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THE IMPACT OF DIGITAL FINANCIAL SERVICES ON THE NIGERIAN ECONOMY

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ABSTRACT: *This paper investigated the impact of digital financial services on the Nigerian economy, a study of Nigerian deposit money banks (DMBs). An expo-facto data analysis was carried out on independent variables of digital financial services: volume of ATM transactions (VATM), volume of POS transactions (VPOS), volume of WEBPAY transactions (VWBP) and volume of mobile banking (VMOB) regressed on Gross Domestic Product (GDP) as a dependent variable. These were obtained from the 2017 Central Bank of Nigeria (CBN) Statistical Bulletin using the ordinary least square regression (OLS). Findings from the study revealed that the volume of mobile banking, point of sales, and volume of automatic teller machines transactions have positive impact on the economy of Nigeria with the volume of automatic teller machines having the highest impact on the gross domestic product of Nigeria as a proxy of economic growth while the volume of web services has a negative impact on the Nigerian gross domestic product. The study therefore recommends improvement on the operationalization of the independent variables: (ATM, POS, WEB PAY and MOB) by the monetary authorities, Fintech (financial technology), and the DMBs (Deposit money banks) to enhance the dependent variable of gross domestic product in Nigeria as a global economy while putting more effort on the security, safety, and literacy of these innovations to eliminate or reduce the negative impact of the web services innovation on the Nigerian economy.*

KEYWORDS: Digital financial services, Digital financial inclusion, financial technology, monetary policy, gross domestic product, Nigerian economy.

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INTRODUCTION

The essence of digital financial services is financial inclusion. Financial inclusion is the ability of households and firms to have access to useful and cost effective financial products and services that meet their needs such as transactions, payments, savings, credit and insurance readily delivered in a responsible and sustainable way. With financial inclusion, individuals and businesses could utilize other areas of the sector such as education, oil and gas, and pay bills quickly with ease with minimum cost. The United Nations' Millennium Development Goal of poverty eradication and shared prosperity by the year 2020 in Africa including Nigeria, based on the Universal Financial Access 2020 of the World bank's group initiative, is yet to be unaccomplished. As such, the inclusion of a large populace of Nigeria in the financial system is highly essential to realize this goal. Although statistics reveal that 69% of adults, estimated at 1.2billion worldwide, have access to financial services as account holders since 2011, yet according to the latest Findex data, close to one-third of adults, which is 1.7 billion, are still unbanked. More work therefore needs to be done to completely eradicate poverty through financial inclusion services in Nigeria. The Nigerian economy, though still an emerging economy, has come of age. It has no doubt witnessed phenomenal changes in the past and undergoing turbulence in recent time as a result of both macro and micro economic factors, such as inflation, interest rates, money supply, productivity index, foreign direct investment, gross domestic product, level of income, ethical values, corporate governance inconsistent governmental policies, among other systemic and non-systemic factors.

The major drivers of current growth of the economy are the oil and gas sector, and the non-oil sectors particularly agriculture, telecommunications, building and construction (Edo & Ikelegbe, 2014). According to the Guardian Newspaper of August 5, 2010, the inequality of the distribution of the economic resources deepens permanently as only 1.9 percent of the economic resources goes to the 10 percent of the poorest while the bulk of 33 percent of the economic resources goes to 10 percent of the richest in Nigeria. The gap widens, as the rich get richer, while the poor get poorer. The Nigerian economy consists of the real sector, trade and distribution sector, social services sector, external sector, the financial sector, public sector, among others. The financial sector however services all other sectors of the economy due to the importance of finance.

The term digital financial services refer to accessing various financial services through digital channels such as smartphones, computers, among others. These services include deposits, payments, credits, mobile banking, insurance and remittances. According to Atina (2014), it is an innovation in financial services. Digital financial service provides easy, timely and affordable access to the under-privileged people, thereby allowing for their contribution to economic growth both in the developing and emerging economies. It also provides secure banking services to poor people in emerging economies (Sopekan, 2021). The introduction of information technology, such as smartphones and computers, has made an indelible impact on the financial sector and the global economies based on its transformation benefits needed to be spread across the populace for maximal effect on the society at large through digital inclusion method by policymakers and financial regulators. It therefore requires compliance of the financial providers to meet up with the modern changes.

The benefits of digital financial services and financial inclusion cut across the financial services users, providers, governments and the economies at large. The returns range from increased access to finance among the poor populace, reduction of financial intermediation cost by the

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providers, and increased aggregate expenditure for governments. The term digital financial services refer to accessing various financial services through digital channels such as smartphones, computers, among others. These services include deposits, payments, credits, mobile banking, insurance and remittances. According to Atina (2014), it is an innovation in financial services. Digital financial service provides easy, timely and affordable access to the under-privileged people, thereby allowing for their contribution to economic growth both in the developing and emerging economies.

It also provides secure banking services to poor people in emerging economies (Sopekan, 2021). The introduction of information technology, such as smartphones and computers, has made an indelible impact on the financial sector and the global economies based on its transformation benefits needed to be spread across the populace for maximal effect on the society at large through digital inclusion method by policymakers and financial regulators. It therefore requires compliance of the financial providers to align with the modern changes aimed at achieving the United Nations' 2030 Sustainable Development Goals of poverty alleviation and zero hunger agenda. According to the G20 (group of 20) reports, financial inclusion has been identified as a catalyst for economic growth and an enabler for 7 of the 17 Sustainable Development Goals. The group is therefore committed to advance financial inclusion globally and implement its High-Level Principles for Digital Financial inclusion. This therefore necessitates digital financial innovations, digital financial inclusion to be able to reach the unbanked and rural dwellers in the countries.

The world is fast becoming technologically inclined. Various sectors of the economy are advancing in their operations. However, a report from the G20 summit of 2018 showed that digital finance is yet to spread across the world population as most areas are yet to harness the positive impact of digital finance, thereby necessitating research into the indexes for the inclusion of the underprivileged populace. Technological advancement has transformed global trade in recent years and taken over the traditional system of business operations. The advancement cuts across the banking, insurance, oil and gas, food industry, information technology, among others, making business operations easy and fast. However, this development has brought in with its insecurity and lack of confidence in this modern financial system.

As the importance of financial innovation in developing countries including Nigeria increases, so does the need for research on the subject. (Joseph et al., 2003). The recognized importance of financial innovations has in recent times generated extensive descriptive literature including empirical studies, however the impact is yet to be felt among the emerging economies like Nigeria, hence the need for more work to ensure the impact is felt. Mugambi (2006) attests that research has been done on areas of service excellence and customer satisfaction in the banking industry. However, there was no study in Nigeria that had looked at the impact of financial innovation on commercial banks with reference to financial performance. This study, therefore, intends to investigate the relationship between financial innovations and financial performance of commercial banks in Kenya. Based on the above, this study examines the impact of digital financial service on the Nigerian economy.

The general objective of this study is to examine the impact of digital financial services on the Nigerian economy. The specific objectives of this study are to:

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i) Evaluate the impact of Automated Teller Machine (ATM) on Gross Domestic Products;

ii) Examine the impact of Agency Banking (POS) on the Nigerian Gross Domestic Products;

iii) Assess the impact of Online Banking on the Nigerian Gross Domestic Products; and to

iv) Investigate the most effective Digital Financial Service on the Nigerian economy.

The following **research questions** and hypotheses were answered in the study.

i. Do Automated Teller Machine services impact the Gross Domestic Products of Nigeria?

ii. What impact does Agency Banking have on the Nigerian economy?

iii. Is there any positive impact of online banking on the Nigerian Gross Domestic Product?

iv. Which of the Digital Financial Services has a greater impact on the Nigerian economy?

Research Hypotheses

Ho_1: Automated Teller Machine (ATM) does not have a greater impact on the Gross Domestic Product of Nigeria.

Ho^2: Point of Sales Services (POS) do not affect the Gross Domestic Product of Nigeria.

Ho_3: Mobile banking does not have a positive effect on the Nigerian Gross Domestic Product.

Ho_4: Web pay does not have a positive effect on the Nigerian Gross Domestic Product.

LITERATURE REVIEW

Theoretical Framework

There are three major theories on which digital financial services would be based on in this paper, namely intermediation theory, and risk management theory, asset pricing theory as follows:

1. Intermediation Theories relate to the traditional approach to financial intermediation based on:

    a) The transaction cost theory: The transaction cost theory established the minimization of the cost of rendering and obtaining financial services through the intermediation of financial institutions such as banks, insurance, stock brokers, and other agents. This therefore necessitated regulations and supervision of the financial intermediaries; and

    b) The information asymmetry theory also arose from the traditional point of view that financial intermediaries and agents have information advantage as a result of their expertise and board room activities over the general market participants, which necessitates their involvement in the financial system.

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c) Risk management theory: This is a modern approach which explains the relevance of management of risks by the financial agencies to hedge risks through transfer or share of risk to avoid financial distress taking into consideration the cost of participation, cost of bankruptcy, tax related interest and self-interest.

2. Asset pricing theory. This theory assumes that investors are capable of choosing efficient or optimal portfolios for themselves without any intermediation by the agents or intermediaries based on their level of risk tolerance. According to Allen and Gorton (1993), market becomes inefficient if intermediaries have to make investment decisions for the investors due to fundamental differentials in asset prices and the existence of bubbles. The modern viewpoint of financial intermediation has however given rise to the new markets for financial futures and options (Allen & Anthonio, 1998). These developments therefore give rise to technological innovation in the modern financial services to increase speed and efficiency. The global changes in the financial system have gone beyond the reduction of transaction costs and information asymmetry provided by the traditional theory of financial intermediation. These changes according to Allen and Anthonio (1998) are difficult to reconcile with traditional theories that give no significant role to financial intermediaries through market interaction of firms and households. Hence the need for the modern theories that negates the opinion of Modigliani-Miller theorem which displaced the participation of financial intermediaries through effective portfolio construction by the households.

Conceptual Framework

Nigerian Economy

Nigeria is a country located in the western part of the African continent. The country after several years of colonization by the British colony attained independence on October 1, 1960 with the autonomy to manage its economic activities. The Nigerian economy has witnessed phenomenal changes that have affected her till date ranging from political turmoil of the civil war between 1966 and 1979 to the several changes in government and its policies to reduce foreign participation in her economy. However, the various reforms and policies that have been put in place since 1986 have contributed to the turnaround of the economy (Samson & Augustine, 2014). From history, the Nigerian economy is primarily product-oriented and dominated by agriculture and crude oil production with the oil and gas sector being the main driver of the economy.

The structure of the Nigerian economy consists of the real sector, the financial sector, the trade and distribution sector, the oil and gas sector, the infrastructure sector, the social sector, among others with the financial sector being the drivers of the entire economy as a result of the important role of finance in economic activities. Empirical events in the country and the entire world had in no small measure affected the financial sector. Such events as the civil war, stock market crashes, US housing development, epidemic and global pandemic, among others had brought phenomenal changes and necessitated the need for transformation of the Nigerian economy through innovations in the financial sector.

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Digital Financial Services

Digital Financial Services describe the various innovations in the operations of the financial system. They are modern based technologies in banking, insurance, oil and gas, education among others to ensure efficient, safe and secure modern transactions. In the banking sector, they include the use of Automatic Teller Machines (ATM), Mobile Banking, Point of Sales (POS) otherwise known as Agency Banking, Web Services, among others. The insurance and other financial institutions are therefore not left out of these technological changes in operations and services. These innovations according to Sopekan (2021) have the enigma of providing, appreciable, convenient, affordable and safe banking services to the populace including the poor and unlearned in the rural areas of the emerging economy like Nigeria. This therefore necessitates the inclusion of a large number of people in the operations of banking services to ensure a reasonable impact or growth on the Nigerian economy through digital financial inclusion.

Digital Financial Inclusion

Digital Financial Inclusion entails the participation of the populace in the various innovation tools in the financial industry. It is the embrace of the innovation tools by the good number of people meant to be reached irrespective of their geographical location or environment. Be it rural or urban areas. The neglected agricultural sector of the Nigerian economy needs to be included in the modern financial system to revive it to the former position of being the mainstay of the economy and to achieve the 2030 United Nations' Sustainable Development Goals of zero hunger.

The enormous challenges of accessing financial services from the money market by farmers as posited by Adediran (2021) in his paper on Digital Financial Flows and Growth of Agricultural sector in Nigeria necessitate digital financial inclusion of the farmers and rural populace through the establishment of a good number of bank branches in the rural areas of the country to increase the impact of digital financial services on the Nigerian economy. Digital financial inclusion requires proper awareness, financial literacy and the provision of adequate facilities to enhance its effectiveness. The rapid spread of digital financial inclusion in China over the last decades has no doubt brought about an appreciable improvement and increase on the growth of her economy (Sopekan, 2014). The role of digital financial inclusion in promoting the economies of the emerging economies like United Arab Emirates, China, Ghana, Nigeria among others through digital financial services cannot be over emphasized.

REVIEW OF RELATED LITERATURES

Empirical studies on digital financial services and the global economy revealed a significant positive relationship between digital financial services and economic growth. These studies also examined the level of financial inclusion across the globe and the key drivers of digital financial services. Purva et al. (2021) investigated the unlocking of growth by digital financial services (DFSs) using cross-sectional instruments of 52 developing countries and using new indices of financial inclusion developed in Khera et al. (2021). Their research found out that the extrinsic variables of digital financial inclusion has positive association with growth in GDP per capita during 2011-2018 suggesting that digital financial inclusion of more populace can accelerate economic growth. Financial and digital literacy, quality of institutions, and

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access to infrastructural facilities were among the identified key drivers of financial inclusion promoting digital financial services in a global economy. Previous studies also examined digital financial inclusion from the traditional point of view. These studies found out that the higher the level of traditional financial services, the higher the level of digital financial services. In other words, digital financial services thrive more in areas of high traditional financial services. Other studies also found out that innovations in financial services emanate from the gaps in traditional financial services (Sahay et al., 2020). However, empirical evidence in the area of digital financial inclusion had been lean despite its effectiveness at promoting economic growth (Sopekan, 2021).

A study was conducted by Ceyla et al. (2020) on digital financial services, reiterating on the importance of affordable financial services to eradicate or reduce poverty, and ultimately economic growth. The study opined that countries with deeper and more developed financial systems have higher economic growth and larger reduction in poverty and income inequality. They concluded that digital financial services powered by fintech have the potential to lower costs, increase speed of transaction, security and transparency of transactions through economies of scale, tailored at assisting the poor.

Yasuharu (2003) also emphasized the significant role technological innovation plays in improving the efficiency and the cost of operation in the banking sector. However, despite the benefits of digital financial services, certain identified risks such as cyber fraud, violation of consumers' rights, and lack of financial and digital literacy could impede the effectiveness of digital financial services. Goh (2002) reiterated on the many barriers to innovations in developing countries, such as low literacy rates, weak higher educational systems, lack of essential human capital to leverage on technological developments, lack of intellectual property right protection, creating disincentive for banks to engage in innovation in research and development. Mugambi (2006) attested that research has been scarce in the area of digital financial innovations. These, therefore, inform financial regulators and policy makers on the need to promote financial and digital literacy, enforce consumer protection acts, and ensure cyber security in order to harness the gains of digital financial services on the growth of the economy.

Nwidobie (2019) conducted a study on financial inclusion index in Nigeria and opined that the level of financial inclusion can effectively be measured through the volume of transactions through Automatic Teller Machines (ATM), Point of Sales (POS) services, Web services, number of bank branches in the rural areas, volume of deposits in rural banks, volume of loans and advances to account holders in rural areas. He posited that the use of other mobile platforms to measure financial inclusion has no effectiveness. Erick and Willy (2017) on the effects of e-banking innovations on the financial performance of commercial banks in Kenya found that there is a significant relationship between e-banking innovations and the financial performance of commercial banks in Kenya and concluded that e-banking innovations, such as ATM, Agency banking, Web Pay, are essential tools for the performance of commercial banks and the growth of the economy.

Abassi and Wegani (2017) in a peer-reviewed scientific journal of existing literatures on the impact of DFS on firm performance for a decade identified 39 studies and found that DFS is still not well researched among academic literature in the non-banking industries such as mobile networks, but with most focus on the banking industry despite the impact it has brought on firms' financial growth and profitability. Further, there had been much repetition in the same

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area by the new researchers. Rana et al. (2019) using interpretive structural modeling (ISM) and fuzzy MICMAC approach investigated some of the challenges confronting DFA in India.

Ozili (2018) provides an insight into the gray areas of financial services. His study was based on the impact of digital finance for financial inclusion and financial system stability, identifying the risks and returns associated with digital finance. Adediran ((2021) in his paper on digital financial flows and growth of agricultural sector in Nigeria posits the need to eliminate the huge challenges of accessing finance from the money market by the farmers through digital financial flows in order to revamp the ailing agricultural sector of the Nigerian economy and to achieve the United Nations through digital financial to achieve the United Nations' Sustainable Development Goal of zero hunger by 2030.

In the study conducted by Afam, Ige and Olumoye (2021) on financial inclusion and sustainable digital economy, the findings revealed that digital financial services are highly essential to the growth of an economy, especially that of an emerging economy like Nigeria and posit that regular access of the unbanked on the digital financial services would allow quick conversion of cash to electronic value thus improving the viability of digital economy in the long-run. These previous studies however failed to determine the level of the impact of the digital financial services tools, namely the automatic teller machines, the point of sales, the web pay services, and the mobile pay, have on the gross domestic product of Nigeria as a proxy of economic growth and which of these innovations have more impact on Nigerian economy. This study therefore seeks to fill the gap in these literatures by examining the specific impact of these financial services innovations and the most impactful of them on the Nigerian economy.

METHODOLOGY

This research undertook an ex post-facto research design through the use of E-view 7 for the regression and descriptive statistics to analyze the secondary data on the Volume of ATM, Volume of POS, Volume of Web Pay, Volume of Mobile banking, and the GDP for a 15 period of 2009 to Q4 of 2017 sourced from the 2017 Statistical Bulletin of the Central Bank of Nigeria due to its reliability and validity. An ex post-facto research is a study of past events or occurrences to establish a fact or determine the relationship between variables (dependent and independent). An ex post-facto research design has the advantage of higher reliability and validity when rightly sourced. Regression model is a statistical tool of measuring the level of impact, effectiveness or association of variables highlighting the level of significance of the independent variables on the dependent variables.

Model Specification

The specified model using regression analysis is: $Y = a + bX$

Where Y is the Dependent variable, a and b are the underlying variables and are constant and X is independent variable (s).

Y = Growth of the Nigerian economy (GDP)

X = Digital Financial Services tools (ATM, POS, MOB, WEB PAY)

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In this study, Y = 4461.291 + 0.382785X

Validity and Reliability

For the purpose of getting valid and reliable data, the data for this research were sourced from the 2017 Statistical Bulletin of the Central Bank of Nigeria which must have gone through validity and reliability tests by the experts before publication.

DATA PRESENTATION AND ANALYSIS

Analysis of data presented on the Impact of Digital Financial Services on the Nigerian Economy was carried out through a regression model to assess the impact of the usage of Automatic Teller Machine, Point of Sales Services, Web Pay services, and Mobile banking on the Nigerian economy using GDP as index. The data from the 2017 Statistical Bulletin of the Central Bank of Nigeria in Table 1 below was run on EVIEW 7. The descriptive and regression analysis results are hereby presented for interpretation:

Table 1: Digital Financial Services Payment Volume and GDP for the 15 periods of 2009 to Q4 of 2017

Period	GDP	VATM	VPOS	VWEB	VMOB
2009	13,301.56	548.60	11.03	84.15	1.27
2010	17,321.30	399.71	12.72	25.05	6.65
2011	22,269.98	1,561.74	31.02	59.61	18.98
2012	28,662.47	1,984.66	48.01	31.57	31.51
2013	32,995.38	2,828.94	161.02	47.32	142.80
2014	39,157.88	3,679.88	312.07	74.04	346.47
2015	44,285.56	3,970.25	448.51	91.58	442.35
2016 Q1	54,612.26	1,069.99	144.76	31.69	135.24
2016 Q2	62,980.40	1,134.50	163.71	26.28	168.28
2016 Q3	71,713.94	1,246.80	189.95	30.76	223.06
2016 Q4	80,092.56	1,536.85	260.58	43.63	230.31
2017 Q1	89,043.62	1,502.06	285.98	46.57	260.59
2017 Q2	94,144.96	1,544.23	324.13	37.09	295.24
2017 Q3	101,489.49	1,558.76	364.55	45.58	239.36
2017 Q4	113,711.63	1,832.55	435.15	55.35	306.82

Sources: 2017 Statistical Bulletin of the Central Bank of Nigeria.

The above table showed the impact of the volume of ATM, POS, MOB, and WEB services on the GDP of Nigeria for 15 periods of 2009 to Q4 of 2017. From the regression model run on E-View 7, the results shown on Table 2 below showed a significant relationship exists between the use of digital financial services tools that is ATM, POS, WEB and the GDP as index for the economy.

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Table 2: Regression Analysis on the Volume of ATM, POS, and WEB Services on the Nigerian GDP

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDP)
Method: Least Squares
Date: 07/16/21 Time: 06:27
Sample (adjusted): 2 15
Included observations: 14 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1)	0.050463	0.018498	2.728034	0.0183
C	4461.291	1127.108	3.958174	0.0019

R-squared	0.382785	Mean dependent var	7172.148
Adjusted R-squared	0.331350	S.D. dependent var	2433.893
S.E. of regression	1990.219	Akaike info criterion	18.16144
Sum squared resid	47531669	Schwarz criterion	18.25273
Log likelihood	-125.1301	Hannan-Quinn criter.	18.15299
F-statistic	7.442167	Durbin-Watson stat	1.809447
Prob(F-statistic)	0.018333		

From the Augmented Dickey=Fuller Test table above, the least squares method used above revealed R-squared and adjusted R-squared of 0.382785 and 0.331350 respectively indicating 38% increase in the impact of the VATM, POS and WEB Services on the GDP.

The equation generated in the above table is: Y = 4461.291 + 0.382785X

Y = Growth of the Nigerian economy (GDP)

X = Digital Financial Services tools (ATM, POS, MOB, WEB PAY)

However, the Trace test indicates 2 cointegrating eqn (s) at the 0.05 significant level which denotes rejection of the hypothesis at the 0.05 level.

Specifically, each digital financial services tool was presented to show the level of their impact on the Nigerian economy.

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Hypothesis Testing

Hypothesis One

Ho: Automated Teller Machine (ATM) does not have a greater impact on the Gross Domestic Product of Nigeria.

From the regression analysis shown above indicating 30% increase in the gross domestic product of Nigeria and the reliable data from the 2017 Statistical Bulletin of the Central Bank of Nigeria shown in Table 3 below indicating a positive and significant relationship between the volume of automatic teller machines and the gross domestic products of Nigeria., hence the null hypothesis above is hereby rejected as the geometric increase in the gross domestic product of Nigeria from 2009 to 2017 grew from 13,301.56 to 113,711.63 indicating the automatic teller machine has greater impact on the gross domestic product of Nigeria and thereby the economy.

Table 3: Analysis on the volume of Automatic Teller Machine on Nigerian Gross Domestic Product for the 15 periods of 2009 to Q4 of 2017

PERIOD	VATM	GDP
2009	548.60	13,301.56
2010	399.71	17,321.30
2011	1,561.74	22,269.98
2012	1,984.66	28,662.47
2013	2,828.94	32,995.38
2014	3,679.88	39,157.88
2015	3,970.25	44,285.56
2016 Q1	1,069.99	54,612.26
2016 Q2	1,134.50	62,980.40
2016 Q3	1,246.80	71,713.94
2016 Q4	1,536.85	80,092.56
2017 Q1	1,502.06	89,043.62
2017 Q2	1,544.23	94,144.96
2017 Q3	1,558.76	101,489.49
2017 Q4	1,832.55	113,711.63

The table above showed a geometric increase in the Gross Domestic Product as the value of automatic teller machines increases, indicating the value addition of digital financial services on the growth of the economy. This finding supports the work of Eric and Willy (2017), Sopekan (2021), among others.

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Hypothesis Two

Ho: Point of Sales Services (POS)) does not affect the Gross Domestic Product of Nigeria.

Table 4: Analysis of Volume of Point of Sales Digital banking services on Nigerian Gross Domestic Products over 15 periods of 2009 to Q4 of 2017.

Period	GDP	VPOS
2009	13,301.56	11.03
2010	17,321.30	12.72
2011	22,269.98	31.02
2012	28,662.47	48.01
2013	32,995.38	161.02
2014	39,157.88	312.07
2015	44,285.56	448.51
2016 Q1	54,612.26	144.76
2016 Q2	62,980.40	163.71
2016 Q3	71,713.94	189.95
2016 Q4	80,092.56	260.58
2017 Q1	89,043.62	285.98
2017 Q2	94,144.96	324.13
2017 Q3	101,489.49	364.55
2017 Q4	113,711.63	435.15

The Table above shows a progressive increase in the volume of point of sales services, otherwise termed agency banking and the gross domestic products, indicating a significant positive relationship exists between digital financial services tools and the growth of the Nigerian economy. That is, an increase in the volume of point of sales services would result in an increase in the gross domestic product of Nigeria. This also supports the work of Erick and Willy, (2017), Sopekan, (2021), Afam, Ige, and Olumoye (2021), Nwidobie, (2019), among others. The null hypothesis is hereby rejected affirming that the volume of point of sales transaction does affect the gross domestic product of Nigeria.

Hypothesis Three

Ho: Mobile banking does not have positive effect on the Nigerian Gross Domestic Product

Table 5: Analysis on the Impact of Mobile Banking Services on Nigerian Gross Domestic Product for the 15 periods of 2009 to Q4 of 2017.

Period	GDP	VMOB
2009	13,301.56	1.27
2010	17,321.30	6.65
2011	22,269.98	18.98
2012	28,662.47	31.51
2013	32,995.38	142.80
2014	39,157.88	346.47
2015	44,285.56	442.35

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2016 Q1	54,612.26	135.24
2016 Q2	62,980.40	168.28
2016 Q3	71,713.94	223.06
2016 Q4	80,092.56	230.31
2017 Q1	89,043.62	260.59
2017 Q2	94,144.96	295.24
2017 Q3	101,489.49	239.36
2017 Q4	113,711.63	306.82

The findings were in line with that of Cohen (2005) who found out that the force that affects the economy was the purchase done with mobile banking when compared to individual savings thereby promoting banks investment. Another support of the findings was Ausubel (1991) who did an empirical study of mobile banking and found out that abnormally high profits existed in the banking industry in spite of its seemingly competitive structure. In addition, Mauning (2000) further found out that banks were eager to expand mobile banking because of the huge benefits associated with mobile banking. Hence the null hypothesis is hereby rejected as mobile banking has a positive effect on the gross domestic product of Nigeria.

Hypothesis Four

Ho: Web pay does not have positive effect on the Nigerian Gross Domestic Product

Table 6: Analysis of Volume of Web pay on Nigerian Gross Domestic Products over 15 periods of 2009 to Q4 of 2017

Period	GDP	VWEB	VWEB	VWE
2009	13,301.56	84.15	84.15	84.15
2010	17,321.30	25.05	25.05	25.05
2011	22,269.98	59.61	59.61	59.61
2012	28,662.47	31.57	31.57	31.57
2013	32,995.38	47.32	47.32	47.32
2014	39,157.88	74.04	74.04	74.04
2015	44,285.56	91.58	91.58	91.58
2016 Q1	54,612.26	31.69	31.69	31.69
2016 Q2	62,980.40	26.28	26.28	26.28
2016 Q3	71,713.94	30.76	30.76	30.76
2016 Q4	80,092.56	43.63	43.63	43.63
2017 Q1	89,043.62	46.57	46.57	46.57
2017 Q2	94,144.96	37.09	37.09	37.09
2017 Q3	101,489.49	45.58	45.58	45.58
2017 Q4	113,711.63	55.35	55.35	55.35

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The Table above reveals that while there is a decline in the volume of web pay services from 2009 and Q4 of 2017 from 84.15 to 55.35 respectively, there is a geometrical increase of 13,301.56 in 2009 and 113,711.63 in Q4 of 2017 in the volume of gross domestic products of Nigeria showing a negative significant impact of web pay services on the growth of the Nigerian economy. This finding, however, contrasts the works of Sopekan (2014) and supports the position of Ige and Olumoye (2021). From the analysis above, the null hypothesis is hereby accepted as web pay innovation does not have a positive effect on the gross domestic product of Nigeria due to cyber frauds, illiteracy, poor network services, among others.

DISCUSSION OF FINDINGS

The followings were drawn from the findings in this study:

i. This study revealed that ATM innovation has the highest impact on the growth of the economy, in support to the finding of Eric and Willy (2017) as shown on the geometric corresponding increase it has on the gross domestic product of Nigeria from 2009 to the fourth quarter of 2017 compared to other observed variables of digital financial services. This therefore necessitates adequate monetary policies to enhance its use through digital financial inclusion and ensure improvement of its functionality.

ii. However, the researcher discovered a negative impact of Web pays innovation on GDP and consequently on the growth of the economy indicating that there are some irregularities in its use to be corrected, such as cyber fraud, poor network, among others. This further necessitates the need to be improved upon and made available to the large populace through aggressive marketing and social media to enhance its impact on the economy.

iii. The study also found that there is a significant impact of mobile banking on the GDP necessitating adequate and extensive provision of this innovation to enhance further growth on the economy.

iv. Lastly, point of sales services also has a good impact on the gross domestic product of Nigeria, hence the need to encourage the use of this innovation to further increase the growth of the economy through its spread to the unreached in the remote areas of the country.

CONCLUSION AND RECOMMENDATIONS

Conclusion

This study investigated the impact of digital financial services on the Nigerian economy using an ordinary least square regression analysis on the volume of automated teller machine, volume of point of sales services, volume of mobile banking, and volume of web pay services on the gross domestic product for the period of 2009 to 2017 sourced from the Central Bank of Nigeria statistical bulletin of 2017. This study also found out that digital financial services innovation has a significant impact on the Nigerian economy with the automatic teller machine and mobile banking having the most considerable impact on the gross domestic product of Nigeria

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necessitating more inclusion of these innovations in the rural areas and the unbanked to further enhance their impacts. However, the web pay innovation has negative impact due to frauds, poor facility, among others plaguing the effective utilization of the service necessitating cyber security and increase in awareness and literacy of the innovation to positively impact the growth of the Nigerian economy.

Recommendations

In other to further impact on the growth of the global economy through digital banking services innovations, the researcher made the following recommendations;

i. The government, banking industry and the regulatory authorities should enhance the use of automatic teller machines to further boost the gross domestic product and ensure adequate security of its usage, and efficiency of its operationalization to encourage users, and extensive education on the use of the Automated Teller Machines across the country.

ii. The POS innovation should also be improved upon and extended to the rural communities so as to increase its impact on the growth of the economy.

iii. The regulatory authorities should urgently and adequately curb cybercrime to encourage the use of WEB Pay innovation and further enlighten customers on easy and optimal utilization of this and other digital financial services.

iv. Mobile banking innovation should be improved upon in terms of good network, awareness and extension to the unreached areas of the country to increase its impact on the economy of Nigeria.

v. Concerted efforts should be made by the government, the regulatory authorities and the banking industry in ensuring digital financial inclusion of the unreached to maximize the impact of digital financial services in Nigeria.

Contribution/Originality

This research adds value to the existing knowledge on digital financial services by exposing the level of effectiveness of these financial technologies and the impact it has on the Nigerian gross domestic product.

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APPENDIX

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.998153	81.82179	27.58434	0.0000
At most 1	0.757197	18.40156	21.13162	0.1155
At most 2	0.528578	9.776028	14.26460	0.2271
At most 3 *	0.320680	5.026618	3.841466	0.0250

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

GDP	VATM	VPOS	VWEB
-2.61E-06	-0.002138	-0.013234	0.064327
-0.000115	-0.000280	0.029470	-0.215607
0.000255	0.002658	-0.086399	0.199532
-0.000129	-0.000572	0.025669	-0.083930

Unrestricted Adjustment Coefficients (alpha):

D(GDP)	354.5410	548.5418	-1040.199	-391.0095
D(VATM)	31.63958	270.2998	340.2009	-176.2452
D(VPOS)	-22.37558	39.21181	48.59702	-20.19127
D(VWEB)	-0.210285	10.90845	8.627784	-4.148879

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1 Cointegrating Equation(s): Log likelihood-271.2465

Normalized cointegrating coefficients (standard error in parentheses)

GDP	VATM	VPOS	VWEB
1.000000	819.6250	5073.924	-24662.41
	(14.5950)	(138.354)	(856.981)

Adjustment coefficients (standard error in parentheses)

D(GDP)	-0.000925
	(0.00169)
D(VATM)	-8.25E-05
	(0.00063)
D(VPOS)	5.84E-05
	(8.7E-05)
D(VWEB)	5.48E-07
	(1.8E-05)

2 Cointegrating Equation(s): Log likelihood-262.0458

Normalized cointegrating coefficients (standard error in parentheses)

GDP	VATM	VPOS	VWEB
1.000000	0.000000	-271.1024	1946.450
		(39.6874)	(188.944)
0.000000	1.000000	6.521307	-32.46468
		(0.16985)	(0.80862)

Adjustment coefficients (standard error in parentheses)

D(GDP)	-0.064247	-0.911455
	(0.07065)	(1.31919)
D(VATM)	-0.031285	-0.143282
	(0.02542)	(0.47465)
D(VPOS)	-0.004468	0.036862
	(0.00345)	(0.06434)
D(VWEB)	-0.001259	-0.002603
	(0.00067)	(0.01243)

Log likelihood-257.1577

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3 Cointegrating Equation(s):

Normalized cointegrating coefficients (standard error in parentheses)

GDP	VATM	VPOS	VWEB
1.000000	0.000000	0.000000	3604.754
			(630.664)
0.000000	1.000000	0.000000	-72.35480
			(11.4970)
0.000000	0.000000	1.000000	6.116891
			(1.73385)

Adjustment coefficients (standard error in parentheses)

D(GDP)	-0.329824	-3.676246	101.3461
	(0.13137)	(1.60450)	(43.2440)
D(VATM)	0.055573	0.760953	-21.84608
	(0.05007)	(0.61157)	(16.4828)
D(VPOS)	0.007939	0.166030	-2.747045
	(0.00659)	(0.08049)	(2.16931)
D(VWEB)	0.000944	0.020329	-0.421178
	(0.00133)	(0.01627)	(0.43854)

Fig. 1 Graph showing the impact of ATM, POS and WEB Services on GDP.

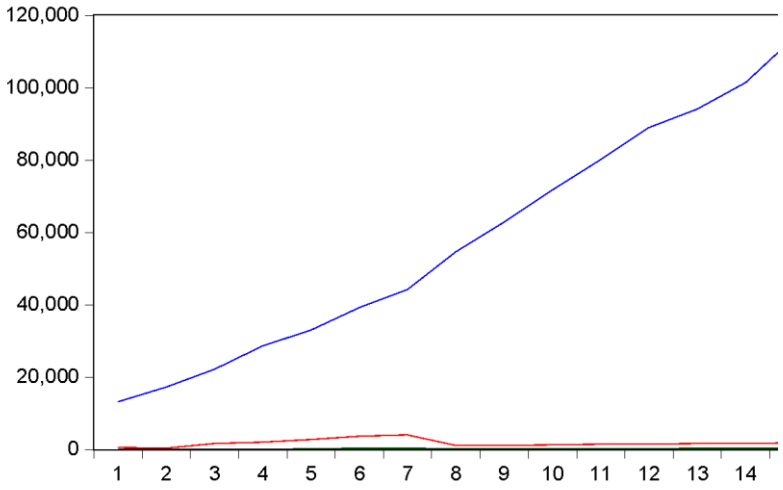

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Table 3: Cointegration Test on GDP, VATM, VPOS, VWEB.
Date: 07/16/21 Time: 06:41
Sample (adjusted): 3 15
Included observations: 13 after adjustments
Trend assumption: Linear deterministic trend
Series: GDP VATM VPOS VWEB
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.998153	115.0260	47.85613	0.0000
At most 1 *	0.757197	33.20421	29.79707	0.0195
At most 2	0.528578	14.80265	15.49471	0.0634
At most 3 *	0.320680	5.026618	3.841466	0.0250

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level

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