

Digital Finance Transactions and the Stability of Nigeria Financial Markets

Henry Waleru Akani¹ and I. Rogers-Banigo²

¹Department of Banking and Finance, Rivers State University, Nkpolu - Port Harcourt, Rivers State, Nigeria. E-mail- akani.waleru@ust.edu.ng

²Department of Banking and Finance, Rivers State University, Nkpolu - Port Harcourt, Rivers State, Nigeria.

To Cite this Article

Henry Waleru Akani & I. Rogers-Banigo (2023). Digital Finance Transactions and the Stability of Nigeria Financial Markets. *Journal of Money, Banking and Finance*, 8: 2, pp. 197-226.

Abstract: This study examined the effects of digital finance on the stability of Nigeria financial markets. The objective was to examine how digital finance affects stability of Nigeria financial markets. Time series data were sourced from Central Bank of Nigeria Statistical Bulletin. Percentage of broad money supply and percentage of private sector credit was used as dependent variables while automated teller machine, point of sales, mobile payment and electronic fund transfer. Ordinary least square was used as data analysis methods. The study found that 46.5 percent variation in the dependent variable was explained by the independent variable, the model was found to be statistically significant while the Durbin Watson found that the absence of serial autocorrelation among the variables in the time series. Beta coefficient of the variables shows that ATM has negative effect on the dependent variable while POS, MP and EFT have positive and significant effect on financial sector stability. 50 percent variation in the dependent variable was explained by the independent variable, the model was found to be statistically significant while the Durbin Watson found that the presence of serial autocorrelation among the variables in the time series. Beta coefficient of the variables shows that ATM has negative effect on the dependent variable while POS, MP and EFT have positive and significant effect on financial sector stability. From the findings, the study concludes that digital finance has significant effect on financial market stability. It recommends that policies such as the cashless policy and the e-naira should be integrated with the objective of achieving financial markets stability in Nigeria.

INTRODUCTION

The concept of money and its effect on the economy was a controversial issue among the mainstream economists such as the classical, Keynesians and the neoclassical economists (Akani, 2017). To the classical economists, money is insignificant and

does not matter, this implies that money has no effect on economic activities while to the Keynesians, money have indirect effect on the economy through interest rate, while to the neo-classical economist, money is the only thing that matters in the economy (Ezirim, 2005; Lucky and Uzah, 2017). Digital finance is a product of technological innovation which was acknowledged by Schumpeter as one factor that determines economic growth and financial stability.

Financial market stability is a multidimensional concept that occurs across a multitude of observable and measurable variables. Financial market stability can be thought of in terms of the financial system's ability to facilitate both an efficient allocation of economic resources both spatially and especially intertemporally and the effectiveness of other economic processes such as wealth accumulation, economic growth, and ultimately social prosperity, to assess, price, allocate, manage financial risks and to maintain its ability to perform key functions even when affected by external shocks or by a buildup of imbalances primarily through self-corrective mechanisms.

One of the problems of financial markets is the growing effect of asymmetric information in deterring both the nature of financial innovation and digital financial transactions. Asymmetries information gives rise to problem of adverse selection and moral hazard behavior of management. Nigeria financial market is emerging market characterized with under capitalization, underdevelopment, and poor corporate government policy mismatch that makes the market sensitive to market shocks thus posing challenge to digital financial transaction.

Access to affordable financial services is critical for poverty reduction and economic growth (Durai & Stella, 2019).

Countries with deeper, more developed financial systems enjoy higher economic growth and larger reductions in poverty and income inequality. Access to financial services also increases opportunities and resilience for the poor, particularly women. According Enffina report 2021, 55 percent of adults in Nigeria lack access to even the most basic transaction account that would allow them to send and receive payments more safely and efficiently (Goldfarb & Tucker, 2017). These accounts are also the gateway to broader financial services such as savings, insurance and credit. Only 20 percent of adults in Nigeria save through a formal financial institution. The remaining savers rely on informal and costlier methods. This does only affect negatively the financial inclusion policy but can affect development of the financial market and the conduct of effective monetary policy.

The occurrence of periodic episode of financial crisis has therefore usually been attributed to external shocks. The growth and interaction of world financial markets

have increased the importance of actions to safeguard the continued stability of the system at large. Sources of financial crisis remain one of the points of departure among scholars (Kenyoru, 2013). There are three sources of financial crisis which are cyclical, the monetarist and the asset pricing channel exist in literature. The monetarist such as Fredman & Schwartz, 1963 believe that financial crisis is a monetary issue source from monetary imbalance; Keynesians economist blamed financial crisis and deficiencies in the component of aggregate demand and cyclical challenges such as business cycle in the economy a factor that can be blamed on macroeconomic variables while Kindlebeger (1978) blamed financial crisis on asymmetric information arising from the demand and supply of financial asset through the asset pricing channels.

Furthermore, digital financial services enabled by fintech, have the potential to lower costs, increase speed, security and transparency and allow for more tailored financial services that serve the poor at scale. Digital financial Services are characterized by low marginal costs and greater transparency. They can respond to the supply-side barriers to access to financial services, such as high operating costs, limited competition, as well as the demand-side barriers, including volatile and small incomes for the poor, lack of identity trust and formality and geographical barriers (Li, Spigt, & Swinkels, 2017). There are many studies on the effect of digital finance, however most of the studies on the effect of digital finance, most of the studies focused on the effect of digital finance and economic growth or the effect of digital finance on commercial banks performance.

The study of Omotunde, Sunday and John-Dewole (2013) examined the impact of cashless economy in Nigeria; this study does not prove any impact of the policy on Nigerian economic growth. The study of Adu (2016) examines cashless policy and its effect on Nigerian economy, the study also failed to prove the extent to which the cashless policies have affected the growth of Nigerian economy. The study of Ezeamama, Ndubuisi and Marire (2014) which examined the impact of the Central bank cashless policy on Nigerian economy does not prove any validity of the policy on the growth of the Nigerian economy. The study of Okoye and Ezejiofor (2013) on appraisal of cashless economy policy in development of Nigerian economy does not model Nigerian economic growth as a function of various cashless policy measures while the study of Akara and Asekome (2018) examined cashless policy and commercial banks profitability in Nigeria. From the above knowledge gap, this study examined the effect of digital finance on financial market stability in Nigeria.

LITERATURE REVIEW

Digital Finance

The definition of digital finance is still diverse, both from the point of view of academics and practitioners, some governments and monetary authorities also define digital finance differently, including the classification of payment data, some of which are still integrated with electronic transactions (PBI, 2018; Ramli, 2020) (Manyika *et al.*, 2016; Durai & Stella, 2019). According to Pazarbasioglu *et al.* (2020) digital financial services are financial services (for example, payments, remittances, and credits) that are accessed and sent via digital channels, including through mobile devices and pre-existing instruments (for example, debit and credit cards) offered primarily by banks.

According to Ozili (2018) digital finance includes all products, services, technology and / or infrastructure that enable individuals and companies to have access to payments, savings, and credit facilities via the internet (online) without the need to visit bank branches or without dealing directly with financial service providers. Based on the latest technological developments, digital finance also includes financial technology (fintech) which offers various investment products in the form of gold which is then referred to as digital gold, stocks, financial derivative products and commodities. Fintech companies are also a financial marketplace that organizes peer-to-peer lending and crowdfunding, so that they can directly bring together lender and borrower, although this function as a financial marketplace is still being debated as a digital financial element that helps achieve financial inclusion. (Akani & Uzah, 2018, Akani & Lucky, 2019)

Digital finance is also a phenomenon of globalization in the financial sector which is facilitated by technological advances, this is not only a positive thing in achieving financial inclusion targets which are useful for increasing economic growth and public welfare, but on the other hand this phenomenon has led to the emergence of an integrated financial system without national borders and the economy. This can expand the possible sources of financial system instability in macroeconomic terms (Mörttinen *et al.*, 2005 & Akani, 2019). The interconnectivity of these interconnected financial transactions will have a chain effect, that is, when difficulties occur in one entity it can be transmitted quickly to other entities in the network. That financial system instability in other countries can easily be transmitted and destabilizes the financial system in any country, in other words, digital financial developments that are expected to help financial system stability will be reduced by

increasing macroeconomic risk or systematic risk. Likewise, the negative impact of digital finance on financial stability will increase with increasing systematic risk.

The use of digital payment systems as one of the main elements of digital finance has been accelerating by the significant growth of online shops (e-commerce) and the presence of financial technology (fintech). This condition is very helpful in achieving the target of financial inclusion, but on the other hand it has raised concerns from various parties, both monetary authorities and academics, about the impact on financial stability (Ozili, 2018, Lucky & Akani, 2019). It is hoped that increasing digital payments as the main element of digital finance and driving financial inclusion will not have a negative impact on financial stability, which the monetary authority must always maintain, but it is expected to be able to help authorities maintain financial stability.

Automated Teller Machine

Worldwide, the use of paper cash still remains the most widely used and acceptable means of settling financial transactions and obligations. However, the proportion of cash transactions is increasingly on the decline, especially in advanced economies (Amedu, 2005, Akani & Tony-Obiosa). In USA, where the use of cash is still prominent, compared with European countries, it represents 50 percent or more of the total transactions. Of course, cash is a no electronic payment method. However, the physical carriage of cash as well as the visit to the bank branches is being reduced by the introduction of an electronic device. Desirous of making the policy succeed, the apex bank has introduced a number of financial services which among others include mobile money payment system, point of sale terminals, Alerts and Automated Teller Machines (ATM). Automated Teller Machines will be used much frequently for making variety of online payments such as utility bills, T.V subscriptions, GSM recharges etc. Customers are advised to keep their ATM cards (Debit and Credit) safe and never to divulge their PINs.

Moreover increase in knowledge and ability to manage internet banking, banks and ATMs have resulted in more independent bank customers no longer requiring bank staff. The shift in bank customers' behavior and attitude towards cash services offered at the banks gave birth to cashless policy. This means banking is entirely relying on monetary transactions that use electronic means rather than cash. The cashless policy was conceptualized by the apex bank to migrate Nigeria's economy from cash based economy to a cashless one through electronic payment system, not only to enable Nigeria monetary system be in line with international best

practices or discourage movement of cash manually, but at the same time increase the proficiency of Nigeria's payment system which will in turn improve the quality of service being offered to the banking public.

Mobile Payment

Essentially, Mobile Payment System introduced at the dawn of January 1, 2012 allows users to make payments with their GSM phones. It is a saving device and transfer system that turns GSM phone into a saving account platform, allowing owners to save money in it and also make transfers. The Point of Sale (POS) terminals are installed by businesses and connected to the Nigeria Inter Bank Settlement System for purposes of making payments during business transactions (Wikipedia2013, Akani & Lucky, 2020). The study presented significant recommendation: availability of sufficient and well-functioning infrastructural facilities (notably Roads and Electricity), harmonization of fiscal and monetary policy, regular assessment of the performance of cashless banking channels (individually and collectively), consideration of the present state and structure of the economy, redesign of monetary policy framework and greater efforts towards economic growth whilst managing inflation. In conclusion, the shift towards a cashless Ogun State seems to be beneficial though it comes with high level of concerns over security and management of cost savings resulting from its implementation.

Point of Sale Terminals

Point of Sale terminals are deployed to merchant locations where users slot their electronic cards through POS in order to make payments for purchases or services instead of using raw cash. As the POS terminals are online real-time, the customer's bank account is debited immediately for value of purchases made or services enjoyed. There are indeed alternatives to handling or transacting cash for transfers and for payments of goods and services purchased. These include: ATMs, mobile banking/ payments which can be done through the use of mobile phones for balance enquiry, fund transfer, bills payment, internet banking which can be used for instant balance enquiries, fund transfer, bills payment and other transactions.(Akani & Lucky, 2014, Akani, Mbauchu & Ibenta, 2016)

Most banks require you to have a token device for internet banking services in order to give some security for customers banking application. Yet, other alternative includes Point of Sale(POS) terminals which allow merchants access to card payments for sale of products and services e.g recharge cards, bill payments,

lottery tickets etc and finally there is electronic fund transfer through which one can transfer money electronically from his account to other account. Some banks also offer an instant electronic fund transfer service. However, most of these e-payment channels require you to have an ATM/ Debit card (Oyetade & Ofoelue, 2012, Akani & Lucky, 2015).

Electronic Transfer

It refers to electronic transfers which can be affected via the internet on (Personal Computers) PCs, laptops and other devices. Bank customers who have subscribed to internet banking can do basic banking transactions via the web. This is a product that enables users to conduct fund transfer, make payment or receive balance enquiries on their mobile phones. The Nigerian Interbank Settlement Scheme is an online platform where banks exchange value thereby enabling the performance of interbank transfer such as NEFT and NIBSS instant transferring funds between banks for single or multiple beneficiaries for individual amounts not exceeding N10million. NEFT transfers (National Electronic Funds Transfer), once affected works with the next available clearing session of CBN and is received in the beneficiary's account the same day or next working day, but NIBSS instant payments are immediate.

Financial Market Stability

There is no consensus among researchers about the definition of financial stability. Same set of problems may be addressed as instability of financial system, or ability of financial system to resolve systemic risks. Widely accepted definition is suggested by Garry Schinas, the author of fundamental study Safeguarding financial stability theory and practice. In Lithuanian research Schinasys approach was applied in the study of central banking role in support of financial stability. Financial system is stable if the system is capable to perform three key functions the inter-temporal allocation of resources from savers to investors and the allocation of economic resources generally; the assessment, pricing, and allocation of forward- looking financial risks; and the absorption of financial and real economic shocks.

Ozili (2018) opined that there is no standard definition of financial stability or financial system stability, Bank Indonesia defines financial system stability as a condition that enables the national financial system to function effectively and efficiently and is able to withstand internal and external vulnerabilities, so that the allocation of sources of funding or financing can contribute to growth and national economic stability (BI, 2020, Akani, Okonkwo & Ibenta, 2016). According to the

World Bank, a stable financial system is capable of efficiently allocating resources, assessing and managing financial risks, maintaining employment levels close to the economy's natural rate, and eliminating relative price movements of real or financial assets that will affect monetary stability or employment levels (World Bank, 2020). Meanwhile, the financial system is defined as a system consisting of financial institutions, financial markets, financial infrastructure, non-financial companies and households, which interact with each other in funding and / or providing financing for economic growth (BI, 2020).

Digital Finance and Financial Market

Globalization in the financial sector due to technological advancement has not only generated a positive impact on the financial sector's development and economic growth, but it has also generated negative consequences. The evolution of integrated financial services without border restrictions has created financial sector instability. Globalization and interconnectivity help in transferring financial sector instability from one country to another. On the one hand, digital finance that helps in promoting financial sector development also creates chances for systematic risks. Various factors cause systematic or business risks such as institutional linkage, financial market connectivity, macroeconomic conditions, and the size of the financial sector. Ozili (2018) concluded that, although digital finance helps in expediting the process of financial inclusion, it also contains some risks. For instance, easy availability of credit helps in increasing nonperforming loans, and excessive use of fintech technologies increases digital risk such as theft of data, disruption in payment systems.

The lack of timely and stringent regulatory mechanisms also aggravates systematic risk, especially in developing countries. Furthermore, García and José (2019) noted that systematic risk increases with new financial outreach activities, as these activities are not so adequately regulated. Similarly, Khan (2018) highlighted that institutions that adopt the business correspondent framework of financial inclusion are more exposed to strategic and compliance risks.

Theory of Financial Innovations

The theory of financial innovations was proposed by Silber (1983) premised on the idea that benefit expansion of money related foundations is the key reason of financial inclusion (Li and Zeng, 2010). The theory demonstrates that the primary thoughts behind the new innovations are the defects of the money related business sector, mostly the deviated data, office expenses and exchange costs (Błach, 2011,

Akani & Momodu, 2016). According to the theory, financial related innovations can be very new resolutions or simply customary means whereby latest component of development has been offered, enhancing firms' liquidity as well as expanding quantity new applicants, due to their qualifications on the situation (Ionescu, 2012).

According to the theory, financial innovation is a critical motivating force of the financial system, which leads to better economic competence and enhanced economic advantage derived from the new and frequent changes (Sekhar, 2013). Financial innovations define financial developments by coming up with new ways of production, technological solutions, creating better return rates hence boosting the country's economy in general.

The theory posits that the innovativeness improves the firms' competitive edge of a corporate and generates more earnings to the investors (Błach, 2011). Innovation is a tool used to solve, manage and transfer the entire extra burden. The application of innovations promotes growth of financial entities through improved allocation, efficiency and a reduction of financial and administration costs (Sekhar, 2013). Financial innovations enhance financial markets liquidity; ensure the allocation of resources to insufficient areas as well as improving the accessibility to emerging prospects (Błach, 2011) hence deepening financial inclusion.

Technology Acceptance Model

This model was originally put forward by Davis (1986) to expounding on attitude behind the urge to employ technological knowhow (Monyoncho, 2015). TAM deals with perceptions and not systems real usage and argues when new technological advancement is introduced to the customers, either one of this occurs that is, Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) influence their decision (Lule, Omwansa & Waema, 2012). PEOU is the level of confidence that people put on a system and if users perceive a new technology to be beneficial in support of both short and long-run, there is that encouragement to use the system. Further, the level by which an individual consider a system will boost performance in the short and long-run is the PU (Mojtahed, Nunes & Peng, 2011).

The TAM affirms that the systems real utilization is established by each user's behavioral intention for usage and is inspired by an individual's perception to the system. The theory also explains that the perception towards new technology has a direct relation to its functionality as well as the simplicity of the system (Lim & Ting, 2012). TAM considers that acceptance of technology and functionality is influenced by consumer's intentions that establish the customer's perception towards system

(Mojtahed, Nunes & Peng, 2011, Lucky, Akani & Anyamaobi, 2015). The theory also supports that the recognitions or suspicions about the advancement are instrumental in the improvement of states of mind that will in the long run result in system usage conduct (Lim & Ting, 2012).

Diffusion of Innovation Theory

The Diffusion of Innovations (DOI) theory was proposed by Rogers (1995) to explain the approach through which innovation can be passed via different ways over certain period among different users (Sarker & Sahay, 2004, Akani & Lucky, 2015). DOI theory explores the ways in which innovative ideas are passed from one generation to the other. According to DOI theory, an innovation is conveyed through various channels continually among individuals of the same social beliefs (Echchab & Hassanuddeen, 2013). The dispersion of Innovation hypothesis looks at the rate at which new advancement are spreading, how the new development is spreading and reasons why it is spreading with a specific end goal to research the elements influencing the selection of new data innovation advancement (Monyoncho, 2015).

The diffusion of innovations theory explains that innovationists apply normal distribution curve which can be partitioned into five segments to categorize users in terms of innovativeness. Diffusion theory explains that the crucial aspect in establishing implementation of innovation is: absolute advantage, companionable, simplicity, trial ability as well as ease to be detected (Monyoncho, 2015). DOI also classifies users as modernizer, early modernizers, and timely mass, late mass and stragglers (Echchab & Hassanuddeen, 2013). DOI theory perceives innovations to be passed on via several ways several in a span of time as well as a certain system (Sarker & Sahay, 2004, Akani & Uzobor, 2015). DOI theory tries to explicate as well as illustrate the approaches in which innovations that are digital financial services are adopted and becomes successful.

Empirical Review

Dabla-Norris, Yan and Filiz (2015) examined three measurements of money related incorporation to be specific access, profundity and intermediation productivity. The study utilized firm-level information from the World Bank Enterprise Survey for six nations at different degrees of financial improvement three low-wage nations (Uganda, Kenya, Mozambique), and three developing business sector nations (Malaysia, the Philippines, and Egypt). The study discoveries built up those lightening diverse monetary contacts have a differential effect crosswise over nations,

with nation particular attributes assuming a focal part in deciding the linkages and tradeoffs between consideration, GDP, imbalance, and the dispersion of additions and misfortunes.

Akhisar, Tunay and Tunay (2015) researched the impacts of the bank's productivity execution of electronic-based managing an account administrations in 23 created and building up nations' electronic keeping money administrations through 2005 utilizing dynamic board information techniques. The discoveries of the study set up that bank productivity of created and creating nations was influenced by the proportion of the quantity of branches to the quantity of ATMs and were profoundly critical and electronic managing an account administrations in huge. The concentrate likewise found that a few variables had a negative relationship, due to differing qualities in the level of advancement of the nations, the socio-social structure and electronic managing an account base.

Ranjani and Bapat (2015) analyzed whether individuals who have ledgers alongside access to different wellsprings of credit use financial balances adequately and whether holding financial balances encourage managing an account propensities in these individuals. This examination undertaking was led crosswise over 550 respondents for the most part borrowers of microfinance organizations to find out whether they had financial balances and what their observations about banks were. This study reasoned that basically having a record with a bank did not bring about the borrowers utilizing saving money administrations and that they liked to manage organizations that permitted more adaptable administrations than the bank. The concentrate additionally found that to have the capacity to accomplish incorporation, it is insufficient if ledgers are opened.

Monyoncho (2015) inspected the relationship between E-Banking advances and money related execution of business banks in Kenya utilizing optional information for a time of five years. The discoveries of the study uncovered that ATM developments, Mastercards, portable managing an account and web keeping money offer the comfort of directing a large portion of the saving money exchanges at the time that suits the client. The study presumed that selection of E-Banking advances affected the execution of business banks in Kenya and prescribed that business banks ought to keep putting resources into saving money innovations.

Terfa (2015) inspected the impact of budgetary creative procedures on neediness decrease in provincial northern Nigeria to build up whether the poorest wage quintile benefits the most from such techniques in various situations. The

study discoveries set up that conventional product protection benefits for the most part rich ranchers, and poor agriculturists underutilize microfinance organizations quickened formal access to credit. The concentrate likewise settled that loaning to rustic ranch family units sorted out into funds clubs profited the poorest of poor people. The concentrate additionally found that redirecting from conventional yield protection to option protection would help poor ranchers adapt or adjust to covariate and unconventional agrarian stuns in creating nations.

Njenga, Kiragu and Opiyo (2015) inspected the impact of money related developments on budgetary execution of SACCO's in Nyeri County, Kenya. The study utilized a cross sectional overview research plan utilizing a specimen of 30 SACCO's and a semi-organized poll to gather information for the study. The study discoveries built up that phone keeping money and web saving money were measurably noteworthy. The study inferred that there is a remarkable relationship between monetary advancements and the money related execution of SACCOs and that phone managing an account and web keeping money are the fundamental drivers of the budgetary execution of SACCOs.

Bakang (2015) investigated the effects of financial deepening on economic growth in the Kenyan banking sector using quarterly time series data from 2000 to 2013. Financial deepening, the was captured through Liquid Liabilities as ratio to nominal Gross Domestic Product; Credit to the Private Sector as ratio to ostensible GDP; Commercial Bank Assets as proportion to business bank resources in addition to Central Bank Assets and Commercial Bank Deposits as proportion to ostensible GDP. Genuine GDP was measured by Economic development. The study verified that keeping money segment in Kenya has an imperative part during the time spent financial development. The outcomes additionally settled that fluid liabilities, credit to the private area, business national bank resources and business bank stores have positive and factually noteworthy consequences for GDP.

Muiruri and Ngari (2014) inspected the impact of monetary advancements on the money related execution of business banks in Kenya with spotlight on Mastercards, portable keeping money, web managing an account and organization saving money. The study utilized a specimen of sixteen banks and gathered information from four individuals from the administration group utilizing surveys. The study confirmed that a few banks in Kenya had received some monetary advancements, for example, charge cards, versatile, web and organization managing an account. The concentrate likewise found that budgetary advancements greatly affected the money related execution of the business banks.

Mbutor and Uba (2013) analyzed the effect of money related consideration on fiscal strategy in Nigeria somewhere around 1980 and 2012. The discoveries of the study built up that developing money related consideration enhances the viability of fiscal strategy. The concentrate likewise found that the coefficient of the quantity of bank offices has the wrong sign. This is on account of opening branches, banks for the most part seek after benefits however not money related incorporation, which is an approach objective, so that there are bunches of branches, which are under-used while various areas, which are considered not good for asset reports, are under-expanded.

Nyambariga (2013) inspected the impact of money related advancement in the execution of business banks in Kenya with spotlight on versatile managing an account, office keeping money, robotized teller machines and plastic card utilization utilizing optional information. The study uncovered that portable managing an account, robotized teller machines and card use positively affected execution of business banks in Kenya. The exploration likewise uncovered that organization managing an account negatively affected execution of banks. The study reasoned that money related advancements influence business banks execution therefore business banks ought to set up a suitable domain to upgrade organization managing an account, portable keeping money, ATMs and card use developments to enhance the execution of business banks consequently enhancing Kenya's economy.

Ngungi (2013) researched the effect of internet depending on money related execution of business banks in Kenya. The study did an enumeration of the 43 business banks in Kenya and gathered essential information through surveys. The study reasoned that web saving money affected the monetary execution of business banks in Kenya. The study recommended that banks should rally more clients to use internet banking as based on the results of the study, internet banking services were very useful in addressing lowering costs to the bank and customers, security and accessibility by users.

Buckley and Malady (2015) concluded that digital financial administrations in developing markets experiences constrained uptake and use thus; they may have little effect on financial inclusion. Nwanne (2015) on the relationship between monetary consideration and financial development in Nigerian country occupants found that the manageability of money related incorporation to rustic inhabitants in Nigeria was the standard for monetary development and economy can't develop quickly without appropriate execution of budgetary consideration to provincial zones in Nigeria.

Karpowicz (2014) found that bringing down imperatives on insurance guarantees higher development while money related avoidance can be handled through measures that lower the monetary interest cost. Nyamongo and Ndirangu (2013) on the effects of economic creativity in the banking sector in Kenya found that innovations had improved the monetary policy environment and proportion of the unbanked population had declined. Kenyoru (2013) examined the link between financial innovations and financial extending in Kenya and inferred that money related development had an immaterial positive effect on budgetary developing. Based on the reviewed studies it evident that most studies focus more on financial innovations and its impact on the banking sectors hence there no conclusive study on digital finance and deepening financial inclusion.

Demirguc-Kunt *et al.* (2017) discussed benefit of financial inclusion on the reduction of poverty and inequality. Sahay and Čihák (2020) founds that higher financial inclusion in payments is associated with reduction in inequality, particularly for those at the low end of the income distribution and when female financial inclusion is high. On the impact on growth, Sahay *et al.* (2015) found that, for a country with low levels of financial inclusion (25th percentile), improving financial inclusion to the 75th percentile would lead to a 2-3 percentage point increase in GDP growth on average. Loukoianova *et al.* (2018) found that a one percent increase in their financial inclusion index (equivalent to an increase from the fourth to the third quartile) is associated with a 0.2 percent cumulative increase in per capita income growth over a five-year period for low income developing countries (and the Asia Pacific region).

Sahay *et al.* (2015) and Sahay and Čihák (2020) rely on single measures of financial inclusion/access at the country-level (such as the number of bank accounts per capita), and used these measures to analyze their impact on economic growth. Others such as Dabla-Norris *et al.* (2015), Kenn-Ndubisi & Akani (2015) and Loukoianova *et al.*, (2018) use composite measures instead, but only reflecting indicators of financial inclusion through traditional financial institutions. Levine, Loayza and Beck (2000) use measures of legal origin as instrumental variables for financial development, and find a very strong connection between the exogenous component of financial development and long-run rates of per capita GDP growth. However, these studies are limited to assessing the causal link between financial development and growth. Causal relationship between financial inclusion, and in particular digital financial inclusion and economic outcomes is scarce. This paper's aim is to fill this gap by providing new evidence on the impact of usage of DFSs on economic growth.

Jack and Suri (2014) found that consumption of households in Kenya that uses mobile money is unaffected by shocks, while households who do not use mobile money saw a seven percent decline in consumption. Riley (2016) also found similar results on consumption smoothing by mobile money users after rainfall shocks in Tanzania, while the consumption of non-users from the same village were adversely affected. Demombyne and Thegeya (2012) documented the widespread use of mobile money system for savings in Kenya, and find that mobile money users are 32 percent more likely to have some savings. Mbiti and Weil (2016) found positive relationship between the adoption of mobile money and frequency of sending and receiving transfers, as well as with bank use, formal savings, and employment. McKinsey (2016) predicted that digital finance (includes both mobile money and mobile banking) could boost GDP of emerging economies by 6 percent by 2025, informed by field research in seven large countries.

Tchamyau *et al.* (2019) applied tests to 48 African countries and found that ICT reduced income inequality through formal financial sector development and formalization. Mushtaq and Bruneau (2019) used a sample of 62 countries and found that the association of ICT diffusion with financial inclusion could help alleviate poverty and inequality; furthermore, ICT used as an instrument for financial inclusion accelerated such effects, therefore it could stimulate financial inclusion by advancing digital finance. Zhong and Jiang (2021) offered empirical evidence in China, showing that Internet finance tended to weaken the exclusiveness of traditional finance, by reducing the asymmetry in traditional financial markets. However, some scholars put forward different points of view.

Kar (2011) used data from 426 institutions in 81 countries for research and found that the relationship between inclusive finance and narrowing the urban–rural income inequality was not obvious. Chen *et al.* (2020) used the Gini coefficient as proxy variable for income inequality and combined it with per capita income to conduct tests, finding that the EKC hypothesis was valid, and for G20 countries, income inequality in most developed countries hardly affected CO₂ emissions, while more equal income distribution in developing countries favored a reduction in CO₂ emissions. Third, some literatures focused on the research objects.

Dong and Hao (2018) used the urban–rural income gap as income inequality and per capita electricity consumption as the explained variable to study whether income inequality affected electricity consumption in China. Lim and Lee (2012) proposed that utilising Internet technologies to offer access to environmental information could put community pressure on polluters. Salahuddin *et al.* (2016)

tested the relationship between Internet usage and CO₂ emissions in OECD countries, and reported that although there was a positive significant relationship in the long run.

Zhang and Meng (2019) tested the EKC with Internet penetration in 115 countries, indicating that the EKC existed and Internet penetration pushed a decrease in CO₂ emissions. Zhang *et al.* (2019) conducted research on the Internet and residents' environmental awareness in China, and reported that increased online content frequency reduced residents' satisfaction with the government's environmental protection. Gong *et al.* (2020) investigated the effect of Internet use on pro-environmental behavior in China and reported a significant positive relationship, suggesting that pro-environmental behavior can be encouraged by improving Internet access. Hsu *et al.* (2020) utilized the app's citizen reports in Guangzhou (a big city in China) to find that the reports were helpful to significantly improving water quality. However, some scholars had argued that Internet penetration did not significantly influence individual sustainable consumption behaviors, but substantially enhanced the transition from pro-environmental attitudes to sustainable behaviors. Odior & Banuso (2013) examined the challenges, benefits and prospects of cashless policy and their study found that some of the challenges that have the capacity to hamper the success of cashless policy are power supply and poor infrastructures to mention but a few. On the other hand, their study revealed that cashless policy will promote economic growth and provide banks with more liquidity for lending to needy sectors and contribute to eliminating corruption if the right infrastructure and trust is instituted.

Muyiwa *et al.*, (2013) found that the introduction of cashless policy will contribute in reducing robbery incidences; attraction of more foreign direct investment and creation of employment. Oyewole *et al.*, (2013) examined electronic payment systems and its impact on economic growth in Nigeria, and their study found that e-payment system has a positive impact on economic growth in terms of real GDP and that the introduction of ATMs in doing financial transaction impacts directly on economic growth, while other forms of e-payment channels showed a negative impact on economic development.

Newstead (2012) examined the influence of cashless payment on economic growth and found a positive relationship between cashless payment and economic growth. Specifically, it was found that cashless transactions were growing twice as fast in developing economies as compared across the world. This assertion by Newstead was not supported with appropriate statistical figures, showing the pace

of cashless growth in the developing economies as compared to figures of cashless growth in the developed economies.

Mallat and Tuunainen (2008) examined the adoption of mobile payment systems by merchants and found that the main purpose of mobile payment adoption is to increase sales and reduce the costs of payment processing and showed a positive influence on business sales growth. But, it carries challenges such as: complexity of the systems, unfavorable revenue sharing models, lack of critical mass, and lack of standardization. Cheng *et al.*, (2011) risk perception of the E-Payment Systems using adult consumers in Malaysia and found that e-payment systems impacts negatively on firm's sales growth; also they further found that E-payment system has positive influence on consumers purchase intentions.

Echekoba and Ezu (2012) carried out in Nigeria, observed that 68.2% of the respondent complained about long queues in the bank, 28.9% complained of bad attitude of teller officers (cashiers) while 2.89% complained of long distance of bank locations to their home or work places. Likewise, in her 24th NCS national conference in December 2011, CBN data shows that 51% of withdrawal done in Nigeria was through Automated Teller Machine (ATM), while 33.6% was through Over the Counter (OTC) cash withdrawals and 13.6% through cheques. Payment was also done through point of sales machine (POS) which accounted for 0.5% and web 1.3%. Therefore, if the introduction of ATM in Nigeria cash withdrawals system reduced OTC withdrawal; then it will implies that introduction of cashless policy supported by application of information technology can achieve more to reduce over dependent on cash payment in the Nigerian economic system.

Adewoye (2013) empirically studied the impact of mobile banking on service delivery in the Nigerian Commercial Banks through the use of questionnaire. He found out that the introduction of e-banking services has improved banking efficiency in rendering services to customer. His findings shows that mobile banking improve banks service delivery in a form of transactional convenience, savings of time, quick transaction alert which has recuperate customer's relationship and satisfaction.

Literature Gap

The above studies revealed the relevance of the digital finance on financial market stability. However, despite the numerous studies there is no study that examined the effect of digital finance on Nigerian economic growth using econometrics method. This study therefore intends to adopt ordinary least square method to examine the relationship between digital finance on financial market stability in Nigeria.

METHODOLOGY

The study adopted the quasi-experimental research design. This is because the variable under study cannot be manipulated or is not under the control of researcher. The study is designed after correlation or regression research methodology. Here we try to see how two or more variables can relate or influence each other. This study utilized secondary data. The data is described as time series data that is information on a variable of study over the periods of one year. Secondary data for estimation were collected from the CBN financial stability report, CBN Economic reports, audited financial statements of banks, Journals, Textbooks and Seminar papers.

Model Specification

The functional form of the model is specified as follows;

$$M2/GDP = f(ATM, POS, MP, EFT) \quad (1)$$

$$M2/POS = f(ATM, POS, MP, EFT) \quad (2)$$

To have the estimable version of above equation, equation 1 and 2 can be rewritten to have

$$M_2/GDP_t = \alpha_0 + \beta_1 ATM_{t-1} + \beta_2 POS_{t-2} + \beta_3 MP_{t-3} + EFT_{t-5} + \mu_{it} \quad (3)$$

$$M_2/CPS_t = \alpha_0 + \beta_1 ATM_{t-1} + \beta_2 POS_{t-2} + \beta_3 MP_{t-3} + EFT_{t-5} + \mu_{it} \quad (4)$$

Where

M2/GDP = Broad money supply to gross domestic products

M2/CPS = Broad money supply to Credit to private sector credit

ATM = Automated Teller Machine Transaction

POS = Point of Sales Transactions

MP = Mobile Money Payment

ETF = Electronic Fund Transfer

$\phi_0 \alpha_0$ = Constant

$\beta_1 - \beta_5$ = Coefficients of independent variables

μ_{it} = Error Term

Data Analysis Procedure

The main tool of analysis is the Ordinary Least Squares (OLS) using the multiple regression method for a period of 34 years, annual data covering 1985– 2018.

Statistical evaluation of the global utility of the analytical model, so as to determine the reliability of the results obtained were carried out using the coefficient of correlation (r) of the regression, the coefficient of determination (r^2), the student T-test and F-test.

- (i) **Coefficient of Determination (r^2) Test:** This measure the explanatory power of the independent variables on the dependent variables. R^2 gives the proportion or percentage of the total variation in the dependent variable Y that is accounted for by the single explanatory variable X . The higher the R^2 value the better. For example, to determine the proportion of monetary policy to private sector funding in our model, we used the coefficient of determination. The coefficient of determination varies between 0.0 and 1.0. A coefficient of determination says 0.20 means that 20% of changes in the dependent variable is explained by the independent variable(s). Therefore, we shall use the R^2 to determine the extent to which variation in monetary policy variables are explained by variations in private sector funding variables over the periods covered in this study.
- (ii) **Correlation Co-Efficient (R):** This measures the degree of the relationship between two variables x and y in a regression equation. That is, it tries to establish the nature and magnitude of the relationship when two variables are been analyzed. Thus correlation co-efficient show whether two variables are positively or negatively correlated. That is, it takes the value ranging from -1 , to $+1$.
- (iii) **F-Test:** This measures the overall significance. The extent to which the statistic of the coefficient of determination is statistically significant is measured by the F-test. The F-test can be done using the F-statistic or by the probability estimate. We use the F-statistic estimate for this analysis.
- (iv) **Student T-test:** measures the individual statistical significance of the estimated independent variables. This is a test of significance used to test the significance of regression coefficients (Gujurati, 2003). Generally speaking, the test of significance approach is one of the methods used to test statistical hypothesis. A test of significance is a procedure by sample results are used to verify the truth or falsity of a null hypothesis (H_0) at 5% level of significance.
- (v) **Durbin Watson Statistics:** This measures the collinearity and autocorrelation between the variables in the time series. It is expected

that a ratio of close to 2.00 is not auto correlated while ratio above 2.00 assumed the presence of autocorrelation.

- (vi) **Regression coefficient:** This measures the extent in which the independent variables affect the dependent variables in the study.
- (vii) **Probability ratio:** It measures also the extent in which the independent variables can explain change to the dependent variables given a percentage level of significant

ANALYSIS AND DISCUSSION OF FINDINGS

Table 1: Ordinary Least Square Regression Result

<i>Variable</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-Statistic</i>	<i>Prob.</i>
Model i:				
ATM	-1.178055	2.772032	-1.833465	0.2541
POS	1.344141	2.653620	5.027626	0.0002
MP	1.116255	2.392175	0.645376	0.5685
EFT	8.800410	2.027845	4.339785	0.0008
C	1.160637	2.453162	0.473119	0.6440
R-squared	0.573979	Mean dependent var		0.540870
Adjusted R-squared	0.455964	S.D. dependent var		55.61793
S.E. of regression	11.67133	Akaike info criterion		8.051168
Sum squared resid	1770.859	Schwarz criterion		8.544861
Log likelihood	-82.58844	Hannan-Quinn criter.		8.175331
F-statistic	4.06529	Durbin-Watson stat		1.285874
Prob(F-statistic)	0.00684			
Model ii				
ATM	-7.576207	1.905756	-3.975433	0.0010
POS	5.472714	1.784136	0.067432	0.6870
MP	4.229505	1.568907	2.695829	0.0153
EFT	3.089181	1.250824	2.469717	0.0244
C	-1.552402	2.891600	-0.536866	0.5983
R-squared	0.686846	Mean dependent var		-0.076400
Adjusted R-squared	0.540253	S.D. dependent var		35.70683
S.E. of regression	14.27146	Akaike info criterion		8.408738
Sum squared resid	3462.466	Schwarz criterion		8.798778
Log likelihood	-97.10922	Hannan-Quinn criter.		8.516918
F-statistic	9.035387	Durbin-Watson stat		1.865968
Prob(F-statistic)	0.000001			

Source: Computed From E-View 9.0

From model one the study found that 45.5 percent variation in the dependent variable was explained by the independent variable, the model was found to be statistically significant while the Durbin Watson found that the presence of serial autocorrelation among the variables in the time series. Beta coefficient of the variables shows that ATM has negative effect on the dependent variable while POS, MP and EFT have positive and significant effect on financial sector stability.

From model two the study found that 54 percent variation in the dependent variable was explained by the independent variable, the model was found to be statistically significant while the Durbin Watson found that the presence of serial autocorrelation among the variables in the time series. Beta coefficient of the variables shows that ATM has negative effect on the dependent variable while POS, MP and EFT have positive and significant effect on financial sector stability.

Table 2: Error Correction Model Regression Result

<i>Variable</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-Statistic</i>	<i>Prob.</i>
D(M2_GDP (-1))	0.247231	0.309939	0.797676	0.4367
D(ATM(-1))	-0.183400	0.172703	-1.061944	0.3040
D(POS(-1))	0.371457	0.224261	1.656363	0.1171
D(MP(-1))	0.069294	0.247330	0.280167	0.7829
D(ETF(-1))	-0.680693	0.717662	-0.948488	0.3570
C	1.047482	1.828979	0.572714	0.5748
ECM(-1)	-0.395124	0.322417	-1.225509	0.2381
R-squared	0.539412	Mean dependent var		0.293333
Adjusted R-squared	0.465185	S.D. dependent var		9.777419
S.E. of regression	8.933452	Akaike info criterion		7.522208
Sum squared resid	1276.905	Schwarz criterion		8.176100
Log likelihood	-98.83311	Hannan-Quinn criter.		7.731393
F-statistic	4.481403	Durbin-Watson stat		2.175839
Prob(F-statistic)	0.001560			
D(M2_PSC (-1))	-0.586832	0.969727	-0.605153	0.5536
D(ATM(-1))	1.136049	1.468155	0.773793	0.4503
D(POS(-1))	1.354480	1.493460	0.906941	0.3779
D(MP(-1))	0.123783	1.341488	0.092273	0.9276
D(ETF(-1))	-0.723874	2.538406	-0.285169	0.7792
C	-1.310558	7.299704	-0.179536	0.8598
ECM(-1)	-1.160069	1.210223	-0.958558	0.3520
R-squared	0.724566	Mean dependent var		-1.669667
Adjusted R-squared	0.500776	S.D. dependent var		54.73375
S.E. of regression	38.67256	Akaike info criterion		10.45286
Sum squared resid	23929.07	Schwarz criterion		11.10675
Log likelihood	-142.7929	Hannan-Quinn criter.		10.66205
F-statistic	3.237703	Durbin-Watson stat		2.001023
Prob(F-statistic)	0.014308			

Source: Extract from e-view 9.0

Table 2 presents the error correction results, from model one the study found that 46.5 percent variation in the dependent variable was explained by the independent variable, the model was found to be statistically significant while the Durbin Watson found that the absence of serial autocorrelation among the variables in the time series. Beta coefficient of the variables shows that ATM has negative effect on the dependent variable while POS, MP and EFT have positive and significant effect on financial sector stability. The ECM indicates 39.5 percent speed of adjustment.

From model two the study found that 50 percent variation in the dependent variable was explained by the independent variable, the model was found to be statistically significant while the Durbin Watson found that the presence of serial autocorrelation among the variables in the time series. Beta coefficient of the variables shows that ATM has negative effect on the dependent variable while POS, MP and EFT have positive and significant effect on financial sector stability; the ECM indicates the speed of 116 percent over the periods.

DISCUSSION OF FINDINGS

Model one found that 46.5 percent variation in the dependent variable was explained by the independent variable, the model was found to be statistically significant while the Durbin Watson found that the absence of serial autocorrelation among the variables in the time series. Beta coefficient of the variables shows that ATM has negative effect on the dependent variable while POS, MP and EFT have positive and no significant effect on financial sector stability. The ECM indicates 39.5 percent speed of adjustment while model two the study found that 50 percent variation in the dependent variable was explained by the independent variable, the model was found to be statistically significant while the Durbin Watson found that the presence of serial autocorrelation among the variables in the time series. Beta coefficient of the variables shows that ATM and electronic fund transfer have negative effect on the dependent variable while POS and MP have positive and significant effect on financial sector stability; the ECM indicates the speed of 116 percent over the periods.

The positive effect of the variables confirm the a-priori expectations of the study and in line with theory of innovation and technology acceptance model while the negative effect of variables contradict the expectations of the results and can be blamed on environmental factors such as poor applications of financial technology. Empirically, the findings confirm the findings of Dabla-Norris, Yan and Filiz (2015) built up those lightening diverse monetary contacts have a differential effect

crosswise over nations, with nation particular attributes assuming a focal part in deciding the linkages and tradeoffs between consideration, GDP, imbalance, and the dispersion of additions and misfortunes, Akhisar, Tunay and Tunay (2015) that bank productivity of created and creating nations was influenced by the proportion of the quantity of branches to the quantity of ATMs and were profoundly critical and electronic managing an account administrations in huge, the findings of Ranjani and Bapat (2015) that basically having a record with a bank did not bring about the borrowers utilizing saving money administrations and that they liked to manage organizations that permitted more adaptable administrations than the bank.

Monyoncho (2015) that selection of E-Banking advances affected the execution of business banks in Kenya and prescribed that business banks ought to keep putting resources into saving money innovations, the findings of Terfa (2015) that redirecting from conventional yield protection to option protection would help poor ranchers adapt or adjust to covariate and unconventional agrarian stuns in creating nations, the findings of Njenga, Kiragu and Opiyo (2015) that there is a remarkable relationship between monetary advancements and the money related execution of savings and credit co-operation society (SACCOs) and that phone managing an account and web keeping money are the fundamental drivers of the budgetary execution of savings and credit co-operation society (SACCOs).

CONCLUSION

The study examined the effect of digital banking on the stability of Nigeria financial market; data were sourced from Central Bank of Nigeria Statistical Bulletin. From the results presented in Table 1 the study found that 46.5 percent variation in the dependent variable was explained by the independent variable, the model was found to be statistically significant while the Durbin Watson found that the absence of serial autocorrelation among the variables in the time series. Beta coefficient of the variables shows that ATM has negative effect on the dependent variable while POS, MP and EFT have positive and significant effect on financial sector stability. 50 percent variation in the dependent variable was explained by the independent variable, the model was found to be statistically significant while the Durbin Watson found that the presence of serial autocorrelation among the variables in the time series. Beta coefficient of the variables shows that ATM has negative effect on the dependent variable while POS, MP and EFT have positive and significant effect on financial sector stability.

RECOMMENDATIONS

From the finding, the study makes the following recommendations:

Digital finance such as the ATM has a positive impact on financial stability by increasing the ability of banks to provide financing, so that the availability of bank loans tends to experience growth therefore the regulatory authorities should ensure effective policies to checkmate assets quality of the commercial as the major determinants of financial market stability.

The positive influence of digital finance on financial stability will decrease with increasing systematic risk, increasing digital payments as the main element of digital finance can no longer automatically support the growth of banking financing, this happens because banks anticipate systematic risks by reducing loans. The study recommends that the management of the financial sector should ensure proper integration of the digital financial transactions to ensure financial market stability.

There is need for management of the financial institutions to maintain high level of liquidity as digital finance can affect the level reserves that affects negatively financial market stability in Nigeria.

The study suggest for adequate regulatory measures to cushion the negative effect of digital finance such as the Automated teller machine on the financial market stability.

References

- Akhisar, I., Tunay, K. B. & Tunay, N. (2015). The effects of innovations on bank performance: The Case of Electronic Banking Services. *Procedia - Social and Behavioral Sciences* 195, 369 – 375
- Akinwale, O. Y., Sanusi, A., & Surujlal, J. (2018). An empirical analysis of information and communication technology (ICT) and economic growth in Nigeria. *International Journal of eBusiness and eGovernment Studies*, 10(1), 129-142.
- Akani, H. W., & Lucky, A. L., (2015). Econometric analysis of capital adequacy ratios and the impact on profitability of commercial banks in Nigeria. *IOSR Journal of Economics and Finance*, 6 (6), 11 – 24.
- Akani H.W.,Nwanna,I. & Mbachu, A. (2016) Effect of selected macroeconomic variable on commercial banks performance in Nigeria. *Iard International Journal of Banking and Finance Research* 2(3), 34-75.
- Akani, H. W., Okonkwo V. I.& Ibenta, S. N. (2016). Empirical analysis of monetary policy on capital market activities: Evidence from Nigeria economy. *International Journal of Accounting and Financial Management*. 2(3), 82-111.

- Akani, H.W. & Momodu A.A. (2016). Empirical analyses of financial sector development and national savings: Evidence from Nigeria economy *International Journal of Financial Economics*, 5(1), 46-60
- Akani, H. W. & Uzah, C. K (2018). Determinants of bank distress in Nigeria commercial banks: A Multi-dimensional study. *International Journal of Innovative Finance and Economic Research*, 6(4), 67-87.
- Akani, H. W., & Lucky, A. L. (2018). Electronic payment system and commercial banks dynamics: Evidence from Nigeria. *Journal of Strategic and Internet Business*, 3(1), 131-147.
- Akani, H.W., & Lucky, A. L. (2019). Financial discipline and performance of deposit money banks: empirical evidence from Nigeria economy. *European Journal of Accounting, Finance and Investment*, 5(2), 100-123.
- Akani, H.W. (2019). Effect of cross border banking on growth of deposit money banks in Nigeria. *International Journal of Interdisciplinary Research Methods*. 6(5), 1-26.
- Lucky, A.L., & Akani, H. W. (2019). Cost of capital and dividend policy: a panel data study of Nigeria commercial banks. *European Journal of Accounting, Finance and Investment*, 4(12), 80-89.
- Akani, H.W. (2019). Credit expansion and commercial banks soundness in Nigeria: An application of multi-dimensional analysis. *European Journal of Business and Innovation Research*. 7(1), 12-40.
- Akani, H.W., & Tony-Obiosa, R. L. (2019). Effect of financial innovations on the profitability of deposit money banks in Nigeria. *European Journal of Accounting, Auditing and Finance Research*, 8(1), 52-73.
- Akani, H.W., & Tony-Obiosa, R.L. (2019). Financial intermediation and capital formation: A time variant study from Nigeria. *International Journal of Innovation Finance and Economic Research*, 8(1), 64-84.
- Akani, H.W. & Akani, V. C. (2019). Theoretical perspectives of earnings, profitability and asset quality in banking: Descriptive evidence from Nigeria economy. *World Journal of Finance and Investment Research* 8(1), 1-24.
- Akani, H.W., & Lucky, A. L. (2020). Financial deficiency syndrome and behaviour of low income Earners in rural communities of Rivers State, Nigeria. *International Journal of Small Business and Entrepreneurship Research*, 8 (1), 14-3
- Akani, H.W & Lucky, A.L. (2014), Money supply and stock prices in Nigeria: An analysis of co-interpretation and causality tests. *Research Journal's of Finance*, 2 (10), 1- 24.
- Akani, H.W. & Uzobor, C.C.(2015), Empirical analysis of the effects on aggregate stock prices in Nigeria. *European Journal of Accounting, Auditing and Finance Research*, 3(9), 31-51.
- Kenn-Ndubuisi, J.I.& Akani H.W. (2015). Effect of recapitalization on commercial banks survival in Nigeria: Pre and post camels analysis. *European Journal of Accounting Auditing and Finance Research*, 3(9), 12-30.

- Akani, H.W.& Uzobor, C.C. (2015). Empirical analysis of effect inflation on aggregate stock prices in Nigeria, 1980-2012. *European Journal of Accounting, Auditing and Finance Research*, 3(9), 3-51.
- Andrianaivo, M. & Kpodar, K. (2011). ICT, financial inclusion, and growth: Evidence from African countries. IMF Working Paper WP/11/73. International Monetary Fund
- Arenaza, S. (2014). Potential risks to clients when using Digital Financial Services. Smart Campaign and Accion Channels and Technology.
- Bakang, M. L. (2015). Effects of financial deepening on economic growth in Kenya. *International Journal of Business and Commerce*, 4(7), 01-50.
- Bank Indonesia (2020). Financial System Stability. Available at: <https://www.bi.go.id/id/ssk/Content/default.aspx>. (Accessed July 2020).
- Bayero, M. A. (2015). Effects of cashless economy policy on financial inclusion in Nigeria: An Exploratory Study. *Procedia - Social and Behavioral Sciences* 172, 49 – 56
- Beck, T., Demirgüç-Kunt, A., & Levine, R. (2007). Finance, inequality and the poor. *Journal of Economic Growth*, 12(1), 27-49.
- Bharat, S. (2014). Deepening financial inclusion: evidence from two states. United Nations Development Program.
- Błach, J. (2011). Financial innovations and their role in the modern financial system – identification and systematization of the problem. *Financial Internet Quarterly - e-Finance*, 7(3), 13-26
- Bruhn, M., & Love, I. (2014). The real impact of improved access to finance: Evidence from Mexico. *The Journal of Finance*, 69(3), 1347e1376.
- Buchak, G., Matvos, G., Piskorski, T., & Seru, A. (2018). Fintech, regulatory arbitrage, and the rise of shadow banks. *Journal of Financial Economics*, 130(3), 53-483
- Buckley, P. R. & Malady, L. (2015). Building consumer demand for digital financial services—the new regulator frontier. *The Journal of Financial Perspective*, 3(3), 1-36
- Caballero, R. J., & Simsek, A. (2013). Fire sales in a model of complexity. *The Journal of Finance*, 68(6), 2549-2587.
- Cardona, M., Kretschmer, T., & Strobel, T. (2013). ICT and productivity: conclusions from the empirical literature. *Information Economics and Policy*, 25, 109-125.
- Dabla-Norris, E., Yan, J. R. & Unsal, D. F. (2015). Identifying constraints to financial inclusion and their impact on gdp and inequality: A Structural Framework for Policy. IMF Working Paper WP/15/22. International Monetary Fund.
- Dayadhar, R. S. (2015). Financial inclusiveness: The role of mobile money and digital financial services. *Socrates*, 3(1), 95-112

- Durai, T., & Stella, G. (2019). Digital finance and its impact on financial inclusion. *Journal of Emerging Technologies and Innovative Research*, 6(1), 122-127.
- Echchabi, A. & Hassanuddeen, A. (2013). An empirical survey on the prospects of mobile money in Morocco. *Studies in Business and Economics*, 1, 46 – 54
- European Investment Bank. (2014). Digital financial services in Africa: Beyond the Kenyan Success Story. European Investment Bank.
- Gai, P., & Kapadia, S. (2010). *Contagion in Financial Networks*, Bank of England Working Paper 383, London.
- Goldfarb, A., & Tucker, C. (2017). Digital Economics. *NBER Working Paper No. 23684*
- Hannig, A. & Jansen. S. (2010). Financial inclusion and financial stability: *Current Policy Issues*. *ADBI Working Paper 259*.
- Hodula, M., & Pfeifer, L. (2018). Fiscal-monetary-financial stability interactions in a data-rich environment. *Review of Economic Perspectives*, 18(3), 195–224.
- Inter-American Development Bank (2015). Financial Integration and inclusion: mobilizing resources for social and economic development. Inter-American Development Bank.
- Ionescu, C. (2012). Financial instability and financial innovations. *Economy Transdisciplinarity Cognition*, 15(2), 30-37
- Li, Y., Spigt, R., & Swinkels, L. (2017). The impact of FinTech start-ups on incumbent retail banks' share prices. *Financial Innovation*, 3(1), 1-16.
- Lim, W. M. & Ting, D. H. (2012). E-shopping: An Analysis of the Technology Acceptance Model. *Modern Applied Science*, 6(4), 49 -62
- Lule, I., Omwansa, T. K. & Waema, T. M. (2012). Application of technology acceptance model (tam) in m-banking adoption in Kenya. *International Journal of Computing and ICT Research*, 6(1), 31-43.
- Lucky, A. L., Akani, H. W., & Anyamaobi, C., (2015). Prudential determinants of stock prices of commercial banks in Nigeria: An application of fundamentalists and macroeconomic view. 1980 – 2014. *IIARD International Journal of Banking and Finance Research* 1 (7), 1 – 27.
- M'Amanja, D. M. (2015). Financial Inclusion, Regulation and Stability: Kenyan Experience and Perspective. A paper presented at the UNCTAD's Multi-Year Expert Meeting on Trade, Services and Development held in Geneva, Switzerland.
- Manyika, J., Lund, S., Singer, M., White, O., & Berry, C. (2016). *Digital finance for all: Powering inclusive growth in emerging economies*. USA: McKinsey Global Institute, September.
- Martin, C., Harihareswara, N., Diebold, E., Kodali, H. & Averch, C. (2016). Guide to the Use of Digital Financial Services in Agriculture. USAID's Mobile Solutions Technical Assistance and Research.

- Mbutor O. M. & Uba, I. A. (2013). The impact of financial inclusion on monetary policy in Nigeria. *Journal of Economics and International Finance*, 5(8), 318-326
- McKee, K., Kaffenberger, M. & Zimmerman, J. M. (2015). Doing digital finance right: the case for stronger mitigation of customer risks. *Focus Note No. 103*.
- Minoiu, C., & Reyes, J. A. (2013). A network analysis of global banking: 1978–2010. *Journal of Financial Stability* 9(2), 168-184.
- Mojtahed, R., Nunes, J. M. B. & Peng, G. C. (2011). The role of the technology acceptance model in information systems research. In Proceedings of the International Workshop on Information Systems Research Trends, Approaches and Methodologies Rome, Italy.
- Monyoncho. L. N. (2015). Relationship between banking technologies and financial performance of commercial banks in Kenya. *International Journal of Economics, Commerce and Management*, 3(11), 784 -815.
- Mörttinen, L., Poloni P., Sandras P., & Vesala J. (2005). Analysing banking sector conditions: how to use macroprudential indicators, ECB Occasional Paper no. 26, April 2005
- Muiruri, J. K. & Ngari, J. M. (2014). Effects of financial innovations on the financial performance of commercial banks in Kenya. *International Journal of Humanities and Social Science*, 4(7), 51 – 57
- Mujeri, M. K. (2015). Improving access of the poor to financial services. A report prepared for the general economics division of the planning commission to serve as a background study for preparing the 7th Five Year Plan (2016-2020) of Bangladesh.
- Nelson, B. (2018). Financial stability and monetary policy issues associated with digital currencies. *Journal of Economics and Business*, 100, 76-78.
- Nelson, B. (2019). Commentary: Digital Currencies and payments: financial stability and monetary policy implications. *The Journal of Investing Cryptocurrency Special Issue 2019*, 28(3) 70-72.
- Ngungi, T. M. (2013). Effect of online banking on financial performance of commercial banks in Kenya. Unpublished MBA Project. University of Nairobi
- Nicoleta, P. (2009). Modern solutions for the banking distribution channels: E-Banking – Strategy, Cost and Benefits. *The Young Economists Journal*, 12(4), 28-33.
- Njenga, S. M. Kiragu, D. N. & Opiyo, H. O. (2015). Influence of financial innovations on financial performance of savings and credit co-operative societies in Nyeri county Kenya. *European Journal of Business and Social Sciences*, 4(6), 88 – 99.
- Nugroho, Lucky & Harnovinsah, Harnovinsah & Putra, Yananto & Prinoti, P. (2020). Analysis of comparison of Islamic banks with financial technology (fintech) in disbursements of micro-financing based on requirements, Services Speed and Margin, 1(3). 1-10.
- Nyambariga, H. M. (2013). The effect of financial innovation on the financial performance of commercial banks in Kenya. Unpublished MSc. Project. University of Nairobi

- Nyamongo, E. & Ndirangu, L. (2013). Financial innovations and monetary policy in Kenya. a paper submitted to the African economic research consortium (AERC) Biannual Research Workshop on Financial Inclusion and Innovation in Africa, 1-5 December 2013.
- Omwansa, T. K. & Waema, T. M. (2014). Deepening financial inclusion through collaboration to create innovative and appropriate financial products for the poor. *Working Paper No. 01/14. Kenya Bankers of Association.*
- Ozili, P. K. (2018). Banking stability determinants in Africa. *International Journal of Managerial Finance*, 14(4), 462-483.
- Parada, M. & Greta B. (2014). In the Fast Lane: Innovations in Digital Finance. Accessed online on 20/8/2016 from www.ifc.org/financialinclusionafrica
- Pazarbasioglu, C., Garcia Mora, A., Uttamchandani, M., Natarajan, H., Feyen, E., & Saal, M. (2020). Digital Financial Services. Available at: <http://pubdocs.worldbank.org/en/230281588169110691/Digital-Financial-Services.pdf>. Accessed July 2020).
- PBI (2014). Regulation of Bank Indonesia Number 20/PBI/2014 concerning Prudential Principles for the Management of Non-Bank Corporate External Debt to corporate borrowers of foreign loans, which was further amended with BI Regulation No. 16/21/PBI/2014.
- PBI (2018), Regulation of Bank Indonesia Number 20/PBI/2018 concerning Electronic Money.
- Peake, C. (2012). New Frontiers: Launching Digital Financial Services in Rural Areas. The 2012 Brookings Blum Roundtable Policy Briefs. Mercy Corps.
- Radcliffe, D. & Voorhies, R. (2012). A digital pathway to financial inclusion. bill & melinda gates foundation. Electronic copy available at: <http://ssrn.com/abstract=2186926>
- Ramakrishnan, D. (2012). Financial Literacy and Financial Inclusion. Accessed online on 25/8/2016 from <http://ssrn.com/abstract=2204173>
- Ramli, Y. (2020). Adopting Digital Payment based on the Features and Benefits provided by the Application. *European Journal of Business and Management Research*, 5(3), 56-78.
- Ranjani, K. S. & Bapat, V. (2015). Deepening financial inclusion beyond account opening: Road Ahead for Banks. *Business Perspectives and Research*, 3(1), 52-65.
- Redda, E. H., & Surujlal, J. (2017). Measuring and modelling internet banking service quality in South Africa. *International Journal of eBusiness and eGovernment Studies*, 9(2), 137-157.
- Risman, A., Sulaeman, A. S., Silvatika, B. A., & Siswanti, I. (2020). The moderating effects of economic growth on the relationships between related party transactions, profitability, audit committee and firm's value. *European Online Journal of Natural and Social Sciences*, 9(4), 719.
- Románova, I., & Kudinska, M. (2016). Banking and Fintech: a challenge or opportunity?. In *Contemporary issues in finance: Current challenges from across Europe*. Emerald Group Publishing Limited, 98, 21-35.

- Sarker, S. & Sahay, S. (2004). Implications of space and time for distributed work: An interpretive study of Us-Norwegian systems development teams. *European Journal of Software Developments*, 13(1) 3-20.
- Scott, S. V., Van Reenen, J., & Zachariadis, M. (2017). The long-term effect of digital innovation on bank performance: An empirical study of SWIFT adoption in financial services. *Research Policy*, 46(5), 984e1004.
- Sekhar, G. V. S. (2013). Theorems and theories of financial innovation: Models and mechanism perspective. *Financial and Quantitative Analysis*, 1(2), 26-29.
- Tang, H. (2019). Peer-to-Peer lenders versus banks: substitutes or complements? *The Review of Financial Studies*, 32(5), 1900–1938.
- Terfa W. A. (2015). Financial innovation and poverty reduction: Evidence from Rural Northern Nigeria. MFW4A Working Paper No. 1. African Development Bank.
- Tuesta, D., Sorensen, G., Haring, A. & Cámara, N. (2015). Financial inclusion and its determinants: The Case of Argentina. Working Paper No. 15/03. Madrid.
- Toby, A.J & Akani, H.W (2014), Microfinance and poverty alleviation programme in Nigeria – The needed paradigm shift. *Developing Country Studies*, 4 (6), 157 – 177.
- Utari, G. D., Arimurti, T., & Kurnia, I. N. (2012). Optimal credit growth. *Buletin Ekonomi Moneter dan Perbankan*, 15(2), 3-34.
- Villasenor, J. D., Darrell M. W. & Lewis, J. R. (2015). The 2015 brookings financial and digital inclusion project report: Measuring Progress on Financial Access and Usage. Washington, DC. Center for Technology Innovation.
- World Bank. (2015). Innovative digital payment mechanisms supporting financial inclusion: Stocktaking Report. World Bank Group.
- World Bank. (2020). Financial stability. Available at: <https://www.worldbank.org/en/publication/gfdr/gfdr-2016/background/financial-stability>. (Accessed July 2020).