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Impact of Electronic Banking on the Profitability of Commercial Banks in Nigeria (2011-2018)

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Abstract:
The study examined the impact of electronic banking on the profitability of commercial banks in Nigeria from 2011 – 2018. The methodology used in this study was multiple regression technique because the explanatory variables which predicted the outcome response variable (dependent variable) were six in number. Secondary data were obtained from Central Bank of Nigeria statistical bulletin and online materials that covered the period of the study. From the result, 1% increase in ATM transaction led to 0.84% increase in bank profit. This showed that there was a positive relationship between volumes of ATM increase and bank profit. R-square (R^2) is the fraction of the variance of the dependent variable explained by the independent variables. In this result, R^2 was about 95% and adjusted (R^2) was 98% meaning that about 90% of the bank profit was explained by the independent variables put together. Sum of squared residual is a measure of error using the estimated regression equation values of ATM, POS, WP, MP, NEF and NIP. From the result, it showed that electronic bank transactions have significantly impacted on Nigerian banks profitability from 2011 – 2018. The F-ratio computed from regression (12.55) was statistically significant. Therefore, we accepted H_1 (alternative hypothesis) and rejected H_o (null hypothesis). This means that electronic bank transactions have significantly contributed to commercial banks profitability in Nigeria. One of the major findings of the study showed that positive and significant relationship existed between electronic banking and profitability of commercial banks in Nigeria within the period of the study. The article, however, concluded that there were mixed data by both Sumra et al. (2011) and Gutu (2013) in Malik et al. (2016) on the same topic that were not in favour of Microfinance Banks (MFBs) and Pakistani commercial banks. The paper recommended, among others, that financial regulatory authorities should work as a team with the banks in Nigeria with a view to providing an enabling environment and appropriate regulatory framework that will give optimal services to customers, especially in the area of inconclusive transactions.

Keywords: Electronic banking, automated teller machine, Point of sale terminals, web payment, mobile payment, electronic fund transfer, NIBSS Instant Payment (NIP)

1. Introduction

In electronic banking, funds are transferred through an exchange of electronic signals and not through an exchange of cash, cheques or other types of paper documents. Transfer of funds occurs between financial institutions such as banks and credit unions. They also occur between financial institutions and commercial institutions such as stores. When anybody withdraws cash from an Automated Teller Machine (ATM) or pays for groceries using a debit card (which draws the amount owed to the store from a savings or checking account), the funds are transferred via electronic banking. Burr (1996) in Njogu, 2014 described electronic banking as an electronic connection between the bank and the customer in order to prepare, manage and control financial transactions.

1.1. Statement of the Problem

Shareholders of various securities in banks look forward to the performance of their invested assets that were under their management. Poor performance by management means a serious draw back on the expected profitability of the banks. For instance, low level of profit declaration by the chief executives of banks at Annual General Meetings (AGM) could trigger some crisis. Consequently, inappropriate marketing strategy cum information communication Technology application by management of commercial banks could have a negative impact on the profitability of the banking industry.

1.2. Objectives of the Study

The major objective of this study is the determination of electronic banking as a competitive marketing strategy to improve the profitability level of commercial banks between 2011-2018 in Nigeria.
The specific objectives were:
- To find out if Automated Teller Machine (ATM) has significantly contributed to the generation of excess revenues by commercial banks between 2011-2018 in Nigeria.
- To ascertain if point of sales terminals has any positive effect on the return of banking activities between 2011 - 2018 in Nigeria.

- To examine, if any, the impact of web payment method by commercial banks on their financial gains between 2011 – 2018 in Nigeria,
- To determine if mobile payment method by commercial banks had any effect on their cost efficiency between 2011-2018 in Nigeria.
- To find out if Nigerian inter-bank settlement system (Electronic Fund Transfer - NEF) had any significant relationship with the cost effectiveness of commercial banking operations in Nigeria between 2011-2018.
- To ascertain if NIBSS instant payment (NIP) has contributed to the profitability of commercial banks between 2011-2018 in Nigeria.

1.3. Research Questions

Six research questions were asked in line with the six objectives designed above. They were:
- Has Automated Teller Machine contributed significantly to the generation of excess revenues by commercial banks between 2011 - 2018 in Nigeria?
- Have point of sales terminals any positive effect on the return of banking activities in Nigeria between 2011-2018?
- Has Web Payment method by commercial banks any impact on the financial gains of their operations between 2011-2018 in Nigeria?
- Did mobile payment method by commercial banks have any effect on their cost efficiency between 2011-2018 in Nigeria?
- Has the Nigeria inter-bank settlement system (electronic fund transfer) any significant relationship with the cost effectiveness of Commercial Banking operations in Nigeria between 2011-2018?
- Has NIBSS Instant Payment (NIP) contributed to the profitability of commercial banks in Nigeria between 2011-2018?

1.4. Research Hypotheses

This study designed six research hypotheses in the null that were tested. They were:
- Ho_1: Automated Teller Machine (ATM) has not contributed significantly to the generation of excess revenues by commercial banks in Nigeria between 2011-2018.
- Ho_2: Point of sale terminals have no positive effect on the return of commercial banks in Nigeria between 2011-2018.
- Ho_3: Web payment method by commercial banks had no impact on the financial gains of their operations in Nigeria between 2011-2018.
- Ho_4: Mobile payment method had no effect on the cost efficiency of commercial banks in Nigeria between 2011-2018.
- Ho_5: Nigeria Inter-bank settlement system (Electronic Fund Transfer) had no significant relationship with the cost effectiveness of commercial banking operations in Nigeria between 2011-2018.
- Ho_6: NIBSS Instant Payment (NIP) did not contribute to the profitability of commercial banks in Nigeria between 2011 – 2018.

2. Literature Review

This section surveyed and reviewed the literature related to the topic: Impact of Electronic Banking on the profitability of commercial banks in Nigeria between 2011-2018.

2.1. Conceptual Review

2.1.1. Electronic Banking

The concept of electronic banking refers to the automated delivery of new and traditional banking products and services directly to customers through electronic and interactive communication channels. Shekhar K.C and Shekhar, L. (2008) defined electronic banking as those services provided through extensive use of information technology without direct recourse to the bank by the customers.

The growth of Information and Communication Technology (ICT) has revolutionized traditional systems of payment. Individuals can now carry out many transactions for goods and services using new methods of cash and cheques. This phenomenon of cashless payment is known as electronic payment. CIBN study pack (2018) described e-payments as payments which are initiated, processed and received electronically, making use of information and communications technologies including integrated circuit (IC) cards, cryptography and telecommunications. An electronic payment system is, therefore, a process that describes how value (usually money) is exchanged for goods and services. It is an internet based, on-line, real time transaction which operates on double entry accounting principle (CBN study pack, 2018).

Electronic banking services can be grouped into six major classes, namely: Automated Teller Machine, Point of Sales Terminals, Web payment, Mobile payment, NIBSS Electronic fund transfer and NIBSS Instant Payment (NIP).

2.1.2. Automated Teller Machine (ATM)

An Automated Teller Machine (ATM) is an electronic telecommunications device that enables customers of financial institutions to perform financial transactions such as cash withdrawals, deposits, fund transfers or account

information inquiries at any time and without the need for direct interaction with bank staff. (Available on https://googleweblight.com).

In British English, the terms cash points; cash machine and hole in the wall are used. Other terms include any time money, cash line, nibank, tyme machine, cash dispenser and bancomat. (Available on https://googleweblight.com).

ATM can also be used to withdraw cash in foreign country. If the currency being withdrawn from the ATM is different from that in the bank account denominated, the money will be converted at the financial institution's exchange rate. Customers are identified by inserting a plastic ATM card or some other acceptable payment card in the ATM with authentication being by the customer entering a personal identification number (PIN) which must match the PIN stored in the chip on the card (if card is so equipped) or in the issuing financial institution database.

2.1.3. Point of Sales Terminals

This is an electronic device which is used to process card payments at retail locations. This system is a combination of software and hardware that allows retail locations to accept card payments without updating their cash registers to read cards directly.

2.1.4. Web Payment

This is a web standard developed by the W3C to simplify online payments and enable a broader set of players to participate easily in the payment's ecosystem on the web. The standards are flexible; they work with various types of payment systems and are intended to work on any browser or any device, payment method or payment compatibility with emerging payment technologies. Some benefits of web payments are: (1) For consumers, they simplify checkout flow by making it a few taps instead of typing small characters many times on a virtual keyboard, (2) For merchants, they make it easier to implement with a variety of payment filtered for the customers.(3) For payment handlers, they allow bringing any type of payments methods to the web with relatively easy interaction and (4) For payment service providers, they bring new payment methods and enhance the ability of businesses to serve more customers with a better developer experience and more secure solutions.

2.1.5. Mobile Payment

Mobile payment is also known as mobile money, mobile money transfer and mobile wallet generally refers to payment services operated under financial regulations and performed from or via a mobile device. (Available on https://en.m.wikipedia.org).

Instead of paying with cash, cheque or credit cards, a consumer can use a mobile to pay for a wide range of services, digital or hard goods.

In developing countries, mobile payment solutions have been deployed as means of extending financial services to the community known as 'unbanked' which is estimated to be as much as 50% of the world's adult population. According to financial access 2009 report, 'half the world is unbanked'. These payment networks are often used for micropayments.

According to European payments Council (EPC), Mobile payments are becoming a key instrument for market participants to achieve new growth opportunities. The EPC states that 'new technology solutions provide a direct improvement to the operations efficiency, ultimately resulting in cost savings and an increase in business volume' (Available on https://en.m.wikipedia.org).

2.1.6. NIBSS Electronic Fund Transfer

According to Nigeria-interbank settlement system, widely accepted electronic payment systems would reduce the volume of cash outside the formal banking sector; increase the velocity of money, and thereby engender sustainable growth. (Available on (https://www.nibss-plc.com.ng). The developed economies are characterized by popular electronic payment systems.

2.1.7. NIBSS Instant Payment (NIP)

Nigeria inter-bank settlement system (NIBSS) instant payment is so far the most innovative and revolutionary e-payment solution designed by NIBSS to service the banking industry. NIP is the first and only point to point funds transfer service that guarantees instant value to the beneficiary. Nigeria is the only country in Africa and essentially the world to have developed such a solution (CIBN study pack, 2018).

The service is majorly offered via banks, internet banking, mobile and bank branch platforms for corporate and individuals as well as through the bank's branch networks. NIP is an online real-time bank account that is based on inter-bank credit transfer.

One effective approach to reducing high dependence on cash is to make available to consumers and merchants a variety of payment systems such that the two players would be able to select a preferred choice depending on the nature of the transaction and circumstances of the purchase. The NIBSS electronic funds transfer (NEFT) service is one of such payment systems. The NEPT was introduced into the financial system in Nigeria in March, 2004. This payment method is available in three modes namely: (a) NEPT credit transfer (single items), (b) Bulk clearing automated direct credits, (c) Bulk clearing automated direct debits. (CIBN Study Pack, 2018).

Benefits of using or accepting NEPT as a payment method are: (i)_Bank transfers are more secure for both the customers and the banks. There are no cheques that will be misplaced; lost or stolen. In addition, since the payment goes directly from the customer to the bank, there is no possibility of fraudulent alternation of the payment amount, (ii)The senders account is debited immediately in case of credit transfers. This makes account reconciliation much simpler for the

customer. The customer does not have to worry about unpresented cheques being debited unexpectedly months later on presentation by the payee, (iii) As NEPT credit transfers are credited directly, the payment process is much quicker than with cheques, which must first be presented to the paying bank in clearing. This can result in cash flow and (iv) Any payment credited to the beneficiary's account is a cleared item. Payment cannot be rejected because of funds not being enough, drawers' attention, suspicious signature, or any other reasons relating to the cheques. (Available on https:goodleweblight.com).

Some Specific Benefits for Banks are: (a) Decongests banking halls, (b) Enhances customer service delivery, (c) Reduces cash handling costs, (d) Reduces cost of payment processing (e) Additional revenue for banks, (f) improvement of services for banks, (g) Helps the finance houses to proffer answers to corporate stop service and (h) Enhances banking operations for example, standing orders, et cetera (etc.). (Available on https: googleweblight.com).

Some Advantages for the Banking Public are: (a)Convenience, (b)Reduces reconciliation efforts, (c) Can provide substantial savings in accounting time and money, (d) No cheque handling, printing and storage costs, (e)Reduces exposure to cheque   fraud, (f)No loss or stolen cheques, (g)Better cash flow management and (h)Faster clearing period. (Available on https: googleweblight.com).

2.2. Theoretical Review

2.2.1. Electronic Revolution in Banking

Electronic revolutions in money dealing centers on changes in distribution channels of financial institutions. The reason for the emergence of modern electronic distribution channel is the aftermath of the concept of money in the days of trade by barter. The ability to pay for goods and services was reflected in the physical existence of goods which could be used for exchange (santh et al, 2000, available on https://www.semanticscholar.org).

2.2.2. Role of E-Channels in Banking Services

Electronic banking is the newest delivery system of banking services. The definition differs among scholars because the concept refers to many channels through which a bank carries out most retail finance services through computer, television or mobile phone (Lustic, 2004). A multi-channel device can be an effective means to keep the customers. On the other hand, it is clearly an expensive option in the long-run as it is necessary in all distribution channels and to keep up with relevant technological developments. It may not be acceptable to every money deposit bank, especially smaller institutions as the cost may be prohibitively high. In some years ahead, these competitors may come from non-finance institution, for instance, from the technology sector (Quiros, 2011). The combination of e-channels and services can lead to four strategic options or positions if applied in the right way. They are referred to as four policy choices or experiments, channel innovators, service innovators and optimizers (Boateng, 2016).
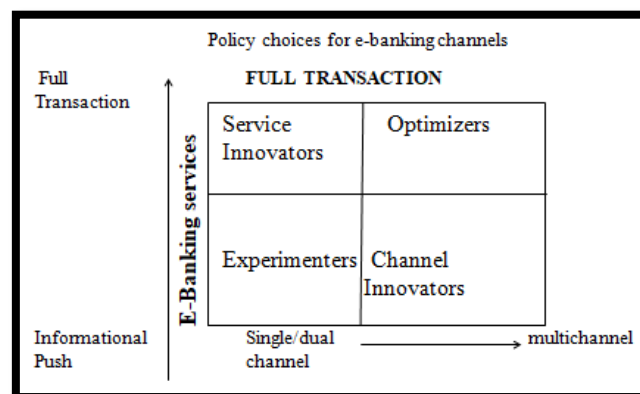

Figure 1: Policy Choices for E-banking Channels
Source: Adopted from Boateng (2016)

From the quadrant table of policy choices for money dealing channels above, banks in the experimental quadrant refer to those institutions that release information push to information download services through single or dual delivery channels. Experimenters may achieve the benefit of extending the marketing reach of their services and attracting potential customers as the public becomes more informed. Experimenters can take the decision to expand money services to grow their e-banking either by adding more channels to render the same service or by adding more services with existing channels. By making available more channels, channel innovators have ability to come up with unique value proposition to their customers.

The increase in sophistication of services requires moving from basic information – oriented services to full-transactional services. Service-innovators tend to specialize on one or two channels but increase the services that can be delivered over these channels. The choice of using a limited number of channels can be justified due to operational constraints (like limited resources and capabilities, external constraints such as market readiness) and value proposition to customers (core purpose). Service innovators need to expand the services through multiple channels existing and new such banks move to the optimal level becoming optimizers.

This position indicates banks whose processes are integrated and services are seamlessly provided through multiple channels. Thus, the banks become more visible and increase their market reach by attracting more new customers, improve their reputation and create a potential competitive advantage.

Boating (2016) argued that the challenge for banks is moving through these strategic positions and to define a strategy for enticing customers to migrate to e-banking services and for managing potential conflict as customers reach a critical mass (Boateng, 2016). (Available on https://www.semanticscholar.org).

2.2.3. The Emerging E-Banking Technologies

The evolution of e-banking can be traced to the early 1970s. Banks saw the business of finance transactions as a means to replace some of their traditional branch functions for two reasons. One, branches were costly to establish and run because of large overheads associated with them. Two, money deposit services like ATM and electronic funds transfer were a source of differentiation for banks that utilized them.

Being in a terribly competitive industry, the ability of banks to differentiate themselves on the basis of price is limited. Technology has evolved new means of rendering finance obligations to the customer like ATMs and internet banking. Therefore, the finance companies have been in the fore front of technology adoption since the past decades. It is important for those institutions to align their strategies in response to changing customers' needs and development in technology (Sinsh et al, 2017). Technology will allow banks to be closer to customers to deliver a wider range of services at lower costs, and to streamline interest systems so that all data are together in one place where it can be used to spot trends that can lead rapidly to new products (Sobti, 2014). Electronic delivery of banking services will allow data to be gathered and analyzed. Interactivity will give customers an opportunity to register their preference, actually steering to development of new products.

2.2.4. Empirical Review of Impact of Electronic Banking on Profitability of Commercial Banks

Njogu (2014) wrote on the effect of electronic bank on profitability of commercial banks in Kenya and reported that research papers relating to the study of profitability were measured in the form of ratios which were normally presented by commercial banks in their annual reports. Devinga, R (2010) in Njogu (2014) agreed that return on assets (ROA) and return on equity (ROE) were much more useful consideration for the measurement of electronic banking on profitability. Allen & Hamilton (2002) in Njogu (2014) estimated cost of providing the routine business of a full-service branch in the United States of America (USA) as $1.07 per transaction as compared to 54 cents for telephone banking, 27 cents for ATM banking and 1.5 cent for internet banking. Looking at it differently, the advantages for the customers are significant time saving and reduced costs in accessing and using the various banking products and services, increased comfort and convenience.

The banking sectors recorded enhanced growth in Kenya in year 2011 with a 20.4 percent increase in the total net assets from KSH.1, 678.1 billion in December 2010 to Ksh. 2,020.8 billion in December, 2011. Loans and advances, government securities and placements which accounted for 57.0 percent, 15.1 percent and 5.8 percent of total assets respectively continued to be the major components of their balance sheet. Net loans and advances recorded a growth of 31.4 percent from Ksh.876.4 billion to Ksh.1, 152.0 billion in December, 2011 (Njogu, 2014). Significant portion of the sectors loans were given to personal trade, manufacturing and the real estate sectors which accounted for 72 percent of the gross loans in 2011. However, investment in government securities declined from Ksh. 342.2 billion in 2010 to Ksh. 304.8 billion in 2011. Njogu (2014) attributed this decline to low interest rates on government securities during the first half of 2011 compared to lending interest rates.

Njogu (2014) reported that the source of funding in the banking sector, mainly customer deposits grew by 20 percent from Ksh. 1,236.5 billion in 2010 to Ksh.1,488.2 billion in 2011. The growth was supported by branch expansion and receipts from exports. The increased deposits enhanced the banks' capacity to extend credit to various economic sectors (Njogu, 2014). In terms of profitability, the sector registered a 30.5% growth in pre-tax from Kshs 14.9 billion in April 2009 to Kshs 19.5 billion at the end of April, 2010. Consequently, he added that annualized return on assets improved from 2.8% in April, 2009 to 3.0% in April, 2010 while return on equity increased from 25.3% to 27.3%. Total industry income increased by 18.5% during the year from 53.0billion in April 2009 to Kshs 62.8 billion in April, 2010.

Sumraet at (2011) in (Malik et al, 2016) studied the effect of e-banking on assets quality on 27 European Union markets. Their empirical analysis showed that based on the country level retail payment service data from across 27 European Union (EU) markets, banks performed better in countries with more developed retail payment services, adding that this relationship is stronger in countries with more retail payment transaction equipment like automatic teller machine (ATMs) and point-of-sale terminals et cetera.

However, though it has been empirically proven that the adoption of electronic-based payment system in the delivery of financial services has a positive effect on the financial performance of conventional banks and financial institutions (see Asiimwe, 2015, Barasa et al, 2017, Kombe and Wafula, 2015, Yang et al, 2017, Mateka et al, 2016, Siddik et al, 2018, Mawutor, 2014, Yasin, 2018, Njoroge&Mugambi, 2018, David &Kaulihowa, 2018, Abaenewe et al., 2018, Ugwueze&Nweaku, 2016, Chimaobi, 2018) due to its obvious cheapness in comparison to physical branches delivery which most often results in the reduction of operational cost in form of reduced and better utilized work force, equipment, space and operational savings, more is yet to be done (Yange et al., 2018)

Though scholarly work has revealed the potential impact of the internet on different industries including the banking industry (Asiimwe, 2015), investigative research outcome on the electronic-based payment systems on financial performance in the banking sector has been largely devoted to the conventional commercial banks (see Bara et al., 2017, Kombe&Wafula, 2015, Njoroge&Mugambi, 2018, David &Kaulihowa, 2018, Mawutor, 2014, Yasin, 2018, Yang et al, 2018,

Siddik et al., 2016; Bantegeye, 2017, Abaenewe et al., 2013, while neglecting its (electronic payment system) impact on the financial performance of microfinance banks (MFBs). Sumra et al, (2011) (2013) and Gutu (2014) in Malik et al (2016) showed findings that the impact on the profitability of some electronic banking in Pakistani was negative.

Taiwo and Agwu (2017) studied the role of e-banking on the efficiency of banks in Nigeria using Eco Bank, UBA, GTB and First bank as case studies. Pearson correlation was used to analyse the result obtained using the statistical package for social sciences (SPSS). Their findings showed that banks operational efficiency improved since the adoption of electronic banking compared to the era of traditional banking (available on https://www.researchgate.net).

3. Methodology of the Study

The methodology used in this study was multiple regression technique because the explanatory variables which predicted the outcome response variable (dependent variable) were six in number. Secondary data were obtained from Central Bank of Nigeria statistical bulletin and online materials that covered the period of the study.

3.1. Model Specification, Description of Variables and Analysis of Results

Data for these variables were collected from the Central Bank of Nigeria statistical Bulletin vol. 7 numbers 4, December, 2018. The data were for 8 years as contained in the appendix. The models specified as follows:

$$BP = \alpha + \beta x_1 + \beta x_2 + \beta x_3 + \beta x_4 + \beta x_5 + \beta x_6 + \mu_t$$

Where:
BP   = Banks profitability as dependent variable.
ATM   = Automated Teller Machine as an independent variable.
POS   = Point of Sale(s) Terminals as an independent variable
WP   = Web Payment as an independent variable.
MP   = Mobile Payment as an independent variable
NEF   = Nigerian inter-bank settlement Electronic Fund Transfer as an independent variable.
NIP   = Nigerian Inter-bank settlement instant payment as an independent variable

4. Data

The data for this study were purely secondary data. The data for the variables were obtained from the Apex Banks statistical bulletin for the period 2011-2018.

4.1. Hypotheses

The following hypotheses stated in the null form were tested in this study.
H_0:   There are no significant relationships between Commercial Banks profitability and electronic banking in Nigeria. The alternative hypothesis (H_1) which states the opposite may or may not be accepted depending on the E-view version 9.0 output, 2020 results.

4.2. Test of Hypotheses

4.2.1. Hypothesis 1

- $H0_1$: ATM has not contributed significantly to the generation of excess revenues by commercial banks operations in Nigeria between 2011-2018.

The results of the stationery test using Augmented Dickey-Fuller (ADF) Unit Root Test for the time series data in table 2 showed that the null hypothesis (H_0) of a unit root can be rejected at 1(0), 1 (1) and 2 (1). The differences were because all the series (BP, ATM, POS, WP, MP, NEF and NIP) were stationary and therefore their regression were not spurious. The series were all stationary at a critical value of 5% level of significance.

From the result, 1% increase in ATM transaction led to about 0.84% increase in bank profitability. This showed that there was a positive relationship between volume of ATM transaction and bank profitability. The standard error was 1.1456% which was small or insignificant and thus showed that the volume of ATM transaction was statistically related to bank net profit.

4.3. Hypothesis 2

- $H0_2$: Point of sale Terminals has no positive effect on the return of commercial Banks in Nigeria between 2011-2018.

From table 5, a 1% increase in POS transaction led to about 0.10% increase in bank profit. This showed that there was a positive relationship between POS transaction and bank return. This result was not significant at 5% as the P-value was 0.1214. The standard error of 0.405% was insignificant and thus showed that POS transaction was statistically reliable to predict the bank return (profitability).

4.4. Hypothesis 3

- $H0_3$: Web payment method by commercial banks had no impact on the financial gains of their operations in Nigeria between 2011-2018.

Table 6 showed that 1 % increase in the web pay transaction led to about 0.72% increase in the bank profit. This showed that there was a positive relationship between web payment and banks financial gains. The standard error of 0.250% was insignificant and showed the value added tax was statistically reliable to predict bank profit.

4.5. Hypothesis 4

- $H0_4$: Mobile payment (MP) method had no effect on the cost efficiency of commercial banks in Nigeria between 2011-2018.

The result for the mobile payment transactions showed that an increase of 1% in mobile payment transaction led to about 0.981% increase in bank profit. This showed that there was a positive relationship between mobile payment transaction and cost efficiency (profitability). This result was consistent with the apriori expectation of the study and it was insignificant at 5% as the p-value was 0.2181 which was more than 0.05. The standard error of 0.2138% was insignificant, thus showing that mobile transaction was statistically reliable to predict bank profit.

4.6. Hypothesis 5

- $H0_5$: Nigeria Inter-Bank settlement system (Electronic Fund Transfer- NEF) had no significant relationship with the cost-effectiveness of commercial banking operations in Nigeria between 2011-2018.

Appendix 9 showed that the result for NEF transaction indicated that an increase of 1% in NEF led to about 0.856% increase in bank profit. This showed that there was a positive relationship between NEF and Bank profit in commercial banking operations from 2011-2018 in Nigeria.

This result was consistent with the apriori expectation of the study and it was insignificant at 5% as the p-value of 0.4954 was less than 0.05. The standard error of 0.843% was insignificant showing that NEF was statistically reliable to predict Bank profit.

4.7. Hypothesis 6

- $H0_6$: NIBSS Instant Payment (NIP) did not contribute to the profitability of commercial banks in Nigeria between 2011-2018. Appendix 8 showed that the result for NIP transaction was such that if it increased by 1% in NIP, it would lead to about 0.163% increase in bank profit. This showed that there was a positive relationship between NIP and banks profitability. This result was consistent with the apriori expectation of the study and it was insignificant at 5% as the p-value of 0.0416 was less than 0.05. The standard error of 0.4148% was insignificant which showed that NIP was statistically reliable to predict bank profit.

4.8. Data Presentation and Analysis

In this section, data analysis and test of the hypotheses relating to this study were presented. The data were sourced from the Central Bank of Nigeria Statistical Bulletin, 2018. The data were analyzed using software E-view version 9.0 2019 for regression analysis at 5% level of significance.

4.9. Statistical Analysis

The study employed the technique of unit root (ADF Test) and regression analysis to test the relationship between commercial banks profitability and electronic banking in Nigeria. The strength of the relationship is always measured by the coefficient of the parameters (variables) of the regression as well as co-efficient of determination. The computation of the co-efficient of the unit root and regression were done using e-view 9.0 output 2020.
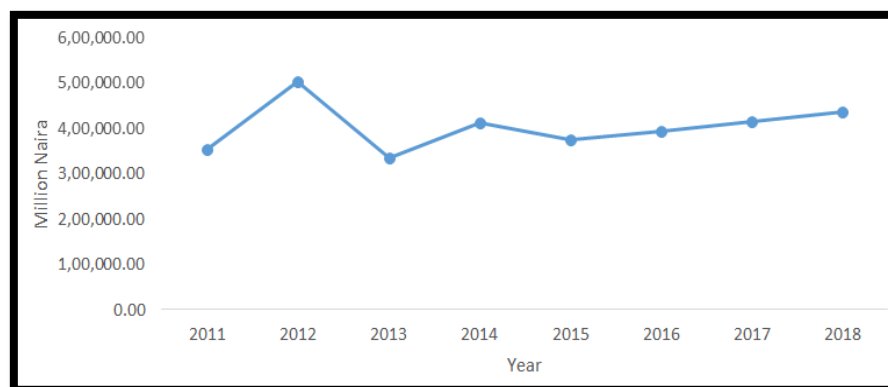
4.10. Data and Graph Presentation

Figure 2: A Line Chart Showing Distribution of Nigerian Banks' Profitability
Trend (Million Naira) from 2011-2018
Impact of Electronic Banking on Bank Profitability (=N= Million) From 2011 To 2018
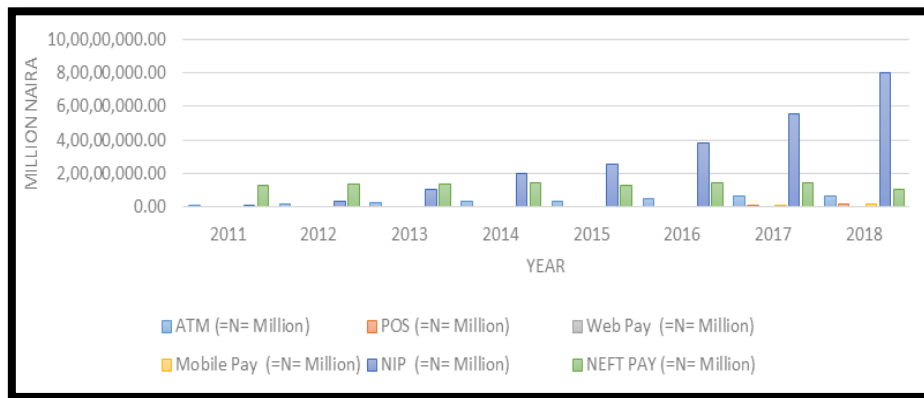
Figure 3: A Bar Chart Showing Distribution of Nigeria's ATM, POS, Web Payment,
Mobile Pay, NIBSS Instant Payment and NIBSS Electronic Transfers (Million Naira) from 2011-2018
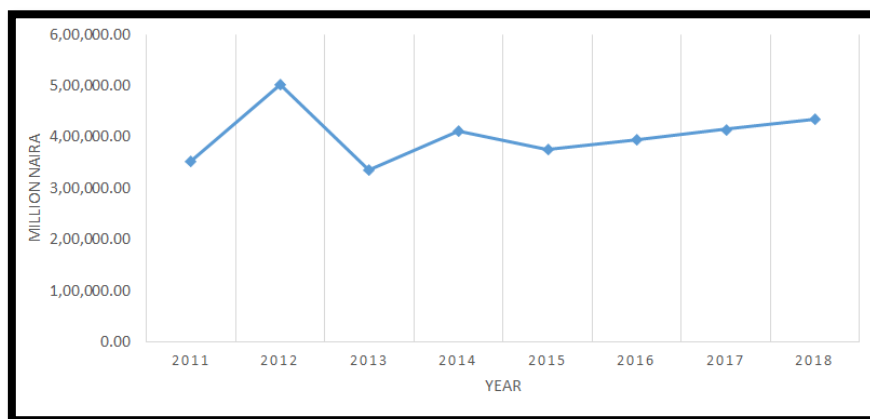

Figure 4: A Line Chart Showing Distribution of Nigeria's Banks Volume of
Electronic Transaction (Million Naira) from 2011-2018

Variable	Description	Unit	Source
NP	Net Profit	Millions of Naira	CBN
ATM	Automated Teller Machine	Millions of Naira	CBN
POS	Point of Sale terminals	Millions of Naira	CBN
WP	Web Pay	Millions of Naira	CBN
MP	Mobile Pay	Millions of Naira	CBN
NIP	NIBSS Instant Payment	Millions of Naira	CBN

Table 1: Summary of the Description of Variables and Their Corresponding Unit and
Sources NT NIBSS Electronic Fund Transfer Millions of Naira CBN
Source: Researcher's Own Computation

Series	ADF Test Statistics	1% Critical Value	5% Critical Value	10% Critical Value	Order of Co-integration
BP	-5.614463	-4.803492	-3.403313	-2.841819	I(0)
ATM	-10.66644	-6.423637	-3.984991	-3.120686	2(1)
POS	-14.11890	-3.694851	-3.694851	-2.982813	I(1)
WP	-4.251929	-5.119808	-3.519595	-2.898418	2(1)
MP	-3.023971	-5.604618	-3.694851	-2.982813	1(1)
NEF	-3.804417	-6.423637	-3.984991	-3.120686	2(1)
NIP	-5.051141	-4.803492	-3.403313	-2.841819	1(0)

Table 2: Augmented Dickey-Fuller (Adf) Unit Root Test
*Note: * Denotes That the Variable Is Not Stationary at That Percentage*
Source: Author's Computation, 2019 Using E.View, Output, 2020

4.11. Data Analyses

The results of the stationarity test using ADF for all the time series data in table 2 show that the null hypothesis (H_0) of a unit root can be rejected at 1(0), 1(1) and 2(1). The differences were because all the series (BP, ATM, POS, WP, MP, NEF and NIP) were stationary and therefore their regression will not be spurious. The series were all stationary at a critical value of 5% level of significance. The stationary was obtained by comparing test statistics with critical values, if the t-calculated was greater than the critical values numerically, the variable was stationary and if it was the reverse, it was

not stationary. Table 2 above showed the entire ADF statistics calculated were greater than the critical values, that was why they were stationary. Hence, the data are adequate enough for further treatment and analysis since they have been found to be stationary.

Dependent Variable: BP Method: Least Squares Date: 01/27/20 Time: 18:19 Sample: 2011-2018 Included observations: 8				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
ATM	0.841844	1.145610	2.480639	0.2439
POS	0.100023	0.405430	5.179745	0.1214
WP	0.718686	0.250103	2.873555	0.2132
MP	0.209621	0.213748	0.980691	0.5062
NIP	0.163041	0.414756	2.804155	0.2181
NEF	0.855079	0.842723	1.014661	0.4954
C	0.218346	3.363809	1.848603	0.3157
R-squared	0.986888	Mean dependent var		5.601936
Adjusted R-squared	0.908219	S.D. dependent var		0.054658
S.E. of regression	0.016559	Akaike info criterion		-5.693232
Sum squared resid	0.000274	Schwarz criterion		-5.623720
Log likelihood	29.77293	Hannan-Quinn criter.		-6.162058
F-statistic	12.54482	Durbin-Watson stat		2.043073
Prob(F-statistic)	0.212828			

Table 3: Regression of BP= α +βX₁+βX₂+βX₃+βX₄+βX₅+βX₆+Uₜ
Researcher's Own Computation Using E-Views 9.0 Output, 2020

4.12. Results and Discussions

$$InBP = 0.22 + 2.84ATM + 0.100POS + 0.719WP + 0.209MP + 0.163NIP + 0.855NEF + U_t$$
$$(1.85)\quad(2.48)\quad(5.18)\quad(2.87)\quad(0.99)\quad(2.80)\quad(01.015)$$

$$R^2 = 0.986 \qquad Adjusted\ R^2 = 0.908 \qquad DW = 2.04 \qquad F = 12.55$$

The equation showed that α = 0.22 which was the intercept. This was the base level of prediction for the dependent variable when all the independent variables were equal to zero. The coefficients of the independent variables measured how a percentage change in independent variables affected the dependent variable. From the result, 1% increase in ATM transaction led to about 0.84% increase in bank profit. This showed that there was a positive relationship between volume of ATM transaction and banks generation of excess revenues. This result was not significant at 5% as the p-value was 0.2439. The standard error measured the statistical reliability of the coefficient estimates. The larger the error, the more statistical noise in the estimates. The standard error was 1.1456% which was small or insignificant and thus showed that the volume of ATM transaction was statistically related to bank net profit.

Furthermore, a 1% increase in POS transaction led to about 0.10% increase in bank profit. This showed that there was a positive relationship between POS transaction and bank's return. This result was not significant at 5% as the p-value was 0.1214. The standard error measured the statistical reliability of the coefficient estimates. The larger the errors, the more statistical noise in the estimates. The standard error of 0.405% was insignificant and thus showed that POS transaction was statistically reliable to predict the bank profitability.

More so, a 1% increase in the web pay transaction led to about 0.72% increase in the bank profit. This showed that there was a positive relationship between web payment and bank's financial gains. This result was not consistent with the a priori expectation of the study and it was insignificant at all the levels as the p-value of 0.2132 was less than all the levels of significance. The standard error measures the statistical reliability of the coefficient estimates- the larger the error, the more statistical noise in the estimates. The standard error of 0.250% was insignificant and thus showed that value added tax was statistically reliable to predict bank profit.

The result for the mobile payment transactions showed that an increase of 1% in mobile payment transaction led to about 0.981% increase in banks cost-efficiency. This showed that there was a positive relationship between mobile payment transactions and bank profit. This result was consistent with the a priori expectation of the study and it was insignificant at 5% as the p-value was 0.2181 which was more than 0.05. The standard error of 0.2138% was insignificant thus showed that a mobile transaction was statistically reliable to predict bank profit.

The result for the NIP transaction showed that if it increased by 1% in NIP, it would lead to about 0.163% increase in bank profit. This showed that there was a positive relationship between NIP and bank profitability. This result was consistent with the a priori expectation of the study and it was insignificant at 5% as the p-value of 0.0416 was less than 0.05. The standard error of 0.4148% was significant and therefore showed that NIP was statistically reliable to predict bank profit.

The result for the NEF transaction showed that an increase of 1% in NEF, would lead to about 0.856% increase in bank's profit. This shows that there is a positive relationship between NEF and bank profit. This result is consistent with

the a priori expectation of the study and it is insignificant at 5% as the p-value of 0.4954 is more than 0.05. The standard error of 0.843% is insignificant and thus shows that NEF is statistically reliable to predict Bank profit.

R-square (R^2) was the fraction of the variance of the dependent variable explained by the independent variables. In this result, the R^2 was about 95% and adjusted R^2 was 98% meaning that about 90% of the bank profit was explained by the independent variables put together. If more regressors are added, the R^2 decreases; Adjusted R^2 penalizes the R^2 for the repressors which do not contribute to the explanatory power of the model. Sum of squared residual is a measure of error in using the estimated regression equation values of the ATM, POS, WP, MP, NEF and NIP. From the result, it showed that electronic banking transactions have significantly impacted on Nigerian commercial banks profitability over the period (2011-2018).

4.13. Discussion of Findings

This study was set to examine the impact of electronic banking on the profitability of commercial banks in Nigeria between 2011-2018. Indicators of electronic banking used in the study included volumes of Automated Teller Machine ATM transactions, point of sale terminals (services – POS), Web payment (WP), Mobile Payment (MP), NIBSS electronic Fund Transfer (NEF) and NIBSS instant payment (NIP) while BP was used to represent Bank profitability. The results of the empirical study showed that there was a positive relationship between electronic banking and the profitability of commercial banks in Nigeria between 2011-2018. This agreed with Njogu (2014) who did a study on the effect of electronic bank on profitability of commercial banks in Kenya that the banking sector registered enhanced growth in 2011 of 20.4 percent increase in the total net assets from Ksh. 1, 678.1 billion in December, 2010 to Ksh. 2, 020.8 billion in December, 2011. Loans and advances, government securities and placements accounted for 57.0 percent, 15.1 percent and 5.8 percent of total assets respectively formed the major components of their balance sheet. Net loans and advances recorded a growth of 31.4 percent from Ksh. 876.4 billion to Ksh. 1, 152.0 billion in December, 2011 (Njogu-2014).

5. Summary, Conclusion and Recommendations

5.1. Summary of Findings

From the results of analysis on empirical data and the discussion above, the findings of this study were hereby summarized as below:

- That there was a positive and significant relationship between electronic banking and profitability of commercial banks in Nigeria between 2011-2018.
- That ATM transactions had a positive and significant impact on the generation of excess revenues (profitability) by commercial banks in Nigeria between 2011-2018.
- That point-of-sale terminals (services) transactions had a positive effect on the return (profitability)by commercial banks in Nigeria between 2011-2018.
- That Web payment transactions had a positive effect on the financial gains of commercial banks in Nigeria between 2011-2018
- That mobile payment had a positive impact on the cost-efficiency of commercial banks in Nigeria within the period of this study
- That NIBSS Electronic Fund Transfer had a positive relationship with the cost-effectiveness of commercial banks in Nigeria between 2011-2018.
- That NIBSS Instant payment had a positive impact on the profitability of commercial banks in Nigeria within the period of the study

5.2. Conclusion

The study was carried out to examine the impact of electronic banking on the profitability of commercial banks in Nigeria between 2011-2018. Many literatures and academic publications from different authors in electronic banking services were reviewed in the course of this work. Also, empirical data were gathered, analyzed and interpreted. The evidence of the impact of the adoption of electronic banking as a delivery channel of bank products/services on bank profitability was mixed at both sides as Sumra (2011) in Njogu (2014) observed that preference for electronic banking has been on conventional banks to the exclusion of microfinance Banks (MFBs)

However, the more recent studies including this one seems to find a positive relationship between e-banking and profitability, even though, in the present study, it cannot be concluded that adopting electronic banking decision is the key factor in improving bank profitability. However, it can be argued that as the intensity and experience in the development and usage of internet services increase, the profitability, and by implication, the overall financial performance of multichannel banks is likely to improve.

5.3. Recommendations

Following the above inference from empirical evidence, the study made the following recommendations:

- That commercial banks should intensify efforts to deploy more ATM delivery points with sufficient security facilities and make them effective and efficient.
- That commercial banks should reactivate all vandalized ATMs in order to ease the tension experienced by customers in trying to use their services so as to reap the benefit of cost reduction.

- Indisputably, just as customers have accepted ATMs transactions, other e-banking channels like electronic mobile banking, POS, Web payment et cetera can be more acceptable if quick response to customers complaints from about failed transactions is rapidly attended to.
- Banks authorities should investigate factors that could make electronic banking channels more attractive to customers.
- The regulatory authorities should also work as a team with the banks to put in place an enabling operating environment and regulatory framework to bring out optimal delivery of these services to customers, especially with respect to inconclusive transactions.

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xix.

Appendix

Year	Bank Net Profitability (=N= Million)	ATM (=N= Million)	POS (=N= Million)	Web Pay (=N= Million)	Mobile Pay (=N= Million)	NIP (=N= Million)	NEFT PAY (=N= Million)
2011	352,987.00	1,561,740.00	31,020.00	59,610.00	18,980.00	1,396,052.86	13,042,031.79
2012	501,879.00	1,984,658.82	48,008.31	31,567.36	31,509.33	3,891,026.30	13,660,032.67
2013	335,890.00	2,828,939.00	161,016.33	47,316.33	142,797.14	10,844,922.94	14,307,317.71
2014	411,114.00	3,679,877.60	312,071.74	74,043.63	346,467.29	19,921,499.57	14,616,579.54
2015	375,651.83	3,970,252.41	448,512.55	91,581.29	442,353.76	25,649,060.79	13,087,085.48
2016	394,539.86	4,988,133.40	758,996.51	132,360.33	756,897.48	38,109,061.20	14,584,802.66
2017	414,377.59	6,437,592.40	1,409,813.09	184,596.63	1,101,998.97	56,165,666.31	14,946,463.88
2018	435,212.78	6,480,085.90	2,383,108.90	404,600.99	1,830,701.11	80,423,025.70	11,030,961.55

Table 4: Original Sourced Data
Source: Central Bank of Nigeria Statistical Bulletin, 2018

Year	Bank Net Profitability (=N= Million)	ATM (=N= Million)	POS (=N= Million)	Web Pay (=N= Million)	Mobile Pay (=N= Million)	NIP (=N= Million)	NEFT PAY (=N= Million)
2011	5.55	6.19	4.49	4.78	4.28	6.14	7.12
2012	5.70	6.30	4.68	4.50	4.50	6.59	7.14
2013	5.53	6.45	5.21	4.68	5.15	7.04	7.16
2014	5.61	6.57	5.49	4.87	5.54	7.30	7.16
2015	5.57	6.60	5.65	4.96	5.65	7.41	7.12
2016	5.60	6.70	5.88	5.12	5.88	7.58	7.16
2017	5.62	6.81	6.15	5.27	6.04	7.75	7.17
2018	5.64	6.81	6.38	5.61	6.26	7.91	7.04

Table 5: Transformed Data
Source: Researcher's Own Computation

Null Hypothesis: BP has a unit root Exogenous: Constant Lag Length: 0 (Automatic - based on SIC, maxlag=1)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-5.614463	0.0044
Test critical values:	1% level		-4.803492	
	5% level		-3.403313	
	10% level		-2.841819	
*MacKinnon (1996) one-sided p-values.				
Warning: Probabilities and critical values calculated for 20 observations				
and may not be accurate for a sample size of 7				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(BP)				
Method: Least Squares				
Date: 01/27/20 Time: 10:26				
Sample (adjusted): 2012 2018				
Included observations: 7 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
BP(-1)	-1.678135	0.298895	-5.614463	0.0025
C	9.404984	1.672895	5.621981	0.0025
R-squared	0.863097	Mean dependent var		0.012992
Adjusted R-squared	0.835716	S.D. dependent var		0.102627
S.E. of regression	0.041597	Akaike info criterion		-3.286633
Sum squared resid	0.008651	Schwarz criterion		-3.302087
Log likelihood	13.50321	Hannan-Quinn criter.		-3.477644
F-statistic	31.52219	Durbin-Watson stat		1.032748
Prob(F-statistic)	0.002480			

Table 6: Bank Profit (BP)

Null Hypothesis: D(ATM,2) has a unit root Exogenous: Constant Lag Length: 1 (Automatic - based on SIC, maxlag=1)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-10.66644	0.0014
Test critical values:	1% level		-6.423637	
	5% level		-3.984991	
	10% level		-3.120686	
*MacKinnon (1996) one-sided p-values.				
Warning: Probabilities and critical values calculated for 20 observations				
and may not be accurate for a sample size of 4				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(ATM,3)				

Table 7

Method: Least Squares Date: 01/27/20 Time: 10:29 Sample (adjusted): 2015 2018 Included observations: 4 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(ATM(-1),2)	-2.764303	0.259159	-10.66644	0.0595
D(ATM(-1),3)	1.134274	0.155221	7.307500	0.0866
C	-0.036041	0.009406	-3.831721	0.1625
R-squared	0.991422	Mean dependent var		-0.017050
Adjusted R-squared	0.974265	S.D. dependent var		0.114810
S.E. of regression	0.018418	Akaike info criterion		-5.037282
Sum squared resid	0.000339	Schwarz criterion		-5.497561
Log likelihood	13.07456	Hannan-Quinn criter.		-6.047330
F-statistic	57.78655	Durbin-Watson stat		1.871704
Prob(F-statistic)	0.092619			

Table 8: Automated Teller Machine

Null Hypothesis: D(POS) has a unit root Exogenous: Constant Lag Length: 1 (Automatic - based on SIC, maxlag=1)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-14.11890	0.0001
Test critical values:	1% level		-5.604618	
	5% level		-3.694851	
	10% level		-2.982813	
*MacKinnon (1996) one-sided p-values.				
Warning: Probabilities and critical values calculated for 20 observations				
and may not be accurate for a sample size of 5				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(POS,2)				
Method: Least Squares				
Date: 01/27/20 Time: 10:37				
Sample (adjusted): 2014 2018				
Included observations: 5 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(POS(-1))	-1.212747	0.085895	-14.11890	0.0050
D(POS(-1),2)	0.305231	0.054496	5.601005	0.0304
C	0.291673	0.025563	11.40988	0.0076
R-squared	0.992276	Mean dependent var		-0.059514
Adjusted R-squared	0.984553	S.D. dependent var		0.126714
S.E. of regression	0.015749	Akaike info criterion		-5.180383
Sum squared resid	0.000496	Schwarz criterion		-5.414721
Log likelihood	15.95096	Hannan-Quinn criter.		-5.809321
F-statistic	128.4723	Durbin-Watson stat		1.404507
Prob(F-statistic)	0.007724			

Table 9: POS

Null Hypothesis: D(WP) has a unit root Exogenous: Constant Lag Length: 0 (Automatic - based on SIC, maxlag=1)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-4.251929	0.0232
Test critical values:	1% level		-5.119808	
	5% level		-3.519595	
	10% level		-2.898418	
*MacKinnon (1996) one-sided p-values.				
Warning: Probabilities and critical values calculated for 20 observations				
and may not be accurate for a sample size of 6				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(WP,2)				
Method: Least Squares				
Date: 01/27/20 Time: 18:01				
Sample (adjusted): 2013 2018				
Included observations: 6 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(WP(-1))	-0.999486	0.235066	-4.251929	0.0131
C	0.184589	0.042908	4.301981	0.0126
R-squared	0.818832	Mean dependent var		0.102814
Adjusted R-squared	0.773539	S.D. dependent var		0.197431
S.E. of regression	0.093953	Akaike info criterion		-1.630835
Sum squared resid	0.035309	Schwarz criterion		-1.700248
Log likelihood	6.892505	Hannan-Quinn criter.		-1.908703
F-statistic	18.07890	Durbin-Watson stat		1.533687
Prob(F-statistic)	0.013138			

Table 10: Web Pay

Null Hypothesis: D(MP) has a unit root Exogenous: Constant Lag Length: 1 (Automatic - based on SIC, maxlag=1)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-3.023971	0.0957
Test critical values:	1% level		-5.604618	
	5% level		-3.694851	
	10% level		-2.982813	
*MacKinnon (1996) one-sided p-values.				
Warning: Probabilities and critical values calculated for 20 observations				
and may not be accurate for a sample size of 5 Augmented Dickey-Fuller Test Equation				

Table 11: Mobile Pay (MP)

Dependent Variable: D(MP,2) Method: Least Squares Date: 01/27/20 Time: 18:05 Sample (adjusted): 2014 2018 Included observations: 5 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(MP(-1))	-0.975021	0.322431	-3.023971	0.0942
D(MP(-1),2)	0.241074	0.236362	1.019935	0.4151
C	0.216616	0.110961	1.952176	0.1902
R-squared	0.853732	Mean dependent var		-0.087169
Adjusted R-squared	0.707463	S.D. dependent var		0.185574
S.E. of regression	0.100371	Akaike info criterion		-1.476184
Sum squared resid	0.020149	Schwarz criterion		-1.710521
Log likelihood	6.690460	Hannan-Quinn criter.		-2.105122
F-statistic	5.836745	Durbin-Watson stat		3.446678
Prob(F-statistic)	0.146268			

Table 12

Null Hypothesis: NIP has a unit root Exogenous: Constant Lag Length: 0 (Automatic - based on SIC, maxlag=1)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-5.051141	0.0077
Test critical values:	1% level		-4.803492	
	5% level		-3.403313	
	10% level		-2.841819	
*MacKinnon (1996) one-sided p-values.				
Warning: Probabilities and critical values calculated for 20 observations				
and may not be accurate for a sample size of 7				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(NIP)				
Method: Least Squares				
Date: 01/27/20 Time: 18:09				
Sample (adjusted): 2012 2018				
Included observations: 7 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
NIP(-1)	-0.223825	0.044312	-5.051141	0.0039
C	1.844140	0.316176	5.832643	0.0021
R-squared	0.836141	Mean dependent var		0.251497
Adjusted R-squared	0.803369	S.D. dependent var		0.140015
S.E. of regression	0.062087	Akaike info criterion		-2.485605
Sum squared resid	0.019274	Schwarz criterion		-2.501059
Log likelihood	10.69962	Hannan-Quinn criter.		-2.676616
F-statistic	25.51403	Durbin-Watson stat		1.816653
Prob(F-statistic)	0.003929			

Table 13: NIP

Null Hypothesis: D(NEF,2) has a unit root Exogenous: Constant Lag Length: 1 (Automatic - based on SIC, maxlag=1)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-3.804417	0.0574
Test critical values:	1% level		-6.423637	
	5% level		-3.984991	
	10% level		-3.120686	
*MacKinnon (1996) one-sided p-values.				
Warning: Probabilities and critical values calculated for 20 observations and may not be accurate for a sample size of 4 Augmented Dickey-Fuller Test Equation Dependent Variable: D(NEF,3)				
Method: Least Squares				
Date: 01/27/20 Time: 18:14				
Sample (adjusted): 2015 2018				
Included observations: 4 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(NEF(-1),2)	-4.214425	1.107772	-3.804417	0.1636
D(NEF(-1),3)	1.854599	0.630285	2.942478	0.2086
C	-0.026026	0.027212	-0.956412	0.5142
R-squared	0.941266	Mean dependent var		-0.032936
Adjusted R-squared	0.823798	S.D. dependent var		0.128562
S.E. of regression	0.053966	Akaike info criterion		-2.887229
Sum squared resid	0.002912	Schwarz criterion		-3.347508
Log likelihood	8.774458	Hannan-Quinn criter.		-3.897278
F-statistic	8.012968	Durbin-Watson stat		1.678970
Prob(F-statistic)	0.242351			

Table 14: NEF