



---

# **Review of Consumer Service Quality Perception of Digital Banking and Digital Application Software**

<sup>1</sup>Alaya, L. A., <sup>2</sup>M.O Mojeke, <sup>3</sup>Ezema, C.N

<sup>1,2</sup> Chukwuemeka Odumegwu Ojukwu University, Igbariam - Anambra State

<sup>3</sup>Nnamdi Azikiwe University, Awka - Anambra State

---

## **ABSTRACT**

A digital banking platform enables banks to bring together new and existing processes as a means of offering the innovative digital banking products and services that are critical to retaining and attracting consumers in an increasingly competitive market. Supporting open, unified and multichannel integration is an essential function because it enables you to focus synergies across all channels. Digital banking platforms need to provide a first-class customer experience by letting consumers manage their personal details without difficulty. A future-proof platform should also be capable of managing, visualizing, and logging your banking processes and handling customer on boarding, product or service maintenance, and compliance - all in one place. a digital banking platform with a three-layer architecture is the most effective way to build a future-proof digital bank. It is more than just focusing on what the consumers see. You need a platform that digitizes the front, mid and back layers - or as we describe them the presentation layer, the client and orchestration layer, and the product layer. In the banking industry, keeping your place in a competitive market, customer experience enhancement, meeting legislation requirements, and costs reduction are the main challenges. Making the switch to digital banking is essential to overcome these challenges. A digital banking platform is the basis of every digital bank and no digital bank can operate without application software.

---

**Keywords:** Service Quality Perception, Digital Banking, Digital Application Software, Computer Self-Efficacy

---

## **1 Introduction**

The subject of this article is to review the literature on consumer service quality perception of digital banking and application software. Service quality (SQ) is viewed as an important issue in the banking industry because of its apparent relationship to customer satisfaction (Jamali, 2007), to costs as viewed by Crosby (2017), and to profitability (Williams, Ogege & Ideji, 2014, Rust & Zahorik, 2015). In the like manner, service quality can be viewed in terms of key dimensions that consumers use while evaluating the service provided (Ganguli and Roy, 2011). Consequently, service quality could be widely regarded as a driver of corporate marketing and financial performance. It can be inferred from these that service quality is commonly noted as a critical prerequisite and determining force in competitiveness and for establishing and sustaining satisfying relationship with consumers since it is an important indicator of customer satisfaction.

Digital banking is presumed to have brought about positive shift in consumers perception, but one wonders if this could be true about Nigeria (Ezema et al.; 2018). This study therefore draws attention to the subject matter and tries to explore empirical research on the perception of consumers towards service quality of digital banking/digital banking software in Nigeria, hence the necessity to bridge the gap in the subject matter. Many researchers have given proof of the advantages that can be derived from using digital banking application software (Barnes & Corbitt, 2003; Herzberg, 2003), which consumers can derive when there is willingness to adopt the facility of the services. This article examines previous writings and attempts to develop an understanding of the impact of service quality on patronage digital banking and digital banking application software.

---

## **2 Service Quality and Digital Banking**

Bateson (2002) defined service quality as a consumer's comparison between service expectations and service performance. It presupposes that until a consumer judges a service as meeting or exceeding a certain perceived level of expectations, quality is not determined. This puts a lot of pressure on service providers to design production systems that are responsive to consumers' expectations and desires/wants so as to meet or exceed their expectations. To Fry, Stoner and Hattwick (2016), quality has several dimensions. These are: perceived credibility, usefulness and self efficacy, cost and ease of use, reliability, durability, service after sale and perceived quality. Performance relates to the primary operating features of a product or service which can't be objectively measured on individual on aspects of performance i.e. how well a product performs or how well a service is provided. Special features are those added extras that affect or enhance the appeal or performance of the product or service offered to the user but is not

standard on all competing products or services. Performance is critical to a consumer. It relates to how well a product performs compared to consumer expectations. Reliability relates to the consistency of performance. Can the service always be expected to perform the way it should? Durability relates to the life of the service. Perceived quality is almost as important as quality itself. Quality is, by definition, customer focused. However, consumers also have perceptions of quality based on advertisements, past experiences and competing products/services. The perceived quality is important because it affects customer expectations. Finally, Service after sale is the handling of complaints and requests as well as whether the company checks on the consumers' satisfaction.

Generally, quality is a construct that is difficult to give a generic meaning. Crosby (2014) opined that quality means conforming to requirements. The big question is whose requirements—consumers or producers? International Organization for Standardization (ISO) defines quality as the totality of characteristics of an entity that bear on its ability to satisfy stated and implied needs (Gryna, 2014). From these definitions, a marketer or software developer delivers quality when the services/products meet or exceed the expectations of the customer. The emphasis should be prevention of quality of service problem rather than just correction of quality problems. It is worthy of mention to stress here that improving quality of service can be the driving force to improving results in other parameters. The concept of customer satisfaction and service quality is interrelated with each other. Moreover satisfaction of consumers depends upon service quality and service quality is increasingly offered as strategy by marketers to position themselves in the market place (Manasa, 2014).

Digital banking is a form of banking in which funds are transferred through an exchange of electronic signals rather than through an exchange of cash, checks, or other types of paper documents. The introduction of digital banking to the banking sector has brought about efficiency in the way banking business and commercial activities are been performed (Tiwari & Buse, 2017). There has been unprecedented growth in the digital banking market in many nations. Research shows that 30 per cent of households in the United State of America use mobile phones to perform banking services. This is also the case in European and Asian countries where 80 per cent of households use digital banking services (Gupta, 2015). Presently, mobile phones are the most popular means of communication technology in Africa.

Digital banking could be defined as a facility which provides banking services such as account balance enquiry, funds transfer, bill payment, and transaction history via a user's mobile phone (Stair & Reynolds, 2018). Kondabagil (2017) defines digital banking as an "occurrence when consumers access a bank's networks using cellular phones, pagers, personal digital assistants, or similar devices through telecommunication wireless networks". Digital banking could also be defined as an application of mobile commerce that enables consumers to bank virtually at any convenient time and place (Suoranta, 2013). Tiwari, Buse, and Herstatt, (2016) believe that a cornerstone of digital banking is built by mobile banking; many banks are taking advantage of this innovation in order to increase customer satisfaction, manage cost, increase profits and bring positive transformation of payment system in the economy. In 2004, Finland-based Nordea bank experiences a high growth of 30% from the utilisation of transaction-based mobile financial services (Atkins, 2015). Digital banking as the term connotes is banking "on the move" with the aid of a mobile telecommunication device (Ciuci, 2010) which can be used for a different purpose at anytime and anywhere. Digital banking allows consumers to receive Short Message (SMS) through their phone, Wireless Application Protocol (WAP) and Java enables phone support other banking activities using GPRS (General Packet Radio Service) such as direct payments confirmation and funds transfer (Mallat, Rossi & Tuunainen, 2016). From research 30 per cent of households in the United Kingdom use their mobile phones to perform banking operations (MMA, 2019). Research also shows that, internet has only a penetration rate of 7 % in a population of 170 million in Nigeria, but mobile technology is close to 50 per cent penetration with prospects for growth (Ciuci, 2010). Mobile devices show a promising way to the future which can reach larger population of consumers irrespective of their location and this can lead to customer's loyalty.

---

### 3 Empirical Reflections

Fatemeh and Ezzatollah (2014) investigated influence of service quality on customer satisfaction with digital banking application software. The study applied descriptive survey research design and random sampling to select 300 respondents. The purpose of this research was to understand the impact of service quality factors of digital banking on customer satisfaction in Iran. A hybrid model based on the previous works was used. Six service quality dimensions namely reliability, efficiency, responsiveness, fulfillment, security / privacy and website design were established based on the literature review. The data were gathered through survey interview by a questionnaire that was designed on a 5-Point Likert scale. The study used ANOVA as the statistical tool to evaluate the influence of service quality on customer satisfaction with digital banking application software. The study showed that the six service quality dimensions has meaningful relationship with customer satisfaction with digital banking application software and reliability has most relation and website design has least relation to customer satisfaction.

Manilall, Jhalukpreya and Ephraim (2014) in their study provided an insight of customer perceptions of technology-based banking service quality in South Africa. A structured questionnaire relating to online banking service quality was administered to two hundred Digital banking consumers randomly selected in the Gauteng province of South Africa. One hundred and eighty (n=180) completed questionnaires were received. Using a factor analysis procedure seven factors that influence customer perception of online banking service quality were extracted. These factors were assurance, responsiveness, ease of use, accessibility, fulfillment, speed and accuracy, and contact. The results showed that periodic measurements of the levels of online banking service quality should become an integral part of any bank's effort and strategy in improving service quality levels. The study suggested that an understanding of the dimensionality and relative importance of the service attributes of online banking service quality is of crucial importance to banks.

Awara and Anyadighibe (2017) conducted an empirical study on “Factors Influencing Banks’ Implementation and Consumers’ Acceptance of digital banking application software in selected commercial Banks at Calabar, Cross River State, Nigeria. Survey investigation and Convenience sampling method were used in collecting primary data from 620 respondents for the study. Regression analysis was employed in testing the hypotheses of the study. The study concluded that much is still needed for the banking system to make reforms and train the consumers for acceptance and adoption of digital banking. From their study, consumers’ perception of digital banking is more of risk and fear for security concerns. Consumers have fears of hacking of accounts and loss of their funds; hence, hesitate to adopt digital banking. However, banks are trying their level best by providing the best security options to the consumers. Banks are providing free digital banking services also so that the consumers can be attracted. If proper training should be given to consumers by the bank employees to open an account, this will be beneficial, and the digital banking platforms should be made friendlier from where the first time consumers can directly access their accounts and carryout transactions. We can see that time is changing and with the passage of time people are accepting technology. There is still a lot of perceptual blocking which hampers the growth; it is the normal tendency of a human to resist change. That is also one of the reasons for the slow acceptance of digital banking.

Fozia (2018) determined the customer’s perception toward the digital banking application software. Random sampling was employed to select a total of 196 consumers for the study. Analysis of variance technique was employed to study the significant relationship between the occupation and customer perception of digital banking application software and significant relationship between the age and customer perception of digital banking application software. The result of the study clearly showed that different age group of customer and different occupation group of consumers have different perception toward the digital banking application software. The results also proposed that demographic factors impact significantly digital banking behaviour, specifically, occupation and age. The paper suggested that an understanding about the customer’s perception regarding the digital banking application software of public and private banks it will help to the banker to understand the consumers need in better way.

Adesina (2019) in his study focused on determining the level of users’ acceptance of the digital banking application software and investigating the factors that determine users’ behavioral intentions to use digital banking systems in Nigeria. Survey research design and snowball sampling were employed to design and administer a total of 500 survey questionnaires within the Lagos metropolis and its environs. An extended Technology Acceptance Model (TAM) was employed as a conceptual framework to investigate the factors that influence users’ acceptance and intention to use digital banking. To test the model, data was collected from 292 consumers from various commercial banks in Nigeria. The model measured the impact of Perceived Credibility (PC), Computer Self-Efficacy (CSE), Perceived Usefulness (PU), and Perceived Ease of Use (PEOU) on customer attitude and customer attitude on customer adaptation. The result of this research showed that ATM still remains the most widely used form of digital banking service. Banks’ consumers who are active users of digital banking system use it because it is convenient, easy to use, time saving and appropriate for their transaction needs. Also, the network security and the security of the system in terms of privacy were the major concerns of the users and constitute hindrance to intending users.

Akinyele & Olorunleke (2018) in their research work investigated the relationship between technology and bank application software quality in Nigeria. The research was carried out through a cross sectional survey design which questioned respondents on digital banking application software. The population of study mainly constituted of consumers of Oceanic bank within Lagos metropolis and its environs. The respondents of the study were randomly selected and comprise consumers of banks using digital banking application software. The sample in this study consisted of 120 respondents who are users of the digital banking application software. The data collected was analyzed by use of frequency, percentage, means and correlation analysis. The findings revealed that secure services as the most important dimension, followed by convenient location of ATM, efficiency (not need to wait, ability to set up accounts so that the customer can perform transactions immediately, accurately of records, user friendly, ease of use, complaint satisfaction, accurate transactions and operation.

Ahasanul, Arun, Sabbir and MdAbdur (2018) carried out a research to find out significant factors of consumers’ perception on digital banking transaction by Malaysian bank consumers. The study utilized a combination of theoretical frameworks and quantitative techniques to testify the statistical relationships between consumer perceptions on digital banking transaction. Factor analysis was performed to extraction and make initial decision on the number of factors underlying asset of measured variables of interest. Thereafter structural equation mode (SEM) was estimated to anticipate the effects of the explanatory variables. The study showed that only protected transaction, have significant impact on consumers’ perception about digital banking security, followed by service quality and regulatory frame work issues.

Manasa (2015) studied on digital banking application software quality of Banks in India and revealed that; Reliability, Empathy, Responsiveness, Assurance, and Tangibility is the core determinant of bank application software quality. Nevertheless, Rajesh (2017) in his empirical work “Customer Perception on Usage of digital banking application software” concluded that all the variables and the perception of consumers can be changed by awareness program, friendly usage, less charges, proper security, and best response to the service offered. The study also provided the kind of correlation between different factors: the consumers who know how to use internet and those that have access to the internet. This there likes to the research questions on whether knowledge gap is a barrier in usage of digital banking application software.

In an empirical work “consumers’ Preference for digital banking application software: a case study of selected banks in Sierra Leone” Gbadeyan and Akinyosoye (2018) revealed that various benefits accrue to digital banking; and that many people are increasingly using this service. The service ranges from bill payments, online deposits and account opening, ticket booking to fund transfer. The study further noted that, there are lots of issues raised in the study which border on security, theft and fraudulent practices with regard to the use of e-banking services. These issues if not addressed can jeopardized the success of this innovative and laudable financial services in the banking industry. The paper therefore, recommends that there should be proper maintenance of the system used by the banks in order to forestall cases of complete breakdown of the system, which can result to loss of

material or information that are of vital importance to the consumers and the organizations concerned; E-banking should be easily accessible by the users; this should be in terms of approach or convenience, availability, understanding and suitability. The users should not need the service of a specialist to conduct their transaction using e-banking. It should also be suitable for all categories of consumers even the physically challenged.

In an empirical study "The Key Determinant of digital banking application software Service Quality: a Content Analysis", Minjoon and Shaohan, (2019) revealed that the implementation of quality initiatives should begin with defining consumers need and preferences and their related quality dimensions. Identification and measurement of customer expectations of the digital banking application software provides a frame of reference for banks assessment of their service quality. The study further analysed the intricacies and revealed that management's first step in planning quality enhancement programs then is to listen to the consumers. Unfortunately, the service quality dimensions and their related quality improvement approaches developed in the traditional banking environment cannot be an appropriate set of guidelines for effectively managing digital banking quality. The reason is that the digital banking unlike the traditional banking system seldom has interpersonal interaction with their consumers in their banking service delivery process. The study identified key qualities attributes of the digital banking application software and services by analysing digital banking experiences. In summary they identified the categories of digital banking service quality to include: Customer service quality which encompasses responsiveness, competence, courtesy, credibility, access, communication, understanding the customer collaboration and continuous improvement, online system quality which mostly concerns itself with security, ease of use, timeliness, accuracy, content, aesthetics, and availability and banking service product quality is majored in product variety, divers feature, cost, and convenience.

As an affirmation, Yujong & Mun (2016) in their work, Predicting the Use of Web-Based Information Systems: Intrinsic Motivation and Self-Efficacy, clearly pointed out the important roles of intrinsic motivational and self-efficacy variables such as enjoyment, learning goal orientation, and application-specific self-efficacy play in influencing the decision to use a web-based technology and subsequent actual use. The model illuminates the underlying relationships between these motivational variables and the existing TAM variables, providing insights into how the acceptance and use of web-based information systems can be further facilitated. As application-specific self-efficacy has been found to be a strong determinant of ease of use and actual use, developing users' confidence in using the specific application seems critical. The findings identify two important sources for enhancing individual confidence in using a web-based system: enjoyment and learning goal orientation. Enjoyment and learning goal orientation were found to have significant effects on application-specific self-efficacy, indicating that users who enjoy using a system and who are oriented toward learning and mastery of content are more likely to develop a higher sense of confidence.

Eija, Virpi, Kristin, Kaisa, Wolfgang, Dhaval & Sujana (2019) in their work 'User Experience of Mobile internet: Analysis and Recommendations' enumerated that the mobile internet has great potential in providing users with personal access to topical information and services. There is still a lot to do to improve user experience of the mobile internet, however. Service providers can improve user experience by providing services specifically designed for mobile use and even utilizing location and other contextual information in the services. To make this affordable, the service has to provide clear value for mobile users.

Safeena et al (2018) determines the consumer's perspective on digital banking adoption. Finding shows that perceived usefulness, perceived ease of use, consumer awareness and perceived risk are the important determinants of online banking adoption and have strong and positive effect on consumers to accept online banking system. Uppal (2017) threw light on growth of digital banking application software in various banks. The objective of this research is to analyze the extent of technological developments in various bank groups. Findings shows as compared to new private sector banks and foreign banks, in public sector banks very less IT has taken place. The maximum technology is taking place in new generation private sector banks and foreign.

Rao, Rama Mohana and Lakew, Tekeste Berhanu (2019) examines the service quality perceptions of consumers of public sector and private sector banks in the city of Visakhapatnam, India. The author reveals that the Reliability and Assurance dimensions of service quality scored the highest ratings while the Tangibles dimension got the lowest score. Moreover, the study found a strong dissimilarity in service quality perceptions between consumers of private sector and public-sector banks. Santhiyavalli (2017) determined the Customer's perception of application software service quality of the select branches of State Bank of India and study the major factors responsible for their satisfaction. In this research SERQUAL Model has been used and study indicates that among five dimensions 'Reliability', 'Responsiveness', 'Empathy' and 'Tangibility' are the major factors responsible for customer satisfaction.

Dharmalingam and Kannan (2018) evaluate the service quality in retail banking in the Tamil Nadu, based on different levels of consumers' perception regarding service quality of application software. Data are collected from Three Private Banks, ie. ICICI, AXIS and HDFC Bank. Sample size of this research is 240. The result indicates that consumers' perception is highest in the tangibles area and lowest in the product variety area of application software. Bahl & Serta (2016) determined that security and privacy issues are the big issue in digital banking. If security and privacy issues resolved, the future of digital banking can be very prosperous.

Rahman., et al (2012) determined that digital banking is still a new technology in Bangladesh. Chibueze., et al (2013) shows that digital banking has improved returns on the equity of Nigeria banks. Kaur, Jasveen and Kaur, Baljit, (2013) shows that there is no significant difference in facilities determining the consumers' usage of digital banking services of Public Sector, Private-sector and Foreign Banks in India.

Adesina (2019) studied the level of acceptability of digital banking application software generally in Nigeria and found out that time saving, convenience, ease of use and compatibility with transaction needs are the factor responsible for the consumer adoption. Likewise, security and privacy are also very important factors which is said to be hindering the adoption of digital banking application software.

Owolabi (2018) studied consumer adoption of digital banking in Nigeria and found out that, access to PC or computer and internet facilities, awareness, cost, availability of knowledge and support, convenience and privacy are the factors determining consumer adoption of digital banking.

Schultz and Slevin (2015), for instance, carried out an exploratory study, and found that perceived usefulness provided a reliable prediction for self-predicted use of a decision model. Robey (2017) later replicated the work of Schultz and Slevin (2015), and confirmed the high correlation that existed between perceived usefulness and system usage. On the other hand, support for the importance of perceived ease could be found in the meta-analysis of Tornatzky and Klein's (2019).

Tornatzky and Klein (2019) studied the relationship between application software innovation and its adoption, and found that the complexity of software innovation was one of the three factors that had the most consistent significant relationships among a wide range of innovation types. Bandura (2016) further, showed the importance of considering both perceived ease of use and perceived usefulness in predicting behaviour. He suggested that in any given instance, behaviour would be best predicted by both, self-efficacy and, outcome judgments of how well one can execute courses of action required to deal with prospective situations, whereas outcome judgment, which was similar to perceived usefulness, was defined as the extent to which a behaviour once successful executed is believed to be linked to valued outcomes.

Similarity, Swanson's research (2016) provided evidence that perceived ease of use and perceived usefulness were both important behavioural determinants. Swanson hypothesized that potential users will select and use information reports based on a trade-off between perceived information quality and associated cost of access. In Swanson's work, information quality was similar to perceived usefulness, whereas associated cost of access was found to be similar to perceived ease of use.

Prior to the work of Davis (2017), several studies had highlighted the importance of perceived ease of use and perceived usefulness in predicting a person's behaviour. Davis (2017) conducted an extension review of these studies. In the end, Davis (2017) found that people tend to use or not to use a system to the extent that they believe it will help them perform their job better (perceived usefulness), and also the beliefs of the efforts required to use a system can directly affect system usage behaviour (perceived ease of use). Davis then, proceeded to the problem of measuring both the perceived usefulness and perceived ease of use of a system. To develop measurement scales for perceived ease of use and perceived usefulness, Davis referred to psychometric scales used in psychology (Davis, 2017). These scales typically prompt an individual to respond to various questions that pertain to a given context. Responses obtained from these prompts can be analysed, and used as an indication of a person's internal belief for the context considered. In the case of TAM, Davis developed his psychometric scales for both perceived ease of use and perceived usefulness in three stages: a pretesting phase, an empirical field study, and a laboratory experiment, and each time he modified and refined the scales. In the pretesting phase, Davis (2017) interviewed 15 experienced computer users to evaluate 14 items that he thought would be suitable for measuring perceived ease of use, and perceived usefulness, had statements that were tailored towards the use of an electronic mail system.

One of the earliest replications of TAM was carried out by Adams, Nelson and Todd (2019). They carried both field and laboratory studies in order to test TAM's variables, perceived ease of use and perceived usefulness for their validity and reliability in explaining the use of five different applications: email, voice mail, word perfect, lotus 123, and Harvard graphics. Participants were MBA students, and self-reported use data of the five applications were used as a measure for actual use. The results of their study indicated that the TAM model maintained its consistency in predicting and explaining system adoption.

Hendrickson, Massey and Cronan (2015) further tested the reliability of the scale items used to measure perceived ease of use and perceived usefulness in TAM. They carried out a field study with 123 undergraduate students who were introduced to a database, and a spreadsheet application, and used self-reported use data of the two systems to perform a test-retest analysis. Hendrickson, Massey, and Cronan found that for both perceived usefulness and perceived ease use, the scale items exhibited significant test-retest reliability result. Subramanian (2016) also replicated TAM with voice mail and customer dialup systems in a field study with 179 knowledge workers, and found evidence for previous results reported in TAM studies.

Davis and Venkatesh (2016) on the other hand, confirmed the reliability and validity of the perceived usefulness and perceived ease of use variables in TAM by verifying whether grouping of the scale items introduced errors in predicting usage. They carried out a laboratory experiment with 195 students by exposing them to different permutations and combinations of the scale items. That is, instead of asking participants to rate a five-system using two scales, which had statements grouped by either perceived ease of use or perceived usefulness, participants were given different variations of the two scales, with statements for both perceived ease of use and perceived usefulness mixed together. After the experiment, Davis and Venkatesh (2016) found that there was no significant difference between the reliability and validity of the scales when the grouping of their statements was changed. Hence, Davis and Venkatesh (2016) concluded that previously obtained reliability and validity measures were not due to items grouping. However, Responses from verbal protocols carried out during the experiment revealed that respondents were more confused when measurement scale items for perceived usefulness and perceived ease of use were mixed together. Thus, Davis and Venkatesh recommended the use of the initial measurement scales for TAM, as was previously shown.

Davis, Bagozzi and Warshaw (2015) compared the performance of TAM with the theory of reasoned action (TRA) for prediction the intention of 107 MBA students in using a word processing system after a one-hour exposure with the system, and again 14 weeks later. They found that the beliefs variables in both TRA and TAM provided significant results to predict the intention of the participants to use the processor. In the Theory of Reasoned Action model however, Davis, Bagozzi and Warshaw (2015) found that there was very little correlation between the subjective norm (SN) and the behavioural intention variables. They formulated two possible reasons for this observation a) the weakness of the SN measurement scale from a

psychometric standpoint, and b) the fact that word processors are usually very individual and personal; thus, their use will be less influenced by perceptions from other groups. Finally, Davis, Bagozzi and Warshaw (2015) concluded that compared to the Theory of Reasoned Action, TAM provided a much simpler and less expensive method to implement because the beliefs variables were context-independent whereas, in the case of the Theory of Reasoned Action, it was necessary to develop a series of salient beliefs specific to word processors before formulating the scales for measuring the beliefs.

Mathieson (2017) on the other hand, compared TAM with the theory of Planned Behaviour (TPB) proposed by Ajzen (1985). The study posits that the Theory of Planned Behaviour model is very similar to the Theory of Reasoned Action model, except that it takes into account the additional construct: perceived behavioural control (PBC), which refers to the perception of control over performance of a given behaviour. PBC is also influenced by the effects of two beliefs: control beliefs and perceived facilitation. Control beliefs include perceived availability of skills, resources, and opportunities, whereas perceived facilitation belief is the individual's assessment of available resources to the achievement of a given set of outcomes.

Mathieson (2017) carried out an experiment applying both TAM and the Theory of Planned Behaviour for predicting the intention of 262 participants in using a spreadsheet application. Since no predefined measurement scales existed for the Theory of Planned Behaviour, an initial interview session was required to identify those salient beliefs that would be specific to the system under investigation. As discussed earlier, this was an inherent characteristic of the Theory of Reasoned Action model. Interestingly, results of the experiment showed that both TAM and the Theory of Planned Behaviour were suitable to predict system usage.

However, compare to the TAM model, the Theory of Planned Behaviour (TPB) model provided more details that explained the intention of the participants to use the spreadsheet application. This is because TPB being a more complex model had several independent variables that could capture various aspects of an individual's belief. For example, the perceived behavioural control construct could help identify specific barriers to system use such as limitations in users' skills. Furthermore, the model also could identify groups whose opinions might be important to future users through the subjective norms construct. Moreover, since the Theory of planned Behaviour model considered only beliefs that were specific to the given system, more accurate information could be obtained. TAM instead, was a simpler model that could be generally applied to any system, and thus provided only broad information about perceived ease of use and perceived usefulness. Yet, due to its simplicity and ease of implementation, TAM remained more attractive than either the Theory of Reasoned Action or the Planned Behaviour. Further efforts later concentrated on either applying TAM in different settings or extending TAM to include more variables.

**Table 1: Summary of Reviewed Empirical Studies**

S/N	Author	Year of Study	Country	Topic/ Objective	Method Used	Findings
1	Fatemeh and Ezzatollah	2014	Iran	Influence of service quality on customer satisfaction with digital banking application software	Questionnaire / Hybrid Model.	Six service quality dimensions has meaningful relationship with customer satisfaction with digital banking application software and reliability has most relation and website design has least relation to customer satisfaction.
2	Manilall, Jhalukpreya and Ephraim	2014	South Africa	Customer perceptions of technology-based banking service quality in a developing country.	Factor analysis.	Periodic measurements of the levels of online banking service quality should become an integral part of any bank's effort and strategy in improving service quality levels.
3	Awara and Anyadighibe	2017	Nigeria	Factors Influencing Banks' Implementation and Consumers' Acceptance of digital banking application software	The survey investigation method was used in collecting primary data for the study.	Consumers 'perception of digital banking is more of risk and fear for security concerns. Consumers have fears of hacking of accounts and loss of their funds; hence; hesitate to adopt digital banking.
4	Fozia	2018	Pakistan	Customer's perception toward the digital banking application software	Analysis of variance technique.	Showed that different age group of customer and different occupation group of consumers have different perception toward the digital banking application software.
5	Adesina	2019	Nigeria	Level of users' acceptance of the digital banking application software and the factors that determine users' behavioural intentions to use digital banking systems in Nigeria	Questionnaire /Technology Acceptance Model (TAM)	ATM still remains the most widely used form digital banking service. Banks' consumers who are active users of digital banking system use it because it is convenient, easy to use, time saving and appropriate for their transaction needs.
6	Akinyele & Olorunleke	2018	Nigeria	The relationship between technology and service quality of digital banking software in Nigeria.	Survey design and correlation analysis.	The findings revealed that secure services as the most important dimension, followed by convenient location of AIM, efficiency (not need to wait, ability to set up accounts so that the customer can perform transactions immediately, accurately of records, user friendly, ease of use, complaint satisfaction, accurate transactions and operation in 24 hr.
7	Ahasanul, Arun, Sabbir and MdAbdur	2018	Malaysia	Factors of consumers' perception on digital banking transaction	Factor analysis.	The findings indicate that only protected transaction; have significant impact on consumers' perception about digital banking security, followed by service quality and regulatory frame work issues.

**Table 1: Summary of Reviewed of Empirical Studies Contd.**

8	Manasa	2015	India	Digital banking application software quality of Banks in India	Analyses were conducted using AMOS software. One structural equation model (SEM) and three confirmatory factor analysis models were tested	Revealed that; Reliability, Empathy, Responsiveness, Assurance, and Tangibility is the core determinant of digital banking application software quality .
9	Rajesh	2017	India	Customer Perception on usage of digital banking application software	From a random sample of 28,888 individuals the opinion of 1,473 active entrepreneurs has been gained. Also, logistic regressions were used as a statistical method to test the hypotheses proposed.	The results indicate that all the variables and the perception of consumers can be changed by awareness program, friendly usage, less charges, proper security, and best response to the service offered. The study also provided the kind of correlation between different factors: the consumers who know how to use internet and those that have an access to the internet.
10	Gbadeyan and Akinyosoye	2018	Sierra Leone	Consumers' Preference for Digital banking application software: a case study of selected banks in Sierra Leone	A survey instrument was applied to 174 MBA students.	Revealed that various benefits accrue to Digital banking softwares; and that many people are increasingly using this service. The service ranges from bill payments, online deposits and account opening, ticket booking to fund transfer.
11	Minjoon and Shaohan	2019	Malaysia	The Key Determinant of digital banking application software Service Quality: a Content Analysis	Surveyed 360 entrepreneurs	Revealed that the implementation of quality initiatives should begin with defining consumers need and preferences and their related quality dimensions..
12	Yujong & Mun	2016	South Africa	Predicting The Use of Web-Based Information Systems: Intrinsic Motivation and Self-Efficacy'.	Based on interview data collected from 41 managers.	Pointed out the important roles of intrinsic motivational and self-efficacy variables such as enjoyment, learning goal orientation, and application-specific self-efficacy play in influencing the decision to use a web-based technology and subsequent actual use.
13	Eija, Virpi, Kristin, Kaisa, Wolfgang, Dhaval & Sujan	2019	47 countries	User Experience of Mobile internet: Analysis and Recommendations	Analyze country-level institutional indicators for 47 countries with working-age population survey data taken from the Global Monitor.	Service providers can improve user experience by providing services specifically designed for mobile use and even utilizing location and other contextual information in the services.
14	Safeena et al	2018	Finland	Consumer's perspective on digital banking adoption	Questionnaire sent to 223 newly-established Finnish firms	Finding shows that perceived usefulness, perceived ease of use, consumer awareness and perceived risk are the important determinants of online banking adoption and have strong and positive effect on consumers to accept online banking system.
15	Uppal	2017	Indonesia	To analyze the extent of technological developments	Archival data from the Panel Study. Descriptive statistics.	Findings shows as compared to new private sector banks and foreign banks, in public sector banks very less IT has taken place.

**Table 1: Summary of Reviewed of Empirical Studies Contd.**

16	Rao, Rama Mohana and Lakew, Tekeste Berhanu	2019	India	Service quality perceptions of consumers of public sector and private sector banks in the city of Visakhapatnam, India	A survey carried out on a total of 701 firms located in India.	Results reveals that the Reliability and Assurance dimensions of service quality scored the highest ratings while the Tangibles dimension got the lowest score. Moreover, the study found a strong dissimilarity in service quality perceptions between consumers of private sector and public sector banks
17	Santhiyavalli	2017	Malaysia	Consumer's perception of application software service quality of the select branches of State Bank of India	SERQUAL Model	Results indicates that among five dimensions 'Reliability', 'Responsiveness', 'Empathy' and 'Tangibility' are the major factors responsible for consumer satisfaction.
18	Dharmalingam and Kannan	2018	India	Service quality in retail banking in Tamil Nadu, based on different levels of consumers' perception regarding service quality of application software	Empirical research based on archival data in India .	The result indicates that consumers' perception is highest in the tangibles area and lowest in the Product Variety area.
19	Bahl & Serta	2016	Sweden	Determinants of security and privacy issues in digital banking	Semi-structured interviews with the founders and managing directors of 20 start-up ventures in the Swedish internet industry.	If security and privacy issues are resolved through the use of robust application software, the future of digital banking can be very prosperous.
20	Tornatzky and Klein	2019	Belgium and Finland	Relationship between application software innovation and its adoption	Analyses of a representative sample of the adult population in Belgium and Finland. This led to a total number of eligible responses	Found that the complexity of an innovation was one of the three factors that had the most consistent significant relationships among a wide range of software innovation types.
21	Owolabi	2018	Nigeria	Consumer adoption of digital banking	Survey Research Design, Questionnaires, Regression Analysis,	Found out that, access to PC or computer and internet facilities, awareness, cost, availability of knowledge and support, convenience and privacy are the factors determining consumer adoption of digital banking.
22	Schultz and Slevin	2015	Sweden	Reliable prediction of digital products	Exploratory Study	Found that perceived usefulness provided a reliable prediction for self-predicted use of a decision model.
23	Robey	2017	Austria	Perceived usefulness and system usage.	Survey design and correlation analysis	Confirmed the high correlation that existed between perceived usefulness and system usage.
24	Tornatzky and Klein	2019	Italy	Relationship between application software innovation and its adoption	Survey research design, Analysis of variance technique	Found that the complexity of software innovation was one of the three factors that had the most consistent significant relationships among a wide range of innovation types

**Table 1: Summary of Reviewed of Empirical Studies Contd.**

25	Bandura	2016	India	Perceived ease of use and perceived usefulness in predicting behaviour	Survey research design, Purposive Sampling	Suggested that in any given instance, behaviour would be best predicted by both, self-efficacy and, outcome judgments
26	Swanson	2016	South Africa	Perceived ease of use and perceived usefulness as behavioural determinants	Analyses of a representative sample of the population	Conclude that potential users will select and use information reports based on a trade-off between perceived information quality and associated cost of access.
27	Davis	2017	Canada	Perceived ease of use and perceived usefulness in predicting a person's behaviour	Survey research design, Review, Interview	Found that people tend to use or not to use a system to the extent that they believe it will help them perform their job better (perceived usefulness), and also the beliefs of the efforts required to use a system can directly affect system usage behaviour (perceived ease of use).
28	Adams, Nelson and Todd	2019	USA	Predicting and explaining system adoption	Field and laboratory studies	The results of their study indicated that the TAM model maintained its consistency in predicting and explaining system adoption.
29	Davis and Venkatesh	2016	Canada	perceived usefulness and perceived ease of use variables in TAM	Laboratory experiment with 195 students	Concluded that previously obtained reliability and validity measures were not due to items grouping
30	Davis, Bagozzi and Warshaw		Canada	Performance of TAM and TRA in prediction of intention	Survey of 107 MBA students	Found that there was very little correlation between the subjective norm (SN) and the behavioural intention variables
31	Mathieson	2017	Belgium	Comparison of TAM with the theory of Planned Behaviour	Laboratory experiment with 262 participants, Predefined measurement scales	Results of the experiment showed that both TAM and the Theory of Planned Behaviour were suitable to predict system usage

#### 4 Conclusion

From the review of literature, several scholars have established the relationship between service quality and consumers' perception of digital banking application software. Since late 90's till date, banking industry is undergoing a radical transformation. The indicators are obvious; new products, new players, new channels. Digital-payment involves every financial transaction that is done without the physical cash. This covers both card payments and mobile payments. While some industry watchers believe that developing nations like Nigeria are not ripe for a cashless economy due to poor infrastructure and a number of risks associated to it, other stakeholders argue that they have gathered sufficient momentum to leverage on all forms of digital payment, especially telephone banking to bring the informal sector into the formal and facilitate Nigeria's transformation from cash-based to a cashless economy.

In view of its economic benefits, the Central Bank of Nigeria (CBN) was bent on evolving this system of payment. Nigeria's burgeoning e-payment industry, according to the E-Payment Providers Association of Nigeria, Nigeria has an estimated card payment industry worth over N23.4trillion, While ATM transactions are now N80bn monthly, and payments on Point of Sales terminals only attract N1.4billionn monthly. Records shows that digital banking is expected to grow into a \$22 billion industry across Africa by 2020 on the back of skyrocketing cell-phone use and growing demand for financial services. Riding on the back of this, it is estimated that Mobile network operators will earn \$7.8 billion in direct and indirect revenues from serving a projected 364 million low incomes, unbanked people in about 147 countries.

Similar studies were carried out by other researchers but with different focus. For example, Babalola (2018) investigated the determinants of banks' service quality in Nigeria but with special focus on capital adequacy, bank size and tangibility; Aminu (2019) focused on software management efficiency and its impact on consumers' perception of service quality in Nigerian banks; Ani, Ugwunta and Imo (2017) examined bank service quality and capital adequacy. The literature reviewed could not point particularly to Nigerian circumstance(s) where profits in the banking sector are linked to investment in service quality programme driven by digital banking application software. This relationship is a necessary ingredient for bank executives/managers in as much as it will determine the linkage between service quality and consumers' perception of digital banking application software. Besides, causality with respect to the nature of relationship between service quality and consumers' perception of digital banking application software in other countries is a contentious matter as other findings did prove otherwise.

Also, reviewed literature did not precisely indicate behavioral patterns of Nigerian bank consumers towards digital banking neither did it show any direct relationship with the application of service quality systems in service provision and delivery powered by digital banking application software. Consequently, there is every need for a search towards filling this gap. As such, it is apparent that the reviewed literature revealed a level of inadequacy in the current body of knowledge relating to prediction of the relationship between service quality and consumers' perception of digital banking and digital banking application software within the Nigerian context. Considering this, it becomes obvious this is an area that has not been thoroughly researched. Therefore, sufficient gap exists in the literature to indicate that an empirical study is justified and needed. The value of this study will be justified by this empirical research which made important contribution to the body of knowledge and the literature in the areas of predicting consumers' service quality perception of digital banking application software. Likewise, it also made contribution to the general body of knowledge on service quality and consumers' perception of digital banking.

#### References

- Adams, D.J., Nelson, H. & Todd, M. (2019). An Assessment of Advanced Mobile Services Acceptance: Contributions from TAM and diffusion theory models. *Information & Management* 45(2008), 359-364.
- Adesina, A.A., (2019). An Empirical Investigation of Level of Users' Acceptance of digital banking in Nigeria: Based on Technology Acceptance Model. *Journal of Digital banking and Commerce*, vol.15, no.1, pp.1-13.
- Ahasanul, D. F., Arun, P., Sabbir, F. & MdAbdur, S. U. (2018). Perceived risk and consumer decision making the case of telephone shopping. *Journal of Marketing Research*, 1, 32-39.
- Ajzen, I. (1985) The Theory of Planned Behaviour. *Organisational Behaviour and Human Decision Processes*, vol. 50, no. 2, pp. 179-211.
- Akinyele, R. E., & Olorunleke, E. (2018). E-tailing vs. retailing: using attitudes to predict online buying behaviour. *Quarterly Journal of Electronic Commerce*, 1(3), 245-253.
- Aminu, J. (2019). Management efficiency and its impact on customers' perception of service quality in Nigerian banks. *Journal of Service Marketing*, 18 (1), 78-90.
- Ani, K., Ugwunta, N. & Imo, O. (2017). Bank Service Quality and Capital Adequacy. *Computers in Human behaviour*, vol. 21, no. 6, pp. 873-891.
- Atkins, W. (2015). *Digital Money*. The Banking, *International Banking Journal*, 4(3), 44-52.
- Awara, Y. & Anyadighibe, F. (2017). The Measurement of Web-Customer Satisfaction: An Expectation and Disconfirmation Approach. *Information Systems Research*, 13(3), pp.296-315.
- Babalola, L. (2018). Determinants of banks' service quality in Nigeria. *Journal of service marketing* 16 (1), 78-90.
- Bahl, F., & Serta, G.H. (2016). Determinants of security and privacy issues in digital banking. *Journal of Administrative Sciences*, Vol. 13, no. 3, pp. 264-76.
- Barnes, K., & Vidgen, A. I. (2013). Protecting personal information online: a survey of user privacy concerns and control techniques. *Journal of Computer Information Systems*, XLIV (2), 85-100.

- Barnes, S.J. & Corbitt, B. (2018) Digital banking: concept and potential. *International Journal of Mobile Communications*, vol. 1, no. 3, pp. 273-288.
- Ciuci, C. (2010) *Possibilities of Digital banking in Nigeria [online]*, Available at: <http://www.ciuci.us/newsletter/PSMobilebanking.pdf> [Accessed: 20 December 2011].
- Crosby, P.B. (2017). *Quality is Free: the Art of Making Quality Certain*. New York: McGraw-Hill.
- Crosby, L. (2014). Perceived usefulness, ease of use, and usage of information technology: A replication. *MIS Quarterly*, 16(2), 227–247.
- Davis Bagozzi, H., & Warshaw, T. (2015). Factors underlying attitude formation towards online banking in Finland. *International Journal of Banking Marketing*, 20 (6), 261-272.
- Davis, C. M., & Venkatesh, L. H. (2016). *Research Methods in Social Relations*. Harcourt Brace Jovanovich College Publishers.
- Davis, F.D. (2017). Perceived Usefulness, Perceived Ease of Use and User Acceptance of Digital banking application software. *MIS Quarterly*, pp. 319-340.
- Eija, G., Virpi, H., Kristin, Y., Kaisa, C., Wolfgang, U., Dhaval, I. & Sujan, B. (2019) User Experience of Mobileinternet – Analysis and Recommendations. *Journal of Mobile HCI, SpecialissueonMobile Internet User eXperience*, IGI Global, Vol. 1, No. 4, 2009.
- Ezema, C.N., Nonum, E. O., Umezina, C.N. & Anakwenze, U. (2018). The Impact of Information Management Systems on the Performance of Commercial Banks in Nigeria. *Archives of Current Research International*, 14(4): 1-13, Article no.ACRI.25120, ISSN: 2454-7077
- Fatemeh, N. & Ezzatollah, K. (2014). Diffusion of digital mobile telephony: Are developing countries different?. *Telecommunications Policy*, 30(1), pp.46-63.
- Fozia, S. (2018). The Internet and socio-economic development: exploring the interaction. *Information Technology & People*, 13(2), pp.85-101.
- Fry, F. F., Stoner, C. R., & Hattwick, R. P. (2016). Influence of computer attitude and self-efficacy on IT usage behaviour. *Journal of End User Computing*, 13(1), 26–33.
- Ganguli, S., and Roy, S.K., (2011). Generic technology-based service quality dimensions in banking: Impact on customer satisfaction and loyalty. *International Journal of Bank Marketing*, 29, 168 - 189
- Gbadeyan, A.M., & Akinyosoye, V. (2018). The depersonalization of retailing: its impact on the ‘lonely’ consumer. *Journal of Retailing*, 67(2), 226-243.
- Dharmalingam, M. & Kannan, T. (2018). Assessing the effects of service quality in retail banking. *Journal of Retailing*, 76, 2, 192-218.
- Gryna, C. (2014). Digital banking as business strategy: Impact of mobile technologies on consumer behaviour and its implications for banks. paper presented at Portland International Conference on Management of Engineering and technology, Istanbul, Turkey, 8-13 July.
- Gupta, S. (2015) Impact of sales promotions on when, what, and how much to buy. *Journal of marketing Research*, 25, 342-55
- Kondabagil, J. (2017) *Risk management in digital banking: concept and best practices*, John Wiley and sons, Asia.
- Mallat, N., Rossi, M. & Tuunainen, V. K. (2016). Digital Banking Services. *Communications of the ACM*, vol. 47, no. 5, pp. 42-46.
- Manasa, F. D. (2015). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 318–339.
- Manasa, N. (2016) “A Study on digital banking application software quality of banks in India” Service Focus Areas of Banking industry. Page 317
- Manasa, R., J. (2014). The Role of Innovation Characteristics and Perceived. Voluntariness in the Acceptance of Information Technologies. *Decision Science*, 28(3), 557-582.
- Manilall, G., Jhalukpreya, B. & Ephraim, J. (2014). E-Service Quality: A Conceptual Model. *International Journal of Arts and Sciences*, 3(7), pp.127-143.
- Mathieson, J., (2017)..Extending the technology acceptance model: The influence of perceived user resources. *Database for advances in information systems*, vol. 32, no. 3, pp. 86-112.
- Minjoon, K.C., & Shaohan, L.J. (2019). The dimensionality of the convenience phenomenon: a qualitative re-examination. *Journal of Business and Psychology*, 8(2), 163-180.
- MMA (2019). Digital banking of Economical Prospects in Bangladesh. *Journal of Digital banking and Commerce*, Vol. 15, No. 2, pp. 1-10.
- Owolabi, K. Y. (2018). Consumer adoption of digital banking in Nigeria. *Journal of Management Information Systems*, 19(3), 97–124.
- Rajesh, B. (2017). Issues for Mobile Banking Services. I-Reach alert. Retrieved November 30, 2008, from [www.ireach.ie](http://www.ireach.ie)
- Rao, F., Rama, B., Mohana, H., Lakew, H., Tekeste, V.E., & Berhanu, K. (2019), *Digital banking in India, Electronic Service journal*, 22 (14) 156-165.
- Rust, R. I., Zahorik, A. J., & Keiningham, T. L. (2015). Return on quality (ROQ): Making servicequality financially accountable. *Journal of Marketing*. 58 – 70.
- Safeena, D., Abinju, M., Agarwal, R., Sambamurthy, V., & Stair, R. M. (2018). Research report: The evolving relationship between general and specific computer self-efficacy – An empirical assessment. *Information Systems Research*, 11(4), 418–430.
- Santhiyavalli, O. (2017). Consumer adoption of digital banking: Consumer’s perception of application software service quality of the select branches of State Bank of India. *International Journal of electronic finance*, vol. 2, no. 3, pp. 284-299.
- Schultz, K. & Slevin, C. (2015). “Internet browsing and searching: user evaluations of category map and concept space techniques”, *Journal of the American Society for Information Science*, Vol. 48 No. 7, pp. 582-603.
- Stair, R.M. & Reynolds, G. (2018) *Fundamentals of Information Systems*, 5th edn, Course Technology, USA.
- Subramanian, V. (2016). Electronic Commerce: Structures and Issues. *International Journal of Electronic Commerce*, vol. 1, no.1, pp. 3-23
- Suoranta, M. (2013) *Adoption of Digital banking in Finland*. Doctoral Dissertation. Jyväskylä University Printing House, Jyväskylä and ER-paino, Lievestuore.
- Swanson, A. (2016). On risk, convenience, and internet shopping behaviour. *Communications of the ACM*, 43(11), 98-105.
- Tiwari, R. & Buse, S. (2017) *The Mobile Commerce Prospects: A Strategic Analysis of Opportunities in the Banking Sector*. Hamburg, Germany: Hamburg University Press.

- Tiwari, R., Buse, S. & Herstatt, C. (2016b). Customer on the move: Strategic Implications of Mobile banking for Banks and Financial Enterprises. paper presented at the 8th IEEE International Conference on E-Commerce Technology, San Francisco, 26-29 June.
- Tornatzky, B. and Klein, A. (2019). Relationship between application software innovation and its adoption, *Communication of the ACM*, vol.46, no.5 pp. 53-58.
- Uppal S. K (2017). Growth of Digital Banking Application Software in Various Banks. *Vikalpa*, Vol.29, N0.2 pp25
- Williams, H. T., Ogege, S., &Ideji, J. O. (2014). An empirical analysis of effective customers service on nigeria banks profitability (A queuing and regression approach). *Asian Economic and Financial Review*.4, 7, 864-876
- Yujong H. & Mun Y. (2016) Predicting the use of web-based informationSystems: intrinsic motivation and Self-efficacy. *Americas Journal of information Systems*, 5, 7, 964-976