Innovations

Assessment of the Impact of Digital Financial Services on Customer Satisfaction of Listed Commercial Banks in Nigeria

Ololade Kolawole[1], Taiwo Muritala Adewale[2] & Hauwa Lamino Abubakar[3]
[1]PhD Student, [2, 3]Associate Professor
[1,2,3]Department of Business Administration, Nile University of Nigeria, Abuja

Corresponding Author: **Ololade Kolawole**

Abstract: *The advent of digital financial services (DFS) has revolutionized the banking sector, offering innovative solutions to meet the evolving needs of customers. This study investigates the impact of various DFS components, including agency banking, automated teller machines (ATMs), internet banking, mobile banking, and point-of-sale (POS) systems, on customer satisfaction in Nigerian commercial banks. Employing a Structural Equation Model (SEM) approach, the research analyzes data from Nigerian bank customers to assess the relationships between these variables. The study's population comprises all quoted banks in Nigeria as of December 31, 2022, with a sample of 384 customers selected through a multi-stage sampling technique. The findings reveal strong positive correlations between the examined DFS components and customer satisfaction. The structural model analysis demonstrates that the DFS components collectively explain a substantial 75.5% of the variance in customer satisfaction. The PLS-SEM analysis demonstrates that digital financial service components have a positive and substantial impact on customer satisfaction for quoted commercial banks in Nigeria. Specifically, indicates that agency banking (β=0.532, $p < 0.05$), ATM banking (β=0.348, $p < 0.05$), internet banking (β=0.233, $p < 0.05$), MBK (β=0.335, $p < 0.05$) and POS activities (β=0.073, $p < 0.05$) all have positive impacts on customer satisfaction.Based on these findings, the study offers policy recommendations for regulatory support, investment in DFS infrastructure, customer education, continuous innovation, strategic collaborations, and data analytics integration. These recommendations aim to facilitate the effective adoption and utilization of digital financial services, ultimately leading to improved customer satisfaction and sustained growth in the Nigerian banking industry.*

Keywords: *Digital Financial Services; Customer Satisfaction; Commercial Banks; Agency Banking; Structural Equation Modeling*

1.0 Introduction

The financial sector has experienced a notable shift in the last few years, primarily due to the swift integration of digital technologies. This change has been especially noticeable in Nigeria's banking industry, as digital financial services have become increasingly popular. The expansion of digital financial services in Nigeria has been made possible by the increasing usage of smartphones, better internet access, and legislative measures that support financial inclusion (World Bank, 2021). This context emphasizes how important it is to evaluate how these services affect client satisfaction in the nation's commercial banking sector.Agency banking, ATM banking, online banking, mobile banking, and point-of-sale (POS) services are just a few of the services that fall under the umbrella of digital financial services (DFS) (Ugwueze&Nwezeaku, 2016).

These services have completely changed the way that banking is done, giving clients more efficiency, accessibility, and convenience. Specifically, mobile banking has become a well-known channel that allows people to use their mobile devices to access their bank accounts and conduct financial transactions (Opiyo et al., 2019). In addition to revolutionizing the client experience, the implementation of DFS has put traditional banking models to the test, forcing financial institutions to adopt digital transformation initiatives.The banking industry has seen substantial changes as a result of the digitalization of financial services, which have had an impact on a number of operational, service, and commercial activity elements (Olalekan & Olumide, 2018). Banks are aware of how digital technology may improve customer relations, service quality, and operational efficiency.

Nonetheless, there have been difficulties with this shift, as certain financial institutions consider the digitalization process to be disruptive and complicated (Carbo-Valverde, 2017). However, investments in digitization efforts have been propelled by the advantages of adopting digital financial services, including enhanced productivity, better risk management, and better support for banking services (Abbasi & Weigand, 2017).Thanks to shifting economic conditions and technological improvements, the Nigerian financial sector has experienced significant vitality and growth (Wachira et al., 2021). Digital financial services (DFS) have been instrumental in this change, providing more affordable and easily available services, adding value to goods and services, and helping to develop and set the prices of new financial instruments.

Financial institutions' ability to provide services more effectively, transparently, and efficiently has been made possible by these developments, which has eventually affected their financial success.Historically, benchmarking, performance against budgets, and financial ratio analysis have all been used to measure financial performance in the banking sector (Ahmad et al., 200). Important indicators of a bank's profitability and overall financial health include profit after tax, market value

allocations, earnings per share, return on assets (ROA), and return on equity (ROE). To fully grasp the complex impact on commercial banks, it is imperative to take into account both financial and non-financial performance measures in the context of digital financial services.

Customer satisfaction serves as a vital non-financial indicator, reflecting the quality of services provided by banks and their ability to meet customer expectations (European Commercial Bank, 2003). While the adoption of digital financial services in Nigeria has witnessed significant growth, there is still room for improvement. Overcoming the lower uptake of services like mobile money, in comparison to peer countries, requires efforts focused on improving digital financial literacy, upgrading digital infrastructure, and promoting the incubation and sound practices of fintech firms (World Bank, 2021). This underscores the importance of assessing the impact of digital financial services on customer satisfaction in the Nigerian banking sector, as it can provide valuable insights to guide strategies and initiatives aimed at enhancing the customer experience and driving sustainable growth.

1.1 Problem Statement

The advent of digital financial services has ushered in a transformative era for the banking industry in Nigeria. The introduction of the cashless policy by the Central Bank of Nigeria (CBN) has catalyzed the widespread adoption of electronic products such as Automated Teller Machines (ATMs), Point of Sale (POS) terminals, mobile banking, internet banking, and electronic funds transfer systems (Taiwo et al., 2017). This shift towards a cashless economy has necessitated substantial investments in Information and Communication Technology (ICT) by deposit money banks to remain competitive and meet the challenges posed by this policy.

While prior research has highlighted the positive correlation between electronic banking products and the performance of banks in Nigeria, particularly in enhancing returns on equity (ROE) (Okonkwo, 2022), there is a contrasting body of evidence indicating that the returns on assets (ROA) of Nigerian banks have not experienced a significant increase as a result of e-banking. This discrepancy underscores the need for a deeper examination of the impact of digital financial services on both financial and non-financial performance metrics in the Nigerian banking sector.

The health of Nigeria's economy is intrinsically tied to the stability of its financial sector (Kanu & Nwali, 2019). The global financial crisis of 2008 served as a stark reminder of the critical importance of a robust banking sector and the far-reaching consequences of financial instability (Zuo & Xia, 2023). In Nigeria, a persistent challenge has been the poor return on assets (ROA) in the banking sector, which has implications for shareholders, equity holders, and the overall financial stability of

the country (Weruet al., 2022). Historical data reveals that inadequate asset value and poor financial performance have led to the closure of several Nigerian banks, causing significant losses for investors and depositors.

Moreover, overexposure to non-performing loans has consistently contributed to the poor performance of Nigerian banks, leading to failures and license revocations (Zelelew,2018). Additionally, regulatory policies such as the Treasury Single Account (TSA) introduced in 2015 have had an impact on the liquidity of commercial banks, reducing their ability to generate interest income (Martins, 2016). Fraud remains a persistent issue, with card-related frauds (ATM/POS) accounting for a significant portion of reported fraud cases (NDIC, 2018). The resulting losses are deducted from the banks' profits, further hampering their ability to provide adequate returns to shareholders (Onodje, 2020).

In today's banking landscape, customers demand not only the safety of their funds but also efficient, fast, and convenient services. This shift in customer expectations has led to a growing emphasis on digital financial services as a means to meet these demands (Kanu & Nwali, 2019). However, there remains a research gap concerning the impact of digital financial services on customer satisfaction in the Nigerian banking sector. While numerous studies have explored the effect of these services on the financial performance of commercial banks, there is a need to examine their influence on customer satisfaction, a crucial non-financial indicator. This study aims to assess the impact of the components of digital financial services on customers' satisfaction.

2.0 Literature Review

2.1 Conceptual review

Digital Financial Services (DFS) have emerged as a transformative force in the financial sector, leveraging digital technology to deliver a wide array of financial services. These include payments, credit, savings, remittances, and insurance, all accessible via digital channels such as the web, mobile devices, ATMs, and point-of-sale systems (Ugwueze & Nwezeaku, 2016). DFS is particularly pivotal in Africa, where over half of the global DFS users reside, significantly impacting the continent's financial industry by making banking more accessible and affordable (LeHouerou, 2018). The goal of DFS is not merely to introduce financial management concepts but to enhance access to reliable financial services and improve financial management practices (ADB, 2016).

The implementation of DFS varies by country, influenced by the level of technological infrastructure. For instance, Kenya's Mobile Network Operators (MNOs) collaborate with banks to offer mobile money services through extensive agent networks (ADB, 2016). Mobile phones and the internet have revolutionized the

delivery of banking services, offering convenience in transactions such as utility bill payments, school fees, cash deposits, withdrawals, wage receipts, and money transfers (Abbasi & Weigand, 2017). This technological shift has pressured traditional banks to innovate, leading to the development of user-friendly mobile banking applications (Shaikh et al., 2020). DFS components include digital transactional platforms for electronic transactions, retail agents for cash-in/cash-out services, and customer devices like mobile phones or computers.

Financial Innovation Services (FIS)encompass the creation and dissemination of new financial instruments, technologies, institutions, and markets (Tufano, 2013). Innovations in this field are categorized into process innovations, which involve novel methods of delivering financial products, and product innovations, characterized by new financial instruments. FIS plays a crucial role in the financial ecosystem by enhancing access to information, facilitating trading, and providing new means of payment (Solans, 2003). Unlike traditional innovations that require physical resources, financial innovations are primarily conceptual and easily replicable, making them cost-effective and widely adoptable.

Components of Digital Financial Services

Agency Banking refers to the process where financial institutions or MNOs contract retail outlets to conduct transactions on their behalf (Calleo, 2014). This model allows bank clients to perform tasks like cash deposits, withdrawals, electronic fund transfers, bill payments, account balance inquiries, and loan referrals through agents equipped with technology such as POS devices or mobile phones (Modupe, 2010). Agency banking aims to enhance financial inclusion, reduce congestion in bank branches, and lower operational costs (Keeler, 2011). In Nigeria, the Central Bank's initiative to integrate non-bank agents into the banking system has significantly improved financial inclusion, with over 60% of the adult population now financially included (EFInA, 2018).

Internet Banking involves conducting traditional banking activities online, allowing customers to manage their finances more conveniently and efficiently. This includes online bill payments, loan applications, credit card management, and ATM locators, often supported by 24-hour telephone assistance (Leow, 1999). Internet banking reduces the need for physical branches, thereby lowering overhead costs and enabling banks to offer competitive interest rates. However, it also poses risks such as exposure to internet fraud and network issues.

Telephone Bankingenables customers to perform banking activities via telephone, authenticated by numeric or verbal passwords or security questions (Balachandher et al., 2001). This service provides account balance information, standing orders, checkbook requests, and address changes. It offers convenience, time savings, and

efficiency for both customers and banks by providing access to banking services around the clock.

Automatic Teller Machines (ATMs) are widely used to facilitate cash withdrawals, deposits, transfers, bill payments, and account balance inquiries (Chorafas, 1988). ATMs are strategically located outside bank branches and in high-traffic areas like shopping malls and fuel stations, providing round-the-clock banking services. They enhance banking efficiency and customer convenience by reducing the need for physical branch visits and queuing. Equally, mobile Bankingintegrates mobile phone technology with Internet services to offer banking activities on the go. Mobile banking has expanded financial inclusion by reaching populations in remote areas. Also, electronic Fund Transfer at Point of Sale (EFTPOS)enables customers to transfer funds directly from their bank accounts to merchants' accounts during purchases using debit cards (Chorafas, 1988). This system improves banking efficiency by providing a secure, real-time alternative to cash and cheque transactions, operational even after regular banking hours, thus saving customers time and increasing productivity for banks.

The Concept of Performance

Bank performance traditionally focuses on metrics such as costs, time, and quality, reflecting a production-oriented perspective (Akhalumeh&Ohiokha, 2012). However, modern assessments incorporate customer satisfaction and orientation alongside traditional success factors, emphasizing a customer-centric approach to service delivery (Jayawardhera& Foley, 2018). Financial performance is typically measured through profitability indicators like Return on Assets (ROA) and Return on Equity (ROE), which evaluate how effectively a bank uses its assets and equity to generate income (Murthy & Sree, 2013). Similarly, customer Satisfaction is a critical component of bank performance, defined by how well a bank's products and services meet or exceed customer expectations (Kotler & Armstrong, 2012). It is a powerful metric that influences employee focus and service delivery improvements. Banks need reliable measures of customer satisfaction to effectively manage and enhance their services (Woodruff, 1997; Anderson et al., 1994). High levels of customer satisfaction are associated with increased customer loyalty, reduced churn, and competitive advantage in the market (Jones & Sasser, 1995).The interplay between digital advancements and customer satisfaction will be crucial in shaping the future of the financial services industry, particularly in regions like Nigeria, where digital adoption is rapidly increasing.

2.2 Empirical review

Digital financial services (DFS) have transformed banking globally, particularly in developing nations like Nigeria. These services encompass mobile banking, internet banking, automated teller machines (ATMs), and other electronic payment systems. As Nigerian commercial banks increasingly adopt DFS, understanding their impact on customer satisfaction becomes critical as obtainable in other climes. For instance, Ahmad (2020) examined the impact of banking innovation on the financial performance of Jordanian commercial banks, highlighting the positive effects on profitability, asset returns, and gross income. Using survey data and SPSS for analysis, the study found significant associations between banking innovations and key financial indicators. This suggests that innovations such as credit guarantees and agency banking should also be considered to fully capture their impact on financial performance. Ahmad's findings imply that similar positive effects could be expected in Nigeria, where digital financial services may enhance the profitability and efficiency of commercial banks, thereby increasing customer satisfaction through improved service delivery and reliability.

Also, Jude (2019) analyzed the profitability and cost efficiency of banks offering internet banking in Northern Cyprus. Using panel data from 22 retail banks, the study found that those offering internet banking services experienced higher returns on assets compared to those that did not. This positive relationship between internet banking and bank profitability suggests that Nigerian banks could similarly benefit from adopting DFS. As banks in Nigeria implement internet banking, they could see improved financial performance, which in turn may lead to enhanced customer satisfaction due to the convenience and efficiency of these services.

In Ethiopia, Andinet and Aashka (2022) conducted an explanatory study on the impact of financial innovations on the profitability of private commercial banks. Using secondary data and multiple regression analysis, the study found that financial innovations positively affected bank profitability. The authors recommend increasing awareness and implementation of financial innovations to enhance return on assets. This underscores the importance of digital financial services in improving bank performance. Nigerian banks can draw from this study by focusing on customer education and promoting DFS, which could lead to higher customer satisfaction through better financial outcomes and service experiences.

Equally, Catherine and Herick (2016) investigated financial innovations in Kenyan commercial banks, revealing mixed results. While product innovation negatively impacted return on assets (ROA), service and organizational innovations had positive effects. This indicates that not all innovations equally benefit financial performance. For Nigerian banks, the emphasis should be on service innovations such as mobile banking and internet banking, which have been shown to enhance customer satisfaction by providing convenient and accessible banking options.

Understanding which innovations resonate most with customers can help banks prioritize their digital strategies to maximize satisfaction and loyalty.
Furthermore, Korir et al. (2016) also studied financial innovations in Kenyan banks, finding a strong positive relationship between innovations and financial performance. The study suggests that regulatory and advisory bodies should guide banks in embracing innovative strategies. Nigerian banks can learn from this by creating an enabling environment for innovation, supported by regulatory frameworks that encourage the adoption of digital financial services. By fostering innovation, banks can improve their financial performance and customer satisfaction, providing more efficient and user-friendly banking services. In the same vein, Virginia et al. (2021) explored the impact of digital financial services on Kenyan banks, discovering negative correlations between mobile money and bank performance, but positive relationships with customer deposits and non-performing loans. This highlights the complex dynamics of digital financial services. Nigerian banks should carefully manage their DFS offerings to mitigate potential negative impacts while leveraging the benefits of increased customer deposits and reduced non-performing loans. Effective management and integration of DFS can enhance customer satisfaction by ensuring reliable and secure financial transactions.

Furthermore, the study by Abubaker et al. (2022) on financial innovation strategies in Kenyan banks found positive and significant effects on performance. The use of both primary and secondary data, analyzed through SPSS, showed that innovation strategies enhance financial performance. This suggests that Nigerian banks should adopt comprehensive financial innovation strategies, including internet banking, mobile banking, and ATMs, to improve their financial performance and customer satisfaction. By offering diverse and innovative financial services, banks can meet the evolving needs of their customers, leading to higher satisfaction levels.
The empirical studies reviewed highlight the positive impact of digital financial services on the financial performance and customer satisfaction of commercial banks in various developing countries. For Nigerian commercial banks, adopting and promoting DFS can lead to significant improvements in profitability, efficiency, and customer satisfaction.

2.3Theoretical framework

Merton's Market Efficiency Theory

The Merton's Market Efficiency Theory serves as the most appropriate theoretical framework for this study on assessing the impact of digital financial services on customer satisfaction and performance of listed commercial banks in Nigeria.The Merton's Market Efficiency Theory emphasizes the role and importance of financial

innovations for the banking sector. It posits that innovative financial products and services, such as internet banking, mobile banking (m-banking), and agency banking, can create business efficiency for financial institutions. This theory aligns with the study's focus on evaluating the impact of digital financial services, which represent significant innovations in the Nigerian banking industry.

The theory recognizes that financial innovations can improve market efficiency by reducing transaction costs, increasing liquidity, and enhancing risk management capabilities. As commercial banks in Nigeria embrace digital financial services, the Merton's Market Efficiency Theory suggests that these innovations can potentially lead to improved operational efficiency, cost savings, and better resource allocation, ultimately contributing to enhanced financial performance.Furthermore, the theory acknowledges that financial innovations can cater to the evolving needs and preferences of customers, enabling financial institutions to offer more convenient and accessible services. This aspect resonates with the study's objective of examining the impact of digital financial services on customer satisfaction, as these innovations are designed to provide a seamless and user-friendly banking experience for customers.

3.0 Materials and Method

This study employs a descriptive survey research design, integrating both primary and secondary data sources. Guided by a pragmatist perspective, which balances qualitative and quantitative approaches, the ex-post facto research design is utilized. This design is selected for its suitability in examining the relationships between variables based on pre-existing data from the Nigerian Exchange Group (NGX). The descriptive survey design allows for the measurement of variables through organizational reports, providing comprehensive insights into the impact of digital financial services on the performance of commercial banks.

A cross-sectional survey method is used to collect primary data, capturing a snapshot of the population at a specific point in time. This method involves gathering data from a representative sample through surveys, questionnaires, interviews, or observations. The cross-sectional design is effective for examining the prevalence of certain characteristics or behaviors within a defined population, which, in this study, is the customer base of the selected banks.

The study’s population comprises all quoted commercial banks in Nigeria as of December 31, 2022. This includes thirteen licensed banks listed on the NGX, with a collective customer base of 180.3 million. This significant population underscores the extensive reach and influence of these banks within the Nigerian financial sector.For primary data, the study used the total customer base of 180.3 million. Using Krejcie and Morgan's (1970) formula for determining sample size, a sample of

384 customers is deemed necessary for a 5% level of significance. A multi-stage sampling technique is employed: initially selecting two branches per bank (one in Lagos and one in Abuja), followed by proportional sampling of customers using simple random sampling. This ensures a representative and manageable sample size.

Primary data is collected via a structured questionnaire distributed through Google Forms and self-administration. This approach is cost-effective and efficient. The questionnaire uses a five-point Likert scale to capture respondents' perceptions of digital banking services.The questionnaire, designed in two sections, collects demographic information and assesses the availability and satisfaction with digital banking services. The Likert scale enables nuanced responses ranging from "strongly agree" to "strongly disagree."

Content validity is ensured through expert review by senior academics, while reliability is assessed using Cronbach's alpha, with a threshold of 0.70 considered acceptable. A pilot study with 38 bank customers tests the instrument's validity and reliability, achieving satisfactory convergent validity and internal consistency as indicated by AVE and composite reliability metrics.Data analysis employs both descriptive and inferential statistics. Descriptive statistics (means, standard deviations, frequencies, percentages) describe variations in responses. Inferential statistics, including Partial Least Squares Structural Equation Modeling (PLS-SEM) was used to test hypotheses.

Hypothesis testing is conducted to compare observed data against the null hypothesis. A significance level of 0.05 is used, where a p-value less than 0.05 leads to rejecting the null hypothesis, indicating a significant relationship between the variables under study. Conversely, a p-value greater than 0.05 results in accepting the null hypothesis, suggesting no significant effect between the tested variables.

3.1Model Specification

Structural Equation Model (SEM) was used to assess the impact of the components of digital financial services on customers' satisfaction. This approach was in line with those of Al-Alawi (2018) and Nareswari et al. (2021) who relied on the PLS-SEM model to assess the relationship between similar variables. The SEM technique is the most appropriate technique as it helps in evaluating the series of autonomous multiple regression equations simultaneously. This is also a helpful technique to find the association between different variables (Rai et al., 2019). This technique is also able to assimilate latent variables and measure the error terms during the assessment process (Hair et al., 2011). The model is stated as follows:

$$CS = \alpha + \beta_1 ABK + \beta_2 ATM + \beta_3 IBK + \beta_4 MBK + \beta_5 POS + \mu \quad \ldots\ldots\ldots\ldots\ldots 1$$

Where:

ROA = Return on Assets
CS = Customers' Satisfaction
ABK = Agency Banking
ATM = Automated Teller Machine
IBK = Internet Banking
MBK = Mobile Banking
POS = Point of Sales
α = Intercept
ß = Independent variable coefficient
μ = Error terms

4. Analysis and Discussions

Table 1 presents the descriptive statistics of primary data for six different categories: ABK, ATM, IBK, MBK, POS, and CS. The table provides key insights into the central tendency and variability of the data. Looking at the mean values, we can see that the respondents' average ratings for these categories range from 4.12 to 4.40 on a scale of 1 to 5. Specifically, ATM received the highest average rating of 4.40, indicating that, on average, respondents had a favorable opinion of this category. On the other hand, MBK received the lowest average rating of 4.12, suggesting a slightly less positive sentiment compared to the other categories.

Table 1: Descriptive Statisticsof the Variables

	N	Minimum	Maximum	Mean	Std. Deviation
ABK	384	1	5	4.35	0.704
ATM	384	1	5	4.40	0.726
IBK	384	1	5	4.28	0.886
MBK	384	1	5	4.12	0.953
POS	384	1	5	4.19	0.938
CS	384	1	5	4.25	0.819

Source: SPSS Result Printout, 2023

Table 2 presents the correlation matrix of primary data, showing the Pearson correlation coefficients between different categories: ABK, ATM, IBK, MBK, POS, and CS. Correlation coefficients range from -1 to 1, where 1 indicates a perfect positive correlation, -1 indicates a perfect negative correlation, and 0 indicates no correlation. The results reveal several significant correlations between the categories.One notable observation is the strong positive correlation between ABK and CS (r = 0.608) and between ATM and ABK (r = 0.775). These findings suggest that there is a significant positive relationship between customers' perceptions of

ABK and CS, as well as between ATM and ABK. This indicates that customers who have a positive opinion about ABK are also likely to have a favorable view of CS, and those who rate ATM highly also tend to rate ABK highly. Additionally, there are moderate positive correlations between other categories, such as IBK and CS (r = 0.469) and MBK and CS (r = 0.446), indicating that customers' evaluations of these categories are moderately related to their perceptions of CS.The results also highlight some weaker but still statistically significant correlations, such as the positive relationship between POS and ATM (r = 0.482) and the positive correlation between MBK and ABK (r = 0.503). These findings provide valuable insights into the interconnections between different service categories, offering potential opportunities for strategic decision-making.

Table 2: Correlation Matrix of the Variables

		ABK	ATM	IBK	MBK	POS	CS
ABK	Pearson Correlation	1	.775**	.463**	.503**	.312**	.608**
	Sig. (2-tailed)		.000	.000	.000	.000	.000
	N	384	384	384	384	384	384
ATM	Pearson Correlation	.775**	1	.362**	.402**	.482**	.452**
	Sig. (2-tailed)	.000		.000	.000	.000	.000
	N	384	384	384	384	384	384
IBK	Pearson Correlation	.463**	.362**	1	.283**	.276**	.469**
	Sig. (2-tailed)	.000	.000		.000	.000	.000
	N	384	384	384	384	384	384
MBK	Pearson Correlation	.503**	.402**	.283**	1	.238**	.446**
	Sig. (2-tailed)	.000	.000	.000		.000	.000
	N	384	384	384	384	384	384
POS	Pearson Correlation	.312**	.482**	.276**	.238**	1	.202**
	Sig. (2-tailed)	.000	.000	.000	.000		.000
	N	384	384	384	384	384	384
CS	Pearson Correlation	.608**	.452**	.469**	.446**	.202**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	

Source: SPSS Result Printout, 2023

This study relied on structural equation model to assess the impact of the components of digital financial services on customers' satisfaction. Structural equation modeling (SEM) is a set of statistical techniques used to measure and analyze the relationships of observed and latent variables. It is similar but more powerful than regression analyses, it examines linear causal relationships among variables, while simultaneously accounting for measurement error. As part of structural model analysis, it is important to check for collinearity among the major constructs in the research. It is required that the variance inflation factor (VIF) should be less than 5. Otherwise, collinearity problem exists in the data. The collinearity diagnostics presented in Table 3 shows that the VIF values for all independent variables are less than 5, hence, the data is of collinearity.

Table 3: Collinearity Diagnostics

Construct	Tolerance	VIF
ABK	0.710	1.421
ATM	0.479	2.090
IBK	0.510	1.952
MBK	0.547	1.831
POS	0.503	1.990

Source: Researcher's compilation (2023)

Coefficient of Determination

Results of the structural model analysis show that the overall coefficient of determination (R^2) is 0.755, and adjusted R^2 of 0.752 This suggests that the six exogenous variables jointly explain 75.5% of the variance of the dependent variable, CS. This shows a substantial coefficient of determination, based on Hair et al. (2013). The result presented in Table 4 indicated that all the variables significantly influence customer satisfaction at 95% confidence level.

Table 4. PLS-SEM Regression Weights

			Path Coefficient	Std. error	t-value	Decision
CS	<---	ABK	0.532	.033	16.12 **	Significant
CS	<---	ATM	0.348	.041	8.48 **	Significant
CS	<---	IBK	0.233	.051	4.567 **	Significant
CS	<---	MBK	0.335	.048	6.99 **	Significant
CS	<---	POS	0.073	.031	2.35 **	Significant

Source: Researcher's compilation (2023)

As presented in Table 4 when ABK increases by 1, CS increase by 0.0.532 with probability value of 0.000. In other words, the regression weight for ABK in the prediction of CS is significantly different from zero at the 0.05 level of significance. Equally, when ATM increases by 1, CS also increases by 0.348, with the probability value of 0.000 which is less than 0.05%. In other words, the regression weight for ATM in the prediction of CS is significantly different from zero at the 0.05 level of significance. Also, when IBK increases by 1, CS also increases by 0.233. With the probability value of 0.000 which is less than 0.05%. In other words, the regression weight for IBK in the prediction of CSis significantly different from zero at the 0.05 level of significance as shown in Figure 1.

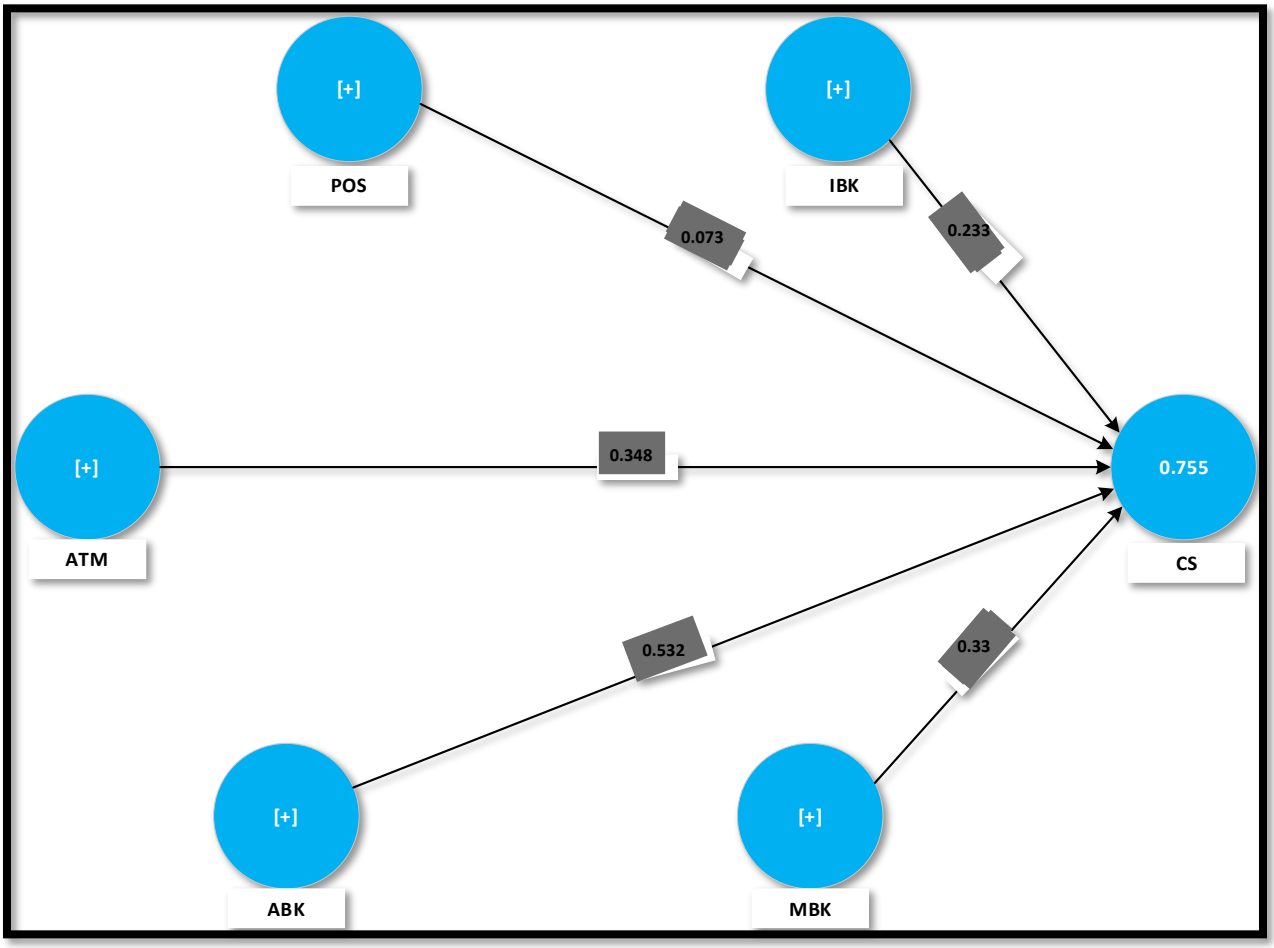

Figure 1: PLS algorithm results for structural model of the Relationship Between the Variables.

Furthermore, when MBK increases by 1, CS also increases by 0.335, with the probability value of 0.000 which is less than 0.05%. In other words, the regression

weight for MBK in the prediction of ROAis significantly different from zero at the 0.05 level of significance. Equally, when POS increases by 1, CS increases by 0.073. With probability value of 0.029 which is less than 0.05%. In other words, the regression weight for POS in the prediction of CSis significantly different from zero at the 0.05 level of significance.

5. Discussions of Findings

Based on the findings, the study aimed to assess the impact of various components of digital financial services (DFS), such as agency banking, automated teller machines (ATMs), internet banking, mobile banking, and point-of-sale (POS) systems, on customer satisfaction in Nigerian commercial banks.The correlation analysis results revealed several significant correlations between the DFS components and customer satisfaction. Notably, there was a strong positive correlation between agency banking and customer satisfaction (r = 0.608), suggesting that customers who perceived agency banking favorably were also likely to have higher levels of satisfaction. Similarly, a strong positive correlation existed between ATMs and agency banking (r = 0.775), indicating that positive perceptions of ATMs were associated with positive perceptions of agency banking.

The structural model analysis demonstrated that the six exogenous variables (agency banking, ATMs, internet banking, mobile banking, and POS) jointly explained 75.5% of the variance in customer satisfaction, indicating a substantial coefficient of determination. All the variables significantly influenced customer satisfaction at a 95% confidence level.Specifically, the study found that a one-unit increase in agency banking led to a 0.532 increase in customer satisfaction, a one-unit increase in ATMs resulted in a 0.348 increase in customer satisfaction, a one-unit increase in internet banking led to a 0.233 increase in customer satisfaction, a one-unit increase in mobile banking caused a 0.335 increase in customer satisfaction, and a one-unit increase in POS systems resulted in a 0.073 increase in customer satisfaction. These findings suggest that all the DFS components positively and significantly impacted customer satisfaction in Nigerian commercial banks.

These findings are in line with some empirical studies that showed the positive impact of digital financial services on the financial performance and customer satisfaction of commercial banks in developing countries. For instance, Ahmad (2020) found significant associations between banking innovations and key financial indicators in Jordanian commercial banks, implying potential positive effects on profitability and efficiency in Nigerian banks as well. Jude (2019) observed that banks offering internet banking in Northern Cyprus experienced higher returns on assets, suggesting that Nigerian banks could similarly benefit from adopting DFS.In Ethiopia, Andinet and Aashka (2022) revealed that financial innovations positively

affected bank profitability, recommending increased awareness and implementation of such innovations to enhance returns on assets. This reinforces the importance of digital financial services in improving bank performance and, consequently, customer satisfaction.While Catherine and Herick (2016) found mixed results for different types of innovations in Kenyan banks, they highlighted the positive effects of service innovations like mobile banking and internet banking on customer satisfaction. This aligns with the findings of the present study, emphasizing the need for Nigerian banks to prioritize service-oriented digital financial services.Furthermore, Korir et al. (2016) and Abubaker et al. (2022) found strong positive relationships between financial innovations and bank performance in Kenya, suggesting that Nigerian banks should adopt comprehensive innovation strategies, including DFS, to improve their financial performance and customer satisfaction.

Therefore, these empirical findingsreinforces the importance of digital financial services in enhancing customer satisfaction and financial performance in commercial banks, particularly in developing countries like Nigeria. By embracing and promoting DFS components such as agency banking, ATMs, internet banking, mobile banking, and POS systems, Nigerian commercial banks can deliver more convenient, efficient, and user-friendly banking services, leading to improved customer satisfaction and loyalty.

6. Conclusion and Policy Recommendations

The study's findings and the supporting empirical reviews underscore the pivotal role of digital financial services (DFS) in enhancing customer satisfaction and driving financial performance in Nigerian commercial banks. The strong positive correlations between agency banking, automated teller machines (ATMs), internet banking, mobile banking, point-of-sale (POS) systems, and customer satisfaction highlight the significance of these DFS components in meeting customers' evolving needs and expectations.The high coefficient of determination indicates that the examined DFS components collectively account for a considerable portion of the variance in customer satisfaction. Furthermore, the positive and significant impact of each DFS component on customer satisfaction reinforces the importance of adopting and promoting these innovative banking services.The empirical studies from various developing countries, including Jordan, Northern Cyprus, Ethiopia, and Kenya, consistently demonstrate the positive effects of banking innovations and digital financial services on profitability, asset returns, gross income, and customer satisfaction. These findings lend credence to the potential benefits that Nigerian commercial banks can reap by embracing and integrating DFS into their operations.

Policy Recommendations

Based on the study's findings and the empirical evidence, the following policy recommendations are proposed:

i. Regulatory bodies and policymakers should establish a conducive environment that fosters the adoption and growth of digital financial services in the Nigerian banking sector. This includes developing clear guidelines, frameworks, and policies that promote innovation, security, and consumer protection in the digital banking landscape.

ii. Commercial banks should prioritize investments in robust digital infrastructure, including secure mobile banking platforms, user-friendly internet banking portals, and a widespread network of ATMs and POS terminals. These investments will enhance the accessibility, convenience, and reliability of DFS, contributing to improved customer satisfaction.

iii. Banks should implement comprehensive customer education and awareness campaigns to promote the benefits and proper usage of digital financial services. These initiatives can address concerns, build trust, and encourage wider adoption of DFS among customers, particularly in underserved or technologically-challenged segments.

iv. Commercial banks should adopt a mindset of continuous innovation and service enhancements. Regular updates, new features, and seamless integration of DFS components will ensure that customer needs are met and exceeded, leading to sustained high levels of satisfaction.

v. Banks should explore strategic collaborations and partnerships with fintech companies, mobile network operators, and other relevant stakeholders. Such partnerships can accelerate the development and deployment of cutting-edge DFS solutions, leveraging diverse expertise and resources.

7. Contributions to knowledge and Suggestions for Further Studies

The study contributes to the existing body of knowledge in several significant ways:

i. The study provides valuable empirical evidence from the Nigerian context, exploring the impact of digital financial services (DFS) on customer satisfaction in commercial banks. This adds to the limited research in this area, specifically within the Nigerian banking sector, and offers insights that can inform decision-making and strategic planning.

ii. By examining the effects of various DFS components, including agency banking, automated teller machines (ATMs), internet banking, mobile banking, and point-of-sale (POS) systems, the study provides a comprehensive understanding of their individual and collective impact on

customer satisfaction. This holistic approach offers a more robust and nuanced perspective compared to studies that focus on a single aspect of DFS.

iii. The study's findings and the supporting empirical reviews from other developing countries validate and reinforce the positive impact of digital financial services on customer satisfaction and financial performance. This consistency across multiple contexts strengthens the existing literature and highlights the universal importance of DFS in the banking sector.

iv. The use of Structural Equation Modeling (SEM) as the analytical approach contributes to the methodological rigor of the study. SEM is well-suited for assessing the relationships between multiple variables simultaneously, offering a robust and reliable framework for evaluating the complex interplay between DFS components and customer satisfaction.

Suggestions for Further Studies

While the study provides valuable insights and contributions, there are opportunities for further research to expand knowledge in this domain:

i. Longitudinal Studies: Conducting longitudinal studies that track the impact of digital financial services on customer satisfaction over an extended period would provide a more comprehensive understanding of long-term trends, dynamics, and potential shifts in customer preferences and behavior.

ii. Exploring the impact of digital financial services on customer satisfaction across different customer segments (e.g., age groups, income levels, geographical locations) could reveal valuable insights into segment-specific preferences and needs. This information could inform targeted strategies for enhancing customer satisfaction within specific market segments.

iii. Incorporating qualitative research methods, such as focus groups or in-depth interviews with customers, could provide deeper insights into their perceptions, experiences, and expectations regarding digital financial services. This qualitative data could complement the quantitative findings and offer a more holistic understanding of customer satisfaction.

Reference List

1. *Abaenewe, Z.C., Ogbulu, O.M. &Ndugbu, M.O. (2013). Electronic banking and bank performance in Nigeria. West African Journal of Industrial & Academic Research, 6(1).*
2. *Abubaker, E, Paul, J.I. & Willy, K. (2022). An empirical investigation of Automated Teller Machines (ATMs) and customers' satisfaction in Nigeria: A case study of Ilorin, Kwara*

3. *Ahmad, O.A. (2020). The effects of innovations on bank performance: The case of electronic banking services. Procedia - Social and Behavioral Sciences, 195, 369 – 375.*
4. *Andinet, F.O. &Aashka, D.S. (2022). The dynamics of product and process innovations in UK banking. International Journal of Financial Services Management, 1(4), 400-421.*
5. *Catherine, A.S. & Herick, K. (2016). Staying on top: characteristics of long-term survival. Journal of organizational change management, 13(1), 32-48.*
6. *Jayawardhera, I.P. & Foley, E.R (2018). The profitability of European banks: a cross- sectional and dynamic panel analysis. The Manchester School, 72(3), 363-381.*
7. *Jude, H.T. (2019). The balanced scorecard: Judgmental effects of performance measures linked to strategy. The Accounting Review, 79(1), 1-23.*
8. *Korir, E., William, A.S., Adam, K., & Charles, C.A. (2016). Empirical studies of financial innovation: lots of talk, little action? Journal of Economic Literature, 42(1), 116-144.*
9. *Okonkwo, A. A., & Ekwueme, C. M. (2022). Effect of electronic payment on financial performance of Nigeria Deposit Money Banks. Int J Adv Acad Res, 8(3), 105-17.*
10. *Okonkwo, A. A., & Ekwueme, C. M. (2022). E-payment and performance of deposit money banks in Nigeria. Research Journal of Management Practice 2(3), 23-34.*
11. *Solans, L. (2003). The dynamics of innovative activity and competitive advantage: The case of Australian retail banking, 1981 to 1995. Organization Science, 14(2), 107-122.*
12. *State. Retrieved from: mpra.ub.uni-muenchen.de.*
13. *Taiwo, N.M. & Agwu, F.I. (2019). The Effects of Mobile Money Services on the Performance of the Banking Institutions: A Case of Kakamega Town. The International Journal of Engineering and Science, 3(4), 16-24.*
14. *Tufano, O.A. (2013). How organizational learning affects a firm's flexibility, competitive strategy, and performance. Journal of Business Research, 65(8), 1079-1089.*
15. *Ugwueze, A.C., &Nwezeaku, N.C. (2016). E-Banking and Commercial Bank Performance in Nigeria: A Cointegration and Causality Approach. International Journal of e-Education, e-Business, e-Management and e-Learning, 6, 175-185.*
16. *Virginia, W., Fredrick, D. andJohn G. (2021). Relationship between bank innovations and financial performance of commercial banks in Kenya. International Journal of Education and Research, 3(5), 443-456.*

17. *Wachira, V.K., Kalui, F.M., & Gathii, J. (2021). Digital financial innovation services and their impact on the performance of commercial banks in Kenya. European Journal of Economic and Financial Research.*
18. *Weru, E., Emmanuel, L.S. &Peter D. (2022). Adoption of financial innovation in the Ghanaian banking industry. African Review of Economics and Finance, 6(2), 88-114.*
19. *World Bank. (2021). Financial Inclusion Data. Retrieved from datacatalog.worldbank.org .*
20. *Zayyanu, R.E., Umar, H. & Taiwo, S.A. (2022). The impact of internet banking on bank performance and risk: The Indian experience. Eurasian Journal of Business and Economics, 2(4), 43-62.*
21. *Zelelew, Y. (2018). Assessment on Attitudes of Employees and Customers towards Electronic Banking System in Commercial Bank of Ethiopia: A Case Study on Hamle 19 Branch. Proceedings of the 11th Annual Student Research Forum, 85-102.*
22. *Zuo, L., Li, H., & Xia, X. (2023). An Empirical Analysis of the Impact of Digital Finance on the Efficiency of Commercial Banks. Sustainability, 15(5), 4667.*