# IMPACT OF DIGITAL FINANCE ON STOCK MARKET PERFORMANCE IN NIGERIA (2012M1-2021M12)

**Gbenga Festus Babarinde[A], Chinyere Catherine Onyejiaku[B], Ayodeji Michael Obadire[C], Awah Pridy Ambam[D], Josaphat Uchechukwu Joe Onwumere[E]**

[A] Ph.D. Candidate in Banking and Finance. Department of Banking and Finance, University of Nigeria, Enugu Campus. Nigeria. E-mail: liftedfgb@gmail.com Orcid: https://orcid.org/0000-0002-5613-9883

[B] Ph.D in Management. Department of Management, University of Nigeria, Enugu Campus. Nigeria. E-mail: onyejiaku@unn.edu.ng

[C] Ph.D in Accounting and Finance. School of Finance and Professional Studies, Botswana Accountancy College, Gaborone, Botswana. E-mail: ayodejio@bac.ac.bw Orcid: https://orcid.org/0000-0003-4710-2680

[D] Ph.D. Candidate in Banking and Finance. Department of Banking and Finance, University of Nigeria, Enugu Campus. Nigeria. E-mail: ambampridy@yahoo.com

[E] Professor of Banking/Finance and Economic Development. Department of Banking and Finance, University of Nigeria, Enugu Campus. Nigeria. E-mail: josaphat.onwumere@unn.edu.ng

Intern. Journal of Profess. Bus. Review. |Miami, v. 9 | n. 3| p. 01-34 | e04340 | 2024.

1

## IMPACTO DAS FINANÇAS DIGITAIS NO DESEMPENHO DO MERCADO DE AÇÕES NA NIGÉRIA (2012M1-2021M12)

**RESUMO**
**Objetivo:** O mercado de ações há muito tempo tem desempenhado um papel significativo na promoção do crescimento econômico nos países em desenvolvimento, fornecendo fundos de capital para formação de capital. Os avanços tecnológicos, particularmente na tecnologia digital, influenciaram significativamente os serviços financeiros, tornando-se um aspecto crucial dos assuntos financeiros. Em especial, os serviços de pagamento digital ganharam destaque na Nigéria, oferecendo potenciais melhorias ao mercado acionário nigeriano. Apesar disso, parece haver uma percepção de uma lacuna entre as transações de financiamento digital e o desempenho do mercado acionista nigeriano. Portanto, este estudo centrou-se no impacto do financiamento digital no desempenho do mercado de ações na Nigéria. O estudo teve como objetivo avaliar especificamente a influência das transações de financiamento digital de Automated Teller Machine (ATM), Point of Sales (POS), mobile payment (mobilepay) e web-based payment (webpay) no índice de capitalização do mercado de ações na Nigéria.
**Metodologia:** Este estudo, realizado para o período de janeiro de 2012 a dezembro de 2021, utilizou a regressão de Least Squares Ordinários Totalmente Modificados para investigar o impacto do financiamento digital no desempenho do mercado de ações na Nigéria. Os dados secundários mensais foram obtidos no Boletim Estatístico, Estatísticas e Relatórios Econômicos Mensais do Banco Central da Nigéria.
**Conclusões e conclusões:** as conclusões empíricas revelaram que as transações financeiras digitais em ATM, POS, dispositivos móveis e na Web tiveram um impacto positivo e significativo no rácio de capitalização do mercado bolsista na Nigéria. Consequentemente, o estudo concluiu que o financiamento digital contribui para melhorar o desempenho do mercado bolsista no país
**Originalidade/valor:** Para promover o crescimento do mercado de ações, o estudo recomenda expandir a implantação e o uso de canais de financiamento digital, como ATM, POS, celulares e baseados na web, incentivando sua utilização para transações do mercado de ações pelos participantes.

**Palavras-chave:** ATM, Finanças Digitais, Índice de Capitalização de Mercado, Mobilepay, Mercado de Ações, POS, Webpay.

## IMPACTO DE LAS FINANZAS DIGITALES EN EL RENDIMIENTO DEL MERCADO DE VALORES EN NIGERIA (2012M1-2021M12)

**RESUMEN**
**Propósito:** El mercado de valores ha desempeñado durante mucho tiempo un papel significativo en la promoción del crecimiento económico en los países en desarrollo, proporcionando fondos propios para la formación de capital. Los avances tecnológicos, en particular en la tecnología digital, han influido significativamente en los servicios financieros, convirtiéndose en un aspecto crucial de los asuntos financieros. En particular, los servicios de pago digitales han ganado prominencia en Nigeria, ofreciendo mejoras potenciales al mercado de valores nigeriano. A pesar de ello, parece percibirse una brecha entre las transacciones financieras digitales y el rendimiento del mercado bursátil nigeriano. Por lo tanto, este estudio se centró en el impacto de la financiación digital en el rendimiento del mercado de valores de Nigeria. En concreto, el estudio pretendía evaluar la influencia de las transacciones de financiación digital de los cajeros automáticos (ATM), los puntos de venta (POS), los pagos por móvil (mobilepay) y los pagos por Internet (webpay) en el índice de capitalización bursátil de Nigeria.
**Metodología:** Este estudio, realizado para el periodo comprendido entre enero de 2012 y diciembre de 2021, utilizó la regresión por mínimos cuadrados ordinarios totalmente modificada para investigar el impacto de la financiación digital en el rendimiento del mercado bursátil en Nigeria. Los datos secundarios mensuales se obtuvieron del Boletín Estadístico, Estadísticas e Informes Económicos Mensuales del Banco Central de Nigeria.
**Resultados y Conclusiones:** los resultados empíricos revelaron que las transacciones financieras digitales en cajeros automáticos, puntos de venta, dispositivos móviles y la web tuvieron un impacto

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 3 | p. 01-34 | e04340 | 2024

**2**

positivo y significativo en el coeficiente de capitalización del mercado de valores de Nigeria. En consecuencia, el estudio concluyó que las finanzas digitales contribuyen a mejorar el rendimiento del mercado de valores en el país.

**Originalidad/Valor:** Para promover el crecimiento del mercado de valores, el estudio recomienda ampliar el despliegue y el uso de canales de financiación digital como los cajeros automáticos, los puntos de venta, los dispositivos móviles y la web, fomentando su uso para las transacciones bursátiles por parte de los participantes.

**Palabras clave:** ATM, Finanzas Digitales, Índice de Capitalización Bursátil, Mobilepay, Mercado de Valores, POS, Webpay.

## 1 INTRODUCTION

Technology has been an enabler to the provision of financial services since man has learnt to embrace the former in their financial affairs. Recently, of particular significance is the digital technology and its application to the financial services industry. Every aspect of modern life is transformed by the advent of digital technology and most electronic devices and machinery incorporate digital technology (Goodman, 2018). Consequently, digital financial services are provided by both banks and the wide range of non-bank financial institutions. Thus, digital finance, has found to expand the range of financial services, and also promotes in financial inclusion. Digital technologies also offer affordability and convenience to consumers of financial services to save, make payments, access credit, and obtain insurance. Thus, due to attendant benefits of internet-based digital technologies, many developing countries recently advocated for the adoption of digital economy thus facilitating capital flows from rich to poor countries (Okoyeuzu & Isa, 2020).

Innovative applications of digital technology for financial services, are applied to alter the interface between financial consumers and service providers and thereby helping to improve communication as well as consumers' engagement (Organisation for Economic Co-operation and Development, 2018). Digital financial services and products have also been found to be convenient, speedy, simple, and user-friendly and thus promoting greater financial inclusion (Ravikumar, 2019). The 2007 to 2009 global financial crisis served as an impetus to the application of digital finance innovation by financial institutions in their financial transactions like processing of cross border payments, management of customers' account (Ozili, 2023). The rationale behind considering digital finance not only as an instrument to promote financial inclusion but also its perceived potential of promoting financial market activities in general and capital market performance, as argued by Uduk (2018), is that, access to finance can encourage

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 3 | p. 01-34 | e04340 | 2024

**3**

investment in new and more productive technologies, and consequently help business expand in terms of size and complexity of operations. As a result of business expansion, therefore, business could approach the stock market for more funding and the attendant benefits of listing. Further argued by Uduk (2018) is the fact that when financial systems become more inclusive, they help broaden financial markets and make policies more effective.

Deposit money banks, financial technology firms, insurance companies, asset management firms and the stock market have been considered to be at the forefront in the deployment of Automated Teller Machine (ATM), web payment, Nigerian Inter-Bank Settlement System (NIBSS) payment, and Point-of-Sales (POS) for financial transactions (Igoni et al., 2021). The rationales behind the provision of digital finance are to reach larger audience of unreached customers; to increase financial inclusion; to increase efficiency of delivery of service; to improve quality of service; for revenue growth; offering of new products and services enabled by technology; and to reduce cost to both companies and customers (Kambale, 2018). Furthermore, digital finance aims to capture new market segments; to improve and differentiate; to create new business models to reach mass market clients; to reduce churn and, to cross-sell new payment services (Holtmann, 2016).

Due to the perceived benefits of digital finance and in line with the trends in other countries, Nigeria, through the Central Bank of Nigeria (CBN), launched the National Financial Inclusion Strategy (NFIS) in 2012 to ensure that more than 80% of bankable adults in Nigeria have access to financial services targeted at the low-income earners by 2020. The digital payment media in Nigeria include ATM, web payment, NIBSS instant payment (NIP), POS, mobile payment, NIBSS Electronic Funds Transfer (NEFT), m-cash, e-bills pay, Remita, NIBSS Automated Payment Services (NAPs), and central pay while the traditional payment platform is basically through the use of cheques and cash. From the launch of the National Financial Inclusion Strategy (NFIS), and the attendant benefits, then, the traditional mode of payment in Nigeria started declining over the years and it has reduced greatly from a total of cheque transactions worth ₦29,436.02billion in 2009 to ₦10,097.87303billion in 2021 (CBN Statistical Bulletin, 2022). However, (CBN Statistical Bulletin, 2022), the electronic/digital form of payment increased considerably from a total of ₦30,081.07 billion in 2009 to a total of ₦448,943.6872biilion in 2021.

The role of financial market in promoting the growth of the economy has been documented in literatures (Akintola et al. (2020), Keji (2020), Abere et al. (2021), Yunus et al. (2022), Sulaiman et al. (2023)). A prominent financial market where long-term investment

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 3 | p. 01-34 | e04340 | 2024

**4**

funds are pooled for trade, investment and business is the stock market. Stock market describes a financial market for trading in long term financial assets such as shares, stocks, and other equity instruments and the market serves as a platform for raising capital by business firms for investments and trading by individual and for raising of public loans and equity by the government. The market also provides platform for businesses to access funds needed for business growth and development. According to Onwumere et al. (2012), the capital market connects the financial sector with other non-financial sectors of the economy and, in the process, facilitates growth and economic development. The authors further observe that capital market achieves this via the mobilization of long-term savings that can be channelled to long-term investment; intermediation of monetary form from surplus sectors to deficit sectors, and facilitation of firms' ability to raising funds to finance their investment in real assets.

Statistics from CBN Statistical Bulletin (2021) shows that pre-2012 (that is, from 2002 to 2011), the Nigerian stock market (equities only) equity market capitalization stood at an average value of ₦4732.50029billion. However, between years 2012 through 2021, the average stock market capitalization (equities only) was ₦13,442.80billion. Furthermore, the Nigerian Exchange Group (NGX) market capitalization (for equities only) in 2012 stood at ₦8,974.45billion but the indicator increased to ₦22,296.84billion in 2021. The comparative analysis of these indicators of stock market performance in Nigeria suggests a general increase in the observed performance indicators in the period under review (2012-2021). Despite the increased use of financial services delivered through digital channels in Nigeria (Okafor, 2019; CBN Statistical Bulletin, 2020; Igoni et al. 2021), there is a perceived disconnect between this usage and its translation to improving stock market performance in Nigeria. Notwithstanding, the expansions in digital finance in Nigeria from 2012, the extent to which digital finance impacts the stock market has remained largely unclarified empirically (Igoni et al., 2021). Okafor (2019) asserts that financial innovation has the potential of eliminating with the traditional means of executing financial transaction in Nigeria in the future. In the same vein, Ravikumar (2019) posits that technological inventions and innovations caused upheaval in the financial market. Also, Ozili (2020) compared the digital finance in US, UK, India and Nigeria and indicates that Nigeria has higher debit card usage than India while India has higher credit card usage than Nigeria. According to the 2017 report of digital financial services in Nigeria, Nigeria has the highest number of licensed mobile money operators, but the low adoption rates, by the under-banked and unbanked (David-West et al., 2017).

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 3 | p. 01-34 | e04340 | 2024

**5**

Digital finance is relatively an emerging issue in the field of Finance and as such empirical literature on the subject is still growing but less adequate. Although, some studies have been carried on digital finance but with different focus in terms of its impact. For instance, past studies had focused on information communication technology (ICT) and stock market nexus (Okwu (2016); electronic payment and stock market capitalization (Igoni et al., 2021)); financial innovation, stock market development, and economic growth (Qamruzzaman, and Wei (2018)); digital finance and financial inclusion (Ozili (2018), Durai and Stella (2019), Shofawati (2019), Uzoma et al. (2020)); digital finance/digital financial inclusion on economic growth in Nigeria (Igoni et al., 2020; Thaddeus et al., 2020)); digitization transformation and financial markets (Shukla and Nerlekar (2019)); technological development and stock trading (Aldyan et al. (2019)); digital financial inclusion and economic growth (Thaddeus et al. (2020)). In Nigerian context, Igoni et al. (2020) investigated the impact of digital finance and economic growth. Also, Igwemeka et al. (2020) evaluated digital finance and financial inclusion in Nigeria. Furthermore, Igoni et al. (2021) analysed the link between electronic transactions and stock market performance in the Nigerian financial ecosystem. Also, recently, Appah et al. (2023) analysed the nexus between digital finance and Nigeria's economic growth. Particularly, though, Igoni et al. (2021) explored the linkage between electronic transactions and the performance of the Nigerian stock market between 2012 and 2019; the study however merely examined these transaction channels as merely electronic transactions as others did but failed to consider these as digital finance. The researchers are currently unaware of any study, particularly in a developing country like Nigeria; that has explored the nexus between digital finance and the stock market performance. This observed empirical lacuna is what this current study attempts to fill.

Therefore, the main objective of the study was to examine the impact of digital finance on the performance of stock market in Nigeria within the period, January 2012 to December 2021 (2012M1-2021M12). Specifically, the study aims to: examine the impact of Automated Teller Machine (ATM) digital finance transactions on stock market capitalization ratio in Nigeria; evaluate the impact of Point of Sales (POS) digital finance transactions on stock market capitalization ratio in Nigeria; investigate the impact of mobile-based digital finance transactions on stock market capitalization ratio in Nigeria; and assess the impact of web-based digital finance transactions on stock market capitalization ratio in Nigeria.

The four hypotheses for the study expressed in their null forms are stated thus:

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 3 | p. 01-34 | e04340 | 2024

**6**

a) Automated Teller Machine digital finance transactions did not have positive and significant impact on stock market capitalization ratio in Nigeria;

b) Point of Sales digital finance transactions did not have positive and significant impact on stock market capitalization ratio in Nigeria;

c) Mobile-based digital finance transactions did not have positive and significant impact on stock market capitalization ratio in Nigeria; and

d) Web-based digital finance transactions did not have positive and significant impact on stock market capitalization ratio in Nigeria.

## 2 LITERATURE REVIEW

## 2.1 CONCEPTUAL REVIEW

### 2.1.1 Meaning of Digital Finance

Digital finance, also known as internet finance, has been described as the merger of digital and information technology with traditional financial services (Wang et al., 2020). Digital finance also refers to financial services delivered over digital infrastructure (Okoyeuzu et al., 2019). The term has also been popularly conceptualized as financial services delivered through mobile phones, personal computers, the internet or cards linked to a reliable digital payment system (Uduk, 2018; Ozili, 2018; Durai & Stella, 2019; Shofawati, 2019; Igoni et al., 2020; Ugwuanyi et al. 2020; Igwemeka et al., 2020). Appah et al. (2023) simply defined digital financial services (digital finance) as a suit of financial services utilized by customers via digital technology. According to Ndungu and Moturi (2020), digital finance is the use of technology innovations in the provision and delivery of financial services. Igoni et al. (2020) also defined digital finance as a financial transaction via an electronic environment or a branchless financial services delivery outside conventional bank branches.

Furthermore, According to Moufakkir and Mohammed (2020), digital finance, variously called electronic banking, internet banking, mobile banking, online banking, cashless banking, branchless banking, service technology, digital banking and internet/self-service, can be defined as a suit of financial and banking services delivered to consumers via digital channels. Also, Manyika et al. (2016) and Dara (2018) defined digital finance as a set of financial products and services provided through digital infrastructures and platforms with

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 3 | p. 01-34 | e04340 | 2024

7

minimum use of cash and with less need for direct involvement of traditional bank branches. Therefore, digital finance can be described as the embodiment of financial products, business operations and process, technologies, as well human interface that are geared towards satisfying the needs of customers using digital channels like ATM, POS, internet, personal computers, mobile devices and cards linked to a reliable system.

## 2.1.2 Importance of Digital Finance

Ozili (2020) posits that digital finance helps improve access to financial services and instruments, and are easy to use and are offered at a low cost. Further noted by the author is that innovative digital finance can reduce barriers to traditional finance. According to Waldron and Sotiriou (2017), digital financial service can be accessed remotely and securely and thereby allow users to transfer funds, access loans, save/store money, and pay bills. Furthermore, Ramos and Steiner (2020) also submit that digital finance can make it easier to raise investment funds for green projects and performance. Other benefits of digital financing according to the authors are that it broadened access to financial services for people and also promotes financial inclusion. Moreover, Lauer and Lyman (2015) also posit that digital finance has the potential to provide affordable, convenient and secure banking service to the poor; and also leads to an increase in access to finance among poor individuals.

Similarly, the other importance of digital finance according to Ozili (2018) are that digital finance: reduces the cost of financial intermediation for banks and fintech providers; enhances banking performance in terms of profitability; improves the payment system; improves the welfare of the individuals and businesses; facilitates consumers' financial decision; curtails the circulation of fake money; facilitates control of customer's finance; increases revenue generation to digital finance providers; and ultimately promotes economic growth and economic stability. Other benefits of digital finance to customers, according to Uduk (2018), are that it leads to greater control of customers' personal finance, enhances quick financial decision-making, and ensure fast payments service.

Moreover, digital finance promotes financial inclusion, leads to economic development; digital payments can reduce costs to recipients; digital finance can increase the incentive to save; digital payments improve risk management by making it easier to receive support from social networks that can act as safety nets; and digital payments speed up delivery (Ugwuanyi et al., 2020).

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 3 | p. 01-34 | e04340 | 2024

**8**

### 2.1.3 Drawbacks of Digital Finance

Some of the drawbacks of digital finance include threat of cyber-attacks and security problems, high costs of transactions, and lack of users' knowledge of technology. Furthermore, Ozili (2018) asserts that thigh cost of customers' data security reduces efficiency and profitability. Furthermore, Ozili observes that there is also lack good quality and affordable digital connectivity and digital finance is likely to benefit individuals in the urban areas with higher income more than those people in the rural areas. Similarly, lack of enabling policy and regulatory environments for full-scale digital finance is another limitation identified by Ozili.

Other problem of digital finance identified by Ugwuanyi et al. (2020) is that corporate providers of digital finance services are discriminatory and skewed towards high-and middle income customers as against low-income and poor customers, thereby leading to lower financial inclusion for poor and low-income customers. The authors noted also bias in the provision of digital finance can be geographical because digital finance providers tend to withdraw the provision of specific digital finance services to high-risk rural areas that do not have the supporting infrastructure to sustain specific digital finance services. The author reiterated the existence of educational bias in the provision of digital financial services most especially when the net monetary value of providing digital finance to poor communities is very negligible, digital finance providers, can choose to focus less on the delivery of digital finance to poor and uneducated communities (Ugwuanyi et al., 2020).

It can be seen from the literature that digital financial illiteracy, dearth of enabling legal and regulatory frameworks, cyber-attacks and security issues, bias of providers of digital financial services, high cost of acquisition and maintenance of digital finance infrastructure, constitute the cardinal limiting factors confronting the successful operation of digital finance.

### 2.1.4 Overview of Digital Finance in Nigeria

Prior to the embrace of electronic means of payment, the Nigerian payment system was dominated by the use of cash with less use of cheques. In Nigeria, the traditional mode of payment is payment through cheques and while electronic mode involved payment through ATM, POS, web pay, mobile pay, NIBSS instant payment (NIP), NIBSS electronic funds transfer (NEFT), M-Cash, e-bills pay, Remita payment, NIBSS Automated Payment Services

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 3 | p. 01-34 | e04340 | 2024

**9**

(NAPs), and central pay. The computation of NIP and NEFT started in the year 2012, while that of m-Cash, e-Bills pay, Remita, NAPS and Central Pay started in the 2017.

From 2012 when the Nigerian populace discovered digital finance had come to stay, and the attached benefits, the traditional mode of payment started declining. The value of traditional mode of payment (cheque-based transaction) declined greatly from 97.86 per cent in 2009 to 2.61 per cent in 2019; while the digital form of payment increased considerably from 2.14 per cent in 2009 to 97.39 per cent in 2019. Specifically, the total of 167,014.33 billion Naira were paid through the electronic means in the 2019 while the traditional mode only accounted for 4481.67billion Naira of the total of 171,496.00 billion Naira paid.

In Nigeria, digital/electronic payment transactions though still evolving and expanding, but are of different sorts, namely, ATM, POS, web pay, mobile pay, instant payment, electronic funds transfer, m-cash, e-bills pay, Remita, automated payment services, and central pay. For instance, between 2012 and 2019, statistics (CBN Statistical Bulletin, 2020) shows that the annual average transactions for cheques, ATM, mobile pay, NIP, POS and web pay were ₦6166.187 billion, ₦4610.268billion, ₦1234.655billion, ₦42528.35billion, ₦1090.785billion and ₦214.4400billion respectively. Between 2012 and 2019, the total monetary values of transactions in Nigeria in respect of cheques, ATM, mobile pay, NIP, POS and web pay were ₦49,329.50 billion, ₦36,882.15billion, ₦9,877.24billion, ₦340,226.83billion, ₦8,726.28billion and ₦1,715.52 billion respectively.

Furthermore, a comparative analysis of the monetary value indicators of digital finance in Nigeria from year 2012 to 2019 indicates upward trends as against the downward trend of the non-digital form of payment as represented by the volume of cheque transaction in Nigeria. For instance, from the 2012's figure of ₦1984.66billion ATM transactions moved to ₦6,512.61billion in 2019 while the increased use of POS in 2012 totalled ₦48.01billion in 2012 also became ₦3,204.75 billion in 2019. The trio (webpay, mobile pay and NIP transactions) in 2012 whose values stood at 31.57 billion, ₦ 31.51 billion and ₦ 3,891.03 billion respectively but in 2019, their respective values have increased to ₦478.14 billion, ₦5,080.96 billion and ₦105,222.57 billion. On the other hands, the cheque transactions, however reduced from ₦7,461.63billion in 2012 to ₦4,481.67billion in 2021.

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 3 | p. 01-34 | e04340 | 2024

**10**

### 2.1.5 Stock Market Performance

A stock market, also called equity market, is an aspect of the capital market where shares and stocks and other equity instruments are traded. A stock market is a financial market where long term financial securities in the form of shares, stocks, and other equity instruments and securities are traded. The Nigerian Exchange Group (NGX) is the platform of the Nigerian stock market. It is an aspect of the capital market of which debt market, derivative market and a market for any long term financial assets and liabilities are other aspects. For the purpose of this study, stock market is the equity segment of the capital market.

Financial performance is a type of performance that can be quantified in monetary terms like profitability (returns), growth, liquidity, volatility, concentration, and integration etc. Stock market development as a multidimensional concept does not have a single index of measurement. Some of the angles of measuring stock market development include stock market size, liquidity, volatility, concentration, integration, returns, resilience, etc. According to El-Wassal (2013), reconsiders the concept of stock market development and suggests five dimensions for assessing it, which are stock market size, liquidity, volatility, concentration and integration with the real sector. The stock market performance of consideration in this study is size (growth). The most popular indicator of stock market size is market capitalization ratio (measured as the ratio of market capitalization to GDP). Market capitalization is the market value of all listed shares in the Exchange. This ratio relates the market size to the size of the economy and hence indicative of the market capability for capital mobilisation and risk diversification.

### 2.1.6 Overview of the Nigerian Stock Market

A Stock Exchange is a market for the sale and purchase of securities of corporations and municipalities (Nurudeen, 2005). The Nigerian Exchange Group (NGX) started as the Lagos Stock Exchange registered under the Business Name Act in 1959 and incorporated/established by created by S.383 of the Lagos Stock Exchange Act 1961. It was incorporated on 5th September 1960 under the Companies Act as accompany limited by guarantee and began operations on 5th June, 1961. The Nigerian Exchange Group is the centre point of the Nigerian capital market while the Securities and Exchange Committee (SEC) serves as the apex regulatory body for the capital market in Nigeria. The Exchange operates through

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 3 | p. 01-34 | e04340 | 2024

**11**

two main segments, the main exchange and the second tier securities market where listing requirements are less stringent for small and medium enterprises. Instruments traded in the Nigeria stock market include shares, stocks, debentures, loans stock, preferences shares.

The Nigerian Exchange Group which started operations with only 19 securities worth 80million Naira in 1961, has as at December 2020, 1,156,830 units of securities, made up of federal government development stocks, state government bonds, corporate/industrial loans and preference shares and equities, all with a total market capitalization of approximately ₦38,589.58billion naira (CBN, 2020). As at 1981, the total volume of transactions at the Nigerian Stock Exchange was 10,199 units consisting of 10,081 industrial loan stocks and 118 units of government stocks. As at 2021, there were a total of 1,060,017 units of securities traded at NSE, which was composed of 1,051 bonds, 1,099 Equity-Traded Funds (ETF) and 1,057,867 equities. (CBN Statistical Bulletin, 2021). Furthermore, the total annual market capitalization on the Nigerian stock Exchange stood at ₦5billion in 1981 and increased to ₦42,054.50 billion in 2021. The 1981 figure is composed of ₦3.10billion and ₦1.90billion of Government stocks /securities/others and equities respectively unlike the 2021 total which is decomposed into ₦19,026.10billion Government stocks /securities/Others, ₦718.30billion corporate bonds, ₦7.35billion ETF and ₦22,296.84billion equities (CBN Statistical Bulletin, 2021).

## 2.2 THEORETICAL REVIEW

In this study, three theories are reviewed, namely Theory of Financial Innovations, Arbitrage Pricing Theory and Theory of Stock Market Development.

### 2.2.1 Theory of Financial Innovations

The Financial Innovations Theory was proposed by Silber (1975, 1983). The theory, according to Silber (1975), states that new financial instruments or practices are innovated to lessen the financial constraints imposed on firms. Therefore, as long as the development of new financial products is costly, normal financial decision making will be distinguished from new product innovation and therefore rising costs of adhering to constraints stimulate financial innovation. (Silber, 1983). Some of the innovations identified by Silber (1983) as occurring between 1960 and 1972 include debit cards, automated clearing houses, point of sale terminals, electronic trading, automated teller machines, etc

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 3 | p. 01-34 | e04340 | 2024

**12**

Silber (1983) shows that the most important forces underlying the remaining innovations are technology and legislative initiatives and both financial innovation and technological change respond to economic incentives and both processes also improve economic welfare. In particular, innovations in financial institutions and practices have improved the ability to bear risk, lowered transactions costs, and circumvented outmoded regulations (Silber, 1983). Basically, the thesis of Financial Innovation theory is that financial innovations (like ATM, POS, web-pay, mobile pay, e-trading etc) are developed purposely to facilitate business and operational activities of firms by helping them mitigate certain financial constraints of the organisation.

### 2.2.2 Arbitrage Pricing Theory

Ross (1976)'s Arbitrage Pricing Theory (APT) is a multi-factor model of the risk-return relationship among securities. According to Nwude (2018), the theory describes the relationship between expected returns on securities given that there are no opportunities to create wealth through risk-free arbitrage investments. Furthermore, APT is premised on capital markets that are perfectly competitive, with investors' preference for higher wealth to less wealth with certainty, homogenous expectations, and the returns are affected by several systematic factors and stochastic process is used to produce a multi-factor model used to obtain the asset returns (Nwude, 2018).

APT states that if equilibrium prices offer no arbitrage opportunities over static portfolios of the assets, then the expected returns on the assets are approximately linearly related to the factor loadings (Sekhar, 2013). APT model gives a reasonable description of return and risk. However, the model itself does not say what the right factors are.

### 2.2.3 The Theory of Stock Market Development

The Theory of Stock Market Development as postulated by El-Wassal (2013) provides four categories of factors that could explain stock market development. These four group of factors are supply factors, demand factors, economic factors, and institutional factors. The theory characterises stock market development in five dimensions of market size, liquidity, concentration, volatility and integration with real sector. The supply factors pinpointed by the author are the stages of economic development, economy size, the structure of the economy,

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 3 | p. 01-34 | e04340 | 2024

**13**

prospects of economic growth while factors such as market infrastructure, banking sector development, political stability, education and public awareness, regulatory and legal framework, are described as institutional factors. Furthermore, the trio demand factors enunciated in the theory are investors' base and institutional investors, portfolio capital flows, economic growth and sufficient level of per capita GDP. Finally, the author also proposed monetary policy, fiscal policy, and foreign participation policy as three economic policies capable of determining stock market development in any country. According to El-Wassal (2013), demand factors are those that affect investors' decisions regarding investment in stock markets while supply factors are those that affect companies' decisions to issue shares. Both supply and demand factors sets serve as building blocks while institutional factors and economic policies are the supporting blocks of the stock market.

This study is underpinned by El-Wassal (2013)'s Stock Market Development theory. This is because it provides a theoretical basis on which the different dimensions of stock market performance (size) can be examined vis-a-vis the explanatory variables (digital finance). This era of digitalization of the entire financial system of which the digital transactions, particularly, bank-based digital payments have come stay, provides a good empirical ground for examining the impact of digital finance on stock market performance.

## 2.3 EMPIRICAL REVIEW

In the context of Nigeria, in a study of the effects of ICT on market outcomes of stock exchange markets in Nigeria and South Africa conducted by Okwu (2016) during the period, 1995-2015, panel least squares and correlation analysis were applied. The study showed that mobile telephone had positive and significant effect on all market indicators. Furthermore evidence from the study is that, aggregate effect of the ICT proxies and moderating variables on all market indices was statistically significant. Also, according to study, the ICT proxies accounted for positive dynamics in market outcomes, market operations and, thus, very vital to the growth and development of the markets and financial sectors in the countries.

Also, an examination of the relationship between financial inclusion and digital financial services was carried by Agyekum et al. (2016) in Ghana from 2011 to 2014. Using OLS and logistic regression models, the study confirm the positive significant trend of mobile money usage and negative trend of bank-based digital financial services (DFS) facilities in Ghana. The study further observes that technological deepening plays in advancing financial

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 3 | p. 01-34 | e04340 | 2024

**14**

inclusion in Ghana. Furthermore, mobile subscription rate has positive influence on credit to private sector and internet penetration encourages financial inclusion in household. The study also reveals that DFS stimulates financial inclusion in Ghana and financial inclusion ultimately stimulates growth.

Furthermore, from the review of digital finance and its consequence for financial inclusion and financial firmness, Ozili (2018) from content analysis found that digital finance has a positive impact for financial inclusion. This study, though not empiric in nature but was a comprehensive review that supports the positive digital finance-financial inclusion nexus established in past literatures reviewed.

Applying Partial Least Squares to the analysis of the effect of financial literacy, digital financial product usage, internet usage on financial inclusion in China, Shen et al. (2018) established that financial literacy and digital financial product usage have significant positive relationship with financial inclusion. Furthermore, the study indicates that the usage of the Internet has no impact on financial inclusion, however, the impact of the usage of digital financial products on financial inclusion will be affected by the level of financial literacy of customers.

Moreover, the study of Ene et al. (2019) which indicated that ATMs do not significantly impact financial inclusion but point-of-sale devices significantly impact financial inclusion in Nigeria. Ene et al. (2019)'s study was based on the impact of electronic banking on financial inclusion in Nigeria using multiple regression analysis. The study used the total number of ATMs and point-of-sale devices in Nigeria as proxies for electronic banking and the proportion of banked adult population to total bankable adult population in Nigeria as proxy for financial inclusion.

Also, focusing on financial inclusion, Okoyeuzu et al. (2019) evaluated the effect that electronic payment channels on financial inclusion in Nigeria in line with Autoregressive Distributed Lag (ARDL) model. The study shows that digital financing channels has positive and significant relationship with financial inclusion in Nigeria. In a related study, Okoyeuzu and Isa (2020) investigated impact of foreign investments (foreign direct investment (FDI), foreign portfolio investment (FPI) and foreign loans) on the development of digital finance in Nigeria. Using web-based transactions value as a proxy for digital finance, the ARDL estimates show that FPI has positive significant influence while foreign loans have positive effect on development of digital finance in Nigeria. However, FDI did not have significant effect on the

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 3 | p. 01-34 | e04340 | 2024

**15**

development of digital finance in Nigeria. The study therefore concludes that foreign investment flows act as drivers for digital finance in Nigeria.

Also, Adejoh et al. (2020) also applied Toda-Yamamoto technique to assess the causal relationship between digital banking and financial deepening in Nigeria between 2009 and 2019.The findings of the study revealed that there was no causal relationship existing between digital banking indicators (volume of ATM, POS, web-based and mobile banking transactions) and financial deepening. The study concludes that digital banking does not spur financial deepening in Nigeria.

Furthermore, Igoni et al. (2020) examined the effect of digital finance on Nigerian GDP from 2012 to 2017. The results of the Granger causality indicate no causal significant impact of digital finance channels of ATM, POS and NIP on Nigeria's GDP. The study did not characterize digital finance as growth-inducing in Nigeria. Also, Risman et al. (2021) examined the role of risk factors in digital financial relations and financial stability between 2010 and 2019. From the multiple linear regression model and moderating regression analysis, the study found that digital finance has a positive impact on financial stability and market risk can moderate the influence of digital finance on financial stability, such that increased systematic risk will reduce the positive impact of digital finance on financial stability. However, Igoni et al. (2021) employed VECM to assess the linkages between electronic transactions and stock market performance in Nigeria from 2012-2019. The study shows that ATM and web-based digital finance were negatively and insignificantly linked to stock market performance in the short-run. Furthermore evidence from the study is that POS has positive but non-significant association with stock market performance. The findings of the study further revealed that NIP is positively and significantly linked to stock market capitalization in Nigeria.

Furthermore, analyzing the dynamic causal relationship digital economy concern and Chinese stock markets using time-varying Granger tests, Ren et al. (2022) reveals that digital economy has a significant effect on stock prices in a time-varying pattern and the causal spillover varies across industry segments. In the same china, Wang (2022) explored the impact of digital finance on enterprise financial risk in the country from 2011 to 2020 using fixed-effect model. The study found that the development of digital finance can significantly reduce enterprise financial risk.

In another empiric, Ekong and Ekong (2022) investigated the effect of digital currency development (digital finance) on financial inclusion in Nigeria for the period, 2006:1 to 2020:4 using weighted stepwise forward regression. The study considered ATM, POS, webpay and

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 3 | p. 01-34 | e04340 | 2024

**16**

mobile pay as measures of digital currency. Findings of the study suggest that digital finances hold positive financial inclusiveness for Nigeria and these positive impacts were felt from the ATMs, POS and mobile pay channels.

In a recent study, Appah et al. (2023) focused on the impact of digital financial services on economic growth of Nigeria from 2006 to 2021 using VECM. The study measured digital financial services as automated teller machine services, point of sales, mobile banking services while real gross domestic product; was the proxy for economic growth. The study found that automated teller machine services and mobile banking services have positive and insignificant influence on economic growth in Nigeria unlike both POS and web banking services positively and significantly influence on real GDP in Nigeria.

The review of extant studies shows past studies have examined issues around digital finance, financial inclusion, electronic payment, information technology, and financial literacy. For instance, though, Igoni et al. (2021)'s study on the nexus between electronic transactions and stock market performance in Nigeria between 2012 and 2019, can be considered as the most closely related past study to this current study, but there are still certain lacuna discovered in that study as well as other studies. First, the body of literature on digital finance generally in Nigeria is scanty and particularly, the researcher is not currently aware of any specific study on the impact of digital finance on stock market performance. Secondly, methodologically, most extant studies (reviewed) applied mostly OLS regression technique which failed to expose the dynamic relationships among variables of study. Thirdly, in terms of duration of study, most studies examined have their research period ended in 2019. Therefore, attempts was made in this current to fill up the gaps identified above. Firstly, this study examined the impact of and (interconnectedness) between digital finance (ATM, POS, mobile-based, and web-based digital finance transactions (payment) and stock market performance, that is, stock market size (growth). Secondly, this current study applied the Fully Modified Ordinary Least Squares, an estimator considered to be asymptotically unbiased and fully efficient (Phillips & Hansen, 1990). Thirdly, unlike most previous studies that relied on annual and quarterly data, this current study used monthly data that covers a period from 2012M1 to 2021M12. Also, unlike previous studies, this study approach the investigation from the disaggregated perspective whereby each instrument of digital finance are considered separately in different models.

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 3 | p. 01-34 | e04340 | 2024

**17**

## 3 DATA AND METHODOLOGY

This study adopts the *ex-post facto* (after-event) research design. The design enables the researcher to examine relationship between variables of study by using past (historical) data which are not subject to manipulation by the researcher. Furthermore, the design helps in the investigation of the possible causes and effects of a subsisting relationship between variables (Onwumere, 2021).

In line with the research design, past (time series) data on digital finance and stock market performance were obtained from the Statistical Bulletin, Statistics, and Monthly Economic Reports of the Central Bank of Nigeria. The data covers from the period of launch of National Financial Inclusion Strategy in Nigeria (2012) to 2021. Hence, effectively, monthly time series data beginning from January 2012 (2012M1) to December 2021 (2021M12), making a total of 120 observations per variable were used in this study.

In line with related studies, this study operationalizes the study variables and state the a priori signs as presented in Table 1.

**Table 1**

*Variables Description and their Measurement*

| Variables | Name/Symbol | Measurement | A priori |
|---|---|---|---|
| Stock Market Performance: Dependent Variable: | Stock market capitalization ratio (MCAPR) | This is the quotient of market capitalization to gross domestic product $[\left(\frac{Stock\ market\ capitalisation}{Gross\ Domestic\ Product}\right)X100]$ (Tsaurai (2018), Qamruzzaman and Wei (2018)). | |
| Digital Finance: Independent Variable: | ATM transactions (ATM) | ATM-based payment transactions expressed in million Naira (₦' Million) (Thaddeus et al. (2020), Igoni et al. (2020), Igoni et al. (2021), Appah et al. (2023)). | + |
| Independent Variable: | POS transactions (POS) | POS-based payment transaction expressed in million Naira (₦' Million) (Igoni et al. (2020), Igoni et al. (2021), Appah et al. (2023)). | + |
| Independent Variable: | Mobile-based transactions (MOBP) | Digital finance payment transaction made via digital mobile devices such as phone and expressed in million Naira (₦' Million) (Thaddeus et al. (2020), Appah et al. (2023)). | + |
| Independent Variable: | Web-based transactions (WEBP) | Web-based payment transactions expressed in million Naira (₦' Million) (Igoni et al. (2021), Appah et al. (2023)). | + |
| Control Variable: | Inflation rate (INFR) | Inflation rate is annual percentage changes in consumer prices and controls for macroeconomic (in)stability (Lawal (2016), Babarinde and Abdulmajeed (2020)). | +/- |
| Control Variable: | Government expenditure (GEXP) | This is the total amount of money of expenditure by the Federal Government of Nigeria, expressed in million Naira (₦' Million) and it controls for public sector (Ibor et al. (2018), Agwu and Godfrey (2020)). | + |

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 3 | p. 01-34 | e04340 | 2024

**18**

| Control Variable: | Foreign exchange rate(EXCR) | This is the average official exchange rate of the Naira (N.US$1.00) and it controls for external sector (Innocent et al. (2018), Epaphra and Salema (2018), Josiah and Akpoveta (2019)). | - |
| Control Variable: | Gross domestic product growth rate (GDPGR) | This is the percentage change in the annual real gross domestic product and it controls for the size of the economy (Onwumere et al. (2012), Babajide et al. (2016), Harcourt (2017)). | + |

Source: Prepared by the authors (2023)

## 3.1 MODEL SPECIFICATION

This study adapts Igoni et al. (2021)'s model on the linkage between electronic payment and capital market performance in Nigeria which was stated as in equation (1):

$$TMCAP_t = Y_t + ß_0 TMCAP_t + ß_1 ATM_{t-1} + ß_2 WEB_{t-1} + ß_3 NIP_{t-1} + ß_4 POS_{t-1} + u_t \quad (1)$$

Igoni et al. (2021) designated TMCAP to be market capitalization and represents performance index of stock market and represents electronic transactions as ATM, WEB, NIBSS instant payment (NIP), and POS.

In this current study, the following modifications were made to Igoni et al. (2021)'s model. Firstly, web payment and mobile payment are included as additional digital finance variables, while the definition of ATM, and POS are adopted from the model adapted. Also, some control variables (not included in Igoni et al. (2021)'s study), which have been established empirically as key determinants of stock market performance were included in this current study. The said control variables are inflation rate; GDP growth rate; foreign exchange rate; and government expenditure.

Therefore, in this study, the functional relationship between digital finance and stock market performance in Nigeria is expressed mathematically as in equation (2).

$$\text{Stock market performance} = f \text{ (Digital finance)} \quad (2)$$

In this study, since stock market performance is examined from the angle of size, then equation (2) is further re-specified as in equations (3).

$$\text{Stock market size} = f \text{ (Digital finance)} \quad (3)$$

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 3 | p. 01-34 | e04340 | 2024

**19**

Therefore, each of the four measures of digital finance examined in this study, ATM, POS, MOBP, and WEBP, is individually combined in a linear regression in company of the four control variables, government expenditure (GEXP), economic growth (GDPGR), foreign exchange rate (EXCR) and inflation rate (INFR) and the resultant mathematical equations versions of equation (3) are specified in equations (3.1.1- 3.1.4).

$$MCAPR_t = \beta_0 + \beta_1 ATM_t + \beta_2 EXCR_t + \beta_3 GEXP_t + \beta_4 INFR_t + \beta_5 GDPGR_t + U_{t1} \quad (3.1.1)$$
$$MCAPR_t = \beta_0 + \beta_1 POS_t + \beta_2 EXCR_t + \beta_3 GEXP_t + \beta_4 INFR_t + \beta_5 GDPGR_t + U_{t2} \quad (3.1.2)$$
$$MCAPR_t = \beta_0 + \beta_1 MOBP_t + \beta_2 EXCR_t + \beta_3 GEXP_t + \beta_4 INFR_t + \beta_5 GDPGR_t + U_{t3} \quad (3.1.3)$$
$$MCAPR_t = \beta_0 + \beta_1 WEBP_t + \beta_2 EXCR_t + \beta_3 GEXP_t + \beta_4 INFR_t + \beta_5 GDPGR_t + U_{t4} \quad (3.1.4)$$

Where;

$\beta_0$ = the intercepts of the models;

$\mu_{t1} - \mu_{t4}$ = the error terms;

$\beta_1 - \beta_5$ are the parameters of the models.

Other variables in the equations are as defined and measured in Table 1.

## 3.2 TECHNIQUES AND PROCEDURES OF DATA ANALYSIS

This study applied FMOLS regression technique proposed by Philips and Hansen (1990) as a technique of data analysis. However, before the model estimation proper, this study carried out necessary preliminary analyses which are descriptive statistics, unit root test, multicollinearity test, and cointegration test. The descriptive statistical test is necessary in order to gain a preliminary understanding of the statistical behavior of the variables of study. Thereafter, unit root test of the augmented Dickey-Fuller (ADF) genre was conducted at both the level and differenced-forms of each variable in their natural logarithms. The unit root tests was carried out based on the three ideal levels of significance, namely, one per cent, five per cent and 10 per cent using the probability value as decision criterion on the significance of each variable. Consequently, if the p-value of the unit root test is less than any of the three significance level, we reject the hypothesis of unit root and conclude that such variable is stationary. The converse holds if the p-value exceeds the ideal significance levels.

In order to avoid the incursion of multicollinearity problem, both Variance Inflation Factors (VIFs) and Tolerance Factors (TOLs) were applied to the data. Once the VIF is less

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 3 | p. 01-34 | e04340 | 2024

**20**

than 10 and or none of the tolerance factors is up to unity, the model is said not to have multicollinearity problem (Obadire et al., 2023; Gujarati, 2004). Moreover, as the ADF results have shown that the variables are integrated of order one, I(1), it is required to determine existence of at least one linear combination of the variables that is a stable and non-spurious relationship exist among variables (Bashier & Siam, 2014). Thus, the Johansen co-integration approach which tests the hypothesis of the long run equilibrium relationships among I(1) series was employed. With the I(1) cointegrating series, the study safely applied Fully Modified Ordinary Least Squares (FMOLS) technique in evaluating the impact of digital finance on stock market performance in Nigeria. Introduced by Philips and Hansen (1990) for estimating a single co-integrating relationship that has a combination of I(1), FMOLS provides optimal estimates of co-integration regressions (Bashier & Wahban, 2013). Finally, in order to ascertain the goodness of fit of the FMOLS models, residual diagnostics tests were conducted. These diagnostic tests are basically serial correlation and normality tests. To test for serial correlation, the Correlogram-Q-statistic test of serial correlation was employed while the Histogram-Normality test (Jargue-Bera statistics) helps in diagnosing the normality of the model as used in studies such as those of Obadire et al. (2022).

## 4 RESULTS AND DISCUSSION

### 4.1 DESCRIPTIVE STATISTICS

The descriptive statistics for the study presented in Table 2.

**Table 2**

*Descriptive Statistics*

|  | Mean | Minimum | Maximum | Std. Dev. | Skewness | Kurtosis | Jarque-Bera |
|---|---|---|---|---|---|---|---|
| **MCAPR** | 12.43186 | 6.348089 | 22.56678 | 3.734219 | 1.054935 | 3.865316 | 26.00161* |
| **ATM** | 618697.2 | 127586.1 | 2451759. | 508901.2 | 1.556479 | 4.376485 | 57.92608* |
| **POS** | 288239.0 | 38.57195 | 2318351. | 521391.6 | 2.615475 | 8.770286 | 303.2952* |
| **MOBP** | 609151.1 | 241.4529 | 4938921. | 1219256. | 2.328972 | 7.066535 | 191.1657* |
| **WEBP** | 5731816. | 1794.647 | 46645986 | 11858679 | 1.754773 | 4.547902 | 73.56453* |
| **EXCR** | 259.7781 | 157.2734 | 414.3357 | 87.16743 | 0.116886 | 1.609474 | 9.941064* |
| **GEXP** | 568128.7 | 80912.00 | 1373787. | 260538.7 | 0.547491 | 2.625977 | 6.694396** |
| **INFR** | 12.37300 | 7.700000 | 18.72000 | 3.329167 | 0.318743 | 1.897318 | 8.111475** |
| **GDPGR** | 2.520137 | 0.261930 | 5.255319 | 1.395841 | 0.263887 | 1.900069 | 7.441965** |

\* and ** denotes significant at 1% and 5% respectively.
Source: Prepared by the authors (2023)

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 3 | p. 01-34 | e04340 | 2024

21

Table 2 indicates that the average market capitalization ratio of the Nigerian Exchange Group (NGX) in the study period (2012M01-2021M12) was 12.43%. The minimum and maximum of the ratio was 6.35%. Furthermore, considering the Jarque-Bera statistics of stock market capitalization, the variable could be said to be not normally distributed in the study period.

Moreover, the average value of ATM, POS, MOBP, and WEBP was ₦618697.2M, ₦288239.0M, ₦609151.1M and ₦609151.1M respectively. The variables (ATM, POS, MOBP, and WEBP) range between respective minimum values of ₦127586.1M, ₦38.57195M, ₦241.4529M, and ₦1794.647M to maximum values of ₦2451759.0M, ₦2318351.0M, ₦4938921.0M, and ₦46645986M respectively. The mean value of ATM and MOBP exceeding their respective standard deviations (508901.2M and 1219256.0M) is suggestive of the relative stability of the variables around their averages. This is unlike the mean value of POS and WEBP not exceeding their respective standard deviations (521391.6 and 11858679) which suggests that the variables are relatively volatile around their mean values. The variables (ATM, POS, MOBP, and WEBP)'s Jarque-Bera statistics reveals that none of them pass the normality test.

Furthermore, the descriptive statistics (in Table 2) in respect of exchange rate averaged 259.7781 and it ranges between 157.2734 and 414.3357 and the variable is not normally distributed but is relatively stable around its mean value (considering its standard deviation (87.16743) not exceeding its mean value). In the study period, 568128.7b stood as the average government expenditure while its minimum and maximum values was ₦80912.00M and ₦1373787.0M respectively. The variable (GEXP) is relatively stable around its mean but not normally distributed. The average inflation rate was 12.37300 while its minimum and maximum was 7.70% and 18.72% respectively. The variable (INFR) though not normally distributed, but did not display wide dispersion from its mean value. The Gross Domestic Product growth rate (GDPGR) averaged 2.520137% while it ranges between 0.261930% and 5.255319.0%. Considering the standard deviation of the variable, vis-à-vis its mean value, the variable is relatively stable around its average value. Jarque-Bera statistics of the series indicates non-normality of the distribution.

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 3 | p. 01-34 | e04340 | 2024

**22**

## 4.2 UNIT ROOT TEST

The Augmented Dickey-Fuller (ADF) unit root test statistics in both levels and first differenced forms of the variables are reported in Table 3.

**Table 3**

*Augmented Dickey-Fuller (ADF) Unit Root Test Statistics*

| | I | | II | | |
|---|---|---|---|---|---|
| **Variables:** | **ADF Statistics (In Level)** | | **ADF Statistics (1st Diff.)** | | **I(d)** |
| | t-Statistic | Prob. | t-Statistic | Prob. | |
| **LOGMCAPR** | -1.189024 | 0.6777 | -9.679096 | 0.0000 | I(1) |
| **LOGATM** | -1.382211 | 0.5889 | -9.452354 | 0.0000 | I(1) |
| **LOGPOS** | -2.129529 | 0.2336 | -12.54178 | 0.0000 | I(1) |
| **LOGMOBP** | -2.620969 | 0.0916 | -11.85318 | 0.0000 | I(1) |
| **LOGWEBP** | -0.586371 | 0.8684 | -12.15747 | 0.0000 | I(1) |
| **LOGEXCR** | -0.389119 | 0.9063 | -5.499769 | 0.0000 | I(1) |
| **LOGGEXP** | -0.610198 | 0.8630 | -11.08548 | 0.0000 | I(1) |
| **LOGINFR** | -1.488288 | 0.5362 | -4.938041 | 0.0005 | I(1) |
| **LOGGDPGR** | -1.956986 | 0.3054 | -9.679096 | 0.0000 | I(1) |

Source: Prepared by the authors (2023)

The ADF statistics as reported in Table 3 (Panel I), show that all the variables have their probability values greater than five percent, hence the null hypothesis of the presence of unit root cannot be rejected at the five percent level of significance. These results imply that all the variables are not stationary in their level forms. The results of the ADF unit root test conducted at first difference form of the variables are presented in Panel II of Table 3 show all the variables to be stationary after first difference. This implies that the variables are integrated of the order one, that is, they are I(1) series.

## 4. 3 MULTICOLLINEARITY TESTS

The Variance Inflation Factors (VIFs) and Tolerance Factors (TOL) of the multicollinearity test are presented in Tables 4.

**Table 4**

*Variance Inflation Factors (VIFs) and Tolerance Factors (TOL)*

| Variable | | ATM | POS | MOBP | WEBP |
|---|---|---|---|---|---|
| LOGATM | VIF | 6.018134 | | | |
| | TOL | 0.003146 | | | |
| LOGPOS | VIF | | 5.979474 | | |
| | TOL | | 0.000489 | | |

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 3 | p. 01-34 | e04340 | 2024

**23**

| | | | | | |
|---|---|---|---|---|---|
| LOGMOBP | VIF | | | 2.507750 | |
| | TOL | | | 9.69E-05 | |
| LOGWEBP | VIF | | | | 2.764104 |
| | TOL | | | | 7.02E-05 |
| LOGEXCR | VIF | 9.174948 | 4.443212 | 3.786248 | 5.463178 |
| | TOL | 0.019320 | 0.009174 | 0.009013 | 0.012317 |
| LOGGEXP | VIF | 2.438636 | 2.078858 | 2.051585 | 2.388038 |
| | TOL | 0.002508 | 0.001982 | 0.002255 | 0.002630 |
| LOGINFR | VIF | 2.586181 | 4.565708 | 4.924872 | 2.376773 |
| | TOL | 0.009143 | 0.002439 | 0.003033 | 0.008997 |
| LOGGDPGR | VIF | 1.041930 | 1.960184 | 1.473769 | 1.045315 |
| | TOL | 0.000575 | 0.076537 | 0.066345 | 0.000618 |

Source: Prepared by the authors (2023)

As presented in Panel I of Table 4, the Variance Inflation Factors (VIFs) for the ATM sub-model has the highest coefficient of 9.1749 while none of the tolerance factors (TOL) is up to unity. This implies that the model does not suffer from multicollinearity problem as tolerance factor and the VIFs are within the acceptable thresholds of less than unity and 10 respectively (Gujarati, 2004). Furthermore, Panel II of the table (4) reveals that the POS sub-model also passes the multicollinearity test in that the highest VIF (5.979474) and tolerance factor (0.076537) of the model are within the acceptable threshold. In the same vein, the maximum coefficients of the VIF (3.786248) and the tolerance factor (0.066345) of the MOBP sub-model reported in Panel III of the Table (4), also agrees to the fact that there is no multicollinearity problem in the model. Finally, the 0.066345 and 0.012317 as the maximum coefficients of the VIF and tolerance factor for the WEBP sub-model (in Panel IV of Table 4), suggests there is no multicllinearity problem in the sub-model.

## 4.4 COINTEGRATION TESTS

The results of the Johansen cointegration tests for the study are presented in Table 5.

**Table 5**

*Johansen Cointegration Tests*

| | ATM Model | | POS Model | | MOBP Model | | WEBP Model | |
|---|---|---|---|---|---|---|---|---|
| | Trace | Max-Eigen | Trace | Max-Eigen | Trace | Max-Eigen | Trace | Max-Eigen |
| No. of CE(s) | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic |
| 0 | 123.9872 [0.0002]* | 49.0372 [0.0038]* | 123.9872 [0.0002]* | 49.0372 [0.0038]* | 114.3291 [0.0015]* | 49.4009 [0.0034]* | 117.8029 [0.0007]* | 55.6105 [0.0004]* |
| ≤ 1 | 74.9499 [0.0184]* | 35.3989 [0.0327]* | 74.9499 [0.0184]* | 35.3989 [0.0327]* | 64.9229 [0.1155] | 26.6620 [0.2819] | 62.1923 [0.1743] | 31.0811 [0.1040] |
| ≤ 2 | 39.5510 [0.2390] | 21.3107 [0.2579] | 39.5510 [0.2390] | 21.3107 [0.2579] | 38.2609 [0.2908] | 22.1860 [0.2110] | 31.1111 [0.6605] | 14.7810 [0.7653] |

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 3 | p. 01-34 | e04340 | 2024

**24**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ≤ 3 | 18.2403 [0.5484] | 10.6805 [0.6791] | 18.2403 [0.5484] | 10.6805 [0.6791] | 16.0748 [0.7070] | 10.5961 [0.6874] | 16.3301 [0.6889] | 12.1249 [0.5354] |
| ≤ 4 | 7.5598 [0.5136] | 6.7782 [0.5157] | 7.5598 [0.5136] | 6.7782 [0.5157] | 5.4786 [0.7561] | 4.8092 [0.7657] | 4.2051 [0.8863] | 4.1921 [0.8385] |
| ≤ 5 | 0.7815 [0.3767] | 0.7815 [0.3767] | 0.7815 [0.3767] | 0.7815 [0.3767] | 0.6693 [0.4133] | 0.6693 [0.4133] | 0.0130 [0.9090] | 0.0130 [0.9090] |

* denotes rejection of the hypothesis at the 0.05 level; Values in [ ] are probability values.
Source: Prepared by the authors (2023)

As presented in Table 5 (Panel I), both Trace test and Max-eigenvalue statistics indicate 1 cointegrating equation at the 0.05 level. This implies the existence of a long-run relationship between ATM digital finance transactions and stock market performance in Nigeria. Also, in Panel II of the same table (Table 5), both Trace test and Max-eigenvalue test indicate 2 cointegrating equations at the 0.05 level. This implies the existence of a long-run relationship between POS digital finance transactions and stock market performance in Nigeria.

Furthermore, in Panel III, both Trace test and Max-eigenvalue test indicates 1 cointegrating equation at the 0.05 level, which suggests that mobile-based digital finance transactions and stock market performance in Nigeria have long-run cointegrating relationship. Finally, a long-run relationship was also established between web-based digital finance transactions and stock market performance in Nigeria. This is as contained in Panel IV of Table 5, wherein both Trace test and Max-eigenvalue test indicate 1 cointegrating equation among the series at the 0.05 level.

## 4.5 REGRESSION MODEL ESTIMATION

After the preliminary tests, the model estimation proper was conducted to examine the impact of digital finance on stock market performance using the Fully Modified Ordinary Least Squares (FMOLS) regression technique. The estimates of the FMOLS regression models are reported in Table 6.

**Table 6**

*FMOLS Regression Estimates*

| Dependent Variable: LOGMCAPR | | | | | |
|---|---|---|---|---|---|
| Method: Fully Modified Least Squares (FMOLS) | | | | | |
| | | I | II | III | IV |
| Variable | | ATM Model | POS Model | MOBP Model | WEBP Model |
| LOGATM | Coeff. | 0.4575* | | | |
| | Prob. | 0.0000 | | | |
| LOGPOS | Coeff. | | 0.2553* | | |
| | Prob. | | 0.0000 | | |

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 3 | p. 01-34 | e04340 | 2024

**25**

| | | | | | |
|---|---|---|---|---|---|
| LOGMOBP | Coeff. | | | 0.1987* | |
| | Prob. | | | 0.0000 | |
| LOGWEBP | Coeff. | | | | 0.0510* |
| | Prob. | | | | 0.0016 |
| LOGEXCR | Coeff. | -0.2053 | -0.7094** | -0.6462** | 0.3318 |
| | Prob. | 0.4166 | 0.0179 | 0.0132 | 0.1146 |
| LOGGEXP | Coeff. | 0.0652 | 0.0472 | 0.0182 | 0.0880 |
| | Prob. | 0.4789 | 0.5779 | 0.8156 | 0.3703 |
| LOGINFR | Coeff. | -0.3082*** | -0.0208 | 0.0605 | -0.4903*** |
| | Prob. | 0.0797 | 0.9088 | 0.7239 | 0.0075 |
| LOGGDPGR | Coeff. | -0.039197 | 0.0228 | 0.0109 | -0.0585 |
| | Prob. | 0.3718 | 0.5820 | 0.7735 | 0.2146 |
| C | Coeff. | -2.4199* | 2.9207** | 3.3788* | 0.2208 |
| | Prob. | 0.0036 | 0.0104 | 0.0018 | 0.8379 |
| R-Squared ($R^2$) | | 0.5947 | 0.7036 | 0.6803 | 0.5830 |
| Adjusted $R^2$ | | 0.5767 | 0.6905 | 0.6661 | 0.5646 |
| Normality? | | Yes | Yes | Yes | Yes |
| Serial Correlation? | | No | No | No | No |

*, ** and *** denotes statistically significant at 1%, 5% and 10% respectively.
Source: Prepared by the authors (2023)

Table 6 (Panel I) indicates that ATM is positively signed with a coefficient of 0.4575 and an associated p-value of 0.0000. The long-run elasticity was positive and significant at 1% level. This means that existence of a positive and significant impact of ATM on market capitalization ratio in the Nigerian stock market. The result indicates that, a 10% increase in ATM digital finance transaction, may increase stock market performance (stock market capitalization ratio) by 45.76%. Thus, ATM transaction as a form of digital finance is a promoter of the growth of stock market capitalization in Nigeria. This finding is not in consonance with the finding of Igoni et al. (2021) which shows that ATM digital finance had negative and non-significant effect on stock market capitalization in Nigeria. Also, in Panel I, result shows that government expenditure has positive but non-significant effect on market capitalization in the Nigerian stock market. However, exchange rate, inflation rate and economic growth were found to be negatively signed but only inflation rate was statistically significant in their impacts on market capitalization in the Nigerian stock market.

Furthermore, Table 6 (Panel II) which reports the regression estimates for MCAPR-POS sub-model indicates that POS is positively signed with a coefficient of 0.2553 and an associated p-value of 0.0000. Likewise, the long-run elasticity was positive and significant at 1% level. This means that existence of a positive and significant effect of POS digital finance transaction on market capitalization ratio in the Nigerian stock market. The result indicates that, a 10% increase in POS digital finance transaction, may increase stock market performance (stock market capitalization) by 25.53%. Thus, POS transaction as a form of digital finance, is a promoter of the growth of stock market capitalization in Nigeria. This finding is not in

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 3 | p. 01-34 | e04340 | 2024

26

agreement with the finding of Igoni et al. (2021) which found that POS had positive but non-significant effect on stock market capitalization in Nigeria. Likewise, in Panel II, estimates of the model show that government expenditure and economic growth had positive but non-significant impacts on stock market capitalization ratio in Nigeria. However, exchange rate and inflation rate were found to be negatively signed but only exchange rate was statistically significant in its impact on stock market capitalization in the Nigeria.

Moreover, Table 6 (Panel III) indicates that mobile-based payment (MOBP) is positively signed with a coefficient of 0.1987 and an associated p-value of 0.0000. This means that the long-run elasticity was positive and significant at 1% level. Thus, there is an existence of a positive and significant impact of mobile based digital finance transactions on stock market capitalization ratio in Nigeria. This result indicates that, a 10% increase in mobile-based digital finance transaction, may increase stock market performance (stock market capitalization ratio) by 19.87%. Thus, mobile-based transaction as a form of digital finance is a promoter of the growth of stock market capitalization in Nigeria. Also indicated in Panel III is the evidence that government expenditure, inflation rate, and economic growth had positive but non-significant impacts on market capitalization in the Nigerian stock market. However, exchange rate was negatively signed and still statistically significant in its impact on stock market capitalization in the Nigeria in the study period.

Finally, Panel IV of Table 6 indicates that web-based digital finance transaction (WEBP) is positively signed with a coefficient of 0.0510 and an associated p-value of 0.0016. This means that the long-run elasticity was positive and significant at 1% level. Hence, there exists an evidence of a positive and significant impact of web-based digital finance transaction on stock market capitalization in the Nigeria. This result indicates that, a 10% increase in web-based digital finance transaction, may increase stock market performance (stock market capitalization ratio) by 5.10%. Therefore, web-based financial transaction as a form of digital finance is enhance the growth of stock market in Nigeria. This finding is not in consonance with that of the study of Igoni et al. (2021) which shows that web-based digital finance had negative and insignificant impact on stock market capitalization in Nigeria. In the same vein, the findings from the web-based digital finance transaction sub-model show that foreign exchange rate and government expenditure had positive but non-significant impacts on stock market capitalization in Nigeria. However, inflation rate and economic growth were both found to be negatively signed but only inflation rate was statistically significant in its impact on stock market capitalization in Nigeria in the study period.

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 3 | p. 01-34 | e04340 | 2024

**27**

## 5 CONCLUSION

This study investigated the impact digital finance on stock market performance in Nigeria during the period, January 2012 to December 2021, using Fully Modified Ordinary Least Squares (FMOLS) regression technique. Empirically, this study found that ATM, POS, mobile-based and web-based digital finance transactions had positive and significant impacts on stock market capitalization ratio in Nigeria.

It can therefore be concluded that digital finance significantly enhances the performance of the Nigerian stock market. In other words, digital finance is a determinant of stock market performance in Nigeria with attendant long-run implications of the former (digital finance) on the former (Nigerian stock market performance).

The study therefore recommends that there should be expansion in the deployment of ATMs such that its usage is encouraged for stock market transactions by stock market participants. Also, POS devices should be deployed and simplified and specially configured for stock market transactions and as such a development of special POS machines for stock market transactions particularly for stock brokers and other key market participants will be a good step in this direction. In the same spirit, technology companies should work in close collaboration with stock market experts to achieve this. Furthermore, the use of mobile devices in the provision of financial services, particularly, digital finance transactions should be encouraged the more by the Nigerian populace and as such potential and actual investors should be encouraged to embrace the mobile-based digital finance transactions particularly in their stock market transactions. Finally, the website infrastructure and security should be further improved to enhanced web-based digital finance transactions. Intensive and extensive pubic enlightenment and strong government policy in the direction of cyber-security will further facilitate the implementation of this recommendation.

## REFERENCES

Abere, M. A., Daramola, K. O., Ogunsanwo, O. F., & Adebayo, A. O. (2021). Effect of capital market development on economic growth in Nigeria. FUOYE Journal of Finance and Contemporary Issue, 1(1), 111-121.

Adejoh, M. O., Ameji, N. E., & Olorunfemi, O. (2020). Digital banking and financial deepening in Nigeria. Confluence Journal of Economics and Allied Sciences, 3(1), 86-97.

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 3 | p. 01-34 | e04340 | 2024

**28**

Agwu, E. C., & Godfrey, O. U. (2020). Capital market and fiscal policy shocks in Nigeria. Journal of Finance and Accounting, 8(3), 125-135. https://doi.org/10.11648/j.jfa.20200 803.13

Agyekum, F., Locke, S., & Hewa-Wellalage, N. (2016). Financial inclusion and digital financial services: Empirical evidence from Ghana. https://mpra.ub.uni-muenchen.de/82885/

Akintola, A. A, Oji-Okoro, I. & Itodo, I. A. (2020). Financial sector development and economic growth in Nigeria: An empirical re-examination. Economic and Financial Review, 58(3), 59-84.

Aldyan, A., Sulistiyono, A., & Pujiyono, (2019). The implication of technological development on stock trading in the stock markets of Indonesia stock exchange. Advances in Social Science, Education and Humanities Research, 358, 123-126.

Aluko, O. A., & Abogun, S. (2018). The risk-return relationship in the Nigerian stock market in the presence of structural break. Ilorin Journal of Management Sciences, 5(1), 61-74.

Appah, E., Tebepah, S. F., & Newstyle, D. (2023). Digital financial services and economic growth of Nigeria: 2006 – 2021. European Journal of Business and Innovation Research, 11(3), 1-23. https://doi.org/10.37745/ejbir.2013/vol11n3123

Babajide, A. A., Lawal, A. I., & Somoye, R. O. (2016). Stock market response to economic growth and interest rate volatility: evidence from Nigeria. International Journal of Economics and Financial Issues, 6(1), 354-360.

Babarinde, G. F., & Abdulmajeed, T. I. (2020). Inflation and capital market performance in Nigeria: Canonical cointegrating regression analysis. United International Journal of Research and Technology, 2(1), 35-42.

Bashier, A., & Siam, A. J. (2014). Immigration and economic growth in Jordan: FMOLS approach. International Journal of Humanities Social Sciences and Education, 1(9), 85-92.

Bashier, A., & Wahban, A. N. (2013). The determinants of employment in Jordan: A time series analysis. International Review of Management and Business Research, 2(4), 927- 936.

Dara, N. R. (2018). The global digital financial services: A critical review to achieve for digital economy in emerging markets. International Research Journal of Human Resources and Social Sciences, 5(1), 141-163.

David-West, O., Adetunji, O., Ajai, O., Aluko, T., David, O., Iheanachor, N., Kelikume, I., Muritala, O., Nwagwu, I., Okhuese, V., Salami, A., Taiwo, I., & Umukoro, I. (2017). Digital financial services in Nigeria: State of the market report 2017. Lagos Business School.

Durai, T., & Stella, G. (2019). Digital finance and its impact on financial inclusion. Journal of Emerging Technologies and Innovative Research, 6(1), 122-127.

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 3 | p. 01-34 | e04340 | 2024

**29**

Ekong, U. M., & Ekong, C. N. (2022). Digital currency and financial inclusion in Nigeria: Lessons for development. Journal of Internet and Digital Economics, 2 (1), 46-67. https://doi.org/ 10.1108/JIDE-11-2021-0018

El-Wassal, K. A. (2013). The development of stock markets: In search of a theory. International Journal of Economics and Financial Issues, 3(3), 606-624.

Ene, E. E., Abba, G.O., & Fatokun, G. F. (2019). The impact of electronic banking on financial inclusion in Nigeria. American Journal of Industrial and Business Management, 9, 1409-1422. https://doi.org/10.4236/ajibm.2019.96092

Epaphra, M., & Salema, E. (2018). The impact of macroeconomic variables on stock prices in Tanzania. Journal of Economics Library, 5(1), 12-41.

Goodman, P. (2018). 16 advantages of digital technology. https://turbofuture.com/computers/ Advantages-of-Digital-Technology

Gujarati, D. N. (2004). Basic econometrics (4th ed.). McGraw-Hill Companies.

Harcourt, E. E. (2017). Macroeconomic variables and the performance of the Nigerian capital market. International Journal of Managerial Studies and Research, 5(5), 13-23.

Holtmann, M. (2016). Digital financial services challenges and opportunities for banks [Paper presentation]. 6th Annual Conference on policy challenges for financial sector, Washington, D.C.

Ibor, B. I., Eba, A. O., & Emori, E. G. (2018). The impact of public sector expenditure on the development of the Nigerian capital market. International Review of Management and Business Research, 7(2), 576-586.

Igoni, S., Ogiri, I. H., & Bloupremo, T. (2021). The link between electronic transactions and stock market performance in the Nigerian financial ecosystem. International Journal of Advanced Engineering Research and Science, 8(1), 262-271. https://dx.doi.org/10.22161/ijaers.81.36

Igoni, S., Onwumere, J. U. J., & Ogiri, I. H. (2020). The Nigerian digital finance environment and its economic growth: Pain or gain. Asian Journal of Economics, Finance and Management, 2(2), 1-10.

Igwemeka, E. C. O., Eje, G. C., Okonkwo, M. C., Onoselogu O. C.O., & Ojiakor I. P. (2020). Digital finance and financial inclusion in Nigeria: Lessons from other climes. Nigerian Journal of Banking and Finance, 12(1), 97-105

Innocent, G., Shukla, J., Mulyungi, P., & Ochieng, A. (2018). Effects of macroeconomic variables on stock market performance in Rwanda: Case study of Rwanda stock exchange. European Journal of Economic and Financial Research, 3(1), 104-125.

Josiah, M., & Akpoveta, E. B. (2019). Macroeconomic variables and Nigeria stock market returns. Accounting and Taxation Review, 3(1), 55-68.

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 3 | p. 01-34 | e04340 | 2024

30

Kambale, L. (2018). Digital financial services: A case of Malawi [Paper presentation]. ITU International Workshop, Lilongwe. https://www.itu.int/en/ITU-D/Capacity-Building/Documents/IG_workshop_August2018/Presentations/Session8_LindaKambale.pdf.

Keji, S. A. (2020). Capital market and economic growth in Nigeria. Jurnal Perspektif Pembiayaan dan Pembangunan Daerah, 8(3), 295-330. Doi: 10.22437/ppd.v8i3.9652

Lauer, K., & Lyman, T. (2015). Digital financial inclusion: Implications for customers, regulators, supervisors, and standard-setting bodies. Consultative Group to Assist the Poor (CGAP).

Lawal, E. O. (2016). Inflation and stock market returns in Nigeria: An empirical analysis. Quest Journal of Research in Humanities and Social Sciences, 4(11), 50-56.

Manyika, J., Lund, S., Singer, M., White O., & Berry, C. (2016). Digital finance for all: Powering inclusive growth in emerging economies. McKinsey Global Institute.

Moufakkir, M., & Mohammed, Q. (2020). The nexus between fintech adoption and financial inclusion (193-209), In N. Naifar (Ed.), Impact of financial technology (FinTch) on Islamic finance and financial stability. IGI Global, https://doi.org/10.4018/978-1-7998-0039-2.ch010

Ndungu, J. M., & Moturi1, C. A. (2020). Determinants of mobile fintech uptake in Kenyan microfinance sector. Current Journal of Applied Science and Technology, 39(28), 102-114. https://doi.org/10.9734/CJAST/2020/v39i2830943

Nurudeen, A. (2005). Financial management: A manual for potential managers. Wisecom International Resources Ltd.

Nwude, E. C. (2018). Investment analysis and portfolio management. El-Delmark.

Obadire, A. M., Moyo, V., & Munzhelele, N. F. (2022). The determinant of African banks' capital structure: Basel III Accord or bank-specific factors? Journal of Economic and Financial Sciences, 15(1), 742.

Obadire, A. M., Moyo, V., & Munzhelele, N. F. (2023). An empirical analysis of the dynamics influencing bank capital structure in Africa. International Journal of Financial Studies, 11(4), 127. https://doi.org/10.3390/ijfs11040127

Okafor, I. G. (2019). Analysis of financial innovation development in Nigerian banking sector. International Journal of Research and Innovation in Social Science, 3(11), 559-570.

Okoyeuzu, C., & Isa, K. D. (2020). What type of investment does digital finance promote: speculative or non- speculative? International Journal of Economics and Financial Issues, 1(4), 237-246.

Okoyeuzu, R. O., Kalu, E. U., & Ukpere, W. I. (2019). Evaluating the impact of electronic payment channels on sustainable financial inclusion in Nigeria. Journal of Reviews on Global Economics, 8, 1363-1370.

Okwu, A. T. (2016). ICT and stock market nexus in Africa: Evidence from Nigeria and South Africa. Acta Universitatis Danubius, 12(4), 38-50.

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 3 | p. 01-34 | e04340 | 2024

**31**

Onwumere, J. U. J. (2021). Business, economics and social studies research methods (4th ed.). Immaculate Publications Limited.

Onwumere, J. U. J., Ibe, I. G., Okafor, R. G., & Uche, U. B. (2012). Stock market and economic growth in Nigeria: Evidence from the demand-following hypothesis. European Journal of Business and Management, 4(19), 1-9.

Organisation for Economic Co-operation and Development. (2018). G20/OECD INFE policy guidelines in digitalization and financial literacy. www.oecd.org/going-digital

Ozili, P. K. (2020). Comparing digital finance in the US, UK, India and Nigeria. Financial Internet Quarterly. 16(4), 1-11. https://doi.org/10.2478/fiqf-2020-0023

Ozili, P. K. (2018). Impact of digital finance on financial inclusion and stability. Borsa Istanbul Review, 18(4), 329-340.

Ozili, P. K. (2023). Digital finance research and developments around the World: A literature review. International Journal of Business Forecasting and Marketing Intelligence, 8(1), 35-51.

Phillips, P. C. B., & Hansen, B. E. (1990). Statistical inference in instrumental variables regression with I (1) processes. The Review of Economic Studies, 57(1), 99–125.

Qamruzzaman, M., & Wei, J. (2018). Financial innovation, stock market development, and economic growth: An application of ARDL model. International Journal of Financial Studies, 6(69), 1-30. https://doi.org/10.3390/ijfs6030069.

Ramos, M., & Steiner, A. (2020). People's money: Harnessing digitalization to finance a sustainable future (The United Nations Secretary General's Task Force on Digital Financing of the Sustainable Development Goals' report).www.digitalfinancingtaskforce.org

Ravikumar, T. (2019). Digital financial inclusion: A payoff of financial technology and digital finance uprising in India. International Journal of Scientific and Technology Research, 8(11), 3434- 3438.

Ren, X., Li, J., & Shi, Y. (2022). Can digital economic attention spillover to financial markets? Evidence from the time-varying Granger test. Journal of Digital Economy, 1, 102–116.

Risman, A., Mulyana, B., Silvatika, B. A., & Sulaeman, A. S. (2021). The effect of digital finance on financial stability. Management Science Letters, 11, 1979-1984.

Ross, S. A. (1976). The arbitrage theory of capital asset pricing. Journal of Economic Theory, 13(3), 341–360.

Sekhar, G. V. S. (2013). Theorems and theories of financial innovation: Models and mechanism perspective. Financial and Quantitative Analysis, 1(2), 26-29. https://doi.org/10.12966/fqa.05.02.2013

Shen, Y., Hu, W., & Hueng, C.J. (2018). The effects of financial literacy, digital financial product usage and internet usage on financial inclusion in China. MATEC Web of Conferences 228, 05012. https://doi.org/10.1051/matecconf/201822805012

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 3 | p. 01-34 | e04340 | 2024

**32**

Shofawati, A. (2019). The role of digital finance to strengthen financial inclusion and the growth of SME in Indonesia. The 2nd International Conference on Islamic Economics, Business, and Philanthropy. KnE Social Sciences, 389–407. https://doi.org/10.18502/kss.v3i13.4218

Shukla, A., & Nerlekar, S. (2019). Impact of digitization transformation on financial markets. MET Management Retrospect, 3(1), 11-20.

Silber, W. L. (1975). Towards a theory of financial innovation. In W. L. Silber (Ed.), Financial innovation. D. C. Heath & Co.

Silber, W. L. (1983).  The process of financial innovation. The American Economic Review, 73(2), 89-95.

Sulaiman, L. A., Adejayan, A. O., & Ilori, O. O. (2023). Capital market development and economic growth of West African countries.  Nigerian Journal of Banking and Financial Issues, 9(1), 115-125.

Thaddeus, K. J., Ngong, C. A., & Manasseh, C. O. (2020). Digital financial inclusion and economic growth: Evidence from Sub-Saharan Africa (2011-2017).  The International Journal of Business and Management. 8(4), 212-225. https://doi.org/10.24940/theijbm/2020/v8/i4/BM2004-051

Tsaurai, K. (2018). What are the determinants of stock market development in emerging markets? Academy of Accounting and Financial Studies Journal, 22(2), 1-11.

Uduk, M. (2018, October 19). Digitization, disruption and financial inclusion: Digital finance as an essential tool for enhancing financial inclusion [Keynote address]. 3rd annual market data day of the Nigerian Stock Exchange, Victoria Island, Lagos.

Ugwuanyi, G. O., Okon, U. E., & Anene, E. C. (2020). Investigating the impact of digital finance on money supply in Nigeria. Nigeria Journal of Banking and Finance, 12(1), 47-55.

Uzoma, A. B., Omankhanlen, A. E., Obindah, G., Arewa, A., & Okoye, L.U. (2020). Digital finance as a mechanism for extending the boundaries of financial inclusion in Sub-Saharan Africa: A general methods of moments approach. Cogent Arts and Humanities, 7(1), 1-12. https://doi.org/10.1080/23311983.2020.1788293.

Waldron, D., & Sotiriou, A. (2017).  Quenching a thirst: Digital finance and sustainable water service for all (Brief April). Consultative Group to Assist the Poor.

Wang, Q., Yang, J., Chiu, Y. H., & Lin, T. Y. (2020). The impact of digital finance on financial efficiency. Managerial and Decision Economics, 41(7), 1225-1236. https://doi.org/10.1002/mde.3168

Wang, Z. (2022). Digital finance, financing constraint and enterprise financial risk. Journal of Mathematics, 1-9. https://doi.org/10.1155/2022/2882113

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 3 | p. 01-34 | e04340 | 2024

**33**

Yunus, M., Setiawan, B., Bhagat, P. R., & Salem, A. (2022). Financial market development on economic growth in Indonesia using principal component analysis. Jurnal Akuntansi Dan Keuangan, 10(1), 83-92.

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 3 | p. 01-34 | e04340 | 2024

34