

A COMPARATIVE STUDY OF THE PERCEIVED EFFICIENCY OF AUTOMATED TELLER MACHINE AND HUMAN TELLER PLATFORMS IN NIGERIAN BANKS

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ABSTRACT: *This study investigated the perceived efficiency of Automated Teller Machines (ATMs) and Human Teller (HT) Platforms in Nigerian Banks with respect to Process, Security, Queue and Transaction. Data were collected from 471 bank customers who have used ATM and Cheque Books/Saving Slips for at least five years. The Mann-Whitney U test was used to analyse the data via the Statistical Package for Social Sciences (SPSS) version 22. Results show that there is no significant difference between the perceived efficiency of ATM and HT platforms with respect to Process, Queue and Transaction, whereas there was a significant difference in terms of Security ($Md = 8.00$, $Md = 12.00$ for perceived efficiency of ATM and HT platforms respectively; $Z = -11.673$; $P = .000$). Thus, the study concludes that bank customers believe that they are more secure making transactions in banking halls than using ATMs. It was therefore recommended that: Banks should improve on their electronic transaction security architecture, while government should put in place adequate policy and build interdependent security networks with law enforcement agencies, digital security firms and banks, in order to tackle the activities of e-fraudsters.*

KEYWORDS: Perceived Efficiency, Automated Teller Machine, Human Teller Platform.

INTRODUCTION

Financial institutions, including money deposit banks, are increasingly embarking on the pursuit of service efficiency through diverse innovations in order to reduce costs, waiting time and risk, as well as the improvement of market share and customer satisfaction (Frame & White, 2002). Mwatsika (2016) argues that it is a primary objective of banks to offer superior services in order to improve customer satisfaction, competitiveness and profitability.

In a bid to achieve these objectives, commercial banks have increased their capacities for service delivery in terms of opening new branches, offering diverse services and increasing the human tellers and cash points. However, banking halls continue to witness heavy customer traffic which led to the introduction of Self Service Technologies such as the Automated Teller Machines (ATMs) (Al-Hawari, Ward & Newby, 2009).

The last five years have witnessed a high degree of Information and Communication Technology (ICT) adoption in the Nigerian banking industry as most banks have augmented the traditional banking mode with modern platforms such as ATMs, Point of Sale (PoS) terminals, Internet Banking, among others. Onyesolu, Asogwa and Chukwuneke (2016) asserted that the use of ATMs attracts benefits to both the banks and customers in respect of time and place utility, reduction of service cost of depositors' demands, and increase in market share.

Several studies have been conducted on the impact of ATM usage on the performance of banks (e.g Mwatsika, 2016; Jegede, 2014), adoption of ATM (Olatokun & Igbinedion, 2009), Comparism of ATM usage and other Self Service Technologies (El.Aziz, Badrawy & Hussein,

2014), ATM usage and customer satisfaction (Danlamina & Mayowa, 2014; Adeniran & Junaid, 2014; Mumin, Ustarz & Yakubu, 2014) as well as ATM and customer behavioural challenges (Sanda & Archin, 2011; Adepoju, 2010). However, few or no studies have been carried out that compare users' perceived efficiency of ATMs via-a-vis human teller platforms, especially in nations with weak ICT infrastructure. This may be attributed to the blanket notion that ATMs are far more efficient than bank teller transactions (Banker & Kauffman, 1998).

From observation, transactions in banking halls are generally characterized by long queues, poor service time, rowdy waiting line behaviours. Customers may spend hours in their bid to withdraw cash or to make deposits. Others have fallen into the hands of armed robbers after leaving banking halls with large sums of money (Danlami & Mayowa, 2014). Thus, Nigerian banks introduced the ATM in order to mitigate the inefficiency of transactions in banking halls. Moreover, Mwatsika (2014) pointed out that ATM banking enjoys user preference due to its round-the-clock accessibility, flexibility of use and faster transactional process.

Despite the positive attributes ascribed to it, the use of ATM is not without its perceived disadvantages. The efficiency of ATM is called into question due to instances of cards debiting users' accounts without releasing cash, long waiting lines and incidences of fraud and insecurity (Ogbuji, et al, 2012; Adepoju, 2010; Dapo, 2008).

It was reported in 2014 by the Nigeria Interbank Service System (NIBBS) that ATM machines recorded 419 cases of fraud, Point of Sales, 166; Internet Banking, 287; Web banking, 218; Mobile banking, 21, while over-the-counter and cheques transactions had 153 and 11 cases of fraud respectively. Thus, ATM platforms recorded the highest incidences of fraud in 2014. Furthermore, NIBBS (2016) reported that ATMs account for 43% of fraud in the Nigerian banking sector. The NIBBS report also shows that PoS accounts for 3%, e-commerce, 1% while other platforms, including human teller transaction, contributed 19% in volume of bank fraud.

A study conducted by Hogarth, Kolodinsky and Gabor (2008) reveals that customers show disapproval to the use of modern service platforms and are more comfortable with one-on-one contact with human tellers. Also, Stemper (1998) opined that customers detest the use of ATM due to its impersonal attributes, vision problem, techno-phobia and sheer resistance to change.

Generally, long queues are observed at ATM points and banking halls in Nigeria. Services provided in the banking halls include cash withdrawal, checking account balances, funds transfer, payment of bills and providing statements of accounts. Similar services are provided on ATM platforms. Some customers who do not subscribe to the use of ATM believe that it is complex to operate and incapable of disbursing preferred cash denominations and note quality.

Commenting on the quality of ATM services, Ayo, et al, (2010) noted that the performance is not satisfactory. The ATM was introduced to improve the quality of banking services especially to ensure faster transactions. However, given the shortcomings of the technology, this study seeks to ascertain if there is a significant difference in the perceived efficiency of ATM services and Human Teller transactions in banking halls as regards (i) process (ii) security (iii) queue and (iv) transaction efficiencies.

REVIEW OF RELATED LITERATURE

The concept of efficiency of a production entity was introduced by Farrell (1957) as a measure of input- output relationship. Efficiency in the banking industry is a reflection of how banks deliver valuable financial services through various combinations or bundles of inputs (Kablan, 2007). The determination of input and output relationship is tied to the intermediation role performed by banks in the economic system. Banks are financial intermediaries because they engage in the transfer of funds from surplus units to deficit units, i.e from savers to borrowers. The inputs are cash deposits, tangible assets, employees, information technology and time; the transformation process involves all activities related to intermediation; whereas customer satisfaction, market share, corporate image, profitability and overall efficiency are measures of banking output.

The challenge facing commercial banks in the area of service delivery is the ability to cope with the ever changing demands and preferences of customers in term of processes, security, queue management and transactional efficiencies. Process factors include the ease of application for the acquisition of ATM cards or chequebooks, as well as the functionality or soundness of the operating platforms (Frei, Harker & Hunter, 1997). Customers are also keen on the security of the mode of transactions. They are prone to adopt services that are fraud-proof to a large extent and whose locations are safe for transactions. Frei, et al (1997) emphasized the importance of queue management in service efficiency by submitting that ‘rapid turnaround time of customer product and service requests also is increasingly important. For example, customers expect firms to be capable of moving money instantly between investment product options and accounts. Equally important is the amount of time required of the customer in these co-productive processes’. Moreover, transactional factors such as availability and sufficiency of the service platform, the ease of operating and interfacing with the chosen platform, the charges associated with using the chosen platform and the issuance of accurate, clean, genuine and preferred denominations of currency, account for the level of perceived efficiency of bank services.

Thus, banks endeavour to expand their distribution channels in order to create desirable range of services for the satisfaction of customers. The multiplicity of distribution models have become necessary due to the forces of competition and changes in the taste and preferences of customers (Adeniran & Junaid, 2014). According to Zhu, Scheuermann and Babineauz (2004), banks basically have two channels of service distribution, viz: (i) those that involve one-on-one interaction with the human teller channel and, (i) those that interact with customers on impersonal platforms or intermediaries such as ATM, PoS, Mobile banking and internet-banking. In order to be competitive in the industry, and to meet up the demands of the market with respect to efficiency, commercial banks have embraced the use of ICT platforms such as the ATM.

The Automated Teller Machine (ATM) is called by different names by various countries. It is called “Automated Banking Machine” in the United State of America, “Automated Transaction Machine or Cashpoint” in Britain, “Cashline Machine” in Scotland, “Minibank” in Norway, and “All Time Money” in India. Automated Teller Machine is an electronic gadget that enables customers of banks to do transactions in a public space without the assistance of the human teller (Jegade, 2014).

The principal functions are performed by the ATM when it gets in contact with a plastic card that has a magnetic-stripe, popularly called ATM card. Thus, the card is a substitute for cheque,

and customer can cash money at any time of the day without other means of verification or interaction with human teller (Komal, 2009). First introduced into the Nigerian banking industry in the 1980s (Obboh, 2005) by the defunct Societe Generale Bank, the ATM has continued to thrive as the most engaged and acceptable platform for e-banking in Nigeria. Report from the Nigeria Inter-Bank Settlement Services Limited (NIBSS, 2014) shows that, as at July 2014, the country had well over 13,770 ATMs situated in banks, hotels, supermarkets, stores and restaurants, while the number of active ATM cards were about 41.89 million. This is accompanied by 214.63 million transactions worth ₦2 trillion. However, Chinedu (2012) pointed out that a large proportion of customers are ATM-shy despite the fact that over 900 ATMs were installed as at 2012.

Research conducted by various scholars shows a multiplicity of findings and conclusions as regards the usage and performance of ATMs. For example, Davies, Moutinho and Curry (1996) found out that cost of ATM use and its efficiency have an influence on customer satisfaction. Adeniran and Junaid (2014) studied customers of United Bank for Africa in Sokoto, Nigeria and concluded that “customers are satisfied with the ATM perceived ease of use, transaction cost and service security but not with ATM dispense of cash”. A similar study conducted by Joseph and Store (2003) in the USA revealed that perception of ATM service efficiency is associated with location accessibility, user-friendliness and security. Sanda and Archin (2011) studied 120 customers of a Ghanaian bank and concluded that customers perceived the ATM services as “convenient, reliable, accurate and suitable for their banking transactions”.

On the other hand, studies have shown that customers still prefer doing transactions at the banking hall. This could be explained by the conclusion made by Grabner-Krauter and Kalusha (2003) that the lack of face- to- face contact with bank’s employee creates a sense of insecurity and risk.

Based on the review above, the following research hypotheses are formulated:

H₁: There is no significant difference in customers’ perception of process efficiency with respect to ATM and Human Teller transaction platforms.

H₂: There is no significant difference in customers’ perception of security efficiency with respect to ATM and Human Teller transaction platforms.

H₃: There is no significant difference in customers’ perception of queue efficiency with respect to ATM and Human Teller transaction platforms.

H₄: There is no significant difference in customers’ perception of transactional efficiency with respect to ATM and Human Teller transaction platforms.

METHODOLOGY

A cross-sectional survey was adopted in this study. It involved the collection of responses from customers of various banks in order to make general conclusion about the variables under investigation (Krishaswami, Sivakumar & Mathirajan, 2009). An accessible population of 600 bank customers in Port Harcourt city were engaged for the study. Six hundred copies of the questionnaire were randomly self-administered to customers of the 19 money deposit banks in the city. Questionnaire used for the analysis were those from the respondents who have been bank customers for a minimum of five years and make use of ATM cards and

chequebooks/savings deposit and withdrawal slips for transactions. A total of 542 copies of the questionnaire were returned of which 483 respondents indicated that they have used ATM cards and chequebooks/savings and withdrawal slips for a minimum of five years. Four hundred and seventy one were usable after eliminating improperly filled ones. The data extracted from the useable copies of the questionnaire were analyzed via the Statistical Package for Social Sciences (SPSS) version 21.

Instrumentation and Measurement

The questionnaire was made up of three sections: A, B and C. Section A contained items that elicited responses regarding the demographic details of the customers. Section B sought to have responses as regards customers' perception of the efficiency of ATM usage, while section C contained same items in section B, which pertain to customers' perception on usage of chequebooks/withdrawal booklets during banking hall transactions.

The statement items contained in section B are also found in section C. They are dimensionalized into four factors, namely: process, security, queue related and transactional. Process factor is made up of 3 items (e.g. easy application of process); security factor comprised 3 items (e.g privacy while collecting cash); queue related factor had 4 items (e.g waiting time), while transactional factor comprised five items (e.g cash availability). All the fifteen (15) observed indicators were adopted from the works of Al-Hawari, et al (2006), Athanassopoulos (2000), Davies, et al (1996), Moutinho and Brownlie (1989), Howcroft (1991), Joseph and Stone (2003), Patricio, et al (2003) and Yavas, et al 2004).

Validity and Reliability of Instrument

The instrument passed the face and content validity criteria since the items were drawn from the rich literature of bank customers' perception and the instrument was subjected to the scrutiny of seasoned scholars in marketing and management. The reliability of the instrument was ascertained by placing each factor on the Cronbach scale. Process, Security, Queue and Transactional factors scored alpha values of 0.78, 0.89, and 0.76 respectively. All alpha values of internal consistency satisfied the minimum criteria of 0.70 and 0.60 recommended by Nunally (1978) and Price and Mueller (1986) respectively. Perceptions of customers with respect to the study variables were observed on a Likert-like scale of 1-5 where one (1) represents very dissatisfied and five (5) means very satisfied.

Data Analysis Technique

Data collected were analyzed via SPSS version 21 to arrive at the medians and standard deviations of the observed indicators. The Mann-Whitney U Test was used to analyse the data since the data is ordinal in nature and the sample randomly selected. Moreso, this technique was chosen because the study involves comparison of perceived efficiencies of various conditions - users' perception of efficiency of ATM and Human Teller platforms (Pallant, 2013).

PRESENTATION AND INTERPRETATION OF RESULTS

The formulated hypotheses were tested using the Mann-Whitney U Test in order to ascertain if there are differences in customers' perception on the efficiencies of human teller and ATM transactions. The results obtained are summarized in tables 4.1.1 to 4.1.3

The first hypothesis which states that ‘There is no significant difference in customers’ perception of process efficiency with respect to ATM and Human Teller transaction platforms’ was tested and the following result was obtained:

TABLES 4.1.1- 4.1.3: PROCESS EFFICIENCY

Table 4.1.1 Ranks (PROCESS EFFICIENCY)

	SERVICE PLATFORM	N	Mean Rank	Sum of Ranks
PROCES S	ATM	471	461.25	217247.00
	HUMAN TELLER	471	481.75	226906.00
	Total	942		

Table 4.1.2 : Test Statistics (PROCESS EFFICIENCY)

	PROCESS
Mann-Whitney U	106091.000
Wilcoxon W	217247.000
Z	-1.186
Asymp. Sig. (2-tailed)	.236

a. Grouping Variable: SERVICE PLATFORMS

Table 4.1.3 : Report (PROCESS EFFICIENCY)

SERVICE PLATFORM	N	Median	Std. Deviation
ATM	471	5.00	3.647
HUMAN TELLER	471	5.00	3.700
Total	942	5.00	3.672

Tables 4.1.1, 4.1.2 and 4.1.3 reveal that there is no significant difference in customers’ perception of process efficiency with respect to ATM (Md = 5.00, N = 471) and Human Teller Transactions (Md = 5.00, N = 471), $U = 106091$, $z = -1.186$, $p = 0.236$. Here, the p value is greater than 0.05. Hence, the null hypothesis was accepted. It therefore means that there is very little difference in the way customers perceive the efficiencies of ATM and Human Teller Transactions in terms of process.

The second hypothesis which states that ‘There is no significant difference in customers’ perception of security efficiency with respect to ATM and Human Teller transaction platforms’ was tested and the following result was obtained:

Tables 4.2.1- 4.2.3: SECURITY EFFICIENCY**4.2.1: Ranks (Security Efficiency)**

	SERVICE PLATFORM	N	Mean Rank	Sum of Ranks
SECURITY	ATM	471	368.96	173780.00
	HUMAN TELLER	471	574.04	270373.00
	Total	942		

Table 4.2.2: Test Statistics^a (Security Efficiency)

	SECURITY
Mann-Whitney U	62624.000
Wilcoxon W	173780.000
Z	-11.673
Asymp. Sig. (2-tailed)	.000

a. Grouping Variable: SERVICE PLATFORMS

Table 4.2.3: Report (Security Efficiency)

SERVICE PLATFORM	N	Median	Std. Deviation
ATM	471	8.00	3.253
HUMAN TELLER	471	12.00	3.514
Total	942	10.00	3.665

Tables 4.2.1, 4.2.2 and 4.2.3 reveal that there is a significant difference in customers' perception of security efficiency with respect to ATM (Md = 8.00, N = 471) and Human Teller Transactions (Md = 12.00, N = 471), U = 62624.00, z = -11.673, p = 0.00. Here, the p value is less than 0.05. Hence, the null hypothesis was rejected. It therefore means customers perceive that Human Tellers are more efficient than ATM platforms in terms of security.

The third hypothesis which states that 'There is no significant difference in customers' perception of queue efficiency with respect to ATM and Human Teller transaction platforms' was tested and the following result was obtained:

TABLES 4.3.1- 4.3.3: QUEUE EFFICIENCY**4.3.1: Ranks (Queue Efficiency)**

	SERVICE PLATFORM	N	Mean Rank	Sum of Ranks
QUEUE	ATM	471	454.79	214208.00
	HUMAN TELLER	471	488.21	229945.00
	Total	942		

Table 4.3.2: Test Statistics (Queue Efficiency)

	QUEUE
Mann-Whitney U	103052.000
Wilcoxon W	214208.000
Z	-1.910
Asymp. Sig. (2-tailed)	.056

a. Grouping Variable: BANK SERVICES USERS

Table 4.3.3 : Report (Queue Efficiency)

SERVICE PLATFORM	N	Median	Std. Deviation
ATM	471	7.00	4.896
HUMAN TELLER	471	8.00	4.902
Total	942	7.00	4.899

Tables 4.3.1, 4.3.2 and 4.3.3 reveal that there is no significant difference in customers' perception of queue efficiency with respect to ATM (Md = 7.00, N = 471) and Human Teller platforms (Md = 8.00, N = 471), $U = 103052$, $z = -1.910$, $p = 0.056$. The null hypothesis was accepted as the analysis shows that there is an infinitesimal difference in perceptions of customers about the queue efficiencies of ATM and face-to-face transaction with Human Teller.

The fourth hypothesis which states that 'There is no significant difference in customers' perception of transactional efficiency with respect to ATM and Human Teller transaction platforms' was tested and the following result was obtained:

Tables 4.4.1 – 4.4.3: TRANSACTION EFFICIENCY**Table 4.4.1: Ranks (Transaction Efficiency)**

	SERVICE PLATFORM	N	Mean Rank	Sum of Ranks
TRANSACTION	ATM	471	459.77	216553.50
	HUMAN TELLER	471	483.23	227599.50
	Total	942		

Table 4.4.2: Test Statistics^a (Transaction Efficiency)

	TRANSACTION
Mann-Whitney U	105397.500
Wilcoxon W	216553.500
Z	-1.334
Asymp. Sig. (2-tailed)	.182

a. Grouping Variable: BANK SERVICES USERS

Table 4.4.3: Report (Transaction Efficiency)

SERVICE PLATFORM	N	Median	Std. Deviation
ATM	471	9.00	6.152
HUMAN TELLER	471	9.00	6.173
Total	942	9.00	6.161

Tables 4.4.1, 4.4.2 and 4.4.3 reveal that there is no significant difference in customers' perception of transactional efficiency with respect to ATM (Md = 9.00, N = 471) and Human Teller Transactions (Md = 9.00, N = 471), $U = 105397.500$, $z = -1.334$, $p = 0.82$. It can be seen that there is no difference in median scores between the two platforms, while the p value is greater than 0.05. Thus, the fourth null hypothesis which states that 'there is no significant difference in customers' perception between ATM and Human Teller transactions with respect to transactional efficiency' was accepted.

FINDINGS AND DISCUSSION

Based on the results and interpretations derived after testing the hypotheses, the following findings are made:

- (i) Customers of banks in Nigeria do not perceive any difference in using ATM platform and Human server with respect to process, queue and transactional efficiencies.
- (ii) Customers of banks in Nigeria feel more secure doing their transactions in the banking hall through a human teller than at ATM platform.

The findings in (i) show that despite the prevalence and spread of Automatic Teller Machines in the Nigerian Banking system, customers do not prefer using them as expected. This is in consonance with the finding of Olatokun and Igbiniedion (2009) that the 'widespread adoption' of ATM by customers of Nigerian banks is not certain, as in some cases long queues are seen at machine points, while in other instances customers are few or unavailable. It does appear that customers show indifference in enlisting the services of ATM because they stand in frustrating queues and often spend a lot of time to be served, just as it is in the banking hall. This position is supported by Danlami and Mayowa (2009) who pointed out that the hope of getting better service quality from ATMs is a mirage as ATMs are few while most of the available ones are dysfunctional, adding that even the handlers of the machines lack technical competence, thereby resulting to long queues and dissatisfaction. The findings of this study are diametrically opposed to the findings of a survey conducted by Intermac Consulting Limited (2007) which concluded that ATM service platforms in Nigeria are more efficient than main banking hall services, including the operation of current account and all types of modern transactional platforms.

However, it was also found in this study that customers feel more secure having over-the-counter transactions at the banking hall. ATM card users appear to be more vulnerable to fraudsters and so customers of banks may have developed a propensity to use cheque books and withdrawal booklets in most of their transactions, thereby giving preference to human teller

platforms. Several scholars have pointed out the security inefficiencies of the usage of ATMs. For instance, Jegede (2014) submitted that the Self Service Technological mediums such as ATMs have created a lot of challenges for users, principal among which is the stealing from accounts of countless number of customers by fraudsters. In addition, other studies in electronic commerce and wireless finance (eg. Pavlou, 2003; Wu & Wang, 2005) have revealed that a high perception of risk is inversely related to adoption of technology which in turn reduces the intention to use Self Service Technologies. In a related study, Shamsdouha, Chowdhury and Ahsan (2005) conducted a study in Bangladesh and concluded that dissatisfaction with the use of ATM is attributable to the fact that most users of the service feel unsafe because of little or no privacy while carrying out transactions. Thus, the findings indicate that bank customers in Nigeria believe that they are safer carrying out transactions in banking halls than using ATMs.

CONCLUSION AND RECOMMENDATIONS

Banks diversify their channels of distribution in order to create increase in market share, customer loyalty, profitability and competitiveness, and to maximize customers' satisfaction. The Automated Teller Machine was introduced to the Nigerian banking industry in 1985 and was adopted by many banks as a means of improving service efficiency and to reduce the frustrating queues at the banking halls. Despite the introduction of this Self Service Technology, the banking halls and ATM cash points continue to witness heavy traffic. Several studies have shown that ATM services improve operational efficiency and customer satisfaction in terms of convenience, speed and flexibility. However, this study reveals that there is no appreciable difference in the perceived efficiency of ATM and that of Human Teller platform in the banking hall in terms of processes, queue and transactional factors. Moreover, customers feel more secure doing transaction with the Human cashier at the banking hall. This calls for attention from managers of banks in Nigeria. In this regard, the following recommendations are hereby made:

- (i) Banks should improve on their electronic transaction security architecture and ensure that their digital equipment are always efficient in delivering value to customers.
- (ii) Government should put in place adequate policy and build interdependent networks with law enforcement agencies, digital security firms and the banks, in order to tackle the activities of e-fraudsters.
- (iii) Banks should increase the number of ATMs not only at banking premises but also in shopping malls, workplaces, schools, hospitals and hotels.
- (iv) Banks should train and re-train their staff to acquire more skills related to maintenance and repair of ATMs.
- (v) Banks should lay emphasis on customer oriented Management By Walking Around (MBWA) whereby not less than two managers should interact with customers both at banking halls and ATM points, in order to provide assistance where necessary.

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