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4 ───────────────────────────────────

5 ## Abstract

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7 *Index terms—*

8 # 1 INTRODUCTION

9 Globally, electronic payment systems have received wide acceptance in various countries. The booming commerce
10 has birthed globalization, therefore the need for more electronic payment systems. Nigeria as a developing nation
11 is also experiencing the development of various forms of electronic payment methods including online internet
12 banking, mobile banking, Automated Teller Machine (ATM), phone banking, SMS banking, fund transfer services,
13 Point of Sales banking, and use of debit cards. These channels keep expanding with the introduction of the e-
14 naira wallet, soft token, and National domestic card scheme which are aimed at the development of the financial
15 sector and Nigerian economic growth.

16   Several policies have been made in Nigeria to promote the electronic payment system. These policies include
17 redesigning the currency to reduce the amount of physical cash in circulation, reducing daily physical withdrawal
18 to N20,000 naira per person to promote electronic payments, and introducing Neobanks such as VBank, Kuda,
19 and Opay to carry out payment activities using financial technology. Despite these efforts, the Nigerian Gross
20 Domestic Product, which measures economic growth, does not appear to have responded in the same direction.
21 According to the quarterly reports of both the National Bureau of Statistics and the Central Bank of Nigeria,
22 the GDP stood at N20,329,062million at the end of December 2021, N17,349,381million at the end of the first
23 quarter of 2022, and N17,285,882million at the end of the second quarter of 2022 **??**CBN, 2022). This suggests
24 that the Gross Domestic Product has been declining.

25   Thus it is pertinent that this study is undertaken to establish the veracity of this position or otherwise.

26   This research thus fills the gaps in the literature in this area by examining the effect of the electronic payment
27 system on economic growth in Nigeria from 2012Q1 to 2021Q4. Given the rising policies in support of the
28 electronic payment system (Currency redesign, Daily withdrawal limits etc) it becomes imperative to ask: i.
29 What is the effect of Point of Sales on economic growth in Nigeria? ii. How have the web payment channels
30 affected Nigerian economic growth? iii. What is the effect of mobile payment channels on economic growth in
31 Nigeria?

32   The study hypothesized that:

33   H 01 : Point of Sales have no significant effect on economic growth in Nigeria. H 02 : Web pay channels have
34 no significant effect on economic growth in Nigeria. H 03 : Mobile payment channels have no significant effect
35 on economic growth in Nigeria.

36 # 2 II. LITERATURE REVIEW

37 # 3 Concept of Electronic Payment Systems

38 Electronic payment systems (e-payment systems) refer to the automated processes of exchanging monetary value
39 among parties in business transactions and transmitting this value over the ICT networks (Amin et al., 2018).
40 In Nigeria, e-payment is effecting payment from one end to another end through the medium of the computer
41 without manual intervention beyond inputting payment data. It is the ability to pay the suppliers, vendors and
42 staff salaries electronically at the touch of a computer button (Udeghi & Hanzace, 2018).

43   In the wake of the cashless policy, the e-payment system has become a medium through which monetary
44 substance circulates conveniently, especially in a developing economy like Nigeria where carrying cash around
45 is habitual. In Nigeria, the e-payment system formed the fundamental starting point of her modern market

economy; a well-functioning e-payment system has been recognized to have much relevance on financial stability, monetary policy and overall economic activity (Aduda & Kingoo, 2018). Historically, the Central Bank of Nigeria (CBN) introduced a payment system which facilitated e-payment in 2002. During this period, Nigeria's Automated Clearing System (NACS) was introduced as a veritable platform for the development of electronic payment and to reduce the clearing of cheques period. Shortly after was the introduction of the Automated Teller Machine (ATM), web pay channels, Point of Sales and mobile payment channels, just to mention a few. Electronic payment systems come in different forms, some of the e-payment systems related to this study are Point of Sales, web pay channels and mobile payment channels.

4   III. POINT OF SALES

The point of sale (POS) is a location where a transaction occurs between a buyer and a seller. It is the final step in a retail transaction where the buyer pays for the goods or services purchased from the seller (Friedman & Johnson, 2019). Point of Sales (POS) terminals is a terminal that enables buyers to make payments using payment cards such as (Visa, MasterCard, verve, etc) issued to them by any bank in or outside Nigeria directly into other accounts (Isibar, 2018). In recent years, the POS has evolved to include electronic payment systems that make transactions faster, easier, and more secure.

A POS system typically includes hardware and software components that enable the processing of sales transactions. The hardware may include a cash register, barcode scanner, card reader, receipt printer, and other peripheral devices. The software component may include a user interface, inventory management, and reporting features (Smith, 2018). One of the main advantages of a POS system is that it can reduce errors and streamline the checkout process, resulting in faster transactions and increased customer satisfaction (Maverick, 2021). POS systems can also help businesses manage their inventory, track sales data, and generate reports that can provide valuable insights into their operations (Lee, 2019). London Journal of Research in Management and Business

5   IV. WEB PAY CHANNELS

Web pay channels also known as internet banking are a type of e-payment system that involves transactions carried out over the Internet. Web pay channels refer to online payment gateways that enable customers to purchase goods and services from businesses or individuals through the internet (Foster, 2018). These channels allow customers to pay for their purchases electronically, without the need for cash or physical payment methods. It is a simple way of paying for online purchases directly from the customer's bank. It also offers the possibility of enjoying banking services from their homes or offices (Jun & Cai, 2011). Anyanwaokoro (2017) asserted that web pay channels are online platforms through which customers of the bank can access their accounts and accomplish financial transactions using the internet. With internet banking customers can view account balances, transfer funds between sister accounts, and transfer funds in favour of third parties.

Web pay channels can be integrated into e-commerce websites, enabling businesses to accept online payments for their products or services. Examples of popular web pay channels include PayPal, flutterpay, Alipay, and Square, which provide secure payment processing services that protect the sensitive information of customers during transactions. One significant advantage of web pay channels is that they provide convenience and ease of use for both businesses and customers. With web pay channels, customers can make purchases from anywhere at any time, as long as they have an internet connection. Businesses can also receive payments in real-time, without having to wait for checks to clear or for manual processing (Russell, 2016).

6   V. MOBILE PAYMENT CHANNELS

Mobile payment channels also known as M-banking or SMS banking are the term used for performing balance checks, account transactions, payments etc. through mobile banking products such as mobile phones (Clive, 2017). Mobile payment channels are one of the latest ways of making payments through mobile phones. This involves sending a payment request through a text message (USSD) or the bank's mobile application. Mobile payments reduce the time and stress of using a credit card or cash as account details are already linked with the banks' software (Hodagho, 2016).

Mobile payment products provide basic banking services to customers from their mobile phones. It is an SMS-driven platform which facilitates access to banking services using cell phones. The services available on the mobile banking product include mini statements and checking of account history, alerts on account activity or passing of set thresholds, monitoring of term deposits, domestic and international fund transfers, micro-payment handling, bill payment processing, portfolio management services, the status of requests for credit, including mortgage approval and insurance coverage, cheque book and card requests, ATM location, general information such as weather updates, news and location-based services (Andrea et al., 2022).

7   IIV. CONCEPT OF ECONOMIC GROWTH

Economic growth involves a substantial increase of the national income per capita, in a wider sense, it involves the increase of the GDP, GNP and NI, including the production capacity, expressed in both absolute and relative size.

(Aldaas, 2021). Economic growth is best measured with Gross Domestic Product (GDP) as it gives information about the size of the economy and how an economy is performing (Haller, 2012).

Gross domestic product (GDP) is the total monetary or market value of all the finished goods and services produced within a country's borders in a specific period (Azeez, 2011). As a broad measure of overall domestic production, it functions as a comprehensive scorecard of a given country's economic health. Though GDP is typically calculated on an annual basis, it is sometimes calculated every quarter as well. Isibar (2018) is of the view that the calculation of a country's GDP encompasses all private and public consumption, government outlays, investments,15 41 | | Volume 23 Issue Compilation 1.0 © 2023 Great] Britain Journals Press

additions to private inventories, paid-in construction costs, and the foreign balance of trade. Of all the components that make up a country's GDP, the foreign balance of trade is especially important. The GDP of a country tends to increase when the total value of goods and services that domestic producers sell to foreign countries exceeds the total value of foreign goods and services that domestic consumers buy. When this situation occurs, a country is said to have a trade surplus. If the opposite situation occurs, that is if the amount that domestic consumers spend on foreign products is greater than the total sum of what domestic producers can sell to foreign consumers, it is called a trade deficit (Edet, 2019). In this situation, the GDP of a country tends to decrease.

8 VI. EMPIRICAL REVIEW

9 Point of Sales and Economic Growth

Andrea et al. (**??**022) investigated the effect of e-payment systems on the gross domestic product of Nigeria. Specifically, the study was set to determine the effect of the Automated Teller Machine (ATM) payment system, Point of Sale (POS) payment system and mobile applications payment system on the gross domestic product in Nigeria. The study adopted an ex-post facto research design. The population comprised all the quoted telecommunication companies listed on the Nigeria Stock Market as of 2020 while the sample size comprised MTN Nigeria, eTranzact, Chams Plc, Courteville Business Solutions Plc and Omatek Plc. A judgmental sampling technique was used in the selection of the sample. Auto Regressive Distributed Lag Model (ARDL) was used as the analytical technique. The study revealed that ATM payment systems, Point of Sales (POS) payment systems and mobile applications payment systems have significant effects on economic growth in Nigeria. The study recommended that banks should constantly upgrade hardware and software whenever a new feature for enhancing security becomes available.

10 Web Pay Channels and Economic Growth

John (2019) estimated the relationship between electronic (e-payment) systems and economic growth in Nigeria. Monthly available Data for Nigeria on values of various payments systems were analyzed using the Autoregressive Distributed Lagged regression (ARDL) method covering the period of (2012-2017). The result indicates a significant positive relationship between the electronic payment system and economic growth in terms of real gross domestic product (GDP) growth. Automated Teller Machines had a positive significant impact on economic growth. This means that ATM-based transaction encourages more cash, and possessions and may not yield the required goal of low cash-based transactions within Nigeria's banking populace. POS and web-based transactions (WBT) had a significant impact on the real GDP growth, but INTERBANK transactions, have an insignificant impact on GDP growth while mobile payment (MOP) has a negative contribution to the impact on real GDP growth. Point of Sales (POS) transactions are also the most patronized electronic banking tool and this is seen from the descriptive analysis, followed by web-based transactions. POS and WBT have the highest average among all other variables. This implies that POS and WBT are significantly part of the major determining factors influencing and contributing to the real GDP growth output in Nigeria, while other variables such as INTERBANK transactions are relevant but contribute minimally and drive real GDP output negatively down, as reflected in the results. Since the successful implementation of the e-payment systems has much to do with internet connectivity and mobile banking, efforts should be made to design or improve the internet security framework to check online fraud. There should be adequate legislation on all aspects of the operations of the e-banking and cashless system so that both the operators of the system and the public can be adequately protected. Statistical Bulletin and the Nigerian Bureau of Statistics to establish the relationship between the dependent variable (Real GDP) and the independent variables (Automated Teller Machines, Point-of-Sale, Internet Banking and Mobile Banking). The research adopted the Vector Error Correction Model (VECM) and the results of the analysis show that electronic banking has significantly impacted the economic growth of Nigeria. The VECM result shows that the model explains about 58.97% of the total variations in Economic growth as explained by the independent variables during the period of the study. The result of the analysis shows that Electronic Banking has a significant relationship with Nigeria's economic growth, while Point of Sales, Internet Banking and Mobile Banking, individually have no significant effect on Nigeria's economic growth, while Automated Teller Machine has a significant effect on economic growth in Nigeria for the period under consideration. The research recommends that the government should reduce the charges for the use of electronic means of transactions to encourage people to use them more often.

11   Mobile Payment Channels and Economic Growth

Ogbeide et al. (2016) investigated the impact of electronic banking on Nigerian economic growth. They made emphasis on the long debate that has been made on the relationship between financial development and the growth of the economy. They further determined if there exists a long-run relationship between e-banking and economic growth in Nigeria employing the Autoregressive Distributed Lag (ARDL) bond testing technique. Economic growth (RGDP) was regressed on some measures of e-banking (Automated Teller machine, Mobile banking, Web banking and Point on Sales Terminal) for the period 2009 to 2014 quarterly data. The Pairwise Granger Causality test was also adopted to determine the direction of causality. The results of the study showed that e-banking had a significant impact on economic growth. ATMs and MB were found to have a positive impact on economic growth while POS and WB showed a negative impact. The result of the study further showed that there is a long-run relationship between e-banking and economic growth and that e-banking Granger causes economic growth in Nigeria. The study thus recommended the improvement of the technological base of the country and policy measures to encourage the efficient performance of the banking sector as well as regulation and control of the banking activities.

12   Theoretical Framework

13   Innovation Diffusion Theory

The core theory which was adopted and aligned with the research is the Diffusion of Innovation theory (DOI) developed by Rogers (1976), which is pertinent to the explanation of the causality between the pertinent variables. One of the earliest theories that has sought to investigate the variables that can lead a person to accept an innovation or a new technology is the notion of diffusion of innovation. This theory's key tenet is that adopting innovations involves reducing uncertainty. People will gather and combine information on the newest technologies in order to lessen ambiguity. This method produces opinions about employing technology. People then decide whether to accept or reject technology based on these ideas. The adoption of new technology or any innovation is influenced by five key concepts, according to this theory: compatibility, relative advantage, trial ability, complexity, and observability, as described by Rogers (1995). Adoption of new technologies is a process for reducing uncertainty. This idea explains why people choose a technological modality over a more conventional one (Isibor et al., 2018). It is concerned with the application of a new technological idea, technique, or method. According to this hypothesis, members of a social system spread technological innovation via particular channels. The stages of transmission are knowledge (understanding the technology's existence and functions), persuasion (having a positive attitude about it), decision (adopting it), implementation (using it), and confirmation (benefits based on positive use of it).

Individuals and banks tend to gather and synthesize knowledge to lessen uncertainty regarding new technology. First, the perceived superiority of an innovation over the idea it replaces is referred to as the relative advantage. Analyzing the advantages and disadvantages of a change, which may be expressed economically or socially, is necessary for adoption. The degree to which an invention is viewed as consistent with current values, prior experiences, and potential users' demands is referred to as compatibility. It is assessed in light of the adopter's sociocultural norms and beliefs, previously popular theories, and the demand for innovation from the client. If the technology is compatible with how they now conduct financial transactions and does not conflict with their current beliefs, it has a better chance of being accepted in the context of internet banking.

Thirdly, complexity is described as the level of perceived difficulty in using and understanding an innovation. The degree of physical or mental effort required to employ an innovation is measured by its complexity. The fourth definition of the belief of trial ability is the extent to which an innovation may be tested out on a small scale. This conviction enables the adopter to test innovation so that it has meaning for them. The fifth belief is observability, which is the extent to which an innovation's results are apparent to other people.

With the exception of observability, the four tenets of innovation diffusion theory are, however, put to the test for internet banking. Because the targeted technology chosen by Baraghani (2008) was related to internet banking, observability was not included in his analysis. People typically use the internet for private banking, so other people would not be able to see or observe these transactions. These four ideas have a good impact on an individual's attitude toward using Internet banking, which in turn has a positive impact on their intention to use the technology.

Our theory is relevant to this study because it recognizes that innovation spreads over time to members of a social system (Omojolaibi et al. 2016;Rogers, 1976) and that economics operates under generally well-established and well recognized overarching frameworks that can guide investigations. However, in the context of the current study, diffusion is the expansion of cashless payment, where consumers seek for more quick and efficient transactions and businesses look for new revenue streams. Consequently, Tee and Ong (2016) believed the diffusion of electronic payment will result in the adoption of cashless transactions within the society or community, subject to the types of innovation adopters and innovation-decision process, therefore, since the consequences of diffusion in electronic payment depend on how quickly the society is willing to adopt electronic payment through different stages of innovation processes, the consequences of the adoption of electronic payment differs in a different society.

14 VII. METHODOLOGY

The research design adopted for this study is ex post facto design. This study uses quarterly time series data covering the period 2012Q1 to 2021Q4. The variables of the study are Point of Sales, web pay channels, mobile payment channels and Gross Domestic Product. Data for the study was obtained from the Central Bank of Nigeria Statistical Bulletin 2021. Descriptive statistics were used to explain the data. A stationarity test was conducted to test for the presence of unit roots in the time series data. In addition, the co-integration test was conducted to investigate the possible correlation among the variables of this study. A vector error correction model was also used: The vector error correction model is a restricted type of VAR designed for the use of non-stationary series that are known to be co-integrated. The data obtained was also analyzed using Dynamic Ordinary Least Square regression through Eviews 10 Statistical Package.

The analysis process of this study follows the following steps:

The Phillips-Perron (PP) unit root test was employed to determine the order of integration of the variables in an attempt to establish the stationarity level of the variables. The PP unit root test is conventionally said to have greater unit root detection ability when compared with the ADF unit root test. The PP test is thus preferred to the Augmented Dickey-Fuller (ADF) because it deals with a potential correlated error by employing a correction factor that estimates the long-run variance of the error process.

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Î?"y t-1 = ? 0 + ?y t-1 + ?. + ?y t-p + ? t Cointegration Johansen (1990) developed two likelihood ratio tests: The Trace Test and the Maximum Eigenvalue Test. The two procedures test for the presence of cointegrating vectors between Point of Sales, web pay channels, mobile payment channels and Gross Domestic Product.n-1 m-1 Î?"Yt =?+ ?Î?"iÎ?"Y t-i + ??iÎ?"X t-i -ECM t-1 + ? t i=1 i=0

where Î?" is the first difference operator, Y t is a p x 1 vector of stochastic variables, X t is the independent variable, ECM is the error-correction coefficient and is also called the adjustment coefficient, l is a vector of constants, and ? t is a vector of normally, independently, and identically distributed errors with zero means and constant variances and p is several variables.

16 VIII. ERROR CORRECTION MODEL

Granger **??**1987) showed that if two variables are cointegrated, then they have an error correction representation. The Error Correction Model (ECM) provides information about the long-run, and short-run relationship as well as the speed of adjustment between the variables in incorporating the estimated equation, the error correction term (ECT).Î?"Y t = a 0 + b 1 Î?"X t -?û t-1 + Y t

The model is specified as follows:

GDP= f (POS, WPC, MPC)

The econometric form of equation (1) is represented as:GDP t = ? 0 + ? 1 POS t + ? 2 WPC t + ? 3 MPC t + ? t (**2**)

Where: GDP = Gross Domestic Product; POS = Point of Sales; WPC = Web Pay Channels; MPC = Mobile Payment Channels; ? 0 =Intercept or Constant; ? 1 -? 3 = Slope of the regression line concerning the independent variables; μ=Error Term. The Cointegration model of the study is represented by:n-1 m-1 Î?"GDP t =?+?Î?"iÎ?"GDP t-i + ?? 1 Î?"POS t-i + ? 2 Î?"WPC t-i + ? 3 Î?"MPC t-i + ECM t-1 + ? t ?? ??? (3) i=1 i=0

Where that gross domestic product was normally distributed because the standard deviation value was lower than the mean value. The maximum gross domestic product within the period of this study was 49,276,018. This implies that the highest gross domestic product is not more than N49,276,018 million within 40 quarters. Table 1 also shows the minimum value to be 16,450,360, meaning that gross domestic product per quarter was not less than N16,450,360 million for the period under review.

17 IX. RESULTS AND DISCUSSION

Point of Sales had a mean value of N301,291.3 million while the deviation from the mean was N531,586.9 million. This indicates that the Point of Sales was not normally distributed since the standard deviation value was greater than the mean value. The maximum value within the period under consideration was 2,089,077, implying that the highest cumulative Point of Sales transaction used in the electronic payment per quarter under review was not more than N2,089,077 million. While the minimum value paid through the Point of Sales payment channel per quarter was not less than N1,456.918 million for the period under review.

Web pay channels had a mean value of N6,101,201 million while the deviation from the mean was N12,728,662 million. This indicates that the web pay channels were not normally distributed since the standard deviation value was greater than the mean value. The maximum value within the period under consideration was 46,645,986, implying that the highest cumulative web pay channels transaction used in the electronic payment per quarter under review was not more than N46,645,986 million. While the minimum value paid through the web pay channels per quarter was not less than N2,031.660 million for the period under review.

Finally, the mobile payment channel had a mean value of N650,464.2 million while the deviation from the mean was N1,292,346 million. This indicates that the mobile payment channel was not normally distributed,

since the standard deviation value was greater than the mean value. The maximum value within the period under consideration was 4,764,969, implying that the highest cumulative value from the mobile payment channel within a quarter was not more than N4,764,969 million for the period under review. The minimum value of N514.5233 million indicates the lowest total value paid through the mobile payment channel for a quarter within the period under review. source: researcher's computation 2023.

To examine the existence of stochastic non-stationarity in the series, the research establishes the order of integration of individual time series through the unit root tests. The test of the stationarity of the variables adopted was Phillips-Perron (PP) test. The variables tested were GDP, POS, WPC, and MPC with results as presented in Table 2.

From Table 2, it can be seen that all the variables were found to be stationary at the first difference, that is, at order I(1). The PP test statistics were greater than their respective tabulated values and their p-values are all below the 0.05 significant level for this study. Since the variables were found stationary at first order I(1), the Johansen cointegration approach was applied to determine the long-run relationship among the variables. Point of sales has a significant effect on economic growth because the p-value is 0.0000 which is lower than the 5% significant level, indicating that an increase in point of sales will automatically increase economic growth to the extent of 84.79623. Therefore, the study rejects H0 1 , which states that point of sales has no significant effect on economic growth in Nigeria.

However, the analysis showed that the web pay channel has no significant effect on economic growth because the p-value is 0.5735 which is greater than the 5% significant level, indicating that an increase in the web pay channel will not automatically decrease economic growth to the extent of 0.143013. Therefore, the study accepts H0 2 , which states that the web pay channel, has no significant effect on economic growth in Nigeria. According to the analysis, mobile payment channels have a significant effect on economic growth because their p-value is 0.0008 which is lower than the 5% significant level, indicating that an increase in mobile payment channels will automatically decrease economic growth to the extent of 27.71097. Therefore, the study rejects H0 3 , which states that mobile payment channels have no significant effect on economic growth in Nigeria.

The coefficient of determination (R2) is 0.955039 implying that the electronic payment systems explain variation in economic growth to the extent of 96%, while the remaining variation was explained by other variables not captured in the model.

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The stability of the model was checked using the CUSUM test and it shows that the model is stable as it is within the 5% boundary.

19   IIX. CONCLUSION AND RECOMMENDATIONS

The main objective of the study is to empirically examine the effect of the electronic payment system on economic growth in Nigeria for the period 2012Q1 to 2021Q4. Based on the findings of the study, it can be concluded that there is an existence of a long-run equilibrium relationship between point of sales, web pay channels, mobile payment channels and economic growth in Nigeria.

The study concludes that point of sales has a significant effect on economic growth in Nigeria. This means that the use of point of sales as a channel of payment in Nigeria does have a proportionate increase on the gross domestic product. This finding is in line with the works of Andrea et al. (2022) and John (2019). However, the web pay channel does not significantly increase economic growth. This result is in tandem with the findings of Njoku et al. (2020) that web pay channels have no significant effect on the economic growth of Nigeria. But does not support the findings of John (2019) who found that the web pay channel has a significant effect on the gross domestic product, meaning that an increase in transactions through the web or the internet will lead to an increase in gross domestic product. The mobile payment channels on the other hand had a significant effect on economic growth in Nigeria. This indicated that funds transacted through mobile channels of payment contribute to the gross domestic product of the economy in Nigeria. This result is in agreement with the findings of John Based on the findings of this study, it is recommended that:

In the wake of the Central Bank of Nigeria's cashless policy, point of sales should be encouraged by the government through CBN as an alternative source of payment. This should be done by subsidizing the amount needed for its purchase, such that most traders, vendors and business people will be able and willing to own one.

Though the web pay channel had an insignificant effect on economic growth, this could be a result of the slow internet network transmission usually experienced in the process of completing transactions which can be traced to inadequate investment in the fibre-related transmission of networks like the 5G that is already in use in developed nations like the USA, UK, but yet to be implemented in Nigeria. Therefore, there is a need for more investment to be made in the internet network by the government of Nigeria and to also make favourable policies that will entice more private sector-driven investment in the industry.

Finally, the Central Bank of Nigeria has done well by licensing a lot of neo-banks like Kuda, Opay, Palmpay and a lot more as they have enhanced real-time transactions where most commercial banks failed especially in the face of the sudden transition to the cashless economy driven by the implementation of the cashless policy.

340 However, the Central Bank of Nigeria needs to put in place more control measures that will guarantee the safety of depositors' funds since these neo-banks do not have walk-in physical structures. [1]

Figure 1:

Figure 2:

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[1] Effect of Electronic Payment System on Economic Growth in Nigeria

Figure 3:

1

Source: Eview Version 10 Output, 2023

Figure 4: Table 1 :

2

Variables	Adj. T-Statistic	Prob. Values	Order of Integration
GDP	-9.702196	0.0000	I(1)
POS	-3.214800	0.0020	I(1)
WPC	-6.901472	0.0000	I(1)
MPC	-6.092884	0.0001	I(1)

Figure 5: Table 2 :

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.911016	152.6676	47.85613	0.0000
At most 1 *	0.720080	60.73429	29.79707	0.0000
At most 2	0.275414	12.35071	15.49471	0.1409
At most 3	0.002860	0.108833	3.841466	0.7415

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.911016	91.93328	27.58434	0.0000
At most 1 *	0.720080	48.38358	21.13162	0.0000
At most 2	0.275414	12.24187	14.26460	0.1019
At most 3	0.002860	0.108833	3.841466	0.7415

Source: Eview Version 10 Output, 2023

The Trace test of Johansen cointegration shows that there is an indication of cointegration at 0.05 significance level as shown in its Trace statistics of None and At most 1 (152.6676, and 60.73429) are greater than their respective 0.05 Critical Values (47.85613, and 29.79707), while their p-values (0.0000, and 0.0000) are all below the 0.05 level of significance for this study. Also, the Maximum Eigenvalue test of Johansen cointegration shows that there is an indication of cointegration at a 0.05 significance level as the Max-Eigen statistics for None, and At most 1 (91.93328, and 48.38358) are greater than their respective 0.05

Critical Values (27.58434, and 21.13162), while None, and At most 1 p-value of 0.0000, and 0.0000 respectively are all below the 0.05 level of significance for this study. Since there is cointegration in the two criteria of the Johansen cointegration test, it implies that there is a long-run relationship between gross domestic product and the three variables of the electronic payment system (Point of Sales, Web pay channel and Mobile payment channels) considered. Therefore, this suggests the use of the Vector Error Correction model (see Appendix II).

Figure 6:

4

Variable	Coefficient	Std. Error	t-Statistic
POS	84.79623	11.89884	7.126431
WPC	-0.143013	0.250593	-0.570699
MPC	-27.71097	7.233641	-3.830847
C	20548465	712436.9	28.84251
R-squared	0.955039	Mean dependent var	
Adjusted R-squared	0.932559	S.D. dependent var	
S.E. of regression	1992507.	Sum squared resid	
Long-run variance	6.08E+12		

Source: Eview Version 10 Output, 2023

Figure 7: Table 4 :

3

Figure 8: Table 3 :

5

Description	Probability values
Normality Test:	1.506089
Jarque-Bera	0.470931
P-value:	
Serial Correlation	0.189553
F-statistics	0.6661
P-value	
Heteroskadasticity Test	1.568907
F-statistics	0.2138
P-value	

Source: Researcher's computation, 2023

Figure 9: Table 5 :

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above indicates that the data is skewed, denoting that the data are normal. This is corroborated by the Jarque-Berra Statistic of 1.506089 and its corresponding P-value of 0.470931 which is greater than the p-value of 0.05.
The Breusch-Godfrey Serial Correlation LM Test indicates that there is no autocorrelation. This is given by the F-statistic of 0.189553 and its corresponding P-value of 0.6661. The Breusch Pegan Test of Heteroskedasticity with F-statistics 1.568907 and its corresponding P-value of 0.2138 indicates that there is no problem with heteroskedasticity.

Figure 10: Table 5

6

Variable	Coefficient Std. Error		t-Statistic
POS	84.79623	11.89884	7.126431
WPC	-0.143013 0.250593		-0.570699
MPC	-27.71097	7.233641	-3.830847
C	20548465	712436.9	28.84251
R-squared	0.955039	Mean dependent var	
Adjusted R-squared 0.932559		S.D. dependent var	
S.E. of regression	1992507.	Sum squared resid	
Long-run variance	6.08E+12		

Figure 11: Table 6 :

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