Impact of Electronic Payment Systems on Economic Growth of Nigeria

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Abstract: This study empirically investigated the impact of electronic payment systems on economic growth in Nigeria between 2009 and 2018. The study employed descriptive statistics, correlation analysis and Auto Regressive Distributed Lag (ARDL) Model to draw inference. Unit root test (diagnostic test) was carried out on the data and the results suggested that the variables were a mixture of (IO) and (I1), as such; the appropriate estimation technique to be employed was the (ARDL) Model. This study employed automated teller machine (ATM) payment system, point of sales (POS) and web payment system as proxies for electronic payment systems (independent variables), while real gross domestic product (RGDP) was employed as a measure of economic growth (dependent variable). Data were elicited from Central Bank of Nigeria (CBN) Statistical Bulletin of 2018, under payment system statistics. The result of the ARDL Model revealed that electronic payment systems had a positive impact on economic growth in Nigeria within the period under review.

Keywords: electronic payment systems, economic growth, point of sale, web pay, automated teller machine

1. INTRODUCTION

1.1. Background of the study

Electronic payment systems are financial services delivered over digital infrastructure platform including mobile and internet with low use of cash and

traditional bank branches. Mobile phone, computers, or cards used over point-of-sale (POS) devices connect individuals and business to a digitized national payment infrastructure, enabling seamless transactions across all channels.

Electronic payment systems services are vital to the public as it boosts security for their cash and it's more convenient compared to keeping money at home traveling with the money. However, the provision of electronic payment systems involves the participation of different players such as banks/financial institutions, mobile network operators, financial technology providers, regulators, agents, chains of retailers and clients. Electronic payment systems mechanisms also need improvement of infrastructures to make the services user-friendly, secure, and cost effective manner. Electronic payment systems services provide the means to overcome obstacles associated with payments and other financial transactions executed outside the banking hall through electronic platforms, and can contribute to national economic growth and financial inclusion. (Asian Development Bank, 2016).

1.2. Statement of the Problem

Electronic payment systems are pivotal to the digitalization of the financial system here in Nigeria, with numerous advantages ranging from financial inclusion, convenience in carrying out financial transactions to security of these transactions in a digital platform which would culminate to economic development of the economy. However, digital finance is not without it downsides, which constitute the problem this study seeks to resolve.

Providers of digital finance services are profit-seeking corporations that use digital finance to maximise their profitability or to maximise the profitable opportunities of businesses affiliated with digital finance providers namely banks, financial and non-financial institutions. Corporate providers of digital finance services can discriminately use a more aggressive marketing tactic to persuade high-and middle income customers to use a new or existing digital finance platform or infrastructure and use a less-aggressive marketing tactic to persuade low-income and poor customers to use new or existing digital platforms or infrastructure if they believe the latter cannot afford the associated fees, thereby leading to lower financial inclusion for poor and low-income customers since the net monetary pay-off to digital finance providers is higher with high-and-middle income customers than with low-income and poor customers.

Also, bias in the provision of digital finance can be geographical because digital finance providers, based on their own internal risk assessment which

may change from time to time, can choose to withdraw or discontinue the provision of specific digital finance services to high-risk rural areas or communities that do not have the supporting infrastructure to sustain specific digital finance services, thereby leading to lower financial inclusion. Some supporting infrastructure needed to make digital finance work efficiently may include mobile phones that have modern (and up-to-date) operating software systems and applications that support digital finance services.

Another dimension is that educational bias can be introduced in the provision of digital financial services. If the net monetary value of providing digital finance to poor communities is very negligible, digital finance providers, based on their profitability assessment, can choose to focus less on the delivery of digital finance to poor and uneducated communities that do not have the basic financial literacy to use and understand digital finance.

From the foregoing, it therefore becomes imperative to investigate the impact of digital finance on economic growth in Nigeria, employing digital finance variables and empirically analyzing them against economic growth variable in order to establish the impact one has on the other.

1.3. Objectives of the Study

The main objective of this research is to examine the impact of electronic payment systems on economic growth of Nigeria, while the specific objectives are:

1. To examine the impact of automated teller machine (ATM) payment system on economic growth in Nigeria.
2. To investigate the effect of point of sale (POS) payment system on economic growth in Nigeria.
3. To investigate the contribution of web payment system on economic growth in Nigeria.

2. REVIEW OF RELATED LITERATURE

2.1. Concepts of Digital Finance

Electronic payment systems are financial services delivered through mobile phones, personal computers, the internet or cards linked to a reliable digital payment system. Similarly, a McKinsey report identified digital finance as "financial services delivered via mobile phones, the internet or cards" (Manyika, Lund, Singer, White & Berry 2016). According to (Gomber, Koch & Siering, 2017), digital finance encompasses a magnitude of new financial

products, financial businesses, finance-related software, and novel forms of customer communication and interaction - delivered by Financial Technology (FinTech) companies and innovative financial service providers. While there is no standard definition of digital finance, there is some consensus that digital finance encompasses 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 a bank branch or without dealing directly with the financial service provider. In Europe, the internet has emerged as a widely recognized distribution channel for the banking industry, and all traditional banks as well as new players, are discovering its effectiveness compared with other channels (Barbesino, Camerani and Gaudino, 2005).

The goal of financial services made available via digital platforms is to contribute to poverty reduction and to contribute to the financial inclusion objectives of developing economies (United Nations, 2016). Ideally, there are three key components of any digital financial service: a digital transactional platform, retail agents, and the use by customers and agents of a device – most commonly a mobile phone – to transact via the digital platform (CGAP, 2015). To use digital financial services (DFS), the DFS user will have an existing bank account which they own (or third-party accounts with approved permission to use them) and should have available funds (or overdraft) in their accounts to make cash payments (outflows) or to receive revenue (cash inflow) via digital platforms including mobile devices, personal computers or the internet.

2.1.1. Innovations in Digital Payments

There have been four major innovations in digital payments.

1. **Wrappers** create a digital interface with traditional payment systems such as credit cards or bank accounts. Many are offered by nontraditional providers, including internet intermediaries such as Google Wallet and Apple Pay.

2. **Mobile money systems** store money in the national currency as credit on smart cards or a system provider's books, and enable payments online or through mobile phones. A well-known example is M-Pesa, run by Safaricom. These systems can offer lower fees and easier use than traditional payment systems, even for those without a bank account.

3. **Credits and local digital currencies** are alternative units of account (not in national currency) designed to promote spending in a local economy or as a means of exchange in computer games.

4. **Digital currencies** are both a new decentralized payment scheme and a new currency. Such schemes record transactions in a publicly visible ledger. Most digital currencies, including Bitcoin, are cryptocurrencies because they use cryptographic techniques to ensure secure validation of transactions. (Bank of England 2018; https://blockchain.info; company reports).

2.2.   Benefits of electronic payment systems

2.2.1. Electronic payment systems promotes financial inclusion

More than 2 billion people have no access to any financial services. Overall, only about 59 percent of men and 50 percent of women in developing countries have an account at a regulated financial institution. Women, the poor and small businesses often rely on informal financial services, even when they receive public transfers or remittances.

1. Electronic payment systems help overcome barriers to accessing financial services. Mobile money schemes, in particular, allow people who own a phone but do not have a bank account to make and receive payments. In the right environment, these systems can take off and reach massive size rapidly.

2. Digital payments can reduce costs to recipients. For instance, farmers in Niger realized time savings for each payment equivalent to an amount that would feed a family of five for a week. Digital payments increase control, since senders of remittances can have a greater influence on how recipients use the money, including for savings.

3. Electronic payment systems can increase the incentive to save, through automatic deposits, text reminders, or default options. Texted reminders increased savings in Bolivia, Peru, and the Philippines by up to 16 percent.

4. Digital payments improve risk management by making it easier to receive support from social networks that can act as safety nets. M-Pesa users were better able to absorb income shocks compared to nonusers.

5. Electronic payment systems speed up delivery, which is especially important in case of emergencies such as natural disasters. And they increase security compared to traveling with large amounts of cash, as is commonly necessary in low- and middle-income countries. (World Bank Various years. Findex database).

2.3. Theoretical Review

This study is hinged on Theory of Financial Innovations

2.3.1. 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). 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. The theory of financial innovations posits that some restrictions including external handicaps helps corporations in their pursuit of their objective which is maximization of revenues (Li & Zeng, 2010) hence commercial banks come up with innovative ways to reach more people to improve their profits. The emerging innovative financial inclusion models through mobile and other digital financial services especially in many African countries which are assisting in closing the gap of financial instruments which exists in these countries (Omwansa & Waema, 2014).

2.4. Empirical Literature 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 that lightening diverse monetary contact had an 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.

3. METHODOLOGY

3.1. Research Design

This study adopts the *ex-post facto* research design as it deals with event that had taken place and secondary data were readily available for collection.

3.2. Source of Data Collection

Data for this study are elicited from Central Bank of Nigeria Statistical Bulletin of 2018 under payment systems. The study period covers 2009 through 2018.

3.3. Method of Data Analysis

This study used descriptive statistics, correlation matrix and ordinary least squares (OLS) linear regression model in testing the hypothesis of the study. E-view 9.0 econometric statistical software package was used for the analysis.

3.4. Model specification

The econometric model for this study is specified as;

$$\Delta ARGDP_t = \beta_0 \sum_{1=1}^{p} \beta_1 \Delta RGDP_{t-1} + \sum_{1=1}^{p} \beta_2 \Delta APS_{t-1} + \sum_{1=1}^{p} \beta_3 \Delta PPS_{t-1} + \sum_{1=1}^{p} \beta_4 \Delta WPS_{t-1+y} + ECM_{t-1}$$

(1)

Where:

RGDP = Real Gross Domestic Product

APS = Automated Teller Machine Payment System

PPS = Point of Sales Payment System

WPS = Web Payment System

ε_t = Stochastic Error Term;

β_0 = Intercept for Estimation.

$\beta_{1 - } \beta_3$ = Coefficient of Independent Variables

Δ = change

$\sum$ = summation

P = Optimal lag

3.5. Description of Modeled Variables

Real gross domestic product: This is an inflation-adjusted measure that reflects the value of all goods and services produced by an economy in a given year.

Automated teller machine payment system: This is a payment system that allows for use either debit or credit card to undergo financial transactions on an automated teller machine.

Point of sales payment system: this is a payment system that allows a customer to execute payment for product or service with the aid of point of sales terminals and systems.

Web payment system: this is also known as electronic payment system or online payment system, this payment system allow users to make payment or financial transactions online or internet.

4. DATA ANALYSIS AND RESULTS

4.1. Descriptive Statistic

Table 4.1

	RGDP	*ATM*	*POS*	*WEB PAY*
Mean	62760.20	3287.959	557.6297	113.4877
Median	65185.76	3254.410	236.5440	79.09681
Maximum	69875.09	6480.086	2383.109	404.6010
Minimum	49856.10	399.7100	11.03000	25.05000
Std. Dev.	6971.463	2219.979	778.9863	112.9748
Observations	10	10	10	10

Source: Extracted from Appendix

The result of the descriptive statistic in table 4.1 above reveals that mean real gross domestic product, automated teller machine payment system, point of sale payment system and web payment system were 62760.20, 3287.959, 557.6297 and 113.4877 respectively. While their minimum stood at 49856.10, 399.7100, 11.03000 and 25.05000, their maximums were 69875.09, 6480.086, 2383.109 and 404.60100 respectively. It is important to note that all these figures were measured in (billion naira).

4.2. Correlation Matrix

Table 4.2

	RGDP	*ATM*	*POS*	*WEB PAY*
RGDP	1.000000	0.911562	0.668404	0.543051
ATM	0.911562	1.000000	0.867987	0.762383
POS	0.668404	0.867987	1.000000	0.970249
WEB PAY	0.543051	0.762383	0.970249	1.000000

Source: Extracted from Appendix

The correlation results suggested that all the variables had a positive relationship with real gross domestic product. Automated teller machine payment system had about 91% correlation with real gross domestic product, while point of sale payment system had about 67% correlation with real gross domestic product and web payment system was correlated with real gross domestic product at 54%.

4.3. Unit root test

Table 4.3

Variables	Levels						1st Difference					Order of Intergration
	ADF Statistics	Critical Values			P-Values	ADF Statistics	Critical Values			P Values	
		1%	5%	10%			1%	5%	10%		
RGDP	-3.316774	-4.420595	-3.259808	-2.771129	0.0461						I(O)
ATM	-0.377628	-4.582648	-3.320969	-2.801384	0.9656	-5.066906	-4.582648	-3.320969	-2.801384	0.0057	I(I)
POS	15.00938	-4.420595	-3.259808	-2.771129	0.9999						I(O)
WEB PAY	4.548712	-4.582648	-3.320969	-2.801384	1.0000						I(O)

Source: Extracted from Appendix

The result of the unit root test above showed that the entire variable except automated teller machine payment system was stationary at levels, while automated teller machine payment system was stationary at first difference. As such, the appropriate estimation technique to be employed is the Auto Regressive Distributed Lag (ARDL) Model.

4.4.   Inferential Result

4.4.1. Result of (ARDL) Model

Table 4.4.1

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
RGDP(-1)	-0.779869	0.660634	-1.180486	0.4474
ATM(-1)	5.664882	1.450342	3.905894	0.1596
POS(-1)	23.61494	26.82127	0.880456	0.5404
WEB_PAY	36.87935	57.18992	0.644857	0.6354
C	91827.45	30243.78	3.036242	0.2026
R-squared	0.997879	Mean dependent var		64193.99
Adjusted R-squared	0.983035	S.D. dependent var		5616.871
S.E. of regression	731.6028	Akaike info criterion		15.60891
Sum squared resid	535242.6	Schwarz criterion		15.78422
Log likelihood	-62.24008	Hannan-Quinn criter.		15.23059
F-statistic	67.22151	Durbin-Watson stat		1.909135
Prob(F-statistic)	0.093648			

Source: Extracted from Appendix
N/B t-tabulated=2.36 at df = 7 and 95% confidence level

From the ARDL Model above, the r^2 of 99% suggest that the independent variables explained about 99% variation in the dependent variable, while the remaining 1% may be attributed to variables not included in the model. Put differently, electronic payment systems variables explained about 99% variation in economic growth in Nigeria.

The result further suggested that all the electronic payment systems variables had positive impact on economic growth in Nigeria, such that a unit increase in electronic payment systems variables would bring about an increase in economic growth in Nigeria and vice versa. However, not all the electronic payment systems variables had significant impact on economic growth in

Nigeria. The result showed that only automated teller machine payment system had a significant impact on economic growth in Nigeria in terms of the t-stat.

Durbin-watson statistic of 1.9 showed that the model is free from auto correlation since it's close to the 2.0 region which translate to 0.

The prob. f-stat. of 0.09 suggested that the overall model was a good fit, even at 1% and 5% significant level.

4.5. Discussion of Findings

The inferential result showed that all the electronic payment systems variables had positive impact on economic growth in Nigeria proxied on real gross domestic growth. However, only automated teller machine payment system had a positive and significant impact on economic growth in Nigeria within the period under review.

The correlation result also revealed that there existed a positive relationship amongst all the variables. All the electronic payment systems variables were positively correlated with real gross domestic product.

5. CONCLUSION

This study was carried out to investigate the impact of electronic payment systems on economic growth in Nigeria between 2009 and 2018. The study employed automated teller machine payment system, point of sale payment system, web payment system as proxies for electronic payment systems (independent variables), while real gross domestic product was employed as a measure of economic growth in Nigeria. From the inferential results obtained, it is pertinent to deduce that electronic payment systems impacted positively on economic growth of Nigeria.

5.1. Recommendations

This study makes the following recommendations;

1. Since electronic payment systems impacted positively on economic growth in Nigeria, the Central Bank of Nigeria in synergy with the bank needs to come up with more policy that would enhance electronic payment systems in the economy.

2. Monetary authorities in Nigeria should enforce compliance of the cashless policy in the economy, since it will enhance and promote electronic payment systems activities in Nigeria.

3. There should be a lot of orientation and awareness programs to further educate Nigerians on the benefits and work ability of electronic

payment systems in the economy so as to enhance financial inclusion in Nigeria.

4. Commercial banks in Nigeria can give incentives in the form of bonus to customers making use of digital platforms to further encourage people to imbibe the electronic payments platform.

5. One of the major reasons why people shy aware from electronic payment platforms is the issue of fraud and insecurity of digital platforms, the government in conjunction with monetary authorities should put in place mechanisms that would check digital fraud and put in place severe punishment for fraudster. This would give confidence to customers to engage more in electronic payment transactions.

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