated with the speed of operation.

Decision: the correlation (r = 0.178*),

between reliability and speed of operation is significant at 0.05 level, thus we reject null hypothesis (H_0) and accept alternative hypothesis (H_1). This implies that there is a significant relationship between reliability and speed of operation.

Discussion of result: from the above hypothesis tested, it is evident that a positive and significant relationship exists between the two variables; therefore servicing the ATM often is advised to be adopted in order to make the service to be provided on time and faster.

Hypothesis 4

H_0: There is no relationship between convenience and the accessibility of the ATM.

H_1: There is a relationship between convenience and the accessibility of the ATM.

Table 8: Correlation

Correlations

		CONVENIENCE	ACCESSIBILITY
CONVENIENCE	Pearson Correlation	1	.282**
	Sig. (2-tailed)		.000
	N	200	200
ACCESSIBILITY	Pearson Correlation	.282**	1
	Sig. (2-tailed)	.000	
	N	200	200

**. Correlation is significant at the 0.01 level (2-tailed).

The correlation r = 0.282 means that 7.95% shared variance between accessibility and convenience. This means that accessibility helps to explain 7.955 of variance in the respondent's score.

Interpretation: the significant relationship between accessibility and convenience was investigated using Pearson's correlation coefficient. There is a positive correlation between the two variables (r = 0.282, n = 200), with significant level of accessibility being associated with convenience.

Decision: the correlation (r = 0.282), between accessibility and convenience is highly significant at 0.01 level, thus we reject null hypothesis (H_0) and accept the alternative hypothesis (H_1). This implies that there is a relationship between convenience and accessibility.

4.3. Discussion of Results

The result of the above tested hypothesis shows that there is a positive relationship between accessibility and convenience, therefore creating accessible point of making use of the ATM will make transaction convenient for the customers.

5. RECOMMENDATION

Based on the findings of this research work, the following recommendation has been drawn up to help enhance service quality of automated teller machines (ATM).

1. To reduce the customers concerns about perceived risk because of security and privacy concerns, the bank should improve the quality of interaction with the customers to alleviate these apprehensions with a view to improve ATM service quality (Merrilees, 2002).

2. To further improve the service quality, it is recommended that the ATM service should be able to provide enhanced interactivity, diversified offerings, and facilitate customers to participate in improving the service encounter with ATM and make it a memorable and pleasant experience.

3. The banks should focus not only on the satisfaction of ATM users, but also aim at delighting them to ensure their retention.

4. It is evident that convenience, efficient operation, security and privacy, reliability and responsiveness are not the only characteristics that influence customers' satisfaction. The other factors that contribute to customer satisfaction include trust, value, and image of the bank, (Ranaweera and Prabhu, 2003). Bank management should monitor the environment and identify the trends through marketing intelligence. They need to constantly up-date and differentiate their ATM service quality dimensions to ensure

continuous satisfaction and retention of customers, and optimize their limited resources.

6. CONCLUSION AND POLICY IMPLICATION

The rapid increase in number of automated delivery channels and customers' preference to use ATM because of multifaceted attributes are placing pressure on banks to respond aggressively to meet the customers' needs. The study provides necessary input to the bank management to increase customers' satisfaction through improving ATM service quality. The focus should not be on ATM service quality dimensions only. This aspect should be augmented and integrated with other aspects of the service quality of banks for satisfaction of customers.

The rapid diffusion of ICT in Nigerian banking sector provides a platform to use innovative technologies to enhance operational efficiency and quality of service to attain and retain customers. The rapid growth in use of ATMs in Nigeria offers opportunities to banks to use customers' passion for this innovative service for strategic advantage. The banks should proactively monitor customers' preferences with regard to use of this delivery channel for effective response. Bank should also focus on important aspects of security and privacy as well as efficient operation of ATMs. In conclusion the banks should also augment and diversify their offerings through ATM and use this medium to build a strong and sustained relationship with customers.

7. SUGGESTION FOR FURTHER STUDIES

This research concentrated on determinants of ATM service quality and its impact on consumer loyalty. Notwithstanding, the exploration did not examine the relationship between consumer loyalty and customer retention. Additional research may well explore the relationship between these two constructs. The formation of satisfaction process takes place overtime (Andreasen, 1977). The conclusions of the study relates to a specific time in present. Additional study should be done on longitudinal basis to address the interactive and technological dimensions of ATM service quality that affect the dissatisfaction level of customers.

Age has a critical impact on the example of utilization of innovation based administrations. By and large the young want to utilize imaginative and innovation based conveyance channel like ATM that offer different advantages and self-governance of executing transactions (Wan et al., 2005). The old age people are generally shy of use of ATM because of perceived risk of failure, complexity, security, and lack of personalized service (Moutinho, 1992). Future research should explore the association between age and attitude and determine its effects on the ATM service quality and customers' satisfaction.

The price is an essential aspect that affects the customers' perception of ATM service quality (Surjadjaja et al. 2003; Iqbal et al. 2003). The fee charge identifies with the impression of non-competitiveness and injustice and may lead to change in service provider banks (Colgate and Hedge, 2001). The prevailing economic conditions in Pakistan have made the people more prices sensitive. This aspect needs further exploration as essential dimension affecting ATM service quality and customers' satisfaction.

Conflict of interests
Author declare no conflict of interest.

REFERENCES

ANDREASEN, A. R. (1977). 'A Taxonomy of Consumer Satisfaction/Dissatisfaction Measures', *Journal of Consumer Affairs*, 11(2), pp. 11–24.

Churchill, G. A. and Surprenant, C. (1982). 'An Investigation into the Determinants of Customer Satisfaction', *Journal of Marketing Research*, 19(4).

Colgate, M. and Hedge, R. (2001). 'An investigation into the switching process in retail banking services', *International Journal of Bank Marketing*, 19(5), pp. 201–212.

Donnell, Y. K. (2003). *New System of banking. 24-25.* Available from iist.org/Vol6//SITv6, P373-393, olatokun63.pdf.

Fasan, O. (2007). *The Adoption of ATM in Nigerian*

Hillier, D. **(2002)**. *Money Transmission and the Payments Market*. United Kingdom: Financial World Publishing

Intermarc Consulting Limited (2007). *Nigeria e-banking customer survey on cards, ATM and PoS*. Available at: http://www.thenationonlineng. com/dynamicpage.asp?id=36290 (Accessed: 23 April 2015)

Ladda, V. and Sukhothai, T. (2007). 'The Impact of Service Quality and Consumer Decision Factors on Brand Equity', *International Business & Economics Research Journal*, 6(3).

Merrilees, B. (2002). 'Interactivity Design as the Key to Managing Customer Relations in E-Commerce', *Journal of Relationship Marketing*, 1(3-4), pp. 111–126.

Moutinho, L. (1992). 'Customer Satisfaction Measurement: Prolonged Satisfaction with ATMs', *International Journal of Bank Marketing*, 10(7), pp. 30–37.

Oliver, R. L. (1993). 'A conceptual model of service quality and service satisfaction: Compatible goals, different concepts', *Advances in Service Marketing and Management*, 2pp. 65–85.

Omankhanlen, O. (2009). *ATM fraud rises: Nigerians groan in Nigeria*

Parasuraman, A., Zeithaml, V. A. and Berry, L. L. (1994). 'Reassessment of Expectations as a Comparison Standard in Measuring Service Quality: Implications for Further Research', *Journal of Marketing*, 58(1).

Preece, J., Benyon, D., Carey, T., Holland, S. and Rogers, Y. (1994). *Human-Computer Interaction: Concepts and Design*. Reading, MA: Addison-Wesley Educational Publishers

Ranaweera, C. and Prabhu, J. (2003). 'The influence of satisfaction, trust and switching barriers on customer retention in a continuous purchasing setting', *International Journal of Service Industry Management*, 14(4), pp. 374–395.

Surjadjaja, H., Ghosh, S. and Antony, J. (2003). 'Determining and assessing the determinants of e-service operations', *Managing Service Quality: An International Journal*, 13(1), pp. 39–53.

Tse, D. K. and Wilton, P. C. (1988). 'Models of Consumer Satisfaction Formation: An Extension', *Journal of Marketing Research*, 25(2).

Ugwu, E. (2008). *CBN, banks to tackle ATMs' hitches*. Available at: http://www.guardiannewsngr.com (Accessed: 24 April 2015)

Wan, W. W. N., Luk, C. and Chow, C. W. C. (2005). 'Customers' adoption of banking channels in Hong Kong', *International Journal of Bank Marketing*, 23(3), pp. 255–272.