Electronic Banking Services and Profit Performance: The Case of Unstructured Supplementary Service Data (USSD)

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Abstract

The study examined the role of Unstructured Supplementary Service Data (USSD) on the profit performance of commercial banks in Nigeria between 2009 and 2022. The study adopted an ex-post facto research design, utilizing annual time series secondary data extracted from the Central Bank of Nigeria (CBN) Statistical Bulletin. The population consisted of all 24 commercial banks licensed by the Central Bank of Nigeria, making the census survey technique appropriate for the study. The time series data was converted to quarterly values, and the Ordinary Least Squares (OLS) regression technique was employed for analysis. Descriptive statistics and multiple regression methods were used to analyze the data. The OLS regression model results revealed that revenue from USSD had a positive but minimal effect on the profit performance of commercial banks in Nigeria during the study period. Therefore, commercial banks should invest in enhancing their USSD platforms to boost customer engagement by expanding the transactions ceiling, and introducing service charges for higher volumes to enhance earnings, while providing hedging to mitigate the associated risk towards upscaling profit uptake from the USSD service gateway.

Keywords: Commercial Banks, financial landscape, accessible, transactions volume, gateway

1. Introduction

The rise of electronic banking services has transformed the financial landscape globally, enabling banks to provide more efficient, accessible, and cost-effective services. Among these innovations, Unstructured Supplementary Service Data (USSD) has emerged as a key tool for expanding financial inclusion, especially in developing economies like Nigeria. USSD banking allows customers to perform transactions without the need for internet access, making it particularly valuable in regions with limited digital infrastructure. As such, it has become an integral part of the electronic banking ecosystem, facilitating seamless transactions for both rural and urban populations (Eze & Nwankwo, 2021).

The adoption of USSD by commercial banks has not only increased the accessibility of banking services but also accelerated transaction processes, offering a convenient platform for fund

transfers, balance checks, and bill payments (Nwosu, 2020). Its simplicity and wide reach have made it a preferred channel for a large segment of the population, particularly those who may not have access to smartphones or stable internet connectivity (Adewole & Oni, 2022). Consequently, USSD has driven significant growth in transaction volumes, which raises questions about its impact on the profit performance of commercial banks.

USSD facilitates financial inclusion and customer engagement, its contribution to long-term customer retention and satisfaction, and how these factors translate into profit performance, have not been fully explored. As commercial banks in Nigeria increasingly rely on digital innovations to remain competitive, there is a pressing need to assess whether USSD plays a meaningful role in profit generation or if its value lies primarily in non-financial outcomes, such as customer loyalty and service accessibility. Addressing these gaps is essential for banks to develop effective strategies for capitalizing on USSD as part of their broader electronic banking services. Understanding the relationship between electronic banking services, particularly USSD, and profit performance is crucial for banks aiming to adapt to the rapidly evolving financial technology landscape.

Despite the increased usage of USSD, its direct contribution to profit performance remains a subject of debate. Some studies suggest that while USSD generates revenue through transaction fees, its impact on overall profitability is minimal compared to other electronic channels such as Automated Teller Machines (ATMs) and Point of Sale (POS) systems (Okafor & Ugochukwu, 2021). This is attributed to the relatively low fees charged for USSD transactions, which do not significantly boost banks' profit margins. However, the strategic importance of USSD lies in its potential to enhance customer engagement and satisfaction, which could indirectly improve profit performance in the long term (Olowookere & Fashola, 2023). Previous research has shown that other electronic banking channels, such as Automated Teller Machines (ATMs) and Point of Sale (POS) systems, contribute more significantly to banks' profitability (Okafor & Ugochukwu, 2021). This raises a critical concern: to what extent does USSD truly influence the overall financial performance of banks, and how can banks leverage its potential beyond transaction fees to enhance profitability?

Following, this study explored the extent to which USSD contributes to the profit performance of commercial banks in Nigeria, considering both its previously reported role in driving customer engagement.

2. The Literature

Electronic Banking Services

Electronic Banking Services (E-banking) refer to the use of digital platforms and technologies that allow customers to access and manage their banking activities remotely. These services typically include internet banking, mobile banking, Automated Teller Machines (ATMs), Point of Sale (POS) systems, and Unstructured Supplementary Service Data (USSD) technology (Olowookere & Fashola, 2023). The primary goal of e-banking services is to enhance convenience, improve operational efficiency, and extend banking services to a broader customer base. By eliminating the need for physical banking infrastructure, e-banking services have significantly transformed the way financial institutions deliver services to their clients (Eze & Nwankwo, 2021).

Profit Performance

Profit Performance in the context of commercial banking refers to the ability of a bank to generate earnings from its operations. It is typically measured through financial indicators such as return on assets (ROA), return on equity (ROE), net interest margin (NIM), and profit

margins (Okafor & Ugochukwu, 2021). Banks aim to optimize profit performance by balancing the costs associated with providing services and generating revenue from interest, fees, and other income streams. The growth of digital banking services, including USSD, presents both opportunities and challenges in terms of profitability, as the adoption of these technologies can affect revenue streams and operational costs differently.

Unstructured Supplementary Service Data (USSD)

Unstructured Supplementary Service Data (USSD) is a mobile communication protocol used to deliver banking services without requiring internet connectivity. USSD technology enables users to access a wide range of banking services, including money transfers, balance inquiries, and bill payments, through a simple code input on a mobile phone (Adewole & Oni, 2022). Its primary advantage lies in its accessibility, as it can be used on any mobile phone, including feature phones, and does not rely on mobile data. This makes USSD particularly valuable in regions with limited internet access, such as rural areas in Nigeria (Nwosu, 2020). By providing an easy-to-use and widely accessible banking option, USSD has become an essential tool for promoting financial inclusion, especially for individuals who are unbanked or underbanked.

In terms of its contribution to profit performance, USSD generates revenue for banks through transaction fees and service charges. However, these fees are typically low, leading to questions about the significant impact of USSD on overall profitability (Olowookere & Fashola, 2023). Some studies suggest that while USSD may not directly contribute to large profit margins, it plays a critical role in enhancing customer engagement and driving higher transaction volumes, which could lead to indirect financial benefits over time (Nwosu, 2020). The convenience and ease of USSD transactions encourage more frequent use of banking services, potentially increasing customer loyalty and retention, which are crucial for long-term profitability.

USSD as a component of electronic banking services has had a transformative impact on the banking sector by expanding access and improving the convenience of transactions. However, its direct contribution to profit performance remains a topic of debate, with much of its value potentially lying in its role as a driver of customer engagement and financial inclusion. As Nigerian banks continue to innovate in digital banking, understanding the strategic importance of USSD in relation to profit performance is crucial for developing effective business models in the evolving financial landscape.

Theoretical Review

The Technology Acceptance Theory (TAT), developed by Fred Davis in 1986, modifies the Theory of Reasoned Action (TRA) to explain how individuals adopt and utilize new technologies, such as Automated Teller Machines (ATMs) and Purchase-Order-Sales (POS) systems within the banking sector (Davis, 1986). TRA, formulated by Martin Fishbein and Icek Ajzen in 1967, posits that behavioral intentions are influenced by two key factors: attitudes toward the behavior and subjective norms, which represent perceived social pressures to engage in a specific action (Fishbein & Ajzen, 1975). In the context of electronic banking services, these factors significantly affect customers' intentions to utilize USSD, ultimately impacting the profit performance of commercial banks in Nigeria.

As research progressed, the limitations of TRA became apparent, particularly in scenarios where external factors limited individuals' control over their behaviors. Bagozzi et al. (2012) found that individuals often form attitudes and intentions towards new technologies like ATMs, USSD and POS systems before actual usage, indicating that effective adoption may require time and exposure to the technology. TAT expands upon this by asserting that users' intentions to engage with a system are influenced by their perceptions of its usefulness and ease of use

(Davis, 1989). Consequently, intention to use serves as a mediator between perceived usefulness and actual system usage, with perceived ease of use directly impacting perceived usefulness.

This research is anchored in Technology Acceptance Theory (TAT) due to its relevance in understanding the acceptance and adoption of electronic banking technologies. By focusing on customers' perceptions of ease and usefulness, Nigerian commercial banks can develop targeted strategies to enhance user experiences with USSD systems. These strategies can increase adoption rates and, in turn, improve profit performance from non-lending services, thereby contributing to the overall financial health of these institutions.

Hypothesis Premise

According to Efuntade (2023), a cointegration and causality analysis was conducted to determine the relationship between e-banking services and the profitability of commercial banks in Nigeria. The value of POS, USSD, online, mobile, and ATM transactions served as proxies for electronic banking, while the net profit from electronic banking transfers and processing served as a proxy for commercial banking performance. For the data analysis that took place from January 2008 to December 2022, the engle-Granger cointegration model was employed. According to the results, there is a long-term correlation between the use of POS (Point of Sale) systems and the success of banks. Automated Teller Machines (ATMs), USSD services, and POS systems all significantly and positively affect net profit (NP) in the short run. The impact on NP (Net Profit) of IBS and MBS, or mobile banking services, is negligible at best and somewhat positive at worst. With an adjusted R2 value of 0.508994, we can see that POS, USSD, ATM, IBS, and MBS accounted for 50.89% of the variance in NP (Net Profit margin from the electronic businesses), while the remaining 49.11% is captured at the margins of the model. The banking public would be well-served by a comprehensive education campaign by the monetary authorities and commercial banks on the merits, ease, and significance of using online banking channels to conduct financial transactions. In order to boost customer happiness and the bank's bottom line, the study suggests that commercial banks implement a long-term strategy to improve their electronic offerings.

The impact of online banking on the productivity of Nigerian banks was investigated by Taiwo and Agwu (2017). The SPSS (Statistical Package for the Social Sciences) findings were analysed using Pearson correlation. Included in the study's variables are PBIT, mobile application usage, and ATM transactions. The study found that, in comparison to the days of conventional banking, the operational efficiency of Nigerian banks has increased after the implementation of electronic banking. Bank stability, income, and capital bases all saw an uptick, and consumer loyalty took a nosedive as well.

Digital banking's impact on commercial banks' performance from 2010 to 2019 was studied by Chukwu and Molokwu (2022). This study used the Autoregressive Distributive Lag (ARDL) paradigm to look at how commercial banks in Nigeria might improve their return on assets (ROA) by analysing the connection between POSG, USSDG, WEBG, and online banking. This information was culled from yearly reports of the Nigeria Deposit Insurance Corporation (NDIC) and statistics bulletins of the Central Bank of Nigeria (CBN). The study found that commercial banks in Nigeria were positively and marginally affected by digital banking. Based on the results, the study concluded that a generally stable network is necessary: To lessen the frequency of unsuccessful transactions, it is recommended that banks collaborate with network

providers and their engineers to create a unified platform for all digital banking channels. There should also be an effort to educate bank consumers about the advantages of digital banking. To prevent cybercriminals from stealing the channels, it was also suggested that all banks should have a cyber security department that is operational at all times.

Ndungu (2015) looked at how commercial banks' bottom lines were affected by alternative banking channels. Variables utilised in the study were operating expenditures, agency banking, mobile banking, and consumer deposits base. Researchers in Kenya found that operational expenditures, agency banking, mobile banking, and customer deposits accounted for 73.4% of the variance in the financial performance of commercial banks. Commercial banks' bottom lines improved as they began offering agency banking, mobile banking, operational expenditures, and consumer deposits.

Researchers Kairiza et al. (2017) used information from Zimbabwe's publicly traded commercial and merchant banks to examine how well electronic banking guarantees service efficiency in commercial banks. From 2010 to 2016, the research was conducted. The study employed automated teller machines and point-of-sale banking as its variables. Using ordinary least square regression, the data that was collected was examined. According to their findings, commercial banks' service quality has been enhanced by the use of electronic banking channels. Nevertheless, it was also shown that throughout the study period, POS banking did not favourably impact the efficiency of Zimbabwean banks.

Kongiri (2012) investigated how cashless banking impacted digital banking at commercial banks in Kenya. The years 2007–2011 were the focus of the research. In this analysis, online and ATM banking were utilised as independent variables. The study achieved its goals by using a descriptive research approach and a panel data design. The Central Bank of Kenya (CBK) was consulted for the purpose of obtaining the annual financial statements of 37 commercial banks located in Kenya for the fiscal years 2007–2011. Multiple linear regression was used to examine the data, which comprised a sample of 185 research units. The results showed that the use of cashless banking has significantly expanded the use of online and automated teller machine banking.

Mobile and agent banking were studied by Rosen (2013) to determine their impact on Kenya's banking system. The years 2007–2012 were the focus of their research. They used OLS to analyse the data collected from their mobile banking and agent banking. They recognised potential financial benefits and subsequently examined them on an individual bank survey. The poll looked at how these non-traditional channels affected banks according to their operational level, client base, and profitability. A more efficient, responsive, and lucrative banking system has resulted from the study's findings, which imply that mobile banking and agent banking have enabled the supply of financial services to the previously excluded people in Kenya.

Yorulmaz (2018) examined how digital banking indexes were put together on a worldwide scale. He plans to build more comprehensive multi-dimensional digital banking indices that collect data on the breadth of digital banking channels in order to quantify the level of financial access. The years 2003–2015 were the scope of the research. Geographic branch penetration, geographic ATM penetration, deposit accounts per capita, and ATM card fees were the variables utilised in the study. The research demonstrated that the chosen variables had a rising periodic index. Furthermore, the results demonstrated that the index is unaffected by the addition of additional digital banking variables during index building.

In their 2018 study, Isibor et al. looked at how electronic banking affected consumer happiness and GDP growth in Nigeria. A total of 120 questionnaires were handed out to clients of four

different banks in Sango Ota, Ogun state: Zenith Bank, Guaranty Trust Bank, Access Bank plc, and UBA plc. To test for significance, the SPSS statistical tool was used in conjunction with the Pair Sample t-test, a statistical parametric analysis. The researcher set out to determine the relative importance of electronic banking and two related concepts: consumer happiness and bank profitability. Electronic banking is preferred over manual banking by the typical person. They came to the same conclusion: banks are now more profitable thanks to electronic banking. Olaiya and Adeleke (2019) looked studied the relationship between online banking and the profitability of Nigerian commercial banks from 2010 to 2018. Data for the study came from secondary sources. The study's data came from the CBN Financial Stability Reports and the CBN Statistical Bulletin. The unit root test and the cointegration bound test were used to analyse the data. Autoregressive Distributed Lags, implemented in E-view 9.0, were used for the estimation. The study's given model included four variables—the value of ATM transactions, POS transactions, mobile banking transactions, and internet banking transactions—while returns on assets (ROA) served as a proxy for private banks' performance. Contrary to what was expected based on earlier research, the study found that ROA is positively related to two independent variables, namely ATMTV and POSTV, and negatively related to both MBTV and IBTV. There was no statistically significant correlation between ROA and any of the four factors when tested together. Because of this, the study found no evidence that digital banking channels significantly affected the short-term performance of Nigerian banks across the time frame examined.

Ho: Revenue from Unstructured Supplementary Service Data (USSD) has no significant effect on profit performance of the Commercial Banks in Nigeria.

3. Methodology

This research adopted *ex-post facto* research design. The study basically employed annual time series data for the period 2009 to 2022. However, because of the very short study period which is not sufficient for the implementation of the Ordinary Least Square (OLS) estimation process, the annual time series were converted into quarterly data to provide a large data point sufficient enough for the execution of the OLS technique. The secondary data were extracted from published CBN statistical bulletin from 2009 to 2022. The population of the study comprises all the twenty-four commercial banks in Central Bank of Nigeria official website as at December 2023. The study then adopted a census-survey technique, where all the 24 commercial banks will be used in the study.

Model of Specification

The economic model used in the study (which was in line with what is mostly found in the literature) is given as:

$$Y(E) = f(USSD) \ldots\ldots (1)$$

$$PRP = \beta_0 + \beta_1 USSD_t + \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Variables Definition and Measurement
USSD = Revenue from Unstructured Supplementary Service Data,
PRP = Profit Performance
β_1 is the coefficient of the parameter estimate.

β0 the intercept

ε = error term

Descriptive statistics was computed using e-views which amongst other things help show the pattern, distribution, deviation and nature of the data. For the regression analysis, Ordinary Least Square (OLS) Regression was used to test the hypotheses. The study used the adjusted coefficient of determination (adj. R^2) to measure the extent to which electronic banking services (USSD) estimates profit performance from non-lending sources of Commercial banks in Nigeria from 2009-2022. The decision is that the null hypothesis was rejected if the p-value < 0.05; otherwise, it was accepted.

4. Data analyses and Hypothesis Outcome

Table 1: Descriptive Statistics of the variables

Statistics	PRP	USSD
Mean	39347.02	82406.27
Median	37705.56	105676.8
Maximum	52966.04	146231.4
Minimum	31682.82	80.09880
Std. Deviation	6347.132	55761.23
Skewness	0.805137	-0.371407
Kurtosis	2.576632	1.495856
Jarque Bera	1.963659	1.993408
Probability	0.374625	0.369094
Sum	668899.4	1400907
Sum Sq. Dev.	6.45E+08	4.97E+10
Observations	**56**	**56**

Source: E-Views Output (2024)

As shown in table 1, the mean value of PRP for all the sampled 24 banks is 39347.02 billion naira over the study period, with lowest and highest values of 31682 and 52966.04 billion naira respectively. With a standard deviation of 6347.132, the PRP of the banks that were investigated shows a significant amount of variability from the mean value. The skewness statistic value for PRP for the study period, which is 0.805137 is indicative of the fact that the data distribution for PRP is positively skewed and its kurtosis statistic (2.576632) shows that the distribution is mesokurtic in nature (meaning that, the distribution is not too peaky) but normal. This is further supported by the Jarque-Bera statistic value of PRP which is 1.963659 and its corresponding probability value of 0.374625 which is greater than 0.05. USSD is negatively skewed as its skewness statistic has a negative value of -0.371407, with a corresponding kurtosis, Jarque-Bera and Probability values of 1.495856, 1.993408 and 0.369094, indicating that the data distribution for USSD is also normal as the probability value is less than 0.05.

Table 2: OLS Estimates of Non-Lending Electronic Banking Services and Profit Performance of Commercial Banks in Nigeria.

Dependent Variable: PRP
Method: Least Squares
Sample (adjusted): 2009Q1 2022Q1
Included observations: 25 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	15025.56	4072.764	3.689279	0.0018
USSD	0.016365	0.013380	1.223103	0.2415

R-squared	0.871927	Mean dependent var		35890.44
Adjusted R-squared	0.814896	S.D. dependent var		7326.192
S.E. of regression	74.54060	Akaike info criterion		11.71490
Sum squared resid	94457.11	Schwarz criterion		12.10494
Log likelihood	-138.4363	Hannan-Quinn criter.		11.82308
F-statistic	33117.09	Durbin-Watson stat		1.947864
Prob(F-statistic)	0.000000			

Source: Author's computation using E-views 10

Hypothesis: Revenue from Unstructured Supplementary Service Data (USSD) has no significant effect on profit performance of the Commercial Banks in Nigeria.

From table 2, the absolute student t-statistic value for revenue from Unstructured Supplementary Service Data (USSD) of 1.223103 and its corresponding probability value of 0.2415 showed that revenue from Unstructured Supplementary Service Data (USSD) does not have any significant effect on profit performance of commercial banks over the period of the study. This is also because, the absolute t-statistic value that corresponds with USSD (1.223103) is less than 2 and its corresponding p-value (0.2415) is also greater than 0.05. Therefore, hypothesis nine of this study is accepted and its alternate hypothesis is rejected. The study thus concludes that revenue from Unstructured Supplementary Service Data (USSD) has no significant effect on profit performance of the commercial banks in Nigeria.

5. Conclusion, Implications and Recommendation

When controlling for other variables, the results showed that PRP would rise by 0.016365 points for every one-point increase in income from Unstructured Supplementary Service Data (USSD), and that USSD revenue accounted for 1.6% of the variance in PRP. The study observed that commercial banks did not record notable effect on their profit performance from Unstructured Supplementary Service Data (USSD) income. This means that earnings from USSD operations do not contribute significantly to overall profit performance. Hence, while Unstructured Supplementary Service Data (USSD) income contributes marginally to banks' profit performance, its direct financial impact is limited, accounting for only a small percentage of profit variance.

However, USSD services enhance the accessibility and efficiency of banking, leading to greater customer engagement and transaction volume. This highlights the importance of digital

innovations for maintaining competitiveness in the Nigerian banking sector. As captured in prior works, USSD services within the banking service ecosystem offers a quick and easy clientele service at the level of micro-operations, which leads to more transactions and more client involvement. Adapting strategies to capitalise on digital innovations and maintain competitiveness within the Nigerian financial landscape is crucial for banks, as the success of USSD highlights the transformative potential of mobile technology in reshaping traditional banking practices. This observation aligns with the submission of Chukwu and Molokwu (2022). This pan out of the hypothesis test finds credence also with the observations by Taiwo and Agwu(2017), Ndungu (2015), Kairiza et al.(2017), Kongiri (2012), and Rosen (2013) These studies reported a negative and negligible effect on bank performance. However, it is at variance with the observation of Efuntade (2023) who opined that USSD services significantly contributes to net profit.

While not certified within the content of this study, the marginal contribution to broad profit performance may not be unconnected with the cap placed on volume of transactions. The USSD service has a daily cap of One hundred thousand naira, and in dividual transaction limit not exceeding twenty thousand naira. The broad implication of this is a limit in the volume of funds transferable or the limit of purchase that this financial gateway presents. This value is vitiated by the spiralling inflation rate in the country, thus limit the scope of relevance in volume of the USSD service gateway. This invariably has implications for service charge which undermines earnings from this electronic banking service gateway. Therefore, commercial banks should invest in enhancing their USSD platforms to boost customer engagement by expanding the transactions ceiling, and introducing service charges for higher volumes to enhance earnings, while providing hedging to mitigate the associated risk towards upscaling profit uptake from the USSD service gateway.

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