Financial Electronic Technology and Innovation for Banking Services Delivery in Ghana: Operations of the Automated Teller Machine Facility from Customers’ Perspective

Kwaku D. Kessey¹ & Maame Birago Abassah-Wesley²

¹Kwame Nkrumah University of Science and Technology, Ghana
²Council for Scientific and Industrial Research, Ghana

ABSTRACT
Modern electronic technological innovation has changed the landscape of several businesses including the banking industry. This situation has led to introduction of some electronic technology and products (e-products) including Automated Teller Machines (ATM) for dispensing cash. The ATM technology was designed to make banking services less labour intensive and twenty four-hour access to cash. However, introduction of e-products in the banking industry has raised both technical and operational challenges which call for critical examination. Among other questions, one may ask: To what extent is the public familiar with electronic banking products, including ATM technology in banking industry? What benefits do customers gain from the ATM facility? What challenges do banks and customers face for the introduction of the technology? These are some of the questions constituting the foundation of an exploratory study, which sought to examine in detail the relevance of the capital intensive Automated Teller Machine (ATM) technology, in the banking industry of Ghana. Also, the study appraised the customers’ perceptions on electronic banking evolution in general and ATM in particular. Perhaps, bankers have conceived the idea that they provide effective and efficient services once they have introduced electronic banking whereas their customers might see it differently. Hence, the exploratory research focused on the reality on the ground, in terms of customers’ perception on electronic banking. A non probability approach was adopted to randomly select respondents who are customers of different banks, for study. By virtue of the exploratory nature of the study, questionnaires were used to collect primary data from some customers on the field. The primary data necessitated qualitative technique and simple statistical techniques for analysing the data. The study revealed that the respondents were aware of few e-banking products available in the banking sector. The customers expressed different opinions on importance of electronic banking technology. Some of them saw it as relevant while others saw it differently and for that reason preferred transacting businesses in banking halls, notwithstanding long waiting hours associated with manual banking system. The main reason they gave for their choice was the frustrations people go through in course of accessing ATM and other e-banking services. The lack of education of customers on e-banking innovations was identified as a major challenge by customers. Therefore, it was recommended that banks should organise extensive public education on importance and utilization of available e-products and the benefits customers gain from them. Otherwise, customers’ low knowledge on the e-products would prevent from utilizing those products as expected. Notwithstanding, the investment cost, it would be useful for banks to increase supply of ATMs facilities in their catchment areas to provide easy accessibility to cash and increased financial inclusion. That arrangement would increase availability and easy accessibility to the ATMs and high utilization of the product. It is envisaged that a step in that direction could enable both banks and customers to benefit from e-technology and innovations alike.

Keywords: Technology, Innovation, Banking, Customer, Inclusion
INTRODUCTION
The evolution of electronic banking system in Africa, especially in Ghana, has been hailed by businesses and individual customers alike. Banks have taken advantage of e-banking to reduce investment in the number of employees, physical structures and branch banking. However, many bank customers continue to visit the banking halls for services they can easily access through electronic banking. This phenomenon has called for critical investigation to explain this trend in order to enhance banking services, effective corporate financial policy and expand investment to transform the banking industry.

According to The World Bank Report (2019) the unbanked population in Ghana is about 7.3 million implying that almost 24 per cent of the population lack any form of financial account including mobile money account for electronic transactions. This implies that any policy aimed at providing user friendly e-banking facilities and services would be a step in the right direction. However, one might ask whether modern financial technology and innovation adopted by banks in Ghana, at present, are making banking services delivery attractive to customers in terms of reliability, less risky savings and convenience. In other words, have banks introduced innovations that would increase financial inclusion, make customers feel comfortable when transacting businesses in banks or the investment is just to raise their margins? How do the banks which adopt modern technology for service delivery consider its investment as successful? Would that be complete without evaluating customers’ experiences with the new technology as well as identifying the concerns they might have with regards to the innovation.

In other words, among the objectives of the study were: To examine how banks evaluate success after they have introduced an innovation into the banking industry. To analyse charges customers pay with respect to using new technology? To examine the extent of banks involving customers in evaluating a new technology they have introduced. To assess the extent to which customers’ opinions are considered in examining relevance and effectiveness of technology. These issues, among others guided the conduct of the research. As an exploratory study primary data were gather from different banks and customers within Kumasi metropolis for assessment.

Defining the Challenge
The decision of a firm to invest in new technology is a laudable one. However, it is important to consider the effects of the decision on the performance of the firm as well as its customers who are final consumers. One could argue that effects of innovation on customers have to be critically assessed before, during and after an innovation. Many firms fail to assess the impact of technology they adopt in operations, on their customers who are innovation targets. Many firms which analyse the effect of an innovation on its operation play down the human/customer factor and concentrate on their monetary gains. In order words, as long as an investment generates appreciable margins it is considered a success. Hence the effects the decision has on customers are less considered. It has been realized that some costs of an innovation is passed on to customers in a hidden manner. That means some banks just adopt innovation in banking industry in Ghana without human face.

Theoretical and Conceptual Overview
Conceptually, one of the important aspect of innovation is people's decision to embrace a technology as a methodology to perform a familiar action. Therefore, the basic elements that relate to appropriation of technology advancement are: Relative favorable position of the innovation, similarity with a familiar method, complexity or simplicity of the new method, trial ability and its perceptibility. These are important elements that have to be considered in introducing new technology in every industry. It has been argued that, innovation is imparted through specific channels in a social context. The dimensions include information on its availability; comprehension of its capacities; the nature of influence, that is, shaping of a good state of mind to it; choice or probability of its selection; execution that is, putting it to use and affirmation, implying support and taking into account positive results from it. This postulation confirms that introduction of innovation in business is a process which calls for several decisions and activities but not an event which is performed at a point in time.
It has to be emphasised that, the basis of adopting an innovation include its relative advantage that is the extent to which it is seen to be superior to anything that supersedes it; similarity, meaning its consistency with existing qualities, past encounters and needs; as well as its multifaceted nature relating to challenges of customers’ comprehension and utilization; the trial ability indicating the extent to which it can be tried differently within a constrained premise; the observance of innovation refers to the perception of its outcomes. Since this chain of activities is overlooked by many firms after the introduction of new technology, they relax and finally fail to achieve their goals. Therefore, in introducing innovation, the firm’s capacities and responsibilities should include building up requirement for change with respect to the customers. Thus analysing customer issues include expectations; making an interpretation of the expectations, balancing out reception and avoidance of discontinuation as well as moving the customer from dependence on the firm or change agent to self reliance among others.

Since adoption of innovation involves choosing among alternatives, the process of choice is relevant for sustainability of a choice. By introducing innovation, the change agents assume that early users are educated and have higher economic wellbeing. Again, they are more open to both broad communications and interpersonal channels of correspondence and have more contact with change specialists. Broad communications channels are relatively more imperative at the information stage, while interpersonal channels are relatively more essential at the influence stage. By choosing innovation in a discretionary manner is meant where the individual or organization has a genuine chance to receive or reject a product. It could be by aggregate where a choice is made by consensus among the individuals in a group. Also, choice is made based on power, that is where the decision is forced by someone else or organization which has essential authority, status or specialized ability. This framework explains how choices are made in every situation especially if it relates to something new. This preposition, underscores the importance of regarding introduction of technology as a multi-faceted venture which has to be handled with diligence.

Electronic technology devices in banking industry in Ghana include Telephone Banking, Internet Banking, Branch Networking, Mobile Banking and Automated Teller Machines (ATMs) among others. Given the outlined background on innovation, the ATM technology was selected for study by virtue of the fact that it is one of the common electronic banking devices in the banking industry of Ghana.

**Automated Teller Machine (ATM) Technology and its Relevance**

Historically, the first ATM was introduced in 1967 at Barclays Bank, Einfield Town branch, in North London. The technology was invented by John Shepherd-Barron an engineer of De Le Rue printing firm. He was convinced that there ought to be a way one could get access to one’s own money, anywhere in the world or the United Kingdom. He analysed the process of hitting on a chocolate bar dispensing machine and replaced chocolate with cash and developed an ATM. According to ATM Industry Association there are about 3million of the machines installed worldwide, making ATM a global invention.

ATM is an electronic telecommunication devise that enables customers with the help of a card, to perform financial transactions without human assistance. ATM offers two types of services, basic and complex. The basic device which is common, allows customers to withdraw cash and receive reports on the transaction. The complex technology accepts, facilitate line of credit of payment and provide reports on account. That is common in Ghana, However, only customers of banks that operate a complex ATMs could have access to services provided by such machines. Another technology that has been introduced in the ATM system is the “Warm Card” which provides business practitioners greater banking security. The system allows an accountant who is to deposit money on behalf of a company with a “Warm Card” to accomplish that transaction only. The accountant is not able to use that “Warm Card” to make withdrawals, thereby reducing the possibility of fraud. An operator interacts with ATM by inserting an ATM card with magnetic stripe or a plastic smart card with chip that contains a unique card number and other security information such as expiry date The operator is authenticated by his/her signature and personal identification number(PIN). The relevance of ATM technology in banking industry is that banks in many countries operate service points in addition to manual tellers. This system reduces some customer service pressure on tellers. The customers use ATM cards at minimal fees, Records reveal that average
fees charged on services in USA, for non customers of a bank it is about US$4.52(2016). In Seattle, USA
the rate is US$4.21 which is below the national average. It is estimated that US$92billion are withdrawn
in cash from ATMs worldwide. This makes it clear that ATMs play important role in banking industry
and the macro economy in general.

ATMs have made it possible for travelers to carry less cash to all countries. Ability to use ATM enables
travelers to receive better exchange rate deal than they would receive from official money exchange
bureau. Also, it is more convenient to use ATMs compared to travelers’ cheque.

Again, the combination of automation and human services gives more productivity for the bank during
banking hours. Additionally, it spares time in customer service delivery as customers do not queue in
banking halls, and for that matter they could invest time spared into other productive activities. ATMs are
efficient method for yielding higher profitability as they accomplish higher efficiency per duration of time
than human tellers who on average serve 43,000 customers compared to 64,000 customers by ATMs per
month (Rose, 1999). That is about 49 per cent increase in services to customers. Furthermore, ATMs
ability to work after banking hours provides continuous services and high productivity.

Profiles of the selected Universal banks
For reason of anonymity the banks studied have been reclassified as Bank One, Bank Two and Bank
Three located in Kumasi Metropolis where many customers use ATM cards. These banks covered two
local banks and one foreign bank.

Bank One
Bank One is the largest universal bank in Ghana which was established as a limited liability company in
1953. It was set up to provide banking services for socio-economic development of an emerging
economy, Ghana. Among others, the bank was to provide special services to Ghanaian traders, business
entrepreneurs and farmers who could not elicit support from the existing expatriate banks. In 1957, when
Ghana gained independence, the Bank of Ghana was established as the Central Bank and Bank One was
directed to focus solely on provision of commercial banking with personal products such as savings,
loans/overdraft, current, deposit and investment accounts, and branch banking. The bank expanded its
business activities by introducing mobile banking, credit/debit cards, internet banking, electronic banking,
branch networking, business accounts and Small Medium Enterprise accounts among others. It has total
assets of GHS10.7 billion (2018). Also it has total of 214 branches after assuming the management of two
defunct banks in 2019. Since the branches of Bank One have been opened across the length and breadth
of the country it tapped the potentials of all 16 regions in Ghana. For the purpose of electronic banking it
has installed ATMs at some branches. Again, it has a Readycash cards which enable customers to
withdraw from ATMs of other banks at a fee. ATM card holders of the bank can use them both locally
and abroad. According to the Managing director, the electronic technology that has been introduced in
delivery of banking services is an “investment…. made to transform the Bank into a world-class one to
delight customers”. Continuing he admitted that “the banking landscape is changing. A new wave of
technology is fast changing the way customers engage their finances [hence]… the bank is having to
redirect the way we do business to deliver a better customer experience and remain competitive.” In this
context the importance of modern technology in current banking industry cannot be overemphasized.

Bank Two
The Bank Two was licensed by Bank of Ghana on 28th June, 2006 hence it has operated for fourteen
years only. It started as a discount house, operated profitably for eight years, after which the stakeholders
decided to take advantage of the existing economic climate to set it up as a universal bank in 2006. Bank
Two has 43 networked branches and has visa enabled ATMs throughout Ghana. Its financial products
included savings, loans, overdraft, investment Debit card and Mortgages among others. Presently, in terms
of banking services provision, one could conclude that the bank has expanded fast with about 75 branches
throughout the country in fourteen years.
As a limited liability company, its major shareholders include Africa Capital limited liability company which owns about 32 percent stake in the bank, Social Security and National Insurance, State Insurance Company Ltd, and some foreign and Ghanaian individuals who hold the remaining shares. Bank Two is a professional investment banking company. Additionally, it is one of pension fund managers operating in Ghana under the regulation of the Securities and Exchange Commission of Ghana. In 2007, Corporate Initiative Ghana awarded the Bank as the best growing bank in Ghana. Among its aims is continuing to develop as a premier financial organization that earns high returns for all its shareholders. It also seeks to contribute its quota to the development of Ghana’s financial sector and the expansion of the economy. The bank is accomplishing this through its professional staff, continuous investments in state-of-the-art electronic technology, outstanding standards of corporate governance, superior knowledge of the local financial market, as well as adhering to its core values of integrity, passion for service, and culture of excellence.

In the Kumasi metropolis, Bank Two has eight branches. The Adum branch, which is the largest operates with ATMs. As a technologically minded business unit it operates different electronic banking systems which enable its ATM card holders to use them in the ATMs of other banks. This implies that electronic technology is highly applied by the bank thus making it competitive.

Bank Three
Bank Three is a foreign bank established in Ghana on 14th February, 1917. It has worked for more than a century and has been firmly associated with the nation's development. Its parent organization in the United Kingdom is listed on the London, New York and Tokyo Stock Exchanges. In 1970 the bank with 25 branches, was incorporated locally and wholly owned subsidiary of the parent bank in United Kingdom. In 1976 the government of Ghana took 40 per cent shares in the company, though this holding was bought back by the bank in 2003. One century of banking with emphasis on quality and skills in the realm of fund management has made it a noteworthy company in both corporate and retail banking. It has combined its international expertise, product knowledge, with rich experience and appreciation of the local financial market to bring the best of banking to its customers. The vision of the bank is to be the leading contributor to Africa’s growth and to be one of the most admired financial service providers in Africa.

The bank has 75 service outlets across the nation: 57 branches, 3 Agencies, 10 Prestige Centres and 2 Premier Suites. Bank Three has over 155 ATMs installed across the country. Normal customers are charged GHS4 every month as card holders. In addition, the bank has free e-banking solutions including Internet Banking- with that one can do electronic fund transfers, manage accounts and perform online transactions as well as Hello Money Mobile Banking, Smartphone Banking, Short Message Service (SMS) Alerts and e-Statements which customers can access any time of the day. Currently the bank has 11 branches in the Kumasi Metropolis.

From the short profiles of the selected banks one could realize that the banks in Ghana have not been left behind as far as adoption of financial electronic technology and innovation are concerned. Since the present landscape of banking has changed globally towards application of electronic technology, banks cannot be competitive in the banking industry without adopting current technology. To a large extent, therefore one could conclude that electronic technology has become the basis of competitive advantage in the banking sector. However, the role customers play in these changing trends and innovations leaves much to be desired. Therefore, this is an important issue to be considered in analyzing the operations in the banking industry of Ghana.

RESEARCH METHODS
The study as an exploratory one journeyed through several unknown areas to gather data to analyse. Some banks and customers were randomly selected for interview. This approach was purposive as only customers who have ATM cards were selected. Open-ended questionnaires were used to collect primary data from respondents concerning their opinions on electronic technology and innovation in the banking industry with special reference to the ATM. This implied that high proportion of the data were primary
thus making the analysis qualitative. In spite of the qualitative nature of the study, the results from the analysis were quite revealing and significant.

RESULTS AND DISCUSSIONS

Socio-demographic Characteristics of Customers
The backgrounds of customers were critically examined as they influence the level of consumption of banking products and services. The main characteristics examined included age, gender, and level of formal education attained by the customers. Again, the other variables examined were the number of years they have been bank customers, and the regular bank products they consume which enhance financial inclusion.

Table 1 Socio-demographic Characteristics of Customers

<table>
<thead>
<tr>
<th>Type</th>
<th>Frequency</th>
<th>Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>38</td>
<td>55.1</td>
</tr>
<tr>
<td>Female</td>
<td>31</td>
<td>44.9</td>
</tr>
<tr>
<td>Total</td>
<td>69</td>
<td>100</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below 30 years</td>
<td>28</td>
<td>40.6</td>
</tr>
<tr>
<td>31-39 years</td>
<td>21</td>
<td>30.4</td>
</tr>
<tr>
<td>40-49 years</td>
<td>15</td>
<td>21.7</td>
</tr>
<tr>
<td>50-60 years</td>
<td>2</td>
<td>2.9</td>
</tr>
<tr>
<td>Above 60 years</td>
<td>3</td>
<td>4.4</td>
</tr>
<tr>
<td>Total</td>
<td>69</td>
<td>100.0</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic</td>
<td>5</td>
<td>7.2</td>
</tr>
<tr>
<td>SHS</td>
<td>12</td>
<td>17.4</td>
</tr>
<tr>
<td>Tertiary</td>
<td>52</td>
<td>75.4</td>
</tr>
<tr>
<td>Total</td>
<td>69</td>
<td>100.0</td>
</tr>
<tr>
<td>Years as Bank Customers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-3 years</td>
<td>21</td>
<td>30.4</td>
</tr>
<tr>
<td>4-6 years</td>
<td>28</td>
<td>40.6</td>
</tr>
<tr>
<td>7-9 years</td>
<td>9</td>
<td>13.0</td>
</tr>
<tr>
<td>10 and above</td>
<td>11</td>
<td>16.0</td>
</tr>
<tr>
<td>Total</td>
<td>69</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Field Survey. SHS*-Senior High School
The respondents were made up of 55.1 per cent males and 44.9% females. The distribution of customers by gender showed that females play significant role in consumption of banking services in Ghana. Although males are more than females, from the statistics the former do not dominate the industry as it is the case in some sectors of the economy as the transport sector.

About 40.6 per cent of respondents were below the age of 30 years while 30.4 per cent fell within the age range of 30 and 40. Also, customers who were within the age cohort of 40-49 accounted for 21.7 whereas 2.9 per cent of respondents were between 50-60 years and about 4.4 per cent were above 60 years. The results indicated that most of the customers were within the working class bracket who are active economically. They are formal sector workers who are paid through their banks. Hence, a newly employed worker has to open a bank account before he/she receives the first pay package through that account. In effect the government policy to pay workers through the banks has made many workers in Ghana bankable once they are employed. They earn incomes that enable them consume different banking products. Therefore there is a direct association between formal employment and level of bank customers in Ghana.

The table 1 indicates that 75.4 per cent of the respondents have formal education up to tertiary level while 17.4% have formal education to the level of senior high school. This implies that the workers in the formal sector who are paid through the banking system have higher degrees. The other 24.6 per cent who do not have high education could be customers working in the informal sector of the economy. The conclusion is that bank customers are from both formal and informal sectors of the economy but majority are from the formal sector, whose remunerations are paid through the banking system.

About 7.2 per cent of customers have only basic level of education. This finding is attributed to the fact that to understand banking processes one requires some level of literacy. Therefore the illiterates and less educated in society are not attracted to banking activities. This implies that the less educated or illiterates, for that matter, do not utilize banking services in Ghana.

Also 71 per cent of respondents have done business with banks from 1 to 6 years. The customers who have been doing business with banks from 7 to 10 years and above constitute 29 per cent of the total customers. Since banks get to know their customers based on the number of years they have been customers, one can conclude that many of the respondents are new customers therefore the banks do not know them well, a situation which constitutes risk in banking.

Bank Staff for Customer Service

Since banking is a complex business the background of the staff who service customers were examined. In terms of gender both male and females work at all banks. Generally, male workers outnumber females as bank staff. Males constitute about 62 per cent and 38 per cent are females. Total of 29 bank staff were selected purposively; comprising 48.3 per cent junior staff, 44.8 per cent management staff and 6.9 per cent senior management staff (Table 2). Again, male staff outnumbered females in relation to level of high education, and service experience.

All bank staff have formal education up to the tertiary level. This implies that banks employ highly educated personnel to enhance quality of human capital. This is the type of personnel who could contribute to the success of the banks with respect to adopting new technology and innovation in banking.
Table 2. Background Information of Selected Bank Staff

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>18</td>
<td>62</td>
</tr>
<tr>
<td>Female</td>
<td>11</td>
<td>38</td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below 30 years</td>
<td>9</td>
<td>31.0</td>
</tr>
<tr>
<td>30-39 years</td>
<td>13</td>
<td>44.8</td>
</tr>
<tr>
<td>40-49 years</td>
<td>4</td>
<td>13.8</td>
</tr>
<tr>
<td>50-59 years</td>
<td>3</td>
<td>10.4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>29</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Banking(Work) Experience</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-5 years</td>
<td>13</td>
<td>44.8</td>
</tr>
<tr>
<td>6-10 years</td>
<td>9</td>
<td>31.0</td>
</tr>
<tr>
<td>11-15 years</td>
<td>3</td>
<td>10.5</td>
</tr>
<tr>
<td>Above 15 years</td>
<td>4</td>
<td>13.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>29</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Junior Staff</td>
<td>14</td>
<td>48.3</td>
</tr>
<tr>
<td>Management Staff</td>
<td>13</td>
<td>44.8</td>
</tr>
<tr>
<td>Senior Management Staff</td>
<td>2</td>
<td>6.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>29</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Field Survey,

The table 2 shows that the staff have varying level of experience in banking operations. It can be observed from Table 2 that about 45 per cent of the respondents have worked with the bank for between 1 to 5 years, 31 per cent have worked with the banks for between 6 to 10 years; while 13.7 per cent have worked with the banks for over 15 years. This implies that bank staff have adequate knowledge and experience in banking to respond appropriately to issues related to the changing trend in technology and innovations in the banking industry.

Utilisation of electronic banking products and services

One objective of the study was to examine customers’ awareness of electronic products that have been introduced in the banking industry and the level of utilization by customers. The point is that banks could invest in electronic technology to be abreast with the changes taking place in the industry, however if customers are not aware of them they cannot patronize services or products. From the analysis it was revealed that 92 per cent of respondents were familiar with electronic banking technology including ATM facility. According to respondents, their sources of information included media advertisement (24 per cent), short messages and phone call from banks (18 per cent), posters displayed in bank halls and premise (38 per cent), personal and social contacts (13 per cent) and others (7 per cent). The responses indicate that printed materials or posters pasted in banking halls and premises are the main source of information to
customers in becoming aware of new products and services introduced by banks. However, the understanding of the message depends on the respondent’s level of education.

**Level of Customers Patronage of e-banking products**

It is one thing being aware of a product/service in the market and another patronising a product. The e-banking products familiar to respondents in terms of patronage are Short Messages Service (SMS) alert, Automatic Teller Machine (ATM)s, Internet banking and Mobile banking among others.

![Figure 1. Awareness of the electronic technology in Banking industry](image)

The Figure 1 indicates that the ATMs is the most popular technology among the respondents, followed by SMS, mobile and internet banking in that order. The ranking order is not surprising as customers should own smart phones and access to internet to enable them patronize the last two products. To have access to a smart phone and internet, in Ghana, is quite expensive to many customers. However, the study went ahead to measure the utilization level of the ATMs.

**Level of ATM Patronage**

In terms of analyzing the level of patronage of ATM facilities the Relative Importance Index (RII) methodology was used to estimate the level of patronage with reference to the Likert scale. The RII analysis was made with the view to estimating the mean for a factor which gives it weight in the perception of the respondents (Table 3). RII ranges from 0 to 1.

<table>
<thead>
<tr>
<th>Likert Scale</th>
<th>Very High (5)</th>
<th>High (4)</th>
<th>Average (3)</th>
<th>Low (2)</th>
<th>Very Low (1)</th>
<th>Weighted Total</th>
<th>RII</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utilization level of ATM Technology</td>
<td>18</td>
<td>32</td>
<td>10</td>
<td>8</td>
<td>1</td>
<td>265</td>
<td>0.77</td>
</tr>
<tr>
<td>s(n)</td>
<td>90</td>
<td>128</td>
<td>30</td>
<td>16</td>
<td>1</td>
<td>265</td>
<td></td>
</tr>
</tbody>
</table>

Where s- scale, S * is the highest scale, n frequency of respondents
The formula is given as the summation of scales/weights(S) multiplied by number of respondents (n) Table 3 and divided by highest scale level(Sa) multiplied by total respondents(N). That is:

$$RII = \frac{S_a n_a + S_b n_b + S_c n_c + S_d n_d + S_e n_e}{S \times N}$$

$$RII = \frac{5(18) + 4(32) + 3(10) + 2(1) + 1(8)}{5(69)} = \frac{258}{345} = 0.77$$

RII = 0.77
With RII of 0.77 the customers have admitted that ATMs have high patronage as an electronic product of banks in Kumasi Metropolis.

**Frequency of Withdrawal from ATMs (Number of Visitation)**
From the analysis, 27.5 per cent of customers used ATM very regularly, 46.4 per cent, regularly. 13.0 per cent normal and 1.4 per cent very low usage in that order. Generally, about 70 per cent of respondents used ATM technology regularly. This makes it a popular service provider from banks.
Generally, majority of customers that is about 42 per cent withdraw cash from ATMs on weekly basis. About 29 per cent withdraw cash on monthly basis, perhaps when they receive notification on salary payments, 26 per cent withdraw cash everyday that group constitutes the informal sector operators who withdraw cash for their daily operations. Only 3 per cent withdraw cash on yearly basis. Many of those people are resident abroad but send remittances into their accounts, in Ghana, and make withdrawals when they return home on festive occasions (Figure 2.) Given that withdrawal scenario banks should ensure that their machines do not run short of cash especially during the last week of the month when the monthly, weekly and daily cash withdrawals are made by customers simultaneously.

![Cash Withdrawal from ATMs](image)

**Figure 2: Frequency of Cash Withdrawal from ATMs**
The structure of secondary data from banks, analysed and presented in the Figure 3 below collaborated the analysis of primary data on patronage (Figure 2) of e-products. ATM has the highest patronage compared to all other e-banking products. This finding is in agreement with that of Abor (2004) which indicated that the ATM is the main e-banking product that has seen much patronage in Ghana for the past decade.

Perhaps, this is by virtue of the fact that the ATMs play vital role in the e-banking revolution in Ghana. This includes the fact that the machines work even when the banks close and especially at weekends. The patronage would expand as some banks have taken giant steps in installing ATM machines that have been configured to accept cash deposits. The bank staff are of the opinion that ATMs open the way for customers to withdraw cash from their bank accounts without visiting a banking hall. In other words the ATMs technology gives customers easy access to their money. Where ATMs service is available, there is no time wasting on cash withdrawals as customers can also access their bank balances through SMS. It is also one of the simplest e-banking products as customers do not go through many difficult processes to withdraw cash. According to the Bank staff, the outlined benefits have contributed to make the ATM technology one of the most successful banking innovations. This finding also concurs with Humphery et al. (2006) who found that ATMs are highly patronized compared to other e-banking products.

Factors attracting Customers to ATMs
Having identified ATM as the most popular e-product, the customers outlined three cardinal factors that have attracted them to the technology. These are convenience, quick service and accessibility factors. Although these factors are interrelated the customer ranked them according to order of importance. (Figure 4)
Figure 4. Factors that influence ATM patronage

The analysis indicates that 20 percent of respondents claimed that convenience is the factor that attracts them to ATMs. They argued that the technology offer them access to their accounts always. Another 26.4 percent indicated that they patronize ATM for reason of fast services which help them to avoid joining long queues at the banking halls. In addition, they mentioned that ATMs provide balances of accounts by providing short text messages. About 53.6 percent of the respondents indicated they use ATMs for the reason that, they can be accessed 24 hours daily. The accessibility factor is the major issue in the patronage of ATM services in Ghana. Notwithstanding, these advantages, 58 percent of the respondents have used ATM cards from one to two years only implying that the technology is a recent innovation in the banking industry. Hence, there is low subscription in the transaction of major businesses on electronic banking platforms in Ghana.

**Investment in ATM Technology**

To introduce any innovation it is important that the institution takes a critical look of the cost of investment. As electronic banking innovation is capital intensive it must be expected that it is an expensive investment. For example, it is estimated that to install a current version ATM facility a bank has to invest about 200,000 pounds sterling. Since the total cost has two components namely capital and operational costs, a Relative Importance Index (RII) analysis was made to determine which of them should influence the investment decision. In analyzing the capital cost of the installation of an ATM facility, the bank staff admitted that it was an expensive operation. With the application of the Relative Importance Index (RII) based on a Likert Scale (cf. Page 18), to quantify the opinion, the estimated RII for capital cost is 0.74 whilst for operational expenses, the RII is 0.61. This implies that to install an ATM facility decision is tilted by the capital cost of the machine.
Table 4 Cost Analysis of ATM Installation

<table>
<thead>
<tr>
<th>Likert Scale</th>
<th>Strongly Agree (5)</th>
<th>Agree (4)</th>
<th>Don’t know (3)</th>
<th>Disagree (2)</th>
<th>Strongly Disagree (1)</th>
<th>Sum of Weighted Scale</th>
<th>Maximum Weight (5xN*)</th>
<th>RII</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction of ATM Technology has high capital cost</td>
<td>8</td>
<td>13</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>108</td>
<td>145</td>
<td>0.74</td>
</tr>
<tr>
<td>S(n)</td>
<td>40</td>
<td>52</td>
<td>9</td>
<td>4</td>
<td>3</td>
<td>108</td>
<td>145</td>
<td>0.74</td>
</tr>
<tr>
<td>ATM Technology has high operational cost</td>
<td>1</td>
<td>14</td>
<td>2</td>
<td>10</td>
<td>2</td>
<td>89</td>
<td>145</td>
<td>0.61</td>
</tr>
<tr>
<td>S(n)</td>
<td>5</td>
<td>56</td>
<td>6</td>
<td>20</td>
<td>2</td>
<td>89</td>
<td>145</td>
<td>0.61</td>
</tr>
</tbody>
</table>

Where N* is total number of respondents

The high capital cost constitutes a major challenge affecting the installation of ATM technology for providing banking services. As a result of high capital cost institutions would cite initial cost as a main challenge confronting the expansion of ATM innovation in the banking industry.

Generally, introducing electronic products and services undoubtedly require substantial financial resources. This confirms the writings of other authors who found out that high cost of implementing innovations such as e-banking in the banking industry is a major challenge hindering e-banking implementation in the industry. As the high initial cost e-banking and technology systems, banks without strong capital base cannot introduce electronic technology and innovations for the simple reason that introducing new products and services require substantial financial resources. From invention point of view, huge sums of money have to be invested into research before innovation becomes a reality. Therefore, as part of corporate social responsibility banks in developing countries should support research and development.

**Challenges Associated with ATM Innovation**

Although ATM as an e-banking technology has been accepted by many customers and bankers as appropriate for enhanced service delivery, it has brought in its trail several challenges that must be addressed.

Notwithstanding the fact that many bank customers have attained high level of formal education; the respondents indicated that the processes they have to pass through whilst using ATM technology were complicated. For example, it was mentioned that the right positioning of the card with provision of personal identification number (PIN) to operate the account confuse some customers.

Among the challenges identified by respondents was cyber fraud that is committed by internet hackers and difficulties to trace the criminals. It has been observed by the Cyber Crime Division of the Police Service that scammers could install CCTV cameras at places close to the ATM, and take snapshot of ATM cards thereby capturing all the relevant information and use it at another time to withdraw money from respective accounts, even though that is a criminal activity in Ghana.

Customers have identified the electronic software used to run the ATMs as unreliable thereby affecting patronage of ATM facility negatively. Also, it was indicated that an ATM facility could switch off or “swallow” the customer cash card after constant failure to provide right information. Though that was meant to protect the customer’s account yet without any explanation nor help the customer goes away
disappointed and frustrated and would have to wait for the bank to resume services before he/she gets access to the card. The waiting time is longer if the incident occurred on weekend and the customer does not have alternative means to access their accounts.

Many respondents regarded insecurity as a major challenge hindering ATM patronage. Among others, insecurity related to ATM patronage could be associated with the fact that some customers may have their personal identification number (PIN) leaked out. That could be as a result of carelessness by not conforming to the operational regulations of the bank. For example, customers are advised not to carry their ATM cards along with the PIN but many of them fail to follow the instruction. Some customers write their PIN on the card. This helps opportunists to withdraw cash from that account when they get hold of that card. Secondly, some customers give their PIN to family members who are sent to withdraw cash on their behalf, thereafter they take advantage and withdraw cash from that account anytime an opportunity offers itself. The respondents claim that such intruders succeed as ATMs have no means of detecting any biometric information behind the personal identification number (PIN).

Again, respondents complained about limited public education from banks that introduced various technologies. For example, in relation to ATMS, customers are left to take care of themselves after they have been provided with the ATM cards and personal identification numbers (PIN). This has led to ignorance on the part of customers towards the use of e-banking products hence many get frustrated and resort to manual system of banking in spite of the fact that these customers are well educated.

Although the banks charge customers for ownership and usage of ATM cards the actual fees is not disclosed to the customer as it is deducted from the account. The point of emphasis is that customers should be educated on the cost of the ATM service provision, for financial decision making by customers. In other words, it should be made clear to customers that ATM services are not free instead of making it a hidden levy, which is contrary to canon of certainty in financial economics.

These observations confirm those made by agree with Earl (2000) who identified the challenges that customers face in using electronic banking services as, risk arising from fraud, network and system errors and other unanticipated events resulting in the bank’s inability to handle the banking products and services.

Key Findings
As an exploratory study in the financial sector, the work was an empirical one related to the introduction of e-banking technology and innovation in the banking industry, with specific reference to Automated Teller Machines technology. Customers’ opinions constituted the backbone of the study with some impression of bank staff captured.

Some of the main issues the study brought to the fore included the fact that bank customers and staff, in Ghana, are mainly males though there is appreciable number of females who operate in the banking industry. Hence, one could conclude that the banking industry is not male dominated one like the transport industry.

The government policy that formal sector workers have to be paid through the banking system has increased the bankable population in Ghana. Therefore, there is a direct relationship between formal employment and bankable population. Majority of bank customers and staff have tertiary education and also work in the formal sector.

Although there are several e-banking products only four of them were popular among bank customers namely; ATM technology, SMS, mobile banking and internet banking. The ATM is the most popular technology among bank customers.

These factors that make ATM technology popular include convenience, fast service delivery and accessibility to 24 hour banking service.

The study exposed some of the challenges affecting ATM technology patronage in Ghana. These challenges include high initial cost of introducing ATM innovation in Ghana, making it impossible for bank without strong financial base to install ATM facilities.

There are some challenges customers face in patronizing ATM facility, these include general cyber fraud, insecurity of the personal identification numbers issued to customers, difficulties associated with
operating the technology including unreliability of the network system that operates the ATM facilities. This makes any machine out of order to the frustration and disappointment of customers. Since many customers withdraw cash in the last week of the month.

Many ATM run short of cash during such periods and if the shortage occurs at weekends it constitutes a big financial handicap to the customers.

There is limited public education on electronic technology and innovation in the banking industry. Banks take the patronage of e-banking products such as ATM facility, mobile banking and internet banking, just to name a few, for granted, therefore they do not provide adequate information on new products to customers.

RECOMMENDATIONS

As the general public education on new electronic products and innovation is very low in the banking industry, Banks should use their marketing department to run seminars and conferences for targeted customers found in institutions whose employees take their salaries from the banks in question. This will give the banks opportunity to introduce new products to potential consumers, as the consumers will also have the chance to inform the banks the challenges they face in using some of the products already on the market. This will assist customers to understand the operation processes and reduce complexities associated using new products. That would increase level of utilization of the new products whilst enhancing banking services. The fees levied on using ATM cash cards should be explained to first time customers to help them make right decisions instead of making them pay implicit cost hidden levies on the products.

As customers use ATM facilities for the sake of convenience, banks should ensure that challenges associated with ATM network system is brought to the lowest limit. For example, there should not be shortage of cash especially at last week of the month when there would be monthly withdrawal operators, weekly withdrawal actors and daily withdrawal customers demanding cash in the same week.

Since cyber criminals have been hacking into the accounts of customers perhaps using PIN to operate an ATM facility is not adequate. Therefore some biometric information on the customers must be included either in the redesigning the ATM technology or extra biometric information is requested in course of operating the machine. By virtue of the high initial cost of installing ATM facility banks should develop an integrated system that would enable customers to use one card for all machines instead of multiple machines and multiple cards without extra cost. That approach would reduce cost and increase accessibility.

This highlights the importance of Banks supporting research into Banking technology and innovation as corporate social responsibility to benefit the customers and banks together. The security of customers should be improved through mounting of security cameras in the vicinity of installed ATM facilities. Above all banks should expand the coverage of ATM facilities in both the metropolises and municipalities with the view to reducing the transportation of large volume of cash for economic operations in an emerging economy.

CONCLUSION

The importance of e-banking technology and innovation in banking industry globally cannot be overemphasized. However, banks and other financial institutions should focus on long term benefits from the technology development instead of short term ones. Introduction of ATM technology, for example, should aim at expanding enhanced banking services in a predominately unbanked economy to draw many people into the financial arena to increase financial inclusion, so that the ATM innovation promotes a system that would improve the financial sector’s performance to make the economy buoyant and efficient for development. In an era where many economies are working towards promoting cashless systems, banks have a significant role to play hence they ought to redefine their roles in terms of technology and innovation in developing economies.

Perhaps electronic technology and innovation have to be redesigned and promoted in the banking industry for development. This should lead to minimal cash holding by customers in the short run and move
towards cashless economies in the long run through research in technology and innovation. That ought to focus on creating a new banking culture that would bring about a paradigm shift in the banking system with the view to making it a strong industry for growth beyond mobilization and redistribution of financial resources.

As part of their corporate social responsibility, one might submit that, banks must take keen interest in promoting and financing research in engineering, science and technology that would benefit the banking industry specifically and the nation in general.

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