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Original Article

Financial Inclusion and Economic Growth Nexus in Nigeria

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Abstract - This empirical paper investigates the relationship between financial inclusion and economic growth in Nigeria. It draws on the Institutional Theory of Financial Inclusion, Social Capital Theory of Financial Inclusion, and Finance-Growth Nexus Theory as its theoretical foundations. Utilizing annualized data extracted from the Central Bank of Nigeria's Statistical Bulletin (2022), the study employs financial time series methodology, employing Ordinary Least Squares (OLS) and Granger Causality Techniques for comprehensive analysis. The research findings reveal a robust and positive association between financial inclusion and economic growth in Nigeria. Notably, the Granger causality test results establish unidirectional causation from the number of bank branches to Real Gross Domestic Product (RGDP), indicating that as the number of bank branches increases, there is a corresponding augmentation in RGDP. This outcome underscores a discernible cause-and-effect relationship between the two variables. Recognizing the pivotal role of the banking industry in Nigeria's economic development, acting as a crucial channel for monetary transfers within the economy, the study concludes with insightful recommendations that the federal government should facilitate the establishment of low-cost financial centers nationwide, particularly in rural areas, to provide informal banking services to underserved populations. At the same time, operators of automated teller machines should lower transaction fees, thereby fostering increased utilization of ATMs for transactions, thereby reducing dependence on traditional banking methods.

Keywords - Financial inclusion, Economic growth, Granger causality, Banking industry, Nigeria.

1. Introduction

Financial inclusion has emerged as a critical driver of economic growth and development, gaining prominence on the global stage as a means to alleviate poverty and enhance social well-being. The World Bank defines financial inclusion as "access to useful and affordable financial products and services that meet the needs of individuals and businesses." In Nigeria, like many other developing countries, the pursuit of financial inclusion is deeply rooted in the country's commitment to fostering economic empowerment, reducing income inequality, and promoting sustainable development. As the largest economy in Africa, Nigeria faces the dual challenge of a vast unbanked population and the imperative to harness its economic potential for inclusive growth. The significance of financial inclusion lies in its ability to provide individuals and businesses, particularly those in marginalized and underserved communities, with access to formal financial services [10].

In the context of Nigeria, a country with a diverse economic landscape and a substantial unbanked population, understanding the dynamics of financial inclusion and its impact on economic growth becomes imperative. The financial landscape in Nigeria has witnessed transformative shifts in recent years, with concerted efforts by both public and private sectors to expand access to formal financial services. Despite these efforts, 35.9 percent of the

Nigerian adult population remains excluded from the formal banking system, relying on informal and often unreliable financial channels [11]. The need to bridge this gap and empower all segments of society with financial tools and resources has become a priority for policymakers, financial institutions, and development practitioners.

The nexus between financial inclusion and economic growth is a subject of increasing academic and policy interest. A well-functioning financial system, characterized by broad and inclusive participation, has the potential to propel economic activities, enhance productivity, and mitigate income disparities. Despite notable strides in economic development, a considerable portion of the population remains excluded from the formal financial sector. A large number of Nigerians, particularly those residing in rural and remote areas, lack access to basic financial services such as banking, credit, and insurance. The challenge is multifaceted, involving infrastructural limitations, socio-economic disparities, and regulatory complexities. In the Nigerian context, understanding the dynamics of this relationship is essential for designing effective strategies that not only promote financial inclusion but also contribute to sustainable economic development.

However, commendable strides have been made in advancing financial inclusion; in spite of this, Nigeria continues to grapple with challenges hindering the attainment of comprehensive and equitable access to financial services. Factors such as limited infrastructure in rural areas, low financial literacy, regulatory bottlenecks, and a predominantly informal economy pose formidable barriers to widespread financial inclusion. These challenges impede the seamless integration of diverse socioeconomic groups into the formal financial system, hindering the realization of the full economic potential of the nation.

Over the past decade, the Nigerian government, in collaboration with financial institutions and international partners, has undertaken initiatives to enhance financial inclusion. These initiatives include the introduction of mobile money services, the establishment of agent banking networks, and the implementation of regulatory measures to facilitate greater access to financial services. However, the effectiveness and impact of these efforts on economic growth have not been comprehensively studied. It is in light of these challenges and gaps that this study seeks to investigate the relationship between financial inclusion and economic growth in Nigeria.

2. Literature Review

2.1. Theoretical Framework

2.1.1. Institutional Theory of Financial Inclusion

The Institutional Theory of Financial Inclusion focuses on the role of formal and informal institutions in shaping financial inclusion outcomes. Institutions include regulatory bodies, policies, and the overall financial infrastructure. This theory suggests that the effectiveness of financial inclusion initiatives is heavily influenced by the institutional environment in which they operate. The Institutional Theory emphasizes that the regulatory and policy framework, as well as the effectiveness of financial institutions, plays a pivotal role in determining the level of financial inclusion in a given country [9]. A supportive institutional environment fosters the development of inclusive financial systems by creating an enabling environment for financial service providers and users.

2.1.2. Social Capital Theory of Financial Inclusion

Social Capital Theory explores the impact of social networks, relationships, and community ties on financial inclusion. It suggests that the strength of social capital within a community influences individuals' access to financial services. Strong social ties can enhance trust, information-sharing, and collaborative financial practices, contributing to increased financial inclusion [23]. The Social Capital Theory suggests that social networks and relationships are essential determinants of financial behavior. Individuals who are embedded in strong social networks are more likely to have access to informal financial mechanisms, such as Rotating Savings and Credit Associations (ROSCAs) or community-based financial institutions. These social connections can facilitate information flow and mutual support, contributing to increased financial inclusion.

2.1.3. Finance-Growth Nexus Theory

The Finance-Growth Nexus Theory suggests a bidirectional relationship between the development of the financial sector and economic growth. It posits that a well-functioning financial system not only supports economic growth but is also stimulated by it. As the economy grows, the demand for financial services increases, fostering further development of the financial sector [20]. This theory emphasizes that a well-developed financial sector can positively impact economic growth by mobilizing savings, facilitating investment, and improving the efficiency of capital allocation. Conversely, economic growth can contribute to the deepening and sophistication of the financial sector as increased economic activities generate demand for diverse financial services.

2.2. Conceptual Review

2.2.1. Financial Inclusion

Financial inclusion refers to the extent and ease with which individuals and businesses, particularly those in underserved or marginalized segments of the population, have access to and use a range of financial services [31]. These services may include savings, credit, insurance, and payment mechanisms. Financial inclusion aims to promote economic participation and development by ensuring that a diverse range of people can benefit from and contribute to the formal financial system.

2.2.2. Bank Branches

Bank branches represent physical locations or offices established by financial institutions such as banks, where customers can conduct various banking activities. These activities may include opening accounts, making deposits and withdrawals, applying for loans, and seeking financial advice. Bank branches serve as essential touchpoints for individuals and businesses to access a wide array of financial services offered by the banking industry [7].

2.2.3. Automated Teller Machines (ATMs)

Automated Teller Machines (ATMs) are self-service electronic devices that enable individuals to perform basic banking transactions without the need for direct interaction with bank staff. ATMs provide functions such as cash withdrawals, balance inquiries, fund transfers, and, in some cases, bill payments. These machines enhance convenience and accessibility, allowing users to conduct financial transactions outside of traditional banking hours and locations [12].

2.2.4. Deposit Account Holders

Deposit account holders are individuals or entities that have established accounts with financial institutions, such as banks or credit unions, for the purpose of depositing funds [6]. These accounts may include savings accounts, current accounts, and other deposit-based instruments. Deposit account holders entrust their money to the financial institution, which, in turn, may provide interest on deposits and various services to account holders.

2.2.5. Economic Growth

Economic growth refers to the sustained increase in the value of goods and services produced by an economy over time. It is often measured by the rise in the Gross Domestic Product (GDP), reflecting the overall expansion of economic activities. Economic growth is indicative of an expanding economy, increased productivity, rising employment opportunities, and improved standards of living for the population [5].

2.2.6. Real Gross Domestic Product (GDP)

Real Gross Domestic Product (GDP) represents the total value of all goods and services produced by an economy, adjusted for inflation or deflation. Unlike nominal GDP, which does not account for changes in the price level, real GDP provides a more accurate measure of actual economic output over time. Real GDP is a key indicator used to assess and compare the economic performance of different countries or the same country over different time periods [19].

2.3. Empirical Review

Empirical evidence from a multitude of studies underscores the robust link between financial inclusion and economic growth. [8] and Inoue and [15, 16] have consistently reported a positive relationship, while [18] found compelling evidence for the association. [15] investigation of 37 Sub-Saharan African countries for the period 2004-2012, utilizing the panel dynamic GMM estimator, demonstrated a positive correlation between the number of commercial bank branches and real GDP per capita. The study further revealed a positive and significant impact of financial deepening on economic growth in the sub-Saharan African region.

Similarly, [29] delved into the relationship between financial accessibility and economic growth in eight South Asian countries from 2007 to 2015. Employing Generalized Methods of Moments (GMM) estimators, the study found that increased financial accessibility led to a corresponding increase in income. Notably, the impact was more pronounced in low-income countries compared to middle-income nations. [18] extended the exploration to 55 member countries of the Organization of Islamic Cooperation (OIC). Their dynamic panel estimation, panel Vector Autoregressive (VAR) methodology, Impulse-Response Functions (IRF3), and panel Granger causality test provided compelling evidence that financial inclusion positively influences economic growth.[22] expanded the temporal horizon, examining the linkages between financial inclusion and economic growth in 11 countries from 2007 to 2020. Employing a pooled regression model, vector error correction model, and Granger causality test, the findings suggested a long-run relationship between financial inclusion and economic growth. [26] investigation spanning 31 developed and developing countries from 2004 to 2010, employing various panel data models, confirmed a positive and long-term relationship between financial inclusion and economic growth. Additionally, the study identified a bidirectional causality between the two variables, underscoring the mutual influence between financial inclusion and economic growth.

[16] focused on developing countries, employing differenced GMM on a panel of 168 nations between 2014. The study demonstrated a positive relationship between the number of commercial bank branches and real per capita GDP, affirming the positive impact of financial deepening on economic growth. [22] concentrated on 42 African countries from 2004 to 2014, utilizing the GMM dynamic panel data estimator. The study, measuring financial inclusion by the number of commercial bank branches per 100,000 adults, revealed a positive and statistically significant effect of financial inclusion on economic growth in Africa. [30] scrutinized 23 Asian countries from 2010 to 2015, concluding that a high number of bank branches, ATMs, and domestic credits in the private sector were associated with increased economic development. Similarly, [27] examined 24 Asian countries from 2004 to 2016, employing Granger causality and fixed effect regression techniques, revealing a significant positive impact of financial permeation on the economies of Asian countries. The Granger causality test further indicated bidirectional causality between economic growth and financial permeation in Asian economies. These comprehensive findings collectively highlight the intricate relationship between financial inclusion and economic growth across diverse regions, emphasizing the need for policies promoting financial inclusivity to foster sustained economic development.

The author conducted an empirical study to assess the impact of the digital banking model on financial inclusion in Nigeria. The research utilized the financial time series methodology and collected quarterly data from the Central Bank of Nigeria Statistical Bulletin (2021) over a twelve-year period (2009-2021). The study considered various independent variables, including the volume of transactions on Automatic Teller Machines (ATM), Point of Sale (POS), Web Banking Technology (WBT), and Mobile Banking Technology (MBT) in Nigeria-the ratio of total deposit to gross domestic product served as a proxy for financial inclusion. By employing the pairwise Granger causality test, the researchers analyzed the data and discovered a significant and influential relationship between the digital banking model and financial inclusion in Nigeria. Consequently, the study suggests that incorporating more mobile and internet-based banking services can enhance financial inclusion in the country despite the challenges faced by Nigerian banks.

In their study, they employed econometric techniques to investigate the relationship between financial service accessibility and economic growth in Nigeria. Data spanning 40 years from 1981 to 2021, including the number of bank branches, Automated Teller Machine (ATM) usage, and the volume of deposit accounts, were collected and analyzed using panel unit root, Granger causality, and regression methods. The regression analysis yielded significant positive effects of various indicators of financial service accessibility on Nigeria's economic growth.

Additionally, the Granger causality test revealed a one-way causality running from economic growth to financial service accessibility, suggesting that as the Nigerian economy expands, accessibility to financial services also increases. Consequently, the study concludes that financial service accessibility exerts a positive impact on economic growth in Nigeria. As a recommendation, the authors suggest that the federal government should foster the establishment of low-cost financial centers across the country to provide informal banking services to underserved populations in rural areas.

3. Methodology

The data was sourced from secondary sources, primarily relying on documentation. The instrumental collection of secondary data was facilitated through the Central Bank of Nigeria (CBN) statistical bulletin. Utilizing secondary sources offers a solid foundation for purposeful research, providing a well-informed direction for the study. To ensure a robust analysis of the acquired data, the study employs the multivariate regression analysis technique utilizing E-Views version 9.0.

The analytical framework encompasses conducting a unit root test to assess the stationarity of the variables, a crucial step in time series analysis, and employing the Ordinary Least Square regression method to explore the short-run relationships between the dependent and independent variables. This statistical approach enables a comprehensive examination of the initial associations between the variables. The functional relationship between financial inclusion and economic growth in Nigeria is represented as follows:

$$RGDP = f(Deposit\ Accountholder, Bank\ Branches, ATM\ Usage)$$

Econometrically, it is specified as follows:

$$\text{RGDP} = X_0 + \beta_1\, DEP + \beta_2\, BBS + \beta_3\, ATM + \mu$$

Where,

RGDP = Real Gross Domestic Product (Economic growth)
DEP = Deposit account
BBS = Bank branches
ATM = Automated Teller Machine usage
X_0 = Intercept
$\beta_1 - \beta_3$ = Coefficient of regression
μ = Error term

The coefficients of regression β_1, β_2 *and* β_3 elucidate how a unit change in the independent variables (Deposit Account Holders, Bank Branches, and ATM Usage) impacts the dependent variable (Real Gross Domestic Product or Economic Growth). The incorporation of the error term μ accommodates other influential factors that may affect economic growth but are not explicitly accounted for in the model. This comprehensive approach aims to provide a nuanced understanding of the intricate relationship between financial inclusion components and economic growth in Nigeria.

4. Results and Discussions

4.1. Trend Analysis of Financial Inclusion and Economic Growth in Nigeria

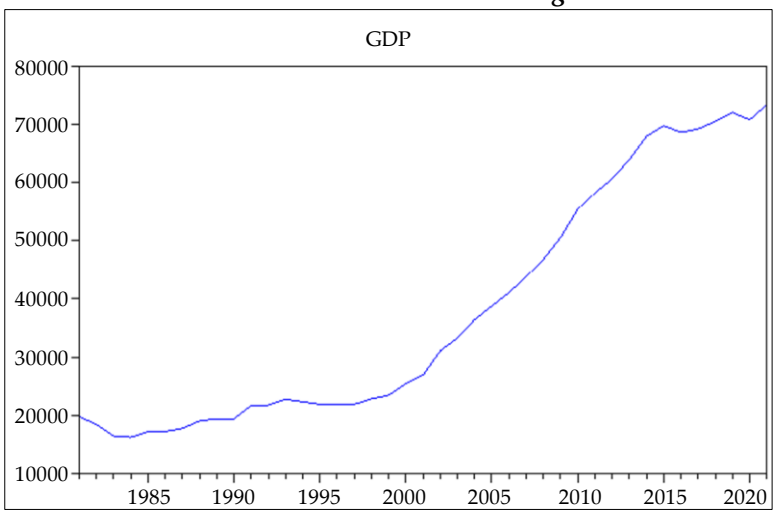

Fig. 1 Trend analysis of Nigeria's Gross Domestic Product (GDP), 1980-2020

Figure 1 illustrates the trajectory of Nigeria's Gross Domestic Product (GDP) over the three-decade span from 1980 to 2020. Noteworthy shifts in economic performance are evident, shaping the country's financial landscape. In 1985, the GDP stood below 20,000, marking an economic baseline. By the year 2005, a substantial surge catapulted the GDP to exceed 30,000. The growth trend persisted, with the GDP surpassing 70,000 in 2020. This evolution in economic output reflects a dynamic and resilient economy, responding to various internal and external factors.

The nexus between economic growth and improved living standards is evident in Nigeria's GDP per capita, witnessing a remarkable 150% surge between 1990 and 2015—from US$400 to over US$1000 [13]. This surge underscores the positive correlation between economic expansion and an enhanced quality of life for the populace. Anticipating future developments, [24] project a substantial growth rate for Nigeria's GDP in the coming decade. The anticipated growth is poised to fuel financial inclusion initiatives further. While challenges persist, particularly in the non-oil sector, prospects for sustained economic growth remain promising. The government's commitment to diversification, emphasizing sectors such as manufacturing, agriculture, and tourism, is poised to be a key driver of economic development.

To catalyze this diversification, the regulatory environment is expected to become more favorable for foreign investors exploring opportunities in Nigeria. The government's focus on creating an enabling business climate, coupled with ongoing reforms to enhance access to finance, improve the overall business environment, and enhance transparency, underscores a commitment to fostering economic growth. These strategic initiatives not only bode well for domestic companies but also serve as an invitation for foreign investors to contribute to Nigeria's economic prosperity. In summary, Figure 1 encapsulates the dynamic nature of Nigeria's GDP over the years, showcasing the country's resilience, growth potential, and concerted efforts towards achieving economic diversification and inclusive prosperity.

The trajectory of the Number of Bank Branches (Figure 2) in Nigeria illustrates a notable growth, starting from less than 1000 branches in 1980 and surpassing 3000 in 2004. The pivotal recapitalization policy of the apex bank in 2005 triggered a significant decline in the number of bank branches, only to witness a subsequent surge surpassing 6000 branches in 2020. While the overall count has increased, recent times have seen a reduction in the number of bank branches, influenced by various factors [28]. Among these factors, high branch density and the substantial cost associated with maintaining branch offices stand out. The intensified concentration of bank branches in urban

areas, driven by high branch density, has resulted in a disparity, with rural areas and small towns being underserved. This urban-centric approach poses challenges in extending financial services to the predominantly unbanked rural population. Additionally, the exorbitant costs tied to branch maintenance make it economically unfeasible for financial institutions to establish new branches in various locations across Nigeria [17].

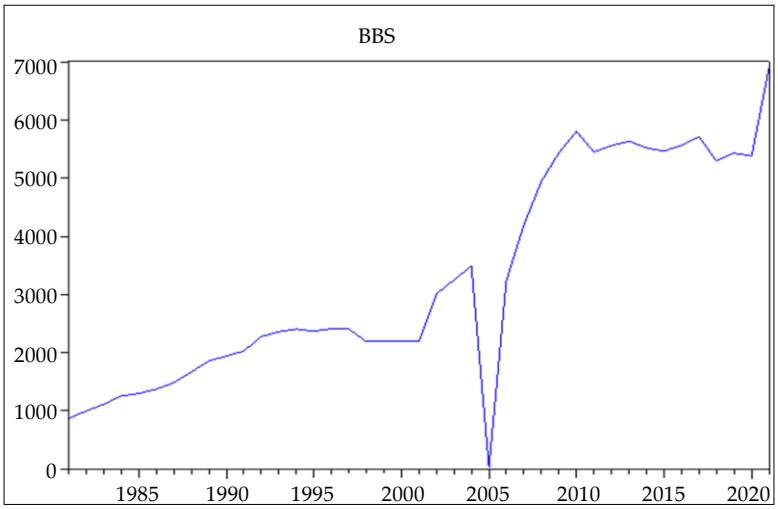

Fig. 2 Trend analysis of the number of bank branches in Nigeria

The increased cost of maintaining branches has prompted banks to strategically reduce their branch count strategically, aiming to optimize operational costs and enhance overall profitability. This trend is further accentuated by consolidation within the banking sector, as witnessed in mergers between major players. Notable examples include the merger of Diamond Bank Plc with Access Bank Plc, forming Diamond-Access Bank Plc with approximately 5300 branches, and the merger between GTBankPlc and Heritage Bank Plc, creating GTBank-Heritage Bank Plc boasting around 8700 branches nationwide [1]. Moreover, certain banks have withdrawn from the market due to challenges such as low profitability and inadequate capital management. The withdrawal of the Union Bank of Nigeria in 2018 serves as an illustration, prompted by poor financial performance and an inability to meet regulatory capital requirements set by the Central Bank of Nigeria. This withdrawal resulted in the closure of specific branches and business lines.

Another significant contributor to the decline in the number of bank branches is the escalating popularity of mobile banking services. The convenience and ease of use associated with mobile banking have fueled its adoption, allowing customers to conduct various transactions anytime and anywhere in Nigeria. The ubiquity of mobile banking has facilitated activities such as money transfers through mobile phones or smartwatches, diminishing the imperative of physical visits to bank branches.

Figure 3 illustrates the dynamic evolution of Automated Teller Machines (ATMs) in Nigeria. The introduction of ATMs in 2010 marked the inception of a significant transformation in the country's financial landscape, a transformation that has manifested in a consistent growth trajectory. As depicted in the figure, the number of ATMs has steadily increased over the years, reaching a noteworthy total of 11,229 in 2016. This equates to an impressive annual growth rate of approximately 41%. The data underscore the pivotal role that ATMs have come to play in the daily lives of both individuals and businesses in Nigeria.

ATMs have evolved into indispensable tools, serving as a preferred and convenient channel for a myriad of financial transactions. Individuals and businesses now heavily rely on ATMs for routine activities such as withdrawals, deposits, and inter-account transfers.

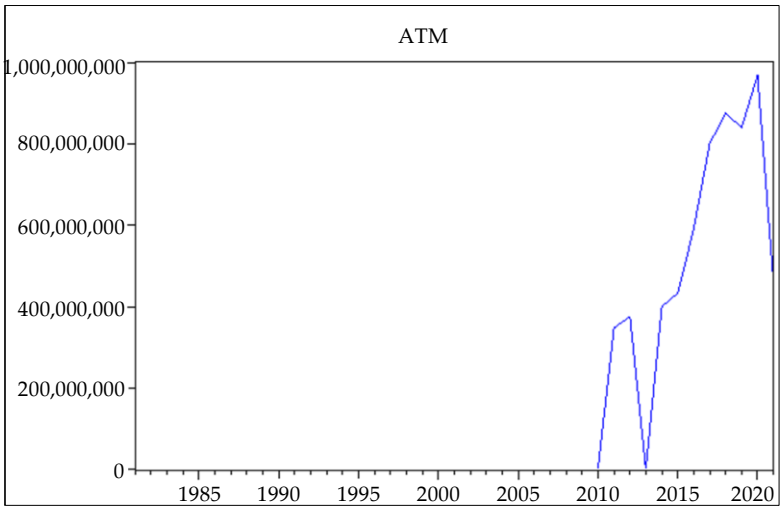

Fig. 3 Growth trend of Automated Teller Machines (ATMs) in Nigeria

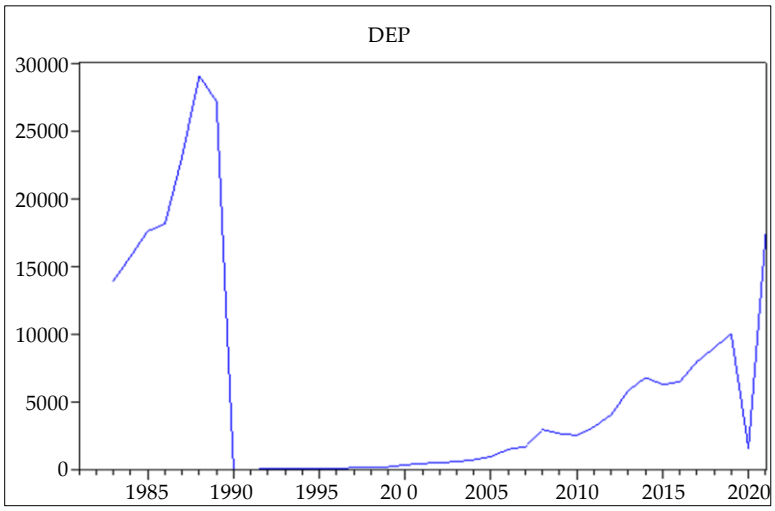

Fig. 4 Trend analysis of the deposit account holders in Nigeria

The proliferation of ATMs signals a significant shift away from traditional, cash-based methods like cash and cheques. The accelerated adoption of ATMs is emblematic of a broader societal acceptance of modern technology in Nigeria's financial landscape. This shift is not only a testament to the convenience afforded by ATMs but also reflects a growing preference for electronic transactions over traditional methods.

Furthermore, the surge in ATM usage has contributed to a reduction in the necessity for individuals to carry large sums of cash, enhancing both security and convenience in day-to-day transactions. Beyond convenience, ATMs have proven to be safe and secure, safeguarding users' personal financial information and mitigating the risks associated with theft or misuse. In essence, the growth of ATMs in Nigeria mirrors the transformative impact of modern technology on the financial behaviors and preferences of the populace, ushering in an era where digital channels like ATMs are pivotal in shaping the financial landscape.

The trajectory of deposit account holders within Nigerian banks has been a focal point of concern, prompting initiatives such as the establishment of the Nigeria Deposit Insurance Cooperative (NDICO) and the implementation of the National Financial Inclusion Strategy (NFIS) in Nigeria [14]. In 1990, a significant drop in the number of deposit accounts occurred, attributed to the liquidation and winding up of numerous banks due to

mismanagement and poor corporate governance practices. Subsequently, the Nigerian financial market witnessed the establishment of new banking institutions, leading to a substantial increase in the number of deposit accounts.

Despite this surge, challenges persist within the Nigerian banking sector, necessitating targeted interventions to foster increased participation in deposit accounts. Figure 4 illustrates the trend of deposit accounts in Nigerian banks. Notably, there has been a consistent upward trajectory since 2005, with a substantial spike in 2020. This surge was catalyzed by the government's financial inclusion program, a strategic measure aimed at broadening financial access. The continuous growth in deposit accounts is further propelled by the introduction of innovative products and services by banks, coupled with heightened competition among financial institutions to attract new customers.

However, the banking industry in Nigeria grapples with persistent challenges, hindering optimal engagement with potential depositors. Notably, a primary obstacle is financial illiteracy, contributing to low financial literacy levels among the public. Many individuals lack comprehensive knowledge about the diverse array of financial products offered by banks, resulting in hesitancy to open accounts due to concerns about potential fraudulent activities by unscrupulous entities. To mitigate this challenge, there is a crucial need for government-led initiatives aimed at public education. Focused efforts should educate the general public about various financial products and raise awareness about the risks associated with utilizing unregulated providers. This strategic approach is integral to fostering a more informed and empowered public, encouraging greater participation in deposit accounts and ultimately enhancing the resilience and inclusivity of the Nigerian banking sector.

4.2. Descriptive Result

Table 1. Relationship between financial inclusion and economic growth in Nigeria

	GDP	BBS	ATM	DEP
Mean	65481.30	5632.538	4.68E+08	6436.549
Median	68652.43	5526.000	4.34E+08	6271.160
Maximum	73382.77	6918.000	9.68E+08	17346.13
Minimum	50564.26	5301.000	60133.61	1602.760
Std. Dev.	7131.087	409.9326	3.37E+08	4190.057
Skewness	-0.857796	2.583318	-0.063340	1.283819
Kurtosis	2.474558	8.798378	1.852801	4.542911
Jarque-Bera	1.743811	32.67079	0.721561	4.860559
Probability	0.418154	0.000000	0.697132	0.088012
Sum	851256.9	73223.00	6.09E+09	83675.14
Sum Sq. Dev.	6.10E+08	2016537.	1.37E+18	2.11E+08
Observations	13	13	13	13

Source: *Extracted from E-view 9.0 Output*

The descriptive statistics in Table 1 portray a normal distribution within the sample data. The mean GDP, standing at 65481.30, coupled with a kurtosis of 2.474558 and a standard deviation of 7131.087, attests to the distribution's normality. The skewness of -0.857796 indicates a negative skew, suggesting that a majority of the sample group exhibited a higher GDP than the median percentage of the population. The median GDP within the sample was recorded at 68652.43, reinforcing the inference that a substantial portion of the sample possessed a GDP exceeding the median of the population.

Likewise, the normal distribution assumption holds for the mean Number of Bank Branches, measuring at 5632.538, with a kurtosis of 8.798378 and a standard deviation of 409.9326. A positive skewness of 2.583318 indicates a rightward skew, highlighting that the data were positively skewed. The median number of bank branches in the sample group further supports the normal distribution inference, registering at 5526.000.

Examining the volume of Automated Teller Machines (ATMs), with a mean of 4.68E+08, a kurtosis of 1.852801, and a standard deviation of 3.37E+08, the normal distribution assumption remains valid. A slightly negative skewness of -0.063340 suggests a minimal leftward skew in the data. The median volume of ATMs in the sample group, recorded at 4.34E+08, aligns with the overall normal distribution inference.

Moreover, the number of Deposit Accounts in the sample data, with a mean of 6436.49, a kurtosis of 4.542911, and a standard deviation of 4190.057, reinforces the likelihood of a normal distribution. A positive skewness of 1.283819 indicates a rightward skew in the data. The median number of deposit accounts, standing at 6271.160 within the sample group, further supports the contention of a normal distribution in the dataset.

4.3. Stationarity Test Result

Table 2. Unit root test for financial inclusion and economic growth in Nigeria

	D(RGDP)	D(BBS)	D(ATM)	D(DEP)
ADF Statistics	-8.547149	-8.193022	-4.8683121	-5.577854
1%	-3.615588	-3.610453	-3.259808	-3.621023
5%	-2.941145	-2.938987	-2.771129	-2.943427
Probability	0.0000	0.0000	0.0019	0.0000

Source: *Extracted from E-view 9.0 Output*

In this study, the Augmented Dickey-Fuller (ADF) test served as the diagnostic tool for stationarity assessments pertaining to economic growth and financial sector development variables. The comprehensive results are presented in Table 2. Upon scrutiny of the table, a discernible pattern emerges: all the variables associated with economic growth and financial sector development exhibited non-stationarity at their respective levels. However, a notable shift occurred, revealing stationarity at the first difference. This noteworthy transition signifies that all the series under investigation possess an order of integration, denoted as I(1).

This conclusion is substantiated by the observed phenomenon where the absolute values of the ADF test statistics surpass the critical values determined by MacKinnon at both the 1% and 5% levels of significance. The elevated test statistics indicate the absence of unit roots within the dataset, affirming the stationarity of the variables at the first difference. This critical insight forms the basis for subsequent analyses, ensuring the reliability and appropriateness of the data for further econometric modeling and interpretation.

4.4. Ordinary Least Square Result

Table 3. Relationship between financial inclusion and economic growth in Nigeria

Variables	Coefficient	Std. Error	t-Statistic	Prob.
C	56180.02	23816.09	2.358911	0.0427
BBS	-0.403789	4.437016	-0.091005	0.9295
ATM	1.31E-05	3.97E-06	3.302937	0.0092
DEP	0.843930	0.446126	1.891684	0.0911
R-squared	0.795031	Mean dependent var		65481.30
Adjusted R-squared	0.726707	S.D. dependent var		7131.087
S.E. of regression	3727.947	Akaike info criterion		19.53276
Sum squared resid	1.25E+08	Schwarz criterion		19.70659
Log-likelihood	-122.9630	Hannan-Quinn criter.		19.49703
F-statistic	11.63633	Durbin-Watson stat		1.122486
Prob(F-statistic)	0.001886			

Source: *Extracted from E-view 9.0 Output*

The outcomes of the Ordinary Least Squares (OLS) regression analysis are detailed in Table 3. Notably, the robust R-squared value of 0.79 signifies that 79% of the variability in the dependent variable (RGDP) can be explained by the independent variables. Crucially, the statistical significance at the 1% level, as indicated by the F-statistics, underscores the meaningful distinction between predicted and observed results. The findings underscore a compelling positive association between financial inclusion and economic growth in Nigeria. Specifically, the volume of Automated Teller Machines (ATMs) demonstrates significance at the 5% level and exhibits a positive correlation with economic growth. This suggests that the quantity of ATMs, a pivotal element of financial inclusion, exerts a discernible impact on Nigeria's economic growth.

Additionally, the frequency of ATM usage holds significance at the 10% level, positively influencing growth in the country. This outcome accentuates the role of frequent ATM utilization as a crucial facet of financial inclusion in shaping economic growth. Notably, this discovery aligns with prior research findings [2, 3].

For instance, [4] contends that financial access plays a pivotal role in a country's growth trajectory, acting as a conduit through which financial opportunities become accessible to individuals and businesses within an economy. Similarly, [25] asserts that an increase in financial inclusion significantly propels the Gross Domestic Product Growth rate of Nigeria. Further analysis reveals that the number of deposit account holders, serving as an indicator of financial inclusion, is statistically significant at the 10% level and displays a positive relationship with economic growth. This suggests that the number of deposit accounts, a critical dimension of financial inclusion, wields influence over economic growth in Nigeria. This finding echoes the conclusions drawn from earlier studies [2, 3].

For instance, [3] suggests no discernible relationship between financial inclusion and economic development in emerging economies like Nigeria. However, contrasting viewpoints posit that financial inclusion can indeed catalyze economic growth by expanding access to capital markets. Given that the number of deposit accounts closely aligns with the population's access to savings and investment services, the present result implies that an

expanded cohort with access to the financial system will catalyze economic growth in Nigeria. This reinforces the pivotal role of financial inclusion in fostering economic prosperity and aligns with the broader discourse on the transformative potential of inclusive financial systems.

4.5. Causality Test

Table 4. Effect of financial inclusion and economic growth in Nigeria

Null Hypothesis	Obs	F-Statistic	Prob.
BBS does not Granger Cause RGDP	39	0.38016	0.6866
RGDP does not Granger Cause BBS		4.78824	0.0147
ATM does not Granger Cause RGDP	11	0.12960	0.8808
RGDP does not Granger Cause ATM		0.70016	0.5330
DEP does not Granger Cause RGDP	37	1.84346	0.1747
RGDP does not Granger Cause DEP		1.19952	0.3145
ATM does not Granger Cause BBS	11	0.05647	0.9456
BBS does not Granger Cause ATM		0.40391	0.6846
DEP does not Granger Cause BBS	37	0.09423	0.9103
BBS does not Granger Cause DEP		0.13906	0.8707
DEP does not Granger Cause ATM	11	3.39697	0.1031
ATM does not Granger Cause DEP		0.25425	0.7834

Source: *Extracted from E-view 9.0 Output*

The Granger causality test results presented in Table 4 indicate unidirectional causation from the number of bank branches to RGDP. This finding suggests that as the number of bank branches increases, there is a corresponding increase in RGDP. In essence, a discernible effect of one variable on another is observed. The outcomes of the Granger causality test provide compelling evidence supporting the existence of a causal relationship between the number of bank branches and GDP.

5. Conclusion

The banking industry in Nigeria undeniably plays a pivotal role in the nation's economic development by serving as a crucial channel for facilitating monetary transfers within the economy. Additionally, it serves as a significant source of revenue for the government through various taxes imposed on financial transactions. However, to foster inclusive growth and enhance the living standards of the population, it is imperative to address the challenges hindering the development of the banking sector in Nigeria. Challenges stem from excessive regulations and poor infrastructure, contributing to the elevated cost of banking services. A substantial percentage of the population lacks access to financial services, with over 70 million people without a bank account.

To counter these challenges and promote financial inclusion, the Nigerian government, as part of its National Financial Inclusion Strategy, has prioritized the establishment of "bankless societies." This objective is pursued through several programs aimed at leveraging Automated Teller Machines (ATMs) to provide access to financial services for the unbanked population. Based on the conclusions, the following recommendations are proffered:

i. Encourage the federal government to facilitate the establishment of low-cost financial centers nationwide, especially in rural areas, to provide informal banking services to underserved populations.
ii. Advocate for operators of automated teller machines to lower transaction fees, incentivizing more Nigerians to utilize ATMs for transactions instead of traditional banking methods.
iii. Urge the government to enact new laws aimed at reducing the operational costs of ATM machines. Measures should include tax and duty reductions, as well as cost reductions in electricity and other utilities.
iv. Enforce minimum quality standards for all existing ATM operators to ensure the safety of customers and their financial information.
v. Provide special incentives to encourage more individuals to open bank accounts, steering those currently relying on informal money lenders toward formal financial institutions to mitigate risks associated with unlicensed moneylenders.
vi. Undertake a concerted effort to promote greater financial literacy among the adult population. Enhancing understanding of financial services will empower individuals to meet personal needs and elevate their standards of living.

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