Impact of technological innovations on customers in the banking industry in developing countries

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Abstract
Without continuous technological innovations in today's highly digital world, it will be extremely difficult for banks to remain relevant within the competitive landscape. Bank customers are also becoming very sophisticated and their demands drive the direction of these technological innovations. Whilst banks derive efficiency from these innovations, customers are however impacted with convenience and transaction costs offered by these innovative services and electronic activities. This study sought to understand the impact of these electronic banking services on customer satisfaction and related transaction cost.

Drawing on the customer satisfaction model - SERVQUAL and the conventional economic efficiency theory, this paper employed the chi-square analysis to investigate customer satisfaction and the associated cost of electronic banking services with specific reference to banking customers in Ghana. Whilst the study concluded that there is a significant relationship between customer satisfaction and technological innovations in the Ghanaian banking industry, it was revealed that the costs associated with technological innovations in banking have also increased transactions costs to the disadvantages of customers. This increase could be attributed to the high cost of investment made by the banks, low level of technology adoption and customer education in the technological innovations.

The findings of the study have important policy implications for banks. First, banks need to have closer collaboration with the target segment of customers in developing new electronic products and services. This is to ensure that these products meet the needs, delight, attract and retain customers. Secondly, to avoid customer attrition as a result of high cost of electronic banking transactions, banks need to employ effective pricing strategies such as offering bundle fees to customers consuming multiple electronic banking services. This means that the banks must focus on innovation, disruptive technology and automation, with the ultimate aim of increasing profitability and at the same time satisfying its customers.

1.   Introduction

Organizations today act under severe pressures by other enterprises, which offer the same or similar products and services. Organizations are also under the pressure of the customers who expect more and more from the products they consume. These pressures cause organizations to continuously search for new product offerings and enhancing existing ones (Shqipe, Gadaf, & Veland, 2013). It is thus becoming imperative in today's highly digital world for enterprises and organizations to use electronic innovations in serving the needs and demands of their customers. Banks are of no exception to this paradigm shift. Banks are currently investing in Information and Communication Technologies (ICT) to enhance service delivery and improve efficiency in their operations. Some of these technological innovations include the automated cheque clearing systems, Automated Teller Machines (ATM) for cash withdrawal and deposits, internet banking and cash collection and mobile banking platforms.

Innovations in the banking industry are gradually changing the way services are offered by the banks and how banking services are consumed by customers. With the introduction of domestic and international fund transfers online as part of customers' account profile, customers no longer need to be physically present at the banking halls to transact such businesses. These can now be achieved through automated clearing house (ACH) integration with internet banking platforms.

However, the drive to achieve customer satisfaction by introducing innovate electronic activities in the banking industry does not come with challenges both to the provider and the customer as noted by Domeher et al., (2015); "While the vital importance of innovation in today's competitive climate has been widely proclaimed, innovation is not without its challenges" (p.89). In other words, whilst these technologies are essentially employed by banks to provide convenience to customers, there are also obvious challenges and problems associated with these technological innovations. An example of these challenges is the high investment cost associated with these innovations and the related high transaction costs incurred by the customers.

There is also the lack of effective and efficient management of the innovation processes. Paap and Katz (2004) have noted that "Organizations in today's hyper-competitive world face the paradoxical challenges of "dualism" that is, functioning efficiently today while innovating effectively for tomorrow". These researchers further stated that in order to achieve these objectives, organizations have to understand and learn to manage the dynamics of innovation that underlie both disruptive and sustaining innovations. Competition through innovation appears to be as critical as price competition among organizations and those that fail to innovate in today's market place fail to be competitive (Paap and Katz 2004). Paap and Katz (2004) on the contrary argued that not only must business organizations be concerned with the financial success and market penetration of their current mix of products and services, but must also focus on their long-term capabilities to develop or commercialize what will emerge as the most customer-valued technical advancements into future offerings in a quick, timely and responsive manner. Therefore the return on technology is not just a function of the investment but of the impact of the change that the investment creates. This therefore suggests that it is essential for technological innovations to change the service offerings of organizations and gradually, the ability to innovate has thus become accepted as a crucial prerequisite of enterprise development and entrepreneurship (Bahiti & Shahini, 2010). However technological innovations in the banking industries are characterized by factors such as huge investment costs and other electronic challenges. It is therefore essential for banks to effectively and efficiently manage these factors in order to delight, attract and retain customers, thereby, minimizing the rate of customer attrition.

In spite of the increase in innovative electronic banking products and services, customers, especially those in developing countries still patronize the traditional brick and mortar banking halls for basic banking services. For instance, whilst it is generally expected that the proliferation of Automated Teller Machines (ATMs) reduce cash withdrawals from the banking halls, customers still patronize the banking halls for cash withdrawal transactions over the counter. It is in this light that this study has been conducted to investigate the impact of technological innovations on customers in emerging banking industry, with specific emphasis to Ghana.

1.1   Objectives
The main aim of this study is to investigate the impact of technological innovations on bank customers in emerging economies. The study specifically seeks to achieve the following objectives;
1. To identify the impact of technological innovation on customer satisfaction in the   Ghanaian banking industry
2. To examine the impact of technological innovations on customer cost of transaction of banking in Ghana

2.   Literature Review
The conventional economic efficiency theory states that companies should structure their output to achieve the lowest possible cost per unit produced. The theory further stated that high levels of competition among producers should prevent them from making excessive profits by raising their selling prices to an unreasonable level above their marginal costs (Yusop, Radam, Ismail, & Yakob, 2011). This means that banks must look to alternative means to compete effectively

and thereby increasing profitability. A study by Nguyen, Tran and Wang (2014) concluded that the application of technology to banking service is a good way to enhance the service. This was supported by other studies. According to Musara and Fatoki (2010), technological innovations play a significant role in improving the efficiency of the banking sector as well as reducing the costs of banking transactions for customers. But this does not come easy. Whilst some banks benefit from the introduction of technologically innovative products and services, others fail to realize the expected benefits of innovations. According to Hilal (2015), innovation and introduction of new technologies are privileged means for improving banks productivity. Angko (2013) also concluded that one of the benefits of electronic innovations in banking is cost saving to both banks and customers. This suggests that banks need to ensure innovative products and services are appropriately priced to attract and provide satisfaction to customers.

2.1   Empirical Review

Contrary to these assertions, various challenges of innovations have been observed by different researchers. One of the main challenges of innovation is when marketers focus on services as a unit of analysis, instead of the fundamental needs of the customer (Christensen, Cook, & Hall, 2005). This suggests that the benefits of a technologically innovative banking product or service may not be realized if that innovation does not originate from customer needs and requirements. According to Nmegbu and Ogwo (2013), one of the factors which cause customer dissatisfaction and attrition in the banking industry is the fact that banks pursue product and service innovations and apply aggressive disparate marketing methods to make customers queue up to a new product idea which may already be of low quality with unsatisfactory pricing. Bettencourt et. al., (2013) argued that organizations get service innovations wrong as a result of the use of the traditional approach of using service as a unit of analysis.

They contended that this approach of using service quality research through mystery shopping, surveys, customer satisfaction studies and service quality studies can only improve existing services and not new services. They further posited that there are issues and challenges associated with traditional approaches to service innovation and suggested that what companies need is an approach to innovation that enables them to identify opportunities for breakthrough service offerings that is not constrained by current or proposed service solutions. On the contrary, Uriona Maldonado, Dias and Varvakis (2009) argued a benchmarking methodology consisting of a well defined set of phases is required for effective innovation management. This is   shown in Figure 1;

Figure 1: The benchstar development steps, (Uriona Maldonado et al., 2009)

A hybrid approach was proposed by Paap & Katz (2004), where organizations were encouraged not to ignore their current and potential customers. By this approach, organizations do not have to focus solely on the wants of their existing customers. More importantly, organizations need to focus on the needs of their customers. The issue is to identify the drivers of the future, those that emerge when old drivers reach their leverage limit, and those that emerge when customers' environment changes. Cognizant of the fact that, many innovations, particularly technological innovations are unreliable and imperfectly designed, organisations should be aware that the newer the technology, the more likely it is to have bugs, breakdown, and be awkward to use (Klein and Knight (2005). Thus the inability of prospective customers to quickly acquire new technical knowledge and skills may negatively impact technological innovations and that learning activities are initiated as a response to a new technology. Thus, the radicalism and complexity of technologies are expected to affect the learning activities that customers experience (Aiman-Smith & Green, 2002).

These findings suggest that technological innovations may result in customer dissatisfaction. Innovation has been defined in various ways by different researchers.

An innovation is a product or practice that is new to its developers and/or to its potential users (Klein & Knight, 2005). Pellissier (2008) on the other hand argued that innovation is fundamentally a function of technology, research and creativity and suggested that innovation is seen as the interrelationship between research (as planned scientific knowledge), technology (as human knowledge) and creativity (as non-linearity). This viewpoint integrates knowledge creation and distribution (in human knowledge and in planned scientific research) into the innovation mindset as shown in Figure 2.
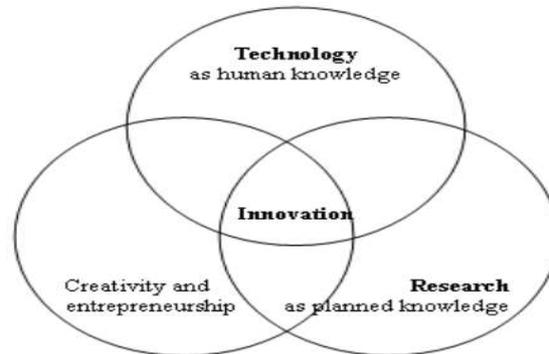

Figure 2: Redefining innovation as the interrelationship between research (as planned knowledge), technology (as human knowledge) and creativity and entrepreneurship, (Pellissier, 2008)

This definition acknowledged the importance of technology in innovations and showed the dimensions of knowledge and the complexities therein to support effective innovation, which will in turn eliminate some of the challenges associated with innovation.

There are generally, two main types of innovations: radical and incremental. A radical innovation focuses on products, processes or services with unprecedented performance features, while an incremental innovation focuses on cost or feature improvements of existing processes, products or services (Shqipe et al., 2013). On the other hand, earlier researchers such as Pellissier (2008) revealed four types of innovation namely:

1. Incremental innovation: These do not involve changes to products but rather involve improvements of the components of existing products and services. For instance, changes to packaging.
2. Radical innovation: This is a whole new design of a product. It entails the use of a new set of components that are linked together in a new architecture.
3. Modular innovation: Modular innovation uses the design and architecture of an existing product and then employs the use of newly designed components.
4. Architectural innovation: In this type of innovation, the design and components remain the same but new linkages are used.

Innovation can also be classified as either opened or closed. In closed innovation model, all the stages of innovation take place in-house and under the guidance of the firm. The firm is sealed to ideas and influences from outside. There is however, a shift from closed to open innovations in research and development organisations, where ideas and influences from the outside can come in during research and development stages to influence the process. Ideas, however, leave the firm during these stages and may be taken up by outside entities (Gabison & Pesole, 2014). It is therefore essential that open innovations are properly managed. Closed and open innovations models are represented in Figure 3;
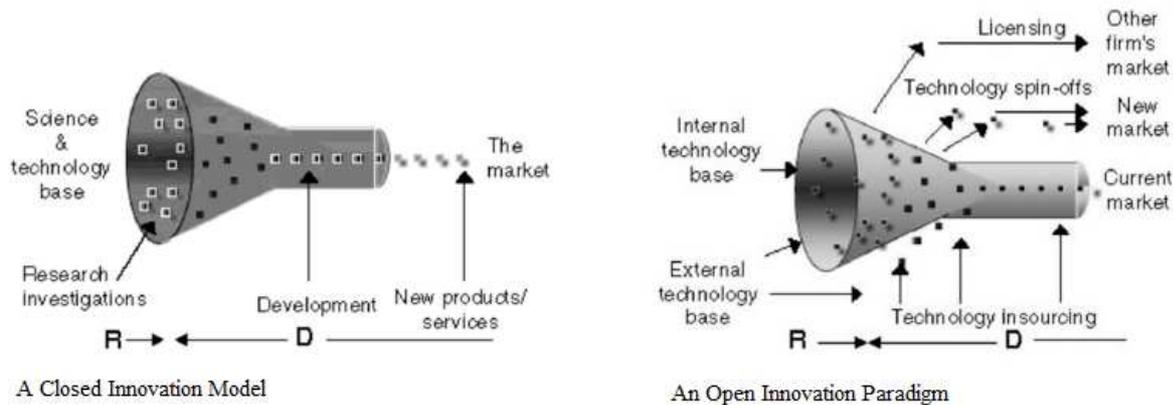
Figure 3: A Closed and Open Innovation Paradigm, (Chesbrough, Vanhaverbeke, & West, 2006)

The end result of innovation as far as customers are concerned is satisfaction and profitability or value to the business entity. The SERVQUAL theory of customer satisfaction has been used extensively to measure the perceptions of service quality. According to Zeithaml, Parasuraman and Berry (1990), the SERVQUAL model identifies five criteria by which to evaluate service quality. These are;

1. Tangibles: The appearance of physical facilities, equipment, personnel and communication material
2. Reliability: The ability to perform the promised service dependably and accurately
3. Responsiveness: Willingness to help customers and provide prompt service
4. Assurance: A combination of competence (possession of the required skills and knowledge to perform the service); courtesy (politeness, respect, consideration and friendliness of contact staff); credibility (trustworthiness, believability and honesty of staff); security (freedom from danger, risk and doubt)
5. Empathy: A combination of access (approachability and ease of contact); communication (keeping customers informed in a language they understand and listening to them); understanding the customer (making an effort to know the customers and their needs).

SERVQUAL has two components to it, i.e. customer expectations and customer perceptions. Customer expectations are those that the customer expects as "should be" and "can be" type of services. Service offered varies with providers and the amount of variation that customers can tolerate is known as tolerance. The gap between what is thought to be adequate service and desired service is known as zone of tolerance. The more important the SERVQUAL dimension, the higher is the desired service level and narrower the zone of tolerance (Naik, Gantasala, & Prabhakar, 2010).

Customer satisfaction is the outcome felt by those that have experienced a company's performance that have fulfilled their expectations. A customer is loyal when he is frequently repurchasing a product or service from a particular provider (Angelova & Zekiri, 2011). According to Jahanshani, Hajizadeh, Mirdhamadi, Nawaser and Khaksar (2014), consumer satisfaction is a response (emotional or cognitive) that pertains to a particular focus (expectations, product, consumption experience, etc.) and occurs at a particular time (after consumption, after choice, based on accumulated experience, etc). A study by Grigoroudis and Spyridaki (2003) indicates that customer satisfaction has been seen as a one-dimensional construction - the higher the perceived product quality, the higher the customer's satisfaction and vice versa.

However, fulfilling the individual product/service requirements to a great extent does not necessarily imply a high level of customer satisfaction. According to Erjavec (2015), several empirical studies in the field of measuring customer satisfaction indicate that the measurement of customer satisfaction itself is not effective if it is not related to customer loyalty or any other variables, which in the service profit chain influence business results. This assertion is further supported by Peyton,

Pitts, and Kamery (2003) in a study which asserts that satisfaction involved a set of inter-related variables rather than a single variable. This suggests that businesses need to look beyond customer satisfaction and focus on loyalty and measure customer fulfillment using net promoter scores to measure customer loyalty.

2.2   Innovation in the Ghanaian Banking Industry

Banking, being the largest financial sector, plays a very significant role in the economy of Ghana. There are 30 banks currently operating in Ghana (PricewaterhouseCoopers, 2014). These are made up of Ghanaian owned banks and multinational foreign banks. In the past decades, banks in Ghana employed manual processes in their operations. The banking industry went through drastic transformations with the introduction of information and communication technologies. The enactment of the Ghana Banking Act 2004 (Act 673) has also brought more discipline into the sector. This is an "ACT to amend and consolidate the laws relating to banking, to regulate institutions which carry on banking business and to provide for other related matters" Information technology is therefore, one of the most important factors driving changes within the Ghanaian banking landscape. The Ghanaian banking sector has thus, experienced rapid changes in the competitive environment as a result of the introduction of technologically innovative products and services. The banks are therefore expanding their branch networks through technology such as the deployment of cash deposit services on ATMs, Point-of-sale services, integration of cash collections platforms with internet banking services, mobile banking and the deployment of other innovative services in conjunction with telecommunication companies.

A study conducted by (PricewaterhouseCoopers, 2014) revealed that, technological factors have the greatest influence on the future business of banking in Ghana and concluded that the key drivers for informing decisions about the industry's uptake and deployment of technology for the provision of banking services are the increasing wealth, demand for convenience, cost-efficiency and increased banking penetration. This means that convenience in banking i.e. investing in technology that allows banks to put banking services at the fingertips of their customers, enabling the customer to undertake their banking business at their own pace, will prove to be valuable and profitable for banks. There is now a major shift from brick and mortar banking to virtual banking across time zones, geographical reach and alternative delivery channels (Roopadarshini & Shilpa, 2014). The expansion of electronic payment systems in the country is a strong signal for a bright future of banking in Ghana.

3.   Methodology
3.1   Research Design

This is a cross-sectional study aimed at investigating the impact of technological innovations on customers within the Ghanaian banking industry as it focuses on a specific phenomenon at a specific point in time. Interviews and structured questionnaires were used as the data collection instruments. Both quantitative and qualitative research methods were employed in addressing the research objectives.

3.2   Data Collection

Primary data was collected through the administration of questionnaires to bank customers. Both closed-ended and open-ended questions were presented to respondents. The closed-ended questions were made up of five-point Likert scale questions. The questions were carefully designed based on an informed understanding of related literatures. Some interviews were also conducted to provide in-depth understanding to the research area.

3.3   Population and Sampling

The study population comprises all banking customers in Ghana and sample unit of analysis drawn from one of the reputable bank in Ghana. The chosen bank has won the product innovation

awards by the prestigious Ghana banking awards and the Chartered Institute Marketing (CIMG) awards in Ghana on several occasions. Fifty (50) electronic banking customers were selected for the study from the highly technologically innovative bank in Ghana. Respondents were selected from Accra, the capital city of Ghana. Ten (10) respondents each were chosen from 5 branches having majority of their customers subscribing to electronic banking products and services.

3.4   Analysis of Data
The study made use of statistical package for social sciences (SPSS) to quantitatively analyze and summarize the data collected. Some speeches from selected respondents were also presented to share individuals' feelings and experiences on the impact of technological innovations on individual customers. The following data analysis techniques were employed;
a) Cross-tabulations to investigate the association between customer satisfaction/customer transaction cost and technological innovations in the Ghanaian banking industry.
b) Cramer's V Statistics to determine the strength of the association between customer satisfaction/customer transaction cost and technological innovations in the Ghanaian banking industry

4.   Discussions and Conclusions
The completed questionnaires were edited, coded and analysed using Statistical Package for Social Sciences (SPSS). The reliability test for the five components of the SERVQUAL model was tested using Cronbach's alpha. This research considered a minimum acceptable alpha value of 0.7 (Yusoff, 2011), (Parsian & Dunning, 2009). Thus, the findings reveal higher internal consistency among each component.

Variables	Cronbach's alpha (>0.7)
Tangibles	0.894
Reliability	0.815
Responsiveness	0.802
Assurance	0.850
Empathy	0.902

Table 1: Reliability of measurement variables

The aim of the study was to identify the impact of technological innovation on customer satisfaction in the Ghanaian banking industry. A chi-square analysis conducted at 5% significance level (0.025 as a result of a 2-tailed test) and 12 degrees of freedom, to determine the relationship between the level of satisfaction and that of technological products and services used in banking transactions. The hypotheses tested were;

H_o: There is no significant relationship between customer satisfaction and technological innovations in the Ghanaian banking industry.

H_1:   There is a significant relationship between customer satisfaction and technological innovations in the Ghanaian banking industry.

		Level of use of Technological Products and services					
		Very Low	Low	Medium	High	Very High	Total
Level of Satisfaction	Slightly satisfied	3	3	1	0	0	7
	Somewhat satisfied	1	3	3	2	0	9
	Satisfied	0	0	0	6	5	11
	Highly Satisfied	0	2	0	14	7	23
	Total	4	8	4	22	12	50

Table 2: Level of satisfaction and use of technological products and services

The observed chi-square value was 43.281 whilst the critical chi-square value ($\chi 0.025$, 12) was 23.337. Since the observed chi-square value of 43.281 exceeds the critical chi-square value of 23.337, the null hypothesis was rejected. The Cramer's V value was 0.930 revealing a strong measure of association between customer satisfaction and technological innovations. The findings suggested

that there is a significant relationship between customer satisfaction and technological innovations in the Ghanaian banking industry. This finding is in line with Naveed, Akhtar, and Cheema (2012) which reported that there is a significant relationship of innovation with customer satisfaction. It is therefore not by chance when one of the interviewees reported that;

> *As long as the IT products being introduced by banks are secure and reliable, I will continue to use them. They are very convenient and satisfying.*

Thus, customer satisfaction must go beyond just introducing innovative products and services. Such services need to be dependable by serving the needs for which they were introduced. For banks to remain relevant in today's competition, they need to look beyond the current needs of their customers. They therefore need to incorporate research and development units within their corporate structures. These units should be empowered to come out with ideas that can be translated into innovative technological products and services that create value for which customers will be willing to pay for.

On the other hand, for banks to stay well ahead of the competition, they need to employ open innovation approach to develop disruptive innovative products and services that enable them to displaced established market leaders. A study by Intellect (2013) also reported that "80% of banks'' technology budgets spent on maintaining existing complex and inefficient systems ('run the bank') leaving 20% available for implementing any sort of change ('change the bank'). Of this 20%, 80% of that is spent on implementing regulatory requirements – equating to approximately 4% of banks' total technology budget for innovative, non regulatory change". This suggests that only a small percentage of banks' technology budgets are spent on actual innovation for improving customer experience. Therefore, since customer satisfaction has direct relationship with technological innovations, banks need to adequately budget for technological innovations in order to achieve their expected customer experiences.

The study also aimed at identifying the impact of technological innovations on banking transaction costs. As a result, the following hypotheses were tested;

H_o: Technological innovations have not reduced the cost of banking for the Ghanaian banking customer.

H_1: Technological innovations have reduced the cost of banking for the Ghanaian banking customer.

		Level of use of technological products and services					
		Very Low	Low	Medium	High	Very High	Total
Cost of transaction	High	4	6	3	16	11	40
	Low	0	2	1	6	1	10
	Total	4	8	4	22	12	50

Table 3: Cost of transaction and level of use of technological products and services

The observed chi-square value from the analysis was 2.936. The critical value however was $(\chi 0.025, 4) = 11.143$. The researchers failed to reject null hypothesis as the observed chi-square value of 2.936 is less than the critical value of 11.143. Despite Cramer's V value of 0.242, revealing a weak association between transaction cost and technological innovations, it was concluded that technological innovations have not reduced the cost of banking for the Ghanaian banking customer. A respondent furiously reported whilst being interviewed that;

> *Charges for same IT products needs to be the same across banks in Ghana. How can one bank charge more than another bank, for the same technological product within the same country? Apart from this, every product introduced comes with its own charge and this is not helping us.*

This suggests high cost of charges associated with technological innovative products and services within the Ghanaian banking industry. Banks therefore need to institute standard banking service oriented architecture (SOA) which enables for successful speed-to-market systems integrations. This will also allow for reduced IT budgets and increases in resource-consuming regulatory demands within the industry.

Banks need to find automated processes in order to reduce the number of people needed to handle the increased number of transactions as a result of advent of new technologies in banking services. This is supported by KPMG International, (2012), contending that, to overcome inevitable loss of scale and cost issues, banks must devise innovative operating models. The study further suggested that banks must introduce cost-reduction measures which are both long-term and sustainable.

5.   Research limitations and direction for further research

The primary limitation of the study has to do with the small sample size of data collected. As a result, the findings cannot be generalized. It is therefore essential to approach the findings and conclusions with caution. Future research may consider the same model with a larger data set from various banks in developing economies in order to enable generalization. Researchers may also consider using other customer feedback metrics such as the Net Promoter Score (NPS) instead of customer satisfaction. Regarding the issue of cost-effectiveness, it may be interesting for future research to aim at educating banks on how to effectively manage their information technology (IT) budgets in a bid to reducing costs associated with technologically innovative products and services. It may also be interesting to replicate the study in a developed economy, under different IT budgetary circumstances.

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