FINTECH INNOVATION IN THE FINANCIAL SECTOR: INFLUENCE OF E-MONEY PRODUCTS ON A GROWING ECONOMY

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Abstract: The FinTech innovation of e-money products in the financial sector has not gained sufficient recognition in Nigeria's developing country. Despite the numerous economic benefits associated with this innovation, physical cash for financial transactions is still prevalent. Banks are still experiencing some level of cash withdrawals and deposits by individuals who refuse to embrace modern technology. This study stresses the economic benefits of e-payment channels available today and statistically supports evidence to substantiate their usefulness. In this study, we use banks' e-money products as the independent variables, while GDP is employed as a proxy for the economy. The data are collected from 2006-2019 and are analyzed with multiple regression techniques using E-views version 9 software. The result shows that all banks' e-money products have a significant favorable influence on the economy except the POS that is yet to gain momentum. The study suggests the full implementation of the cashless policy, proper education of the populace and guidelines to check electronic fraud.

1. Introduction

Financial Technology (Fintech) is a combination of the words 'financial services and digital technology. Financial technology refers to new technology or innovation that is presently available to aid smooth conduct of financial services. In

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the past, customary methods of conducting financial transactions dominated the emerging economies including Nigeria. People physically go to wherever their banks are located before they could carry out their financial dealings. The emergence of Fintech in the financial sector of Nigeria now becomes a big relief and an outstanding achievement. In the present times, Fintech has enabled several financial service options without the traditional visit to banks' premises. Banks are beginning to witness a significant reduction of a crowd in their banking halls. This attainment is due to the evolution of Fintech after the global financial crisis of 2008. Nigeria has now become the hub of financial technology, especially in the financial sector. Nigerians presently use e-money products such as Automated Teller Machines (ATM), Point-of-Sale (POS) terminals, Web-based or internet (WEB) and Mobile Money (MMM) for their frequent financial activities.

Financial Technology has helped surmount the barriers to financial inclusion by enabling under-banked households, individuals and firms to have access to financial services (Demir, Pesque-Cela, Altunbas & Murinde, 2020) with ease. Fintech has afforded people who are regarded as 'unbanked' the opportunity to buy or sell online with just their smart mobile phones. It has also promoted the innovation of a 'cashless society' in Nigeria. A cashless arrangement is not a financial scheme with the out-and-out elimination of money but an economic setting in which goods and services are traded through various e-payment options (Adeyemo, Isiavwe, Adetula, Olusanmi, & Owolabi, 2020). The availability of POS and mobile money transfer give individuals the boost to make their purchases with ease. In Nigeria, POS is available in virtually every big supermarket and business centres. The operation of Fintech through e-payment channels has given the Nigerian economy a tremendous boost. Nigeria's financial sector has witnessed a remarkable improvement in its services using these various options. The entire Nigerian populace no longer carries out their financial transactions with such intensive stress associated with traditional banking activities. Some people presently carry out their banking transactions at the comfort of their homes without going through the stress of driving to the bank.

Although Fintech innovation in the Nigerian financial sector is not without challenges in society, the foremost common food markets in Nigeria are yet to embrace e-money products. In the public market places, if a person does not have physical cash, that individual will not buy goods and services. The market women are yet to understand the need for a cashless society. The street taxi drivers are also another vulnerable group to appreciate e-money products. If an individual attempts to use a cashless device to make payment for a transport fare, a taxi driver will not have confidence in it except the physical cash given. The frequent network issues and scamming in Nigeria have contributed to most challenges of e-payment options. According to Ekwueme and Egbunike (2012), seventy percent of banking

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fraud and forgery in Nigeria are successfully perpetrated through e-banking platforms. Thus, it becomes very complicated, having financial dealings with the less elite group of the society due to the remote understanding of e-payment devices. However, the Nigerian economy has responded positively to Fintech innovations (Babajide, Oluwaseye, Lawal & Isibor, 2020). Fintech has brought such innovative financial service products that most Nigerians have embraced, and the economic outcome is commendable.

The primary aim of this study is to examine the impact of Fintech innovation through e-money products on the economic growth of Nigeria. The use of E-money products started scantly in 2005. The awareness became more robust in 2006 when the Central Bank of Nigeria (CBN) captured essential data on their performance in the CBN annual reports. The data we collected from 2006-2019 is summarized in the graph below.
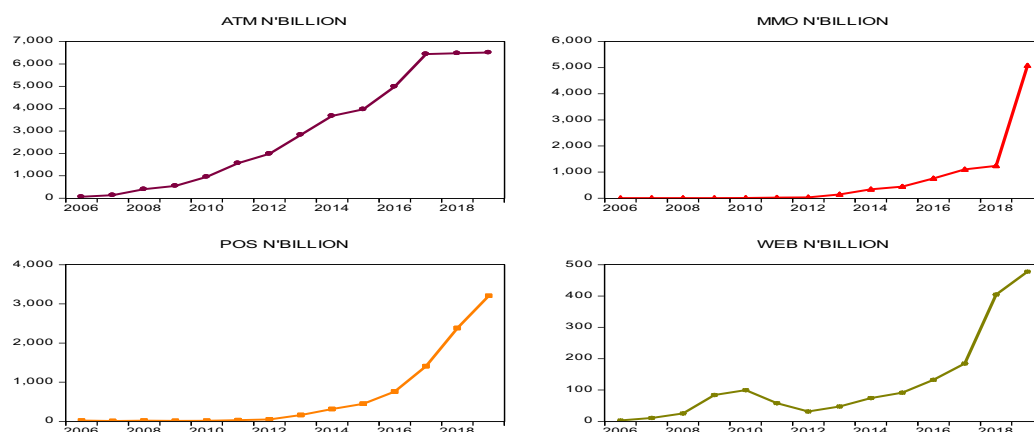

Figure 1 Trend of E-money products in Nigeria
Source: Central Bank of Nigeria Annual Reports 2006-2019

In 2006 as shown in Figure 1, the ATM transactions amounted to ₦63.2 Billion, POS transactions produced a sum of ₦20.2 Billion, and WEB activities yielded ₦3.01 while MMM provided a sum of ₦97 Million. From the trend in Figure 1, the e-money products became so productive that in 2019, the transaction in ATM, MMM, POS and WEB rose to ₦6,513 Billion, ₦5,081 Billion, ₦3,204.7 Billion and ₦478.10 Billion, respectively. However, the ATM appears to be the most patronized among the e-payment channels (CBN, 2013). Thus, the progress witnessed so far has confirmed that e-payment is an integral aspect of a cashless society (Kano, Eke, Nwadiubu & Ikechukwu, 2020). In this study, we chose these

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four types of e-money products because they are commonly used, and all other e-payment innovations are traceable to them. The data capturing by the CBN are also seen within these four broad categories.

The introduction of E-money products is the major FinTech innovation in the global financial sector and markets. It has been an arduous task for scholars to develop various concepts around the new trend of financial services resulting from technological inventions. Mehkhov, Yukhnenko and Bieliakova (2019) refer to Fintech Innovation in developing banking products as banking engineering. According to Mehkhov *et al.* (2020), the creation of the innovative banking product, its software, and technical design to the point of its introduction into the market involves a considerable cost and investment. Demir *et al*. (2020) put forward that FinTech innovation offers financial inclusion and removes inequality between the banked and unbanked, ultimately resulting in an equitable economic expansion. Fintech innovation is the critical enabler of the cashless society, where financial services are guaranteed without a formal visit to the banking locations (Adeyemo *et al.* 2020). Digitalization of financial services has now become universally conventional for banks. The major workforce driving these new technologies and IT-related services is the new generation, using smartphones as the enabling devices (Lee, Kwon, Quoc, Danon, Mehlor, Elm, Bauret & Choi, 2021).

The relationship between financial sector development and economic growth has been a topical issue. Scholars have argued the position of the banking sector technological innovations in determining ease of access to financial services for all role players in an economy (Kim, Yu & Hassan, 2018). It is a consensus that banking services accessibility by all and sundry in the society is seen as financial inclusion. Thus, the introduction of financial technology in the banking sector mitigates scarcity due to its positive correlation with economic growth (Erlando, Riyanto & Masakazu, 2020). Global Financial Index analyzed by Demirguc-Kunt and Klapper (2012) revealed that the percentage of adults having a bank account was approximately 50% globally. Unequal financial accessibility affects economic growth negatively (Erlando *et al.,* 2020). Financial inclusion is a conscious effort to bring banking services to everyone using numerous possible strategies. In the same vein, there are currently several innovations in the banking sector meaningfully driving financial services. Digital cash or cryptocurrency is among them. According to Alonso, Jorge-Vazquez and Forradellas (2021), digital cash is the Central Bank's digital currency which is an electronic form of money issued and backed by a central bank.

Fintech encourages electronic money exchange since there are no banknotes and coins (Bartosova, Pshenichnikov, Ievtushenko & Petrova, 2019). Digital cash is used by households and businesses to make payments and as a store of value

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(Alonso *et al.,* 2020). Although, cryptocurrencies are different from crypto assets since the latter is not supported by a central bank due to its volatility in qualifying as a reliable store of value and medium of exchange (Alonso, et al., 2021). As for Tengeh and Talom (2020), Fintech innovation of e-payments has eased the financial service stress of SMEs by enabling payment and receipt of money for transactions without a visit to bank premises. In this study, we focus on exploring the economic contribution of e-money channels. We believe that these various channels emanating from FinTech innovation have alleviated the financial burden in currency circulation for business transactions. Thus, we see the FinTech innovation of e-money products as an economic booster and driver of all economic activities. This is because finance has a crucial role to play in both private and public sector business activities.

2. Literature review

Ekwueme, Egbunike and Okoye (2012) assessed the operational efficiency of electronic banking in Nigeria using the correlation technique, simple percentage, and student t-distribution for hypothesis testing. The study found that e-banking had a significant relationship with the operational efficiency of Nigerian banks. Sharma (2016) investigated the relationship between India's financial inclusion and economic growth from 2004 to 2013. The study applied Vector Auto-regression techniques and the granger causality test. From the findings, the various financial inclusion dimensions were positively correlated with the economic growth of India. The granger causality was bi-directional between economic development and geographical outreach. Availability of banking services ease of access and usage of banking services favorably affected the Indian economy. Kim et al. (2018) examined the relationship between financial inclusion and economic growth in 55 organizations of Islamic Cooperation Countries. The study revealed that financial inclusion had a positive effect on economic growth. It also established that both financial inclusion and economic growth had mutual causalities.

Kano *et al.* (2020) examined the influence of e-payment products on currency-in-circulation in Nigeria. The study employed the least square regression analysis and Granger Causality Test. The findings revealed that currency in circulation caused cash withdrawals via ATM. Simultaneously, the real-time gross settlement scheme also caused the flow of currency into the economy. Other findings showed that REMITA and WEBPAY had a significant negative relationship with the amount of money in circulation. Also, ATMs and POS were substantial and positively related to currency in circulation. Adeyemo *et al.* (2020) investigated the impact of Nigeria's cashless and e-payment policy on bank customers. The study employed primary data sourced through a questionnaire instrument and analyzed using ANOVA. The result indicated that cashless banking policy impacted positively and

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significantly on customers' satisfaction and fund management. The study also revealed that cashless policy implementation had not reduced banking fraud in the country. Assensoh-Kodua and Msosa (2020) adopted cross-sectional, descriptive, and quantitative techniques to examine the factors and challenges associated with mobile banking boosting in emerging economies and their inherent challenges. The study sampled the opinion of 150 online respondents in Durban via an online data agent. The findings revealed that the quality of service delivery, trust and social norm had a significant positive impact on mobile banking.

Nguyen and Nguyen (2020) considered the influence of financial inclusion on the economic growth of 37 developed nations and 21 developing states from 2006-2017. The research used the generalized method of moment's technique, and the outcome showed that financial inclusion had a positive impact on economic growth in both developed and developing countries. Chinoda (2020) examined the connectivity among financial inclusion, trade openness and economic development in Africa from 2004-2017. The study employed a panel of 30 African countries while using Granger causality tests and co-integration techniques. The findings revealed a unidirectional causality relationship between growth and financial inclusion, trade openness, and growth. Ali, Hashmi, Nazir, Bilal and Nazir (2020) examined the influence of the financial inclusion index on the economic growth of 45 member nations included in the Islamic Development Bank. The study used data that covered a period from 2000 – 2016. The findings showed that the financial inclusion index positively affected economic growth. Singh and Stakic (2020) employ fully modified ordinary least squares and dynamic regular least-squares techniques to assess the effect of financial inclusion on 8 South Asian Association for Regional Cooperation Countries' economic growth. The study utilized annual data from 2004 to 2017 and Pedroni Panel Co-integration test. The results showed a long-run relationship between financial inclusion and economic development. Besides, the explanatory variables supported economic growth.

Demir *et al.* (2020) used global index waves of survey data and quantile regression to assess the inter-relationship among FinTech, financial inclusion and income inequality in 140 countries. The study uncovered that financial inclusion is a crucial channel through which FinTech reduced income inequality. The findings also showed that the significant reduction in inequality through financial inclusion was more noticeable in the higher-income countries. Tengeh and Talom (2020) employed descriptive and inferential statistics to examine the factors supporting the adoption and usage of mobile money services (MMS) to sustain SMEs in developing countries. The study statistically found accessibility, safety and convenience as the major factors propelling MMS in Douala and Cameroon. The study concluded that mobile money helps to promote the financial inclusion agenda for SMEs in emerging economies. Van, Vo, Nguyen and Vo (2021) assessed

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financial inclusion and economic growth in emerging markets. The research used a multidimensional index and panel econometric method. The findings corroborated the positive nexus between financial inclusion and the economic development of low-income nations.

3. Research methodology

This research is expo facto research. Expo facto research is based on existing data that are derived from events that have already taken place. The dependent variable we used in this research as a proxy for the economy is the Gross Domestic Product (GDP). The data on GDP is collected from the CBN Statistical Bulletin. The independent variables are the major e-money products introduced in Nigeria, which include: Automated Teller Machines (ATM), Point-of-Sale (POS) terminals, Web-based or internet (WEB) and Mobile Money (MMM). The data on these electronic payment channels are obtained from the various CBN Annual Reports. The period covered in this study is from 2006-2019. This is due to the availability of data resulting from when the e-money usage came into effect. The data were tested for stability and normality and were found free from serial correlation. The analytical tool employed to analyze the data is the multiple regression techniques with e-views version 9 software.

In this study, we specify the following regression model:

$$LOGGDP = \beta_0 + \beta_1 LOGATM + \beta_2 LOGWEB + \beta_3 LOGPOS + \beta_4 LOGMMM + \varepsilon \qquad (1)$$

Where:
LOGGDP = Gross Domestic Product (GDP)
LOGATM = Automated Teller Machines (ATM)
LOGWEB = Web-based or internet (WEB)
LOGPOS = Point-of-Sale (POS) terminals
LOGMMM = Mobile Money (MMM)

β_0 = Constant; β_1-β_4 = Regression coefficients; ε= Error term.
On the a priori, we expect; $\beta_1 > 0$, $\beta_2 > 0$, $\beta_3 > 0$, $\beta_4 > 0$.

4. Empirical results

The Ramsey Reset test is performed to determine the firmness of the regression model. The outcome in Table 1 divulges that a p-value of 0.19 is more significant than the standard 5%. This result is an indication that the model is unchanging. This is also established with the Recursive estimates of the CUSUM test highlighted in Figure 2, where the blue line falls between the two red lines showing the 5% degree of importance frontiers.

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Table 1 Ramsey RESET Test

Specification: LOG_GDP LOG_ATM LOG_WEB LOG_POS
    LOG_MMM C
Omitted Variables: Squares of fitted values

	Value	Df	Probability
t-statistic	1.400148	8	0.1990
F-statistic	1.960414	(1, 8)	0.1990

Source: Research Output, 2021.

Table 2 Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.711495	Prob. F(2,7)	0.5233
Obs*R-squared	2.365177	Prob. Chi-Square(2)	0.3065

Source: Research Output, 2021

Table 2 depicts the result of the test for serial correlation which indicates that the F-statistic p-value of 0.52 is greater than the 5% level of significance. Therefore, there is an absence of serial correlation in the regression model applied in this study. The Durbin-Watson in table 4 confirms this result.

Table 3 Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.683026	Prob. F(4,9)	0.6212
Obs*R-squared	3.260237	Prob. Chi-Square(4)	0.5153

Source: Research Output, 2021

The investigative test for Heteroskedasticity is to certify that the regression model coefficients projected using ordinary least squares are at liberty with unfairness. The actuality of Heteroskedasticity is ostensible when the variance of errors or the model is not homogenous for all observations. When that occurs, the p-value of the F-statistic will be lower than the usual 5% degree of importance. In this study, the p-value is 0.62, which is by far higher than the 0.05 significance level. Thus, there is an absence of Heteroskedasticity in the regression model of this study.

Figure 1 is the histogram normality, which clarifies that the data set is normally distributed. The result of the Jarque-Bera shows the normality of data distribution when the p-value is more significant than the 5% degree of importance. In this

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study, the Jarque-Bera p-value is 3.74, which is greater than 5%. Thus, the data distribution is normal.

NORMALITY TEST

| Series: Residuals |
| Sample 2006 2019 |
| Observations 14 |

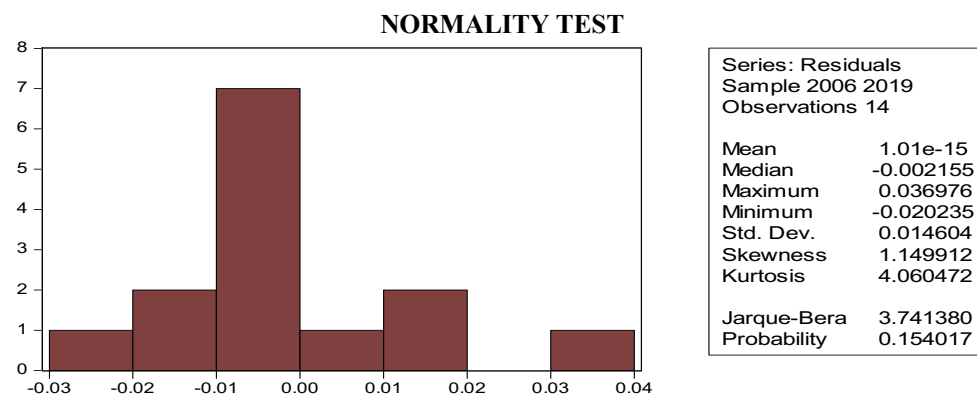|	
Mean	1.01e-15
Median	-0.002155
Maximum	0.036976
Minimum	-0.020235
Std. Dev.	0.014604
Skewness	1.149912
Kurtosis	4.060472
Jarque-Bera	3.741380
Probability	0.154017

Figure 1 Histogram Normality

Table 4 Regression result

Dependent Variable: LOG_GDP

Method: Least Squares

Sample: 2006 2019

Included observations: 14

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG_ATM	0.126478	0.028716	4.404482	0.0017
LOG_WEB	0.049590	0.018150	2.732152	0.0231
LOG_POS	0.019362	0.021306	0.908776	0.3872
LOG_MMM	0.074797	0.020741	3.606178	0.0057
C	4.182620	0.068835	60.76256	0.0000

|				
R-squared	0.995680	Mean dependent var		4.840106
Adjusted R-squared	0.993760	S.D. dependent var		0.222199
S.E. of regression	0.017552	Akaike info criterion		-4.974881
Sum squared resid	0.002773	Schwarz criterion		-4.746646
Log likelihood	39.82416	Hannan-Quinn criter.		-4.996008
F-statistic	518.6199	Durbin-Watson stat		1.493759
Prob(F-statistic)	0.000000			

Source: Research Output, 2021
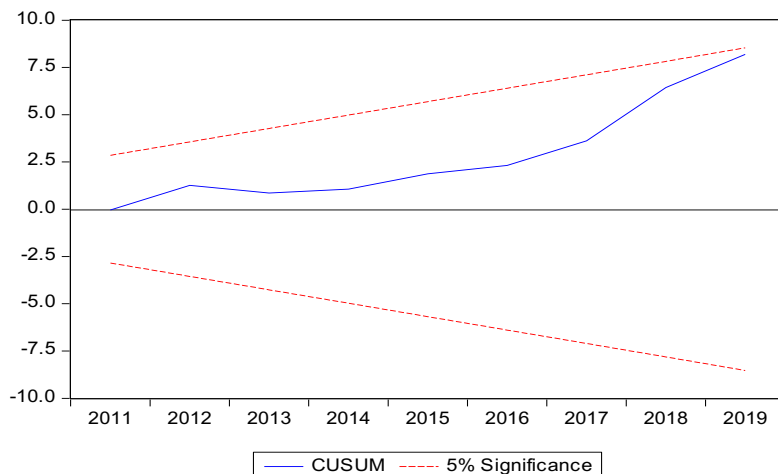
Figure 2 Recursive estimates of the CUSUM test.
CUSUM = Cumulative Sum Control Chart

5. Discussions

Figure 2 is the result of the Recursive estimates of the Cumulative Sum Control Chart (CUSUM) test which indicates the firmness of the regression model applied in this study. The appearance of the blue line in the middle of the two dotted red lines which shows the borders of the 5% level of significance confirms that the regression model is unwavering. Table 4 shows the regression output which includes the collective performance of the independent variables and their individual effects on the GDP. On the joint role, the regression outcome confirms that the correlation between the explanatory variables and the dependent variable is strong as well as the coefficient of determination. This implies that e-payment channels have a major role to play in the improvement of the economy. The result of the Durbin-Watson authenticates the absence of autocorrelation while the Standard Error of regression (0.02 < 1) provides evidence that the study predictions reflecting in the regression line are error-free. At the same time, the F-statistic show that the predictor variable jointly affects the response variable positively. The result is statistically significant at a 95% degree of confidence. The variables (ATM, WEB & MMM) individually influence GDP positively and significantly with the exception of POS which is insignificantly positive.

6. Conclusions

The inference drawn from this study is that E-payment channels have improved economic activities in Nigeria as an emerging economy. The benefits are numerous

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and outweigh seemingly the challenges. The outcome of the study shows that all e-money products have a significant positive impact on GDP except POS. Although POS has an insignificant effect on the economy, its usefulness is tremendous. The policy implication is that the Nigerian populace does not strictly follow the cashless policy. POS is scarcely available in the general market places where women that sell food items believe in 'cash and carry'. Most times, the bigger shops that have them encounter network challenges that hinder their smooth usage.

Therefore, this study proposes efficient implementation and monitoring of the cashless policy. The research suggests that the government should educate the public on the usefulness and economic benefits of E-money products. Proper education and the creation of awareness will reduce the degree of cash transactions and boost FinTech's innovative e-payment devices' usage. The Central Bank of Nigeria, in collaboration with the other government agencies, should come up with policies that will reduce electronic money theft, which is one of the key factors hindering the full application of e-payment channels.

Author's Contributions
The author read and approved the final manuscript.

Disclosure statement
The author has not any competing financial, professional, or personal interests from other parties.

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