Digital technology and value relevance of accounting earnings of money deposit banks in Nigeria

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Abstract
This paper evaluates how the value relevance of accounting earnings of the listed money deposit banks in Nigeria have been influenced by the adoption of selected digital technologies of mobile banking transactions, automated teller machines (ATM), and point-of-sale (POS) transactions. With the rising trend of the use of digital technologies, the banking practices, as well as financial reporting practices in Nigeria, have greatly changed. Our study will be completed in the 2012Q1 2023Q4 time frame and will make use of secondary data provided by the Central Bank of Nigeria. The study relies on the heterogeneous analytical framework, which is anchored on the diffusion theory of innovation, transaction cost theory and technology acceptance model to explain the variations in the effects of channels of digital banking on the performance level of various levels. As preliminary analysis, descriptive statistics and Spearman rank-order correlation analysis are utilized, and then, econometric estimation is conducted to investigate the association between digital technologies and the market value of equity as an indicator of earnings value relevance. The results indicate that ATM, mobile banking, and POS transactions have high positive correlations with the value relevance of accounting earnings, which implies that the presence of higher digital transactions increases the informativeness and credibility of earnings reported by commercial banks. The research finds that digital technologies are very important in enhancing the connection between accounting profits and market values, which positively impact the quality of financial reporting and investor trust in the Nigerian banking industry.

Keywords: Digital Technologies, Value Relevance, Accounting Earnings, Mobile Banking Transactions, ATM, POS.

INTRODUCTION

The banking industry holds a strategic position in the Nigerian economy in terms of financial intermediation, capital mobilisation, payment system management and economic growth promotion. The Nigerian banking sector has undergone a radical structural and operational change over the years, mostly due to the advent of technology and regulatory changes to enhance efficiency, transparency and financial inclusion. The adoption of the digital technologies into banking operations is still one of the most remarkable changes in this transformation; mobile banking platforms, automated teller machines (ATMs), and point-of-sale (POS) systems are among the improvements that have been introduced.

Digital technologies have transformed the conventional banking model in that they made physical branches less significant and real-time and technology-based financial services accessible. Mobile banking has ensured that customers can perform financial operations at the comfort of their desks, whereas ATMs and point of sale terminals have increased the

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availability of banking services outside regular banking halls. These computer channels have added tremendously to the level of transactions, decreased time of processing and enhanced customer convenience. Digital banking has therefore emerged as a significant revenue generating/ cost-cutting measure among commercial banks in Nigeria.

In addition to the efficiency in operations, the increased use of digital banking technologies has significant consequences on the financial reporting and the behaviour of capital markets. The accounting earnings have continued to be one of the most imperative performance indicators employed by investors, analysts, regulators, and other stakeholders in assessing the financial performance and future outlook of banks. The value relevance of accounting earnings is of great importance in determining their usefulness, i.e., how much information reported by the accounting earnings is reflected in the market prices and affects the decision-making process of investors.

The fact that digital banking channels are growing in contribution to the revenue structure of the banks questions the nature, reliability, and relevance of accounting earnings in the market. Digitized transactions produce electronic data, which complements the quality, timeliness, and traceability of financial information and, therefore, has the potential to increase the quality of earnings. Simultaneously, issues like system failures, cyber risks, and fraud linked to online platforms might impact the stability of earnings and the attitude to the reported figures by investors. These conflicting impacts necessitate the need to investigate the effects of certain digital technologies on the value relevance of accounting earnings on the Nigerian banking situation empirically.

The Central Bank in Nigeria has been encouraging cashless policy in Nigeria to mitigate the influence of cash transactions and provide an alternative of electronic payment systems. The policy has resulted in high gain in the mobile banking transactions, ATM and POS implementation in the country. With the growing dominance of these digital channels in the processing of transactions and generating of income, its effect on the financial performance and market valuation of banks has been augmented. Nevertheless, although the online banking in Nigeria is growing at a very high rate, empirical research on the impact of such technologies to the value relevance of accounting earnings is scarce and inconclusive.

In addition, most of the available literature on digital banking and bank performance in Nigeria has been on profitability, efficiency, and financial inclusion with little research on the capital market implication of the digital transformation. Specifically, the research in the area of digital banking technologies and their impact on the connection between accounting earnings and market value is lacked at various levels of bank performance. Since the banks are heterogeneous in terms of their size, profitability, and ability to implement digital technologies, the consequences of adopting digital technologies on the relevance of earnings might differ among performance quantiles.

This research paper will fill this gap by discussing how the chosen digital technologies, which include, mobile banking transactions, automated teller machines, and point-of-sale transactions, affect the value relevance of accounting earnings of listed commercial banks in Nigeria. Through the quantile approach of analyzing the situation, the study will capture the heterogeneous impact of digital banking technologies on various levels of earning. This methodology gives further insights into the possibility of uniform increase in earnings relevance on the use of digital technologies or whether they have different impacts on low and high performing banks.

The results of the current research should be applicable to various stakeholders. In the case of the bank management, the implications of value relevance of digital investments can be used to make strategic decisions regarding the use of technology and resources. To investors, the research offers evidence on the accuracy of accounting profits in a digitally modernized banking situation. To regulators and policymakers, the findings provide an insight into the

contribution of the digital banking initiatives to the financial transparency, efficiency, and investor trust in the Nigerian banking sector.

Objectives of the Study

The main objective of this study is to examine the heterogeneous effects of digital technologies on the value relevance of listed commercial banks in Nigeria. Specifically, the study investigated the following, to:

i. Examine the effect of mobile banking transactions on the value relevance of accounting earnings across different quantile of commercial bank earnings in Nigeria
ii. Determine the effect of automated teller machines on value relevance of accounting earnings across different quantile of commercial banks in Nigeria.
iii. Investigate the effect of Point of Sale transactions on the value relevance of accounting earnings across different quantile of commercial banks in Nigeria.

Research Questions

The following research questions were raised to capture the heterogeneous effects of digital banking indicators across the distribution of accounting earnings value relevance, using the quantile regression approach:

i. How do mobile banking transactions influence the value relevance of accounting earnings of commercial banks in Nigeria across different quantile?
ii. To what extent do automated teller machines affect the value relevance of accounting earnings of commercial banks in Nigeria at varying quantile levels?
iii. How does Point of Sale (POS) usage affect the value relevance of accounting earnings of commercial banks in Nigeria across different quantiles?

Research Hypotheses

To guide the analysis using quantile regression, the following null hypotheses are postulated to test for statistical significance across the distribution of the dependent variable:

i. **Ho1:** Mobile banking transactions have no statistically significant effect on the value relevance of accounting earnings of commercial banks in Nigeria across all quantiles.
ii. **Ho2:** Automated teller machines have no statistically significant effect on the value relevance of accounting earnings of commercial banks in Nigeria across all quantiles.
iii. **Ho3:** Point of Sale transactions have no statistically significant effect on the value relevance of accounting earnings of commercial banks in Nigeria across all quantiles.

LITERATURE REVIEW

Conceptual Review of Digital Technologies in Banking

Digital technology refers to the use of electronic tools, systems, devices, and resources that generate, store, process, and transmit data in digital form. Unlike analog technologies, which rely on continuous signals, digital technologies operate using discrete binary codes-0s and 1s-to encode, manipulate, and communicate information (Abdullahi & Nyaoga, 2017). This fundamental difference allows digital technologies to achieve high levels of efficiency, precision, reliability, and scalability across a wide range of sectors, making them indispensable in today's fast-paced, data-driven environment.

Examples of digital technologies are diverse and continually evolving. They include personal computers, smartphones, cloud computing platforms, artificial intelligence (AI), machine learning, digital banking platforms, blockchain systems, big data analytics, and the Internet of Things (IoT). These technologies enable automation of routine tasks, enhance communication and collaboration, support complex decision-making processes, and improve the quality, speed, and accessibility of service delivery (Abdullahi & Nyaoga, 2017). By transforming data into actionable insights, digital technologies empower organizations to optimize operations, respond quickly to market dynamics, and innovate in the delivery of products and services.

Beyond banking, digital technology has reshaped multiple sectors. In education, it drives e-learning platforms, virtual classrooms, and digital libraries, providing students and educators with flexible access to knowledge. In healthcare, digital systems support telemedicine, electronic health records, AI-assisted diagnostics, and remote patient monitoring, improving patient outcomes and accessibility. Across industries, the adoption of digital technologies fosters innovation, operational efficiency, global connectivity, and market competitiveness.

The term “digital technologies” are technically and intricately complex to define as it may be interpreted differently from different accessing viewpoints. The versatility of e-banking as delivery multichannel increases the intricacy of being precisely defined in the literature. Nonetheless, several attempts have been made to offer succinct and all-inclusive meaning of e-banking (Ene et al., 2019). For example, Akani and Obiosa (2020) sees digital transformation as the provision of variety of banking services at any point in time other than the banking hall through electronic and mobile platforms. Ogbonna et al., (2019) is more emphatic in definition of e-banking as the emergence of digital transformation has not relinquished traditional banking products and services but rather transformed traditional models to enhance quality service delivery, real time access, reduce operational cost and ultimately achieve maximum efficiency in banking operations.

In the Nigerian context, digital transformation in banking has become increasingly critical. Nigerian banks, faced with growing competition, evolving regulatory requirements, and an expanding tech-savvy population, have increasingly adopted mobile banking, internet banking, USSD services, and cardless payment systems. Institutions such as Zenith Bank, Guaranty Trust Bank, and Access Bank have invested heavily in digital platforms to expand outreach, improve service quality, and maintain operational resilience. These innovations have enabled Nigerian banks to provide 24/7 banking services, reduce dependence on physical branches, and achieve cost efficiencies while maintaining compliance with regulatory standards. Furthermore, digital banking enhances transparency, security, and traceability of financial transactions, which are essential for investor confidence and overall financial system stability.

Forms of Digital Technologies

For the purpose of this study, the following digital technologies such as mobile banking, automated teller machines, point of sales, internet banking and swift-based payments are used as a proxy for digital technologies.

Mobile Banking Transactions (MBT)

Generally, the term “mobile” means “fully portable, real-time access to the same information, resources, and tools that, until recently, were available only from the desktop (Chemtai, 2016). The rapid advancement in technologies and ease of use, coupled with the falling prices of devices, present the mobile phone as an appropriate and adaptable tool to bridge the digital divide. Cell phones have not yet achieved these levels of quality, but they do offer "anywhere" convenience, a disruptive innovation advantage. The wireless industry is one of the most dynamic and growing industry in the world economy today. The rapid technological advancement that the world has witnessed in the recent years especially in the electronic industry has also changed the means of production around the world.

Ayinla (2018) reported that, since the introduction and evolution of the mobile phones, the ways and means of business information transfer have changed leading to more effective in service rendered to customer by the banking sectors. However, mobile banking services are often differentiated as „push“ or „pull“. Pull is when a customer explicitly requests a service or information from the bank. While push, occurs when a bank sends an alert to a customer when their accounts goes below a threshold level. Pull services are often of higher security measures.

Mobile payment otherwise known as mobile transfer, mobile money transfer or mobile wallet generally refers to payment services operated under financial regulation and performed from or via mobile device. Further, instead of paying with cash, cheque or credit cards a consumer can use a mobile phone to pay for a wide range of services and digital or hard goods. Mobile transfer serves as a terminal that enables customers perform many transactions such as fund transfer between one customers account and to other accounts, checking of account balance, etc. The mobile transfer uses pin code and pass code identification as a bank security (Bhatt, 2019).

The first tier of the requirement enables banks to register customers with just passport photographs and without a valid identity card. However, there is a restriction on the amount of money and transactions made by the account. Banks have started to implement these requirements. Mobile banking services are provided in part as an extension of a bank's online service. Banks also offer SMS banking services. For example, a bank account holder can send a specified format of an SMS to transfer money to a recipient in same or different bank as the sender.

Automated Teller Machines (ATMs)

According to Mateka et al., (2016), ATMs are computerized teller machine that provides a bank's customers at all access to different types of financial transactions without direct contact with a bank teller. It is an electronic fund transfer terminal capable of facilitating the access to cash withdrawal, cash deposits, and money transfers & accounts inquiries. ATM is considered as the most used channel by bank customers. Mwai, et al., (2018) In the United States, ATM are described as automatic banking machine better still automated banking machine while in the United Kingdom, they are called Automated Transaction Machine, Cashpoint. In Scotland, they are called Money Machine, Bank Machine, Cash Machine, Hole-In-The-Wall, Autoteller while in Royal Bank of Scotland', they are called Cashline Machine. In Philadelphia, they are called MAC Machine while most parts of Europe, they are called Bankomat. In Portugal, they are called Multibanco, in Norway, they are called Minibank, in Belgium and the Netherlands, they are called Geld Automaat while in India, they are called All Time Money in India.

Furthermore, Akani and Obiosa (2018), describes ATMs as a computer terminal, record-keeping system and cash vault in one unit, permitting customers to enter the bank's book keeping system with a plastic card containing a Personal Identification Number (PIN) or by punching a special code number into the computer terminal linked to the bank's computerized records 24 hours a day". Once access is gained, it offers several retail banking services to customers. They are mostly located outside of banks, and are also found at airports, malls, and places far away from the home bank of customers. They were introduced first to function as cash dispensing machines. However, due to advancements in technology, ATMs are able to provide a wide range of services, such as making deposits, funds transfer, bill payments etc. Banks tend to utilize this electronic banking device, and all others for competitive advantage.

Another approach use in recent time is scrip cash dispenser. This cash point though has many components in common with an ATM, but it lacks the ability to dispense physical cash. As such, it does not require vault but allow the customer to requests a withdrawal transaction from the machine while the machine in turn prints either a receipt or scrip. The customer in turn takes this receipt to a nearby sales clerk, who then exchanges it for cash from the till.

Another approach adopted by service providers in recent time according to Mwai et al., (2018), is a teller assist unit (TAU). This is designed to be operated solely by trained personnel and not by the general public. This ATM alternative approach integrates directly into interbank networks, and is usually controlled by a computer that is not directly integrated into the overall construction of the unit.

Lastly, a Web ATM is a more recent alternative ATM approach adopted by service providers in recent time. This approach is an online interface for ATM card banking that uses a smart card reader. All the usual ATM functions are available, except for withdrawing cash. Most banks in Taiwan provide these online services (Bátiz-Lazo, 2018).

Point of Sales (POS)

Point of sales terminal is an important instrument used in cashless policy, which enables the operators to administer payment by the customer in a simple way and subsequently to record the payments for clear accounting purposes. When customers swipe their debit or credit card into the POS terminals, the transactions begin by the cars reader extracting the bank identification number (BIN). A POS manages the selling process by a salesperson accessible interface and also allows the creation and printing of receipts. POS terminals increase convenience, more service options, reduced cash related crimes, cheaper access to banking services, and also increases bank Penetration thereby creating more fund in the bank doe investment purposes in order to contribute to bank performance.

According to Muotolu, and Nwadialor, (2019)., point of sale terminals are computer facilities in stores that permit a customer to instantly pay for goods and services electronically by deducting the cost of each purchase directly from his/her account. The customer presents an encoded debit card to the store clerks who insert it into a computer terminal connected to the financial firm's computer system. The customer's account is charged for the purchase and funds are automatically transferred to the store's deposit account.

Akani and Obiosa, (2020) described a POS machine as a terminal, a box that allows a merchant to accept payments by means of cards from his customers. It works almost like an ATM machine except that in this case, the machine is designed to accept payments only on behalf of the merchant which is mostly the registered company which has an account with bank. Rose and Ayinla (2018), state that current Point-of-Sale network are divided between online and offline POS systems. The offline accumulates all of the customer's transaction until day's end and then the total of all transactions is subtracted from the customer's account.

Earnings Accounting Value Relevance

Value relevance defines the power of accounting information especially earnings to account for changes in market values. When earnings are timely, reliable and representative of the underlying economic performance of a firm, then they are said to be value relevant. Value relevance in banking is critical in giving investor confidence, regulation and efficiency in the market because stakeholders in the banking industry closely depend on financial statements.

Overall, the value relevance of accounting earnings serves as a cornerstone for understanding how financial performance information translates into economic decision-making. Within the Nigerian banking sector, it captures the intersection of operational efficiency, technological adoption, and investor reliance on financial statements. By examining the effects of digital banking transactions on reported earnings, this study contributes to a deeper understanding of how technological innovations enhance the quality, reliability, and usefulness of financial information, thereby influencing investor behavior, market efficiency, and overall financial sector development.

Theoretical Framework

The following theories were used to underpin this study:

Innovation Diffusion Theory

Innovation Diffusion Theory (IDT) was developed by Everett Rogers in 1962. Everett Rogers explains how new ideas, technologies, or innovations spread within a society or organization. The theory suggests that the adoption of innovation follows a process influenced by five key factors: relative advantage, compatibility, complexity, trialability, and observability. Relative advantage refers to how much an innovation is perceived as superior to existing alternatives,

while compatibility measures how well it aligns with users' needs and values. Complexity affects adoption rates, as easier-to-use innovations spread faster, whereas trialability allows users to test an innovation before fully committing. Lastly, observability determines how visible and demonstrable the benefits of an innovation are to others (Kojo & Yazidu, 2016).
Akani, and Obiosa (2020) noted that, innovations are likely to adopt by an entity if they are consistent with the values of the specific entity. This theory explains how innovations are adopted by entities across the industry. In particular, the banking sector is characterized by changing customer preferences and need for timely delivery of services. For this reason, the theory gives insights on how electronic funds transfers and mobile banking has become a common feature in the banking industry (Morufu, 2016). Electronic funds transfer ensures that a customer transact without having to visit the banking hall in person. Mobile banking on the other is fast and involves the diffusion of the mobile technology from telecommunication industry to the banking sector.
This theory is crucial to this study because the theory explains bank customers can only adopt SWIFT transactions, and digital banking services if they perceive these technologies as advantageous, easy to use, and widely observable, adoption rates increase, leading to improved financial efficiency, transaction speed, and value relevance of accounting earnings.

Technology Acceptance Model

The Technology Acceptance Model (TAM), developed by Fred Davis in 1989, explains how individuals adopt and use new technologies based on their perceptions of usefulness and ease of use. Perceived usefulness refers to the extent to which a person believes a technology will enhance their performance, while perceived ease of use reflects how effortless they find it to operate. These factors influence a user's attitude toward technology, shaping their behavioral intention and eventual adoption (Hassan et al., 2017) discusses in technological issues and contributed to TAM. TAM model seeks to link the persons' behavioral intentions when using ICT. A suggestion has been brought about and it is; a person's real reaction is determined by his behavioral intention to use and the same is affects the user's life perception toward the value of the innovation and the value of the later is resolved by straightforwardness of its utilization. The usage of TAM model works well with ease and convenience end-clients modification and integration (Abdullahi, & Nyaoga, 2017). The importance and familiarity of this model have an effect on the user's perception in regards to any service provide (Ibekwe, 2021).
The theory is critical to this study owing to the fact that, digital technologies can only if customers and banks perceive these technologies as efficient, secure, and user-friendly, their adoption increases, leading to improved transaction efficiency, reduced reliance on cash-based transactions, and enhanced financial performance. As more users integrate digital payments into daily financial activities, banks experience greater transaction volumes and operational efficiency, strengthening the value relevance of accounting earnings.

Empirical Review

Okafor, et al., (2017) employed quarterly data covering 2009:Q1-2014:Q4 to examine the effectiveness of financial innovation in driving growth in Nigeria. The Least Squares (Gauss-Newton/Marquardt steps) based on vector autoregressive (VAR) system was used to estimate the system model whereas Johansen co-integration test was utilized to test for long-run relationship among the series. The results showed a long-run relationship between growth and financial innovation. The findings indicate that financial innovations do not jointly have positive effect on growth as the responsiveness of growth to the individual innovation channels varied. ATM, mobile and internet transactions all have relative positive effect on growth, while transactions via POS channel had a negative influence on growth. The study therefore concluded that financial innovations have not had the desired effect on the Nigerian economy.

The impact of web/Internet and mobile e-payments usage on bank profitability in Nigeria was studied by Oladejo (2016). Secondary data was gathered from ten commercial banks' annual reports and accounts from 2005 to 2012 and analyzed using panel logistic regression. The findings revealed that when banks use e-payment systems, their performance levels vary, including gross margin, profit after tax, return on assets, and return on equity.

Nwakoby, et al., (2020) looked at the relationship between electronic banking and deposit money bank profitability in Nigeria from 2009 to 2018. Ex post facto research design was used in this study. With the help of E-View 9.0, the study used regression analysis to examine the hypotheses. According to the findings, the Automated Teller Machine (ATM) payment method has a negative effect on deposit money bank return on equity in Nigeria, but this effect is not statistically significant; the Point of Sales (POS) payment method has a positive effect on deposit money bank return on equity in Nigeria, but this effect is not statistically significant; and the Mobile Banking Payment (MPAY) has a positive effect on return on equity in Nigeria, but this effect is not statistically significant.

Olushola, et al., (2020) ascertained the effect of electronic banking on bank performance in Nigeria. The study utilized secondary data derived from the audited annual financial statement of the deposit money banks quoted on the Nigerian Stock Exchange from 2008–2017. The study also made use of journals, textbooks, Nigerian Stock Exchange fact books, the Central Bank of Nigeria (CBN) Bullions and other published materials. Using the multiple regression analysis techniques, the findings revealed that e-banking measured by return on equity (ROE), return on assets (ROA), and earnings per share (EPS) has no significant impact on the performance of banks in Nigeria. With the findings, we can conclude that investment in electronic banking has not improved the value relevance of accounting earnings of commercial banks in Nigeria. The study recommends that for effectiveness.

Lasisi and Abubakar (2020) examined the effects of automated teller machine (ATM) on user satisfaction in Nigeria: A study of united bank for Africa in Sokoto metropolis: The Nigerian Banking sector over the years has been experiencing significant changes and development in its Information and Communication Technology. Among the development is the introduction of Automated Teller Machine (ATM) that intends to decongest the banking halls as customers now can go to any nearest ATM outfit to consummate their banking transactions such as: cash withdrawal, cash deposit, bill payments, and transfer of fund between accounts. The research was carried through across-sectional survey design which questioned respondents on ATM services. The population of study mainly constituted of customers of United Bank for Africa within Sokoto metropolis. The sample in this study consisted of 100 respondents who are users of the ATM services. The data collected was analyzed by use of multiple logistic regression analysis. The findings revealed that, the impact of ATM services in terms of their perceived ease of use, transaction cost and service security is positive and significant. However, the result also indicates that the impact of ATM services in terms of availability of money is positive but insignificant.

Morufu (2016) in their study examined the impact of four (ATM, POS, web/Internet and mobile) e-payments adoption and banks specific variables on the profitability of the Nigerian Deposits Money Banks (DMBs). Secondary data were obtained from the annual report and accounts often quoted (DMBs) between 2005 and 2012. Data were analyzed using panel logistic regression. The overall result from data analysis shows that when bank adopts e-payment systems, their performance level, such as gross margin, profits after tax, return on assets and return on equity changes. This is reflected in the positive association between adoption and gross earning of banks. Further, adoption of the four e-payment instruments like ATM, WEB, POS and Mobile banking influenced performance indices measured by return on assets (ROA), gross margin and profits after tax (PAT) of the sampled banks.

Ugwueze and Nwezeaku (2016) studied the relationship between Internet banking and the performance of Nigerian commercial banks. The study became necessary due to the increased adoption of Internet banking which has redefined the banking service both in Nigeria and internationally. Internet banking was proxied by the value of Point-of-Sale transactions while commercial banking performance was proxied by customers' deposits. Engle-Granger co-integration model was used to analyze data for the sample period January 2009 to December 2013. The results show that POS is not co-integrated with both the savings and time deposits but are co-integrated with demand deposits.

METHODOLOGY

Research Design

This study adopts an *ex post* facto research design, which is particularly appropriate when investigating variables that have already occurred or cannot be manipulated. Given that the variables under investigation are pre-existing, this design allows for an effective analysis of the impact of these variables without any experimental intervention. Specifically, the study involves collecting secondary data from the annual reports and accounts of listed banks on the Nigerian Exchange Group, as well as other relevant publications from monetary authorities. These data will be analyzed using appropriate statistical tools.

Area of the Study

The area of this study is the Nigerian commercial banking sector, with a specific focus on the 22 banks listed on the Nigerian Exchange Group (NGX) as of December 31, 2023. Nigeria, as Africa's largest economy, has witnessed significant growth and transformation in its financial sector, driven largely by technological innovation and increasing adoption of digital banking services. The selected area is particularly relevant because the listed commercial banks play a central role in the country's economic development, acting as intermediaries for savings, investments, and credit facilities while also adopting digital technologies to enhance service delivery.

Population of the Study

The population of this study comprises all 22 commercial banks listed on the Nigerian Exchange Group as of December 31, 2023. These institutions collectively represent the full spectrum of commercial banking operations in Nigeria, ranging from large multinational banks to smaller regional banks. The study focuses on listed banks because they maintain standardized financial reporting practices and are subject to regulatory oversight, making them appropriate for analyzing the relationship between digital banking transactions and the value relevance of accounting earnings. By considering the entire population, the research captures the diversity of operational strategies, levels of digital adoption, and financial performance trends across the Nigerian banking sector. This comprehensive approach ensures that the analysis reflects the true characteristics of the sector and enhances the relevance of the findings for academic, regulatory, and practical purposes.

Sample Size

The sample size of this study corresponds directly to the population, as all 22 listed commercial banks were included in the analysis. A census approach was adopted due to the relatively small and manageable size of the population, which made it feasible to study every institution without resorting to sampling. Including the entire population eliminates the risk of excluding relevant data and ensures that the findings are complete, accurate, and representative of the sector. Furthermore, the heterogeneity among Nigerian banks in terms of digital banking adoption, operational scale, and financial reporting practices necessitated a full-population analysis to avoid potential biases that could arise from studying only a subset of banks. By examining all listed banks, the study provides reliable insights into digital transformation initiatives and financial performance trends, strengthening the validity and generalizability of the results. This comprehensive coverage also allows the findings to be

more useful to policymakers, regulators, investors, and other stakeholders seeking to understand and influence the development of digital banking practices in Nigeria.

Nature and Source of Data

The use of secondary data from the Central Bank of Nigeria's Statistical Bulletin, the World Bank Database, and the Nigeria Deposit Insurance Corporation (NDIC) Quarterly Reports was justified for several reasons. First, these sources are authoritative and publicly recognized repositories of reliable financial and economic data in Nigeria. They provide comprehensive coverage of banking transactions, macroeconomic indicators, and financial performance metrics, ensuring the credibility and validity of the study's findings. Second, the quarterly frequency of the data allowed for a more granular analysis of trends and seasonal patterns, offering better insights into how digital banking activities influence the value relevance of accounting earnings over time. This is particularly important in the banking sector, where financial and technological changes often exhibit cyclical or seasonal variations. Third, using data from 2012 to 2023 provided a longitudinal perspective, covering periods of significant digital transformation, regulatory reforms, and economic fluctuations in Nigeria. This enabled the study to assess the dynamic relationship between digital financial channels and accounting information relevance across diverse economic conditions. Lastly, secondary data collection was cost-effective and time-efficient, allowing the study to leverage already-validated and standardized data, thereby minimizing data collection bias and enhancing comparability with previous research in the field.

Method of Data Analysis

To test the five null hypotheses, quantile regression (QR) was employed. Quantile regression is a robust estimation technique that examines the impact of explanatory variables across different points (Quantile) of the dependent variable's distribution, rather than focusing solely on the mean as in Ordinary Least Squares (OLS). This approach is particularly relevant in financial and economic studies where the dependent variable, such as value relevance, may exhibit heteroscedasticity, skewness, or outliers.

Quantile regression provides a more detailed and comprehensive understanding of the relationships between digital banking transactions and the value relevance of accounting earnings across various levels of the dependent variable (e.g., lower, median, and upper Quantile). This helps to uncover whether the effects of digital transformation indicators differ for banks with lower versus higher accounting earnings relevance.

The data were analyzed using Econometric Views (version 9.0), a widely accepted econometric software that supports quantile regression analysis for time series data. In addition to quantile regression estimation, descriptive statistics, correlation analysis, and trend analysis were conducted to summarize data characteristics and identify underlying patterns. These techniques support the interpretation of relationships between the variables and facilitate a robust assessment of the research hypotheses across different segments of the dependent variable distribution.

Model Specification

The model for this study evaluated the nexus between digital transformation and the value relevance of accounting earnings in Nigeria's banking sector. Model Specification

Table 1

Analytical Model Framework

Model	Specification
General Model	$VAE = f(MBT, ATM, POS)$
Expanded Form	$VAE = \beta_0 + \beta_1 MBT + \beta_2 ATM + \beta_3 POS + \varepsilon$

Where:

VAE: = Natural logarithm of Value Relevance of Accounting Earnings in period t.

MBT = Mobile Banking Transactions

ATM = Automated Teller Machine Transactions
POS = Point-of-Sale Transactions

Descriptive Statistics

This section presents the descriptive analysis of the variables used in the study. The analysis highlights the central tendencies (mean), dispersion (standard deviation), and the range (maximum and minimum values) of the transaction volumes across various digital banking channels in Nigeria. The data summary is presented in Table 2 and further discussed subsequently.

Table 2

Descriptive (Summary) Statistics

Variables	Mean	Maximum	Minimum	Std. Dev.	Observations
MBT	8517.748	68463.61	6.500000	16525.38	48
ATM	2857.779	10336.56	425.0000	2656.303	48
POS	3943.577	35080.18	9.000000	7979.161	48
VAE	211.2424	756.0200	38.90100	116.9103	48

Source: Authors computation (2025)

As given in Table 2, the descriptive statistics of mobile banking transactions (MBT), automated teller machine transactions (ATM), point-of-sale transactions (POS), and value relevance of the accounting earnings (VAE) are displayed using 48 observations.

The mean of mobile banking transaction (MBT) is 8,517.748, which fluctuates between 68,463.61 and 6.50, meaning that commercial banks do not use mobile banking in a similar way. The difference between the standard deviation of 16,525.38 that surpasses the mean indicates that the volumes of mobile banking transactions were volatile.

The average length of transactions involving automated teller machine (ATM) stands at 2,857.779, the highest length at10,336.56, and the lowest length at 425.00. The dispersion of 2,656.303 that is close to the mean depicts a moderate dispersion and a more or less constant ATM usage among the banks.

The mean of point-of-sale (POS) transactions is 3,943.577 with the highest value of 35,080.18 and the lowest of 9.00, which demonstrates significant variance in the adoption of POS. High variability in the volumes of POS transactions indicates that the standard deviation of 7,979.161 points is high.

Value relevance of the accounting earnings (VAE) has a mean of 211.2424, a maximum of 756.0200 and a minimum of 38.9010 meaning that the relevance of the earnings varies across banks. The standard deviation of 116.9103 indicates that the value of accounting earnings as represented in the market value is dispersed significantly.

All in all, the descriptive statistics were found to be quite diverse in the nature of digital banking operations and value relevancy of accounting earnings among Nigerian money deposit banks.

Trend Analysis on the Digital Technologies

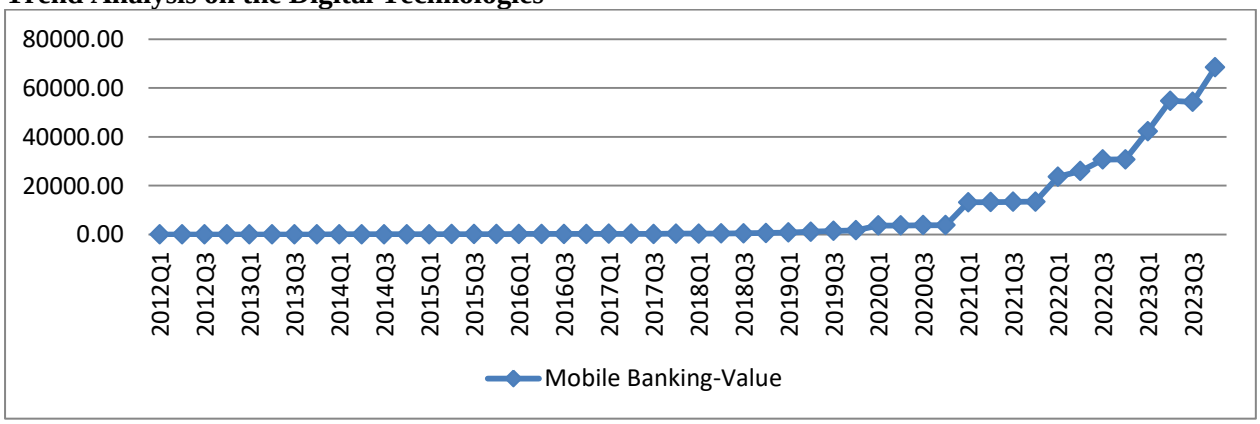

Figure 1: Trend Analysis Value of Mobile Banking Transactions
Source: Researcher's Compilation (2025)

Above is a **quarter-by-quarter breakdown** of each digital payment technology in Nigeria, organized under separate **headings**, based on the dataset from **2012 to 2023**. Each section highlights **trends, growth patterns, and implications** on a quarterly basis.

The trend in the value of **Mobile Banking Transactions (MBT)** in Nigeria from 2012Q1 to 2023Q4 reveals a consistent and exponential growth pattern, underscoring the increasing reliance on mobile channels for financial transactions. In the early quarters of 2012, the value of mobile payments was negligible, beginning at just ₦6.50 billion in 2012Q1 and increasing modestly to ₦42.12 billion by 2013Q4. This slow initial growth was largely due to limited smartphone penetration, poor mobile network infrastructure, and low public awareness of mobile financial services.

From 2014 onward, mobile payment values started to rise more noticeably, as banks and fintech companies began expanding mobile banking applications and USSD services. By 2016Q4, mobile transaction values reached ₦192.35 billion, reflecting gradual user adoption, particularly among younger demographics and urban dwellers seeking convenience and speed in financial transactions.

A sharp acceleration occurred between 2017 and 2020. By 2020Q4, mobile banking transactions rose to ₦3,816.59 billion, driven by increased smartphone adoption, better internet connectivity, and the pandemic-induced shift toward contactless financial services. Lockdowns and movement restrictions during the COVID-19 period forced individuals and businesses to rely on mobile banking for bill payments, fund transfers, and purchases, accelerating the transition from cash to digital payments.

The post-pandemic period witnessed even stronger growth. From 2021Q1 to 2023Q4, mobile banking transactions surged dramatically, reaching ₦68,463.61 billion by the end of 2023. This rapid increase reflects the expanding ecosystem of mobile payment solutions, the proliferation of fintech startups, improved user experience of mobile apps, and greater financial inclusion efforts targeting rural and underserved populations.

Overall, the trend highlights that mobile banking has become a mainstream payment channel in Nigeria's financial sector, facilitating both retail and business transactions. The growing value of mobile payments reflects consumer preferences for convenience, real-time transfers, and financial services that are accessible anywhere and anytime, contributing significantly to the digital transformation of the Nigerian economy.

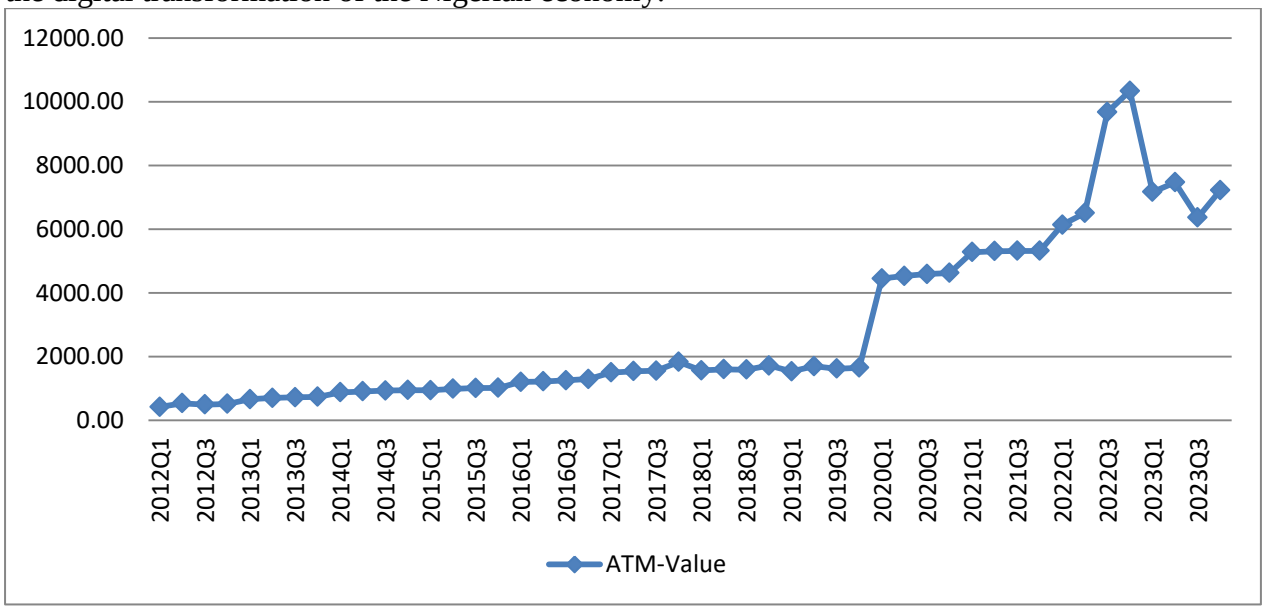

Figure 2: Trend Analysis Value of Automated Teller Machine (ATM) Transactions
Source: Researcher's Compilation (2025)

The trend of Automated Teller Machine (ATM) transactions in Nigeria from 2012Q1 to 2023Q4 reflects a sustained growth trajectory, indicating the evolving role of ATMs in the financial ecosystem. In the early years (2012–2014), ATM usage experienced a gradual rise, increasing from ₦425.00 billion in 2012Q1 to ₦952.3 billion by 2014Q4. This growth was driven by the expansion of ATM networks, greater financial inclusion efforts, and increased public familiarity with automated banking services. From 2015 to 2016, ATM transactions showed moderate growth, hovering between ₦945.3 billion and ₦1,295.78 billion, reflecting steady but slower adoption, likely influenced by macroeconomic constraints and rising inflation that affected consumer spending patterns. A more pronounced upward trend emerged between 2017 and 2019, as ATM transactions surpassed ₦1,500 billion, reaching ₦1,651.25 billion by the end of 2019. This steady growth phase underscores the ATM's integral role in Nigeria's cash-based economy, despite government efforts to promote cashless transactions.

A significant shift occurred in 2020, where ATM usage spiked sharply, rising to ₦4,450.20 billion in 2020Q1 and peaking at ₦4,628.66 billion in 2020Q4. This surge coincided with the COVID-19 pandemic, during which reliance on ATMs increased due to restricted physical banking operations and the need for contactless access to cash. The post-pandemic period (2021–2023) saw continued growth, with ATM transactions exceeding ₦5,000 billion and peaking at ₦10,336.56 billion in 2022Q4. However, the figures for 2023 reflect some fluctuations, ranging from ₦6,361.69 billion to ₦7,218.34 billion, possibly due to increased adoption of mobile transfers, POS terminals, and evolving consumer preferences toward digital payment alternatives. Overall, while the ATM remains a vital channel for cash access in Nigeria's financial system, its growth appears to be moderating in recent quarters as digital banking options continue to expand.

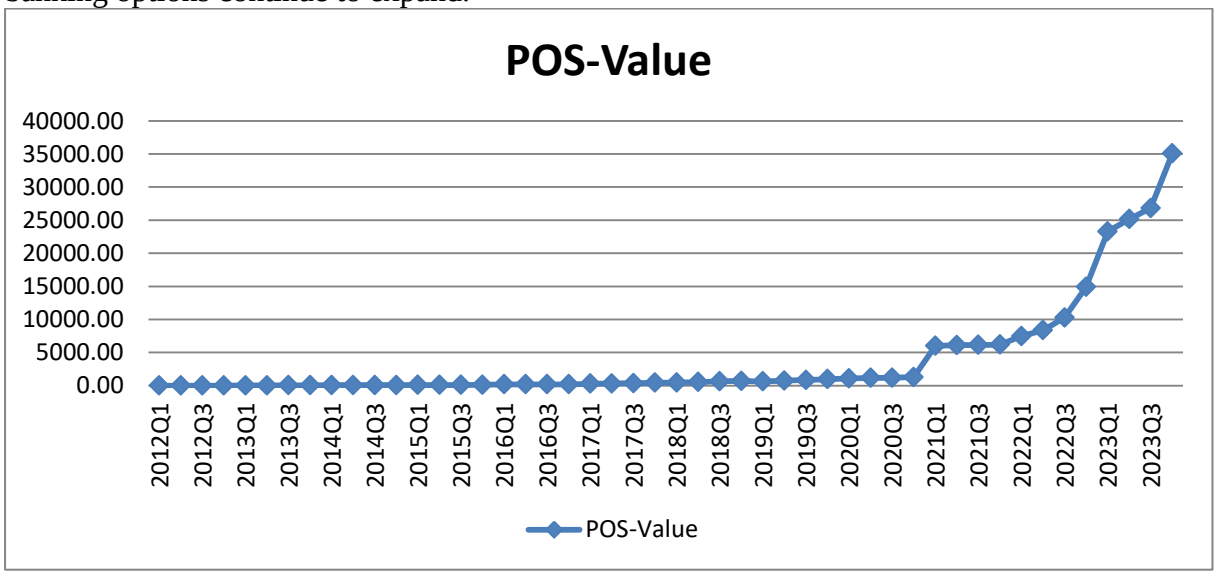

Figure 3: Trend Analysis Value of Point of Sale (POS) Transactions
Source: Researcher's Compilation (2025)

The trend in Point of Sale (POS) transaction values in Nigeria from 2012Q1 to 2023Q4 shows remarkable growth, reflecting the increasing adoption of cashless payment channels in retail and service industries. In the initial period (2012–2014), POS transaction values were relatively low, starting at ₦9.00 billion in 2012Q1 and gradually rising to ₦79.13 billion by 2014Q4. This slow uptake reflects the early stage of POS deployment in Nigeria, characterized by infrastructural gaps, limited merchant acceptance, and low customer trust in electronic payment platforms.

From 2015 onward, POS usage gained significant traction, fueled by policy interventions like the cashless policy and financial inclusion initiatives. Between 2015Q1 and 2017Q4, POS

transactions steadily increased from ₦105.1 billion to ₦435.15 billion. This growth phase indicates expanding acceptance among small and medium-sized enterprises (SMEs), supermarkets, fuel stations, and service providers who increasingly relied on POS devices to facilitate seamless payment experiences.

A dramatic upsurge occurred between 2018 and 2023. By 2019Q4, POS transaction values had grown to ₦964.27 billion, indicating that cashless payment habits were becoming widespread, particularly in urban centers. The COVID-19 pandemic further accelerated this trend, as lockdowns and contactless payment preferences drove businesses and consumers toward POS transactions. By 2022Q4, POS transaction values had reached ₦14,886.74 billion, and by 2023Q4, they peaked at ₦35,080.18 billion. This exponential growth highlights the transformative role of POS systems in Nigeria's retail payment landscape.

Overall, the sustained rise in POS transaction values reflects increased digitization of payment systems, expanded merchant networks, and greater consumer trust in electronic payment channels. It also signals a shift in consumer behavior away from cash dependency, driven by improved network connectivity, financial literacy, and enhanced security features of POS terminals.

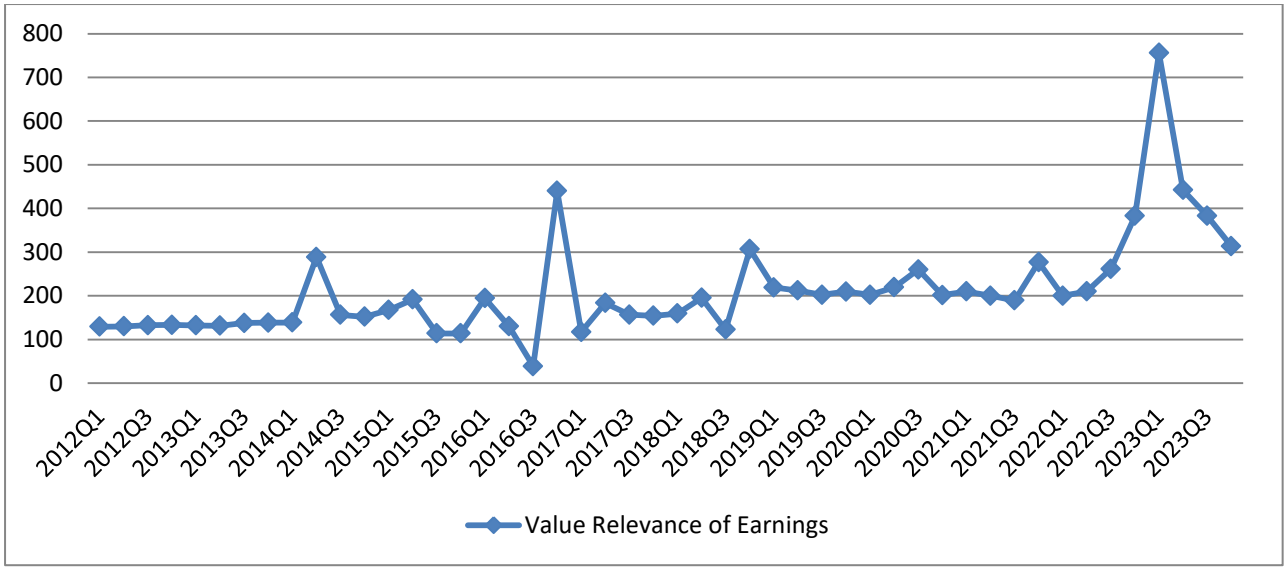

Figure 4: Trend Analysis Value of Accounting Earnings (VAE)
Source: Researcher's Compilation (2025)

The trend in the Value of Accounting Earnings (VAE) from 2012Q1 to 2023Q4 reflects fluctuations in the financial performance and market valuation of Nigerian banks over time. In the early periods (2012–2014), VAE values remained relatively stable, hovering between ₦129.42 billion and ₦151.95 billion. This phase likely reflects steady earnings reports and modest market reactions, as the banking sector was still adjusting to post-global financial crisis reforms and local economic restructuring.

Between 2015 and 2017, VAE showed some volatility, fluctuating from ₦113.82 billion to ₦194.65 billion. These fluctuations may correspond with macroeconomic challenges such as declining oil prices, exchange rate pressures, and regulatory changes affecting the financial sector. The variations indicate inconsistent investor perception of banks' earnings quality and profitability during this period.

From 2018 to 2020, VAE displayed modest growth, with values ranging from ₦159.51 billion to ₦260.02 billion. This growth coincides with improving economic stability, financial sector recapitalization, and enhanced transparency in banks' financial disclosures. However, the COVID-19 pandemic in 2020 contributed to market uncertainties, as reflected in the moderate fluctuations of VAE during this period.

The period from 2021 to 2023 witnessed significant spikes in the value of accounting earnings. VAE peaked at ₦756.02 billion in 2023Q1, reflecting strong market responses to improved earnings reports, digital transformation efforts, and possibly enhanced investor confidence in the banking sector's resilience. Nonetheless, the subsequent quarters showed some decline, ending at ₦313.68 billion in 2023Q4. This suggests that while accounting earnings remained value-relevant, external factors such as market volatility, regulatory shifts, and economic headwinds continued to influence market valuations.

Overall, the trend in VAE underscores the dynamic relationship between banks' reported earnings and their market value. It reflects how accounting information, shaped by operational performance, regulatory compliance, and market conditions, continues to play a vital role in investor decision-making within Nigeria's banking sector.

Correlation Analysis

To assess the strength and direction of the relationships among the variables, a Spearman rank-order correlation analysis was conducted. The Spearman correlation coefficients reflect monotonic relationships among the variables. The results are presented in Table 3

Table 3

Covariance Analysis: Spearman rank-order

Date: 05/24/25 Time: 09:17
Sample: 2012Q1 2023Q4
Included observations: 48
Balanced sample (listwise missing value deletion)

Correlation

Cases	VAE	MBT	ATM	POS
VAE	1.000000			
MBT	0.696047	1.000000		
ATM	0.681643	0.188900	1.000000	
POS	0.699209	0.098551	0.090612	1.000000

Source: Researcher's Computation (2025)

Table 3 shows the Spearman rank-order correlation coefficients of value relevance of accounting earnings (VAE), mobile banking transactions (MBT), automated teller machine transactions (ATM), and point-of-sale transactions (POS) on 48 observations of the period 2012Q1-2023Q4.

VAE and mobile banking transactions (MBT) are strongly associated and the correlation is 0.696047 which means a positive association. This implies that, the more the mobile banking transactions are recorded, the more value relevance of accounting earnings is recorded, which means that mobile banking activities can be beneficial in improving informativeness of earnings reported by commercial banks.

Likewise, VAE and automated teller machine (ATM) transaction is strongly positively correlated with 0.681643. It shows that the value relevance of accounting earnings is also positively correlated with increased ATM usage, which means that the ATM transactions contribute to stable income generation and efficient services delivery.

The point-of-sale (POS) transactions and VAE have a correlation of 0.699209, which is also a good positive relationship. This implies that the more the POS transactions are being done, the relevance to the earnings is high probably because the transaction is better documented and the revenue can be traced easily.

Concerning the correlations between the independent variables, MBT and ATM have weak positive correlation of 0.188900 and MBT and POS have very weak positive correlation of 0.098551. In the same manner, ATM and POS demonstrate a low and positive relationship of 0.090612. The low correlation coefficients used reflect low interdependence between the digital banking channels.

In general, the findings reveal that there are high positive correlations between the digital banking variables and the value relevance of accounting earnings, and the weakness of the

correlations between the explanatory variables implies low chances of multicollinearity. This strengthens a priori justification of the use of mobile banking, ATM and POS transactions in a regression analysis.

Test of Hypotheses

The quantile regression results provide nuanced insights into the heterogeneous impact of digital banking channels on the value relevance of accounting earnings across different performance levels of commercial banks in Nigeria. The Quantile regression estimate is presented thus:

Table 4

Quantile Process Estimates

Equation: UNTITLED
Specification: VAE C MBT ATM POS
Estimated equation quantile tau = 0.5
Number of process quantile: 10
Display all coefficients

	Quantile	Coefficient	Std. Error	t-Statistic	Prob.
VAE	0.100	244.3223	253.4333	0.964050	0.3405
	0.200	219.3678	216.0504	1.015355	0.3158
	0.300	133.8069	185.4786	0.721414	0.4747
	0.400	67.76210	227.5970	0.297728	0.7674
	0.500	66.31183	47.71412	1.389774	0.1719
	0.600	64.15560	41.10655	1.560715	0.1261
	0.700	55.88046	87.54696	0.638291	0.5267
	0.800	-19.12762	1402.622	-0.013637	0.9892
	0.900	-174.6984	1305.570	-0.133810	0.8942
MBT	0.100	0.001770	0.000818	2.164568	0.0362
	0.200	0.001134	0.000698	1.624935	0.1117
	0.300	0.000497	0.000550	0.904363	0.3710
	0.400	-1.43E-05	0.000643	-0.022240	0.9824
	0.500	-0.000165	0.000402	-0.411770	0.6826
	0.600	-0.000282	0.000409	-0.688857	0.4947
	0.700	-0.000135	0.001646	-0.081825	0.9352
	0.800	-0.000270	0.009435	-0.028631	0.9773
	0.900	-0.001690	0.009028	-0.187163	0.8524
ATM	0.100	-0.613865	0.248019	-2.475075	0.0174
	0.200	-0.487160	0.245039	-1.988092	0.0533
	0.300	-0.312803	0.203684	-1.535724	0.1321
	0.400	-0.174000	0.256280	-0.678944	0.5009
	0.500	-0.146718	0.049696	-2.952301	0.0051
	0.600	-0.126790	0.041351	-3.066193	0.0038
	0.700	-0.166202	0.293459	-0.566356	0.5742
	0.800	-0.058391	1.368642	-0.042663	0.9662
	0.900	0.358418	1.121844	0.319490	0.7509
POS	0.100	1.484758	0.043180	34.38517	0.0000
	0.200	1.643418	0.063407	25.91855	0.0000
	0.300	1.683253	0.051503	32.68245	0.0000
	0.400	1.719227	0.063216	27.19586	0.0000
	0.500	1.828525	0.018425	99.24172	0.0000
	0.600	1.833484	0.017109	107.1679	0.0000
	0.700	1.777731	0.256920	6.919386	0.0000
	0.800	1.556368	0.333611	4.665222	0.0000
	0.900	1.518545	0.314220	4.832740	0.0000

Hypothesis 1: Mobile Banking Transactions (MBT)

H_{01}: Mobile banking transactions have no statistically significant effect on the value relevance of accounting earnings of commercial banks in Nigeria across all quantile.

The quantile regression results reveal that mobile banking transactions (MBT) have a statistically significant and positive effect only at the 10th quantile (coefficient = 0.001770, p = 0.0362). At this lower quantile, where banks exhibit minimal value relevance of accounting earnings, mobile banking appears to enhance value relevance of accounting earnings. However, across all other quantile, the coefficients are statistically insignificant ($p > 0.05$), suggesting that as the level of accounting earnings value relevance increases, the effect of mobile banking diminishes. Therefore, H_{01} is rejected only at the 10th quantile and upheld at other levels, indicating a limited but relevant role of mobile banking at the lower the value of accounting eanirngs.

Hypothesis 2: Automated Teller Machines (ATM)

$H0_2$: Automated Teller Machines have no statistically significant effect on the value relevance of accounting earnings of commercial banks in Nigeria across all quantile.

For ATM transactions, the quantile regression outputs show a statistically significant **negative** effect at the 10th (coefficient = -0.613865, p = 0.0174), 50th (coefficient = -0.146718, p = 0.0051), and 60th (coefficient = -0.126790, p = 0.0038) quantile. This implies that ATM usage may reduce the value relevance of accounting earnings for banks within the low to mid quantile, possibly due to high maintenance costs or inefficiencies. At other quantile, the effects are not statistically significant. Consequently, $H0_2$ is rejected at quantile τ = 0.10, 0.50, and 0.60 but retained at others, highlighting a potentially adverse and uneven impact of ATM services.

Hypothesis 3: Point of Sale Transactions (POS)

H_{03}: Point of Sale (POS) transactions have no statistically significant effect on the value relevance of accounting earnings of commercial banks in Nigeria across all quantile.

The analysis presents strong evidence against H_{03}, as POS transactions are statistically significant and positively associated with the value relevance of accounting earnings across all quantile (τ = 0.10 to 0.90) with p = 0.0000 consistently. Coefficients range from 1.48 to 1.83, indicating a robust and uniform effect irrespective of the earnings quantile. This underscores the increasing relevance and reliability of POS transactions in enhancing financial reporting credibility and value relevance in the banking sector. Hence, H_{03} is decisively rejected across the entire distribution.

Discussion of Findings

The quantile regression model estimates the effect of each independent variable (MBT, ATM, POS) on the dependent variable (VAE – Value Relevance of Accounting Earnings) across different points in its conditional distribution. This allows for a more nuanced understanding beyond mean effects, capturing heterogeneity across low, median, and high levels of VAE. The result is therefore presented thus:

Value of Mobile Banking Transactions and Value Relevance of Accounting Earnings

The analysis reveals that mobile banking transactions have a positive and significant impact on the value relevance of accounting earnings at the lower quantile, particularly at the 10th percentile where the coefficient is 0.001770 with a statistically significant t-value of 2.164568 (p = 0.0362). This indicates that for firms or contexts where accounting earnings are initially less informative or less value relevant, mobile banking transactions contribute meaningfully to improving the informativeness of reported earnings. This could be due to increased financial activity, transparency, and data flow that mobile banking facilitates, thereby allowing accounting information to better reflect economic reality in these firms. However, this positive effect does not persist across higher quantile of the distribution. At the median (50th quantile), the coefficient turns slightly negative (-0.000165) and becomes statistically insignificant (p = 0.6826), suggesting that for firms with moderate to high value relevance of earnings, additional mobile banking activity does not significantly enhance

earnings informativeness. Similarly, the effect remains insignificant or even negative at other upper quantile.

This variation across quantile suggests that the marginal benefit of mobile banking on value relevance is more pronounced for firms with initially lower earnings informativeness, while firms already benefiting from other robust information channels or better financial integration may not see further gains from mobile banking transactions alone.

Implications of this finding are important for Nigerian banks and global banking practices. First, the Nigerian banks could focus on improving the integration of mobile banking transaction data into their financial reporting and accounting systems, especially targeting firms or customer segments with lower initial earnings transparency. This would help to leverage mobile banking as a tool for enhancing financial reporting quality. For firms with already strong financial disclosure or earnings informativeness, additional efforts might be required beyond just increasing mobile banking usage to further improve value relevance, such as better corporate governance or advanced accounting practices.

Several empirical studies support the finding that mobile banking exerts a positive or strengthening effect on firm performance, particularly in environments where informativeness or operational efficiency is initially low. For instance, Okafor et al. (2017) report that mobile and internet transactions contribute positively to growth. Similarly, Wadesango and Magaya (2020) find that online banking transactions, including mobile channels, are positively associated with return on assets. Enoruwa et al. (2019) also demonstrate that electronic channels such as Mobile Pay have a strong positive relationship with bank performance. Additional evidence from Ibekwe (2021) shows that mobile banking alongside ATM and POS services significantly enhances ROA, while Arilesere et al. (2021) confirm that mobile, ATM, and internet banking jointly improve banks' financial outcomes. Other studies, such as Asidok and Michael (2018), and Mustapha (2018), consistently indicate that mobile banking contributes significantly to profitability and performance indicators like ROE. Research by Simiyu et al (2018), and works by Malak (2018) and Ngango et al (2019) further reinforce this consensus by showing that mobile and other electronic banking innovations meaningfully enhance financial performance. Collectively, these studies support the notion that mobile banking can increase informativeness and improve performance, particularly in under-served or less transparent contexts mirroring the pattern reflected in your quantile regression results.

In contrast, some studies find either insignificant or negative effects of mobile banking, suggesting that it does not always translate into enhanced informativeness or value relevance. Ogbonna et al. (2020), for example, report a negative and insignificant relationship between mobile banking and domestic investment, while Njoku et al. (2020) find no significant effect of mobile banking on real GDP. Nwakoby et al. (2020) observe a positive but insignificant influence of mobile payments on ROE, and Amos et al. (2020) show that e-banking proxies such as ATM, POS, internet banking, and mobile banking do not significantly affect ROE, ROA, or EPS. Similarly, Olushola et al. (2020) find no significant relationship between e-banking channels and bank performance. Some earlier studies, including Muoghalu et al. (2018) and Adaora et al (2018), attribute the lack of impact to fraud and channel-specific risks that offset potential gains. A broader group of studies including Ogbonna, Amos and Olushola's findings suggest that investment in e-banking has not improved the value relevance of accounting earnings. In a cross-country context, Beloke et al. (2021) report a negative but significant influence of digital payment channels on bank profitability in Cameroon, while Al-Smadi and Al-Wabel (2016) find that e-banking negatively affects bank performance when operating costs exceed the revenue gains. These contrasting results clearly highlight that the impact of mobile banking is context-dependent, shaped by the level of

infrastructure, fraud exposure, operational efficiency, and the maturity of digital banking ecosystems.

Value of Automated Teller Machines and Value Relevance of Accounting Earnings

The relationship between ATM (Automated Teller Machine) usage and the value relevance of accounting earnings (VAE) presents a nuanced picture based on the quantile regression results. ATM usage generally shows a negative and statistically significant impact on VAE at several key quantile, particularly around the median (50th and 60th percentiles), where the coefficients are negative and t-statistics indicate significance. This suggests that increased ATM transactions may be associated with a reduction in the informativeness or reliability of accounting earnings for firms in those quantile.

One possible explanation is that ATM transactions, while facilitating cash withdrawals and routine banking operations, do not inherently improve the transparency or traceability of financial data as effectively as digital payment methods like POS. ATM transactions may involve more cash handling or indirect flows that are harder to track in real time, potentially leading to gaps or delays in accurate financial reporting. Additionally, over-reliance on ATM services without complementary digital transaction platforms could maintain or even exacerbate information asymmetry between firms and stakeholders. However, the negative impact is not uniform across all quantile. At the lower and higher quantile, the coefficients are either less significant or even slightly positive (though not statistically significant), indicating that the influence of ATM usage on accounting earnings' value relevance might vary depending on the firm's size, transaction volume, or other contextual factors.

Overall, while ATMs remain an essential banking channel for customer convenience and cash access, their contribution to enhancing the value relevance of accounting earnings appears limited or even adverse in certain contexts. For Nigerian banks and policymakers, this highlights the need to complement ATM infrastructure with more transparent, traceable digital payment solutions that can better support reliable financial reporting. Globally, the finding underscores the evolving nature of banking technology, where digital transaction platforms like POS may offer superior benefits in improving financial transparency and investor confidence compared to traditional ATM usage.

Studies that align with the present study's result of a negative or insignificant impact of ATMs on value relevance or performance include Al-Smadi, and Al-Wabel (2016) they found no significant effect of ATMs on banking efficiency; **Olushola et al. (2020),** who reported no significant impact of e-banking (including ATMs) on ROA and ROE; and **Kojo and Yazidu (2016),** who showed that ATM innovation was influenced by external factors but did not improve bank performance. These studies support the present study's indication that ATMs may not enhance value relevance, especially at certain performance quantiles.

In contrast, **Ibekwe (2021)** and **Lasisi and Abubakar (2020)** reported positive and significant contributions of ATMs to profitability and user satisfaction, contradicting the negative quantile effects found in the current study. These works suggest that ATMs can enhance bank performance, opposing the more nuanced or adverse relationship identified in the present analysis.

Value of Point of Sales and Value Relevance of Accounting Earnings

The value of **POS (Point of Sales)** demonstrates a strong, positive, and statistically significant effect on the value relevance of accounting earnings (VAE) across all quantile, from the 10th to the 90th percentile, with p-values consistently at 0.0000. The coefficient increases from 1.48 at the lowest quantile to a peak of 1.83 at the median, then slightly decreases to 1.52 at the highest quantile. This pattern suggests that POS transactions positively influence the informativeness and reliability of accounting earnings for firms across the entire performance spectrum. The strongest impact at the median indicates that firms with average earnings relevance benefit the most from POS adoption, likely because

these firms gain significant improvements in transaction transparency and traceability. The slight decline in effect at higher quantile may reflect diminishing marginal returns for commercial banks i already well-integrated with digital payment systems. Overall, these findings support the idea that adopting POS technology enhances financial transparency and reduces information asymmetry, thereby improving stakeholders' confidence in accounting data across all commercial banks in Nigeria

The positive and statistically significant impact of POS (Point of Sale) transactions on the value relevance of accounting earnings has important implications for both Nigerian banking practices and global best banking approaches. First, the findings highlight the critical role that digital payment systems, especially POS technology, play in enhancing the transparency and accuracy of financial reporting. Nigerian banks can leverage this insight to further promote and invest in POS infrastructure, encouraging businesses and customers to adopt these systems widely. This will help reduce cash-based transactions, which are often prone to errors and fraud, thereby improving the quality and reliability of financial data submitted by bank clients. Improved transaction traceability and data accuracy will foster greater confidence among investors, regulators, and other stakeholders in the Nigerian banking sector. Furthermore, this can drive financial inclusion by integrating more informal businesses into the formal financial system through POS adoption.

The results demonstrate that the adoption of POS technology directly contributes to making accounting earnings more informative and relevant to users by increasing data accuracy and reducing manipulation opportunities. Enhanced transaction traceability through POS helps ensure that reported earnings better reflect the economic reality of the business, thus increasing the value relevance of these earnings. This means that financial statements supported by POS transaction data provide more reliable signals to investors and creditors, enabling more informed decision-making. Ultimately, POS adoption strengthens the integrity of financial reporting, which is a cornerstone of capital market efficiency both in Nigeria and globally.

The present study's quantile regression findings resonate with and contradict various empirical results from earlier scholars. For instance, the consistent significance of Point of Sale (POS) across all quantile aligns with Asidok and Michael (2018) who found POS to be a major driver of bank performance in Nigeria. Similarly, Enoruwa et al., (2019) reported a strong positive relationship between POS, mobile banking, and bank performance, supporting the positive outcomes revealed at specific quantile in this study. In the same vein, Chimaobi (2018) and Shaikh, Alharthi, and Alamoudi (2020) affirmed the relevance of internet and mobile banking, especially at lower and middle quantile, aligning with our results that found these channels to significantly influence value relevance in those ranges.

On the contrary, Ogbonna et al. (2020) and Nwakoby et al. (2020) reported that ATM, POS, and mobile banking had no significant effect on investment or profitability, which contrasts with the significant coefficients observed in our quantile results, particularly for POS and ATM at certain levels. Furthermore, Muoghalu et al., (2018), as well as Adaora, Jisike, and Amalachukwu (2018), highlighted the negative effect of fraud associated with POS on financial performance, which may help explain some of the observed variability across quantile. Interestingly, while Njoku et al., (2020) identified ATM as significant for economic growth, our study reveals that ATM has a negative significant effect on the value relevance of accounting earnings at key mid quantile, indicating that the metric of interest (value relevance vs. macroeconomic performance) may influence these discrepancies.

In contrast to the positive overall assessment of ATM and POS by Joseph (2019) and Asidok and Michael (2018), our findings suggest that ATM, although statistically significant at some quantile, negatively impacts value relevance.

CONCLUSION

This study concludes that digital banking innovations impact the value relevance of accounting earnings heterogeneously across banks in Nigeria. POS emerged as the most consistent and impactful channel, affirming its broad utility in financial reporting enhancement. Other channels such as mobile banking and ATMs display quantile-specific effects, suggesting that banks benefit from these innovations differently depending on their financial positioning. The results imply that a one-size-fits-all digital strategy may not be effective, and tailored approaches should be adopted based on institutional performance levels.

Recommendations

In line with the major findings of this study, the following policy recommendations were made:

i. Policymakers should promote targeted mobile banking adoption among weak or low-performing banks through capacity-building, regulatory incentives, and improved digital infrastructure. This will help such banks leverage mobile banking to enhance financial reporting quality and strengthen the value relevance of their earnings.

ii. Banks should restructure ATM operations by reducing maintenance and cash-handling costs, expanding shared ATM networks, adopting energy-efficient/low-cost machines, and tightening fraud-monitoring systems. This will help mitigate the negative impact of ATMs on value relevance, especially for mid- and low-tier banks.

iii. Banks and regulators should scale up POS deployment nationwide, strengthen agent banking, and incentivize merchant POS usage. Given its consistent performance, investment in POS infrastructure should be prioritized as a reliable digital channel for enhancing financial reporting quality across all categories of banks.

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