

ADVANCING SUSTAINABLE DEVELOPMENT THROUGH DIGITAL FINANCIAL INCLUSION: EVIDENCE FROM NIGERIA

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ABSTRACT

This study investigated the impact of digital financial inclusion in achieving sustainable development in Nigeria. An ex post facto research design was adopted utilizing quarterly secondary data from 2012Q1 to 2024Q4. Data were sourced from the Central Bank of Nigeria Bulletin, National Bureau of Statistics (NBS) Data Warehouse and World Bank. The study employed econometric techniques, including stationarity tests and regression analysis, to assess the relationship between digital financial inclusion indicators; WEB, MBP, POS; and household consumption expenditure (CSP) in relation to sustainable development (GDP per capita). Findings revealed that mobile banking payments significantly and positively impact sustainable development, while POS have a statistically significant negative impact. Web-based payments with a negative coefficient, and CSP with a positive coefficient showed limited statistical relevance. Based on these insights, the study recommended scaling mobile banking infrastructure, reevaluating POS deployment strategies, expanding digital literacy and internet across and integrating financial inclusion with broader social programs.

Keywords: Digital Financial Inclusion, Poverty Alleviation, Sustainable Development

I. INTRODUCTION

Sustainable development represents an integrated framework that balances economic growth, social equity, and environmental preservation (Sinakou, Goossens & Petegem, 2018). In light of escalating global challenges such as climate change, land degradation, resource exhaustion, and biodiversity loss, there is an urgent need for coordinated action (Yan et al., 2018; Tost et al., 2018). Issues like poverty, hunger, and inadequate healthcare highlight the persistent gaps in meeting basic human needs. True sustainability involves providing essential services like food, clean water, and healthcare without placing undue strain on the planet's ecosystems, thereby fostering meaningful social transformation.

To steer this global shift, the United Nations introduced the 2030 Agenda for Sustainable Development, which outlines a roadmap toward a more inclusive and resilient economy (Elum, Modise & Nhamo, 2017). Traditionally, the financial sector has focused on allocating capital to its

most productive uses. However, Sustainable Finance broadens this perspective by examining how financial activities such as investments and lending intersect with environmental, social, and economic concerns (Schoenmaker, 2017). Since both finance and sustainability are future-oriented, there is potential for strategic alignment between the two.

On the other hand, digital finance has become instrumental in raising income levels, particularly among disadvantaged populations. Digital financial inclusion has emerged as a key driver of economic empowerment and poverty alleviation (Iwedi, Wachuku & Amadi, 2024). By integrating digital tools with inclusive financial practices, this approach enhances efficiency and expands access to financial services. However, despite these benefits, approximately 1.7 billion people globally remain outside the formal financial system many of whom are women, rural residents, and informal workers (Iwedi, Wachuku & Amadi, 2024).

According to Oyedele and Alhassan (2022), digital financial inclusion (DFI) is a modern advancement in financial development that uses technology to extend formal financial services to underserved populations. Unlike traditional banking, which is limited to basic functions like savings and loans, DFI leverages digital platforms to create broad access at low cost. This model enables rapid and inclusive growth, even in remote areas. With internet connectivity acting as a catalyst, DFI accelerates economic development and supports sustainability goals (Liu et al., 2021). Digital finance such as ATMs, POS terminals, and mobile payment systems have significantly reshaped the financial landscape. These innovations have expanded access to financial services, especially in rural and marginalized communities where conventional banking infrastructure is limited (Ozili, 2021).

Yet, despite ongoing efforts, Nigeria continues to grapple with severe poverty, driven by factors such as uneven economic growth, limited investment in human capital, fragile labor markets, and exposure to external economic shocks (Iwedi, Wachuku & Amadi, 2024). According to the Nigeria Bureau of Statistics (NBS), poverty levels have fluctuated significantly rising from 27.2% in 1980 to a peak of 69.0%, before declining to 40.1% in 2020, which translates to roughly 82.9 million people living in poverty. In response to these challenges, mobile money platforms have gained traction as affordable and accessible financial tools, helping many low-income Nigerians engage with formal financial systems. Nevertheless, the World Bank (2018) notes that access to these services remains limited across the country.

Furthermore, the absence of a robust banking infrastructure particularly affects rural communities, limiting their ability to participate in formal financial activities and benefit from opportunities like cross-border digital trade. As poverty reduction becomes a central theme in academic discourse, scholars increasingly advocate for digital financial inclusion as a strategic pathway to promote sustainable development. Yet, poverty remains deeply entrenched, with a substantial portion of the population still living below the poverty threshold in Nigeria (Agba et al., 2024).

In addition to digital financial inclusion (DFI) gaining recognition as a transformative approach to poverty alleviation, offering low-cost, scalable financial services to underserved populations (Ozili, Ademiju & Rachid, 2023); persistent issues such as high unemployment, low earnings, and limited financial access continue to hinder economic progress and further exacerbate poverty, as highlighted by Ezeudu and Tukur (2024). Given the urgency of these challenges, it is essential to explore the broader implications of digital financial inclusion and poverty on Nigeria's sustainable development trajectory.

Consequently, previous studies have used GDP per capita as a proxy for measuring sustainable development in Nigeria. For instance, Okunlola, Alatise, and Ogunniyi (2020), as well as Orekoya (2022), focused on traditional financial inclusion, while Abdulkareem, Jimoh, and Shasi (2023) examined the influence of poverty reduction and social inclusion on sustainable development from 1970 to 2019 using the same economic indicator.

Building on this foundation, the present study seeks to assess how digital financial inclusion and poverty alleviation contribute to sustainable development in Nigeria, using GDP per capita as a key metric.

II. LITERATURE REVIEW

Sustainable Development

Contemporary discussions on sustainable development emphasize the integration of economic progress, social equity, and environmental preservation for the benefit of future generations. Johnson et al. (2023) describe sustainable development as a guiding framework that seeks to fulfill human development goals while ensuring that natural ecosystems continue to provide essential resources and services. The concept aims to strike a balance between economic growth, environmental sustainability, and social well-being.

Development economists argue that building an inclusive financial system—where basic financial services are accessible to all is essential for promoting sustainable development (Sain, Rahman & Khanam, 2016, as cited in Adebisi, Zannu & Dada, 2023). Improving access to credit, savings, insurance, and risk management tools can enhance productivity and support the growth of small and medium-sized enterprises, which are vital to economic resilience.

Soyemi, Olusola, and Lateef (2020) identify several Sustainable Development Goals (SDGs) that align with this vision, including reducing hunger, promoting food security, improving health outcomes, advancing education, addressing gender inequality, and encouraging responsible consumption and inclusive economic growth across UN member states.

Although GDP per capita does not directly measure sustainability, the UN Department of Economic and Social Affairs recognizes it as a key indicator of economic development. It reflects consumption patterns, resource use, and overall economic health. Coscieme et al. (2020) employed GDP per capita as a proxy for sustainable development, particularly in relation to SDG 8, which focuses on decent work and economic growth

Financial Inclusion

Financial inclusion is widely recognized as a cornerstone in the fight against poverty and a catalyst for sustainable development. It refers to the process by which individuals and businesses particularly those from marginalized or low-income backgrounds gain access to financial products and services that are affordable, relevant, and tailored to their needs (Eldomiaty, Hammam & Bakry, 2020). According to Ehiogu (2022), financial inclusion encompasses a broad spectrum of services, including transactions, savings, credit, insurance, and payments, all delivered in a responsible and sustainable manner.

Empirical studies underscore the positive impact of financial inclusion on economic growth and poverty reduction. Ma'ruf and Aryani (2019) argue that access to financial services empowers individuals to invest in education, healthcare, and entrepreneurial ventures, thereby improving their socioeconomic status. Similarly, Erlando, Riyanto, and Someya (2020) emphasize that financial inclusion enhances economic opportunities and quality of life by providing low-income individuals and small businesses with essential financial resources.

Digital Financial Inclusion

The emergence of digital financial services (DFS) has significantly expanded the reach of financial inclusion. Nkechika (2022) highlights the transformative role of technology and data in democratizing access to financial solutions that were once limited to select groups. Digital finance now offers a diverse array of services including credit, savings, insurance, investment platforms, and retirement schemes delivered through mobile phones, point-of-sale (POS) terminals, internet banking, NEFT systems, and agent networks. These innovations have reshaped business operations and accelerated Nigeria's transition toward a cashless economy.

As of 2020, over half of Nigeria's population engaged with formal financial services, including electronic payments, credit, insurance, pensions, and investment products. Notably, Nkechika (2022) reports that 81% of the 38 million financially excluded Nigerians reside in rural areas, with 61% owning mobile phones. This presents a significant opportunity to expand financial access through mobile technology. Moreover, targeting feature phone users who often rely on USSD services can further extend the reach of digital financial inclusion to underserved communities.

While digital finance has played a pivotal role in enhancing financial access across Nigeria. Ozili (2021) notes the widespread availability of Automated Teller Machines (ATMs), which offer essential banking services such as withdrawals and balance inquiries. Adedotun et al. (2024) highlight the proliferation of POS terminals, which have revolutionized cashless transactions for small and medium-sized enterprises (SMEs). Mobile payment platforms, including mobile money services, have also enabled users to perform financial operations without the need for traditional bank accounts.

Andrew, Ozobialu, and Nduokafor (2024) argue that these technologies contribute meaningfully to poverty alleviation by reducing transaction costs, enhancing financial literacy, and expanding access to financial services. Mobile payment systems, in particular, have empowered previously unbanked individuals to save, invest, and manage their finances more effectively, fostering economic resilience. Despite these advancements, challenges remain in fully leveraging digital financial tools to address poverty in Nigeria.

Poverty Alleviation and Rate in Nigeria

Poverty, often defined by limited financial resources and substandard living conditions, remains a pressing social concern in Nigeria (Umar, 2013). As a developing nation, Nigeria faces widespread poverty that significantly affects the well-being of its citizens (Ogbeide & Igbinigie, 2019). Addressing this issue requires a coordinated effort between government policies and citizen participation. Theoretically and empirically, the factors influencing poverty alleviation are critical to understanding how to achieve lasting improvements. Poverty alleviation encompasses a range of economic and humanitarian strategies aimed at permanently lifting individuals out of poverty and improving their living standards (Onaolapo, 2015).

According to Andrew, Ozobialu, and Nduokafor (2024), citing Aliu (2023), data from Statista and the World Bank reveal a sharp increase in Nigeria's poverty rate from 46.7% in 2010 to 69.0% in 2012 largely due to economic instability, rising inflation, and poor infrastructure. These conditions disproportionately affected vulnerable populations and highlighted the challenges of managing Nigeria's economy amid global pressures. Although poverty rates fell to 33.1% in 2013, this improvement was short-lived, with stagnation persisting through 2014 and 2015. In 2016, the rate spiked to 62.6%, reflecting the impact of a severe recession triggered by falling oil prices and internal unrest. This period underscored the fragility of Nigeria's oil-dependent economy.

Between 2017 and 2019, poverty levels declined gradually, stabilizing at 40.1%. However, this still reflected deep-rooted economic challenges and regional disparities, particularly between the northern and southern regions. The COVID-19 pandemic further exacerbated poverty in 2020 and 2021, with the rate remaining at 40.1% due to widespread job losses and declining household incomes. By 2022, the poverty rate edged up to 40.7%, leaving approximately 88.4 million

Nigerians in extreme poverty. This slight increase highlights persistent issues such as inflation and the absence of robust social safety nets.

This study explores how digital financial inclusion technologies specifically internet banking, mobile platforms, and POS systems, poverty alleviation schemes have contributed to sustainable development in Nigeria. It evaluates how these innovations have expanded access to financial services, created economic opportunities, and supported efforts to lower poverty levels. Previous research by Okoye and Chima (2023), Onyejiaku et al. (2024), and Iwedi, Wachuku, and Amadi (2024) has used household consumption expenditure as a proxy to measure the effectiveness of poverty alleviation strategies.

Theoretical Review

To examine the interplay between digital financial inclusion, poverty alleviation, and sustainable development in Nigeria, this study draws upon two foundational theories:

Financial Inclusion Theory

This theory positions financial inclusion as a key driver of economic advancement and a strategic tool for reducing poverty. By granting individuals and households access to financial services, they gain the ability to manage resources effectively, invest in long-term goals, and protect themselves against financial uncertainties. Allen, Demircuc, and Klapper (2020) emphasize that access to financial tools plays a significant role in lifting people out of poverty. The theory rests on the idea that financial exclusion perpetuates poverty cycles, whereas inclusive financial systems open doors to economic empowerment and household resilience

Amartya Sen's Capability Approach

Sen's Capability Approach offers a human-centered framework that focuses on individuals' freedoms and their capacity to achieve valued outcomes (Sen, 1999). Rather than defining poverty solely by income, this approach views it as a deprivation of essential capabilities (Alkire & Deneulin, 2009). In the context of Nigeria, this framework is useful for evaluating how financial inclusion technologies either enhance or limit the capabilities of those living in poverty. By facilitating access to savings, credit, and investment opportunities, these technologies can empower individuals to improve their education, start businesses, and manage risks ultimately contributing to their overall well-being

Empirical Review

A study conducted in Indonesia by Sriyana (2025) investigated poverty alleviation strategies within the Daerah Istimewa Yogyakarta province, aligning with the Sustainable Development Goal (SDG) 1: No Poverty. Utilizing the multidimensional poverty framework, the research identified several determinants of poverty, including economic growth, wage levels, unemployment, human capital quality, and government expenditure. Based on panel data from 2014 to 2023 and analyzed through panel regression techniques, the findings revealed that local governments effectively reduced poverty by implementing minimum wage policies, investing in human resource development, and directing public spending toward poverty reduction initiatives.

In Nigeria, Bello, Oladimeji, and Aina (2025) explored the transformative potential of digital technologies across key sectors such as agriculture, education, governance, healthcare, finance, and manufacturing. Their study emphasized the role of digital innovation in driving economic growth and sustainable development. Although the paper outlined promising implications for Nigeria's digital transformation, it lacked empirical validation.

Onyejiaku, Ngong, Kum, and Nebasi (2024) assessed the impact of digital financial inclusion on poverty across emerging African economies from 1997 to 2023. Using indicators such as ATMs, mobile payments, and mobile money transactions, and household consumption expenditure as a proxy for poverty reduction, the study found that ATMs and mobile money positively influenced poverty alleviation. Interestingly, mobile payments showed a negative effect, suggesting that not all digital financial tools yield uniform benefits.

In a similar vein, Andrew, Ozuobialu, and Nduokafor (2024) examined how financial inclusion technologies specifically ATMs, POS terminals, and mobile payments affect poverty reduction in Nigeria. Employing trend analysis and error correction models, they discovered that ATMs and mobile payments significantly improved financial access and economic participation among low-income groups. However, POS systems had limited impact, likely due to their restricted availability in rural and underserved areas. The study underscored the importance of financial deepening in expanding access to diverse financial services.

Okoye and Chima (2023) focused on mobile payments and their role in poverty alleviation between 2017 and 2023. Through econometric modeling, they evaluated the effects on income, household consumption, and financial access. Their comparative analysis of urban and rural contexts revealed that mobile payments enhanced financial inclusion for low-income households and small entrepreneurs, facilitating remittances, bill payments, and transactions that increased disposable income.

Similarly, Adebisi, Zannu, and Dada (2023) explored the relationship between digital payment systems and household consumption expenditure (CSP), a proxy for sustainable growth under SDG 12. Using quarterly data from NBS and CBN between 2015 and 2021, and applying OLS regression after unit root and ADF tests, the study found that ATM and mobile payments had a

positive but statistically insignificant effect on sustainable growth. Conversely, POS and web payments showed a negative, though also insignificant, impact on CSP.

In a different dimension, Abdulkareem, Jimoh, and Shasi (2023) analyzed the influence of poverty reduction and social inclusion on sustainable development in Nigeria from 1970 to 2019 using a Vector Error Correction Model (VECM). Their framework included economic indicators (GDP per capita, FDI inflows), social metrics (life expectancy, school enrollment, poverty levels, female parliamentary representation), and environmental factors (CO₂ emissions, resource endowment). Results indicated that GDP per capita, FDI, life expectancy, and school enrollment positively contributed to sustainable development, while poverty gaps, gender representation in parliament, and environmental indicators had adverse effects.

Investigating how financial inclusion acts as a pancreas for inclusive growth and sustainable development in Nigeria, Orekoya (2022) investigated the link between financial inclusion and inclusive growth in Nigeria using the Autoregressive Distributed Lag (ARDL) model. The study found a long-term relationship between financial inclusion and inclusive growth indicators. While financial inclusion increased output per employed person and gross national income per capita, it also deepened age dependency and contributed to higher CO₂ emissions. The findings suggest that accessible and affordable financial services are essential for sustainable development.

Literature Gap

While existing empirical research has explored the relationships among financial inclusion, digital financial services, economic growth, poverty alleviation, and sustainable development, there remains a notable gap in the literature. Specifically, few studies if any, have examined the combined effect of digital financial inclusion and poverty alleviation on sustainable development, particularly within the Nigerian context. This study seeks to address that gap by investigating how these two factors jointly influence Nigeria's progress toward sustainability goals.

III. METHODS

Research Design

This study employs an *Ex Post Facto* research design, relying exclusively on secondary data to analyze historical trends and relationships. Econometric techniques are applied to assess the influence of digital financial inclusion and poverty alleviation on sustainable development in Nigeria.

Quarterly data spanning 2012 to 2024 were sourced from reputable institutions, including the Central Bank of Nigeria (CBN) Statistical Bulletin, the National Bureau of Statistics (NBS) Data

Warehouse, and the World Bank Database. These datasets provide the foundation for evaluating the dynamic interplay between digital financial channels, household consumption patterns, and indicator of sustainable development.

Model Specification

The analytical framework builds upon the model proposed by Adebisi, Zannu, and Dada (2023) and Okoye and Chima (2023), which utilized household consumption expenditure (CSP) to proxy poverty alleviation under SDG 12: Responsible Consumption and Production. This study extends and strengthens their model by incorporating CSP not only as a measure of poverty alleviation but also as a contributor to sustainable development, alongside digital financial inclusion indicators.

The functional model for the study is articulated as follows:

$$SD = f(WEB, MBP, POS, CSP) \dots\dots\dots (3.1)$$

Where:

SD = GDPC = Per capita GDP which is a proxy of sustainable development, considered one of the economic determinants of SDG 8 (Decent Work and Economic Growth)

CSP = Consumption Expenditure of Households at current price, (poverty alleviation);

WEB = Value of financial transactions made on websites or internet;

MBP = Value of Mobile Payment Transactions;

POS = Value of Point-of-Sales Payment Transactions

The relationship can be formulated into an econometric equation thus:

$$GDPC_t = \beta_0 + \beta_1(WEB)_t + \beta_2(MBP)_t + \beta_3(POS)_t + \beta_4(CSP)_t + \mu_t \dots\dots\dots (3.2)$$

To eliminate disparity in the data, the model is converted to natural logarithm, thus, equ 3.2 becomes:

$$LnGDPC_t = \beta_0 + \beta_1 LnWEB_t + \beta_2 LnMBP_t + \beta_3 LnPOS_t + \beta_4 LnCSP_t + \mu_t \dots\dots (3.3)$$

Where:

β_0 is a constant or intercept, $\beta_1, \beta_2, \beta_3$, and β_4 are regression coefficients of X1 – X4, μ is the stochastic error term. Characteristics of each variable were ascertained with the use of descriptive statistics, correlation matrix and unit root test, Ln represent natural logarithm.

The a priori expectation of this model is that all the independent variables should have a positive relationship on the dependent variable (CSP). The mathematical expression is represented as; $\beta_0 > 0$; $\beta_1, \beta_2, \beta_3$, and $\beta_4 > 0$ implying that a unit increase in the independent variables will lead to increase in GDPC by the value of the coefficient of the respective independent variables.

IV. DISCUSSION OF RESULTS

Table 4.1 Descriptive Statistics of the Data Collected on the Variables of the Subject Matter

	GDP Per Capita (GDPC) (Current US\$)	Web Payment Transactions – WEB ₦'Billion	Mobile Payment Transactions - MBP ₦'Billion	Point-of-Sales Payment Transactions ₦'Billion	Consumption Expenditure of Households @ Current Price ₦'Billion - CSP
Mean	2202.648	123.3533	15414.69	7933.933	23911.07
Median	2109.274	66.89809	454.3238	588.7156	23614.21
Maximum	3088.721	571.6205	131643.3	83527.76	41372.99
Minimum	806.9457	6.380682	1.081546	1.865365	9876.633
Std. Dev.	494.0251	135.6059	29489.07	16612.36	8071.855
Skewness	-0.405785	1.518541	2.257741	2.757393	0.205095
Kurtosis	3.491008	4.744941	7.591141	10.84288	2.307093
Jarque-Bera	1.949427	26.58215	89.84766	199.1678	1.404814
Probability	0.377300	0.000002	0.000000	0.000000	0.495391
Sum	114537.7	6414.372	801563.8	412564.5	1243376.
Sum Sq. Dev.	12447102	937837.2	4.43E+10	1.41E+10	3.32E+09
Observations	52	52	52	52	52

Source: Researcher's Computation using E-Views 12, (2026).

The descriptive statistics in table 4.1 indicates that the average mean value of GDPC is 2202.648 which means that the average GDP per Capita Income in Nigeria within the period under review is \$2202.648 million; further reported in the table, the mean of web payment transactions (WEB), mobile payment transaction (MBP), point-of-sale transactions (POS) and final consumption expenditure of households (CSP) stood at 123.3533, 15414.69, 7933.933 and 23911.07 billion naira respectively.

The maximum and minimum values show the highest and lowest figures in each of the variables; while the standard deviation shows the deviation from the sample mean, with respect of each of the variables.

Furthermore, CSP is skewed towards normality with a value less than 1 (0.205095) while WEB, MBP and POS are positively skewed (long-right tailed) with a value greater than one (1). Meanwhile GDPC, a proxy of sustainable development exhibits a negative skewness.

In addition, the kurtosis value of CSP is mesokurtic with a value less than 3 (2.307093) while the kurtosis value of GDPC, WEB, MBP and POS are leptokurtic with a value greater than 3.

Table 4.2 Correlation Matrix of the Datasets

	LN GDPC	LN WEB	LN MBP	LN POS	LN CSP
LN GDPC	1.000000	-0.780810	-0.733163	-0.777031	-0.732047
LN WEB	-0.780810	1.000000	0.937854	0.948836	0.951467
LN MBP	-0.733163	0.937854	1.000000	0.992786	0.929481
LN POS	-0.777031	0.948836	0.992786	1.000000	0.939173
LN CSP	-0.732047	0.951467	0.929481	0.939173	1.000000

Source: Researcher's Computation using E-Views 12, (2026).

Correlation values ranged from -1 to +1; where 0.75-0.99 signifies a "very strong" relationship between the intersecting variables, 0.5-0.74 implies a "strong" relationship within the intersecting variables, and 0.35-0.49 implies a "weak" relationship among variables as presented in table 4.3. As observed, there exists a strong negative relationship between sustainable development (GDPC), WEB, MBP, POS and CSP. However, it is also observed that poverty alleviation (CSP) exhibits a very strong and positive relationship with the usage of digital financial inclusion channels, portraying digital finance improves consumption expenditure. Table 2 shows the preliminary idea of the relationship that is expected to exist between the variables.

Table 4.3 Summary of Augmented Dickey-Fuller Unit Root Test Statistic

Trend and Intercept		Variables				
		LnGDPC	LnWEB	LnMBP	LnPOS	LnCSP
Level	T-Statistics	-0.963121	-3.896158	-4.254192	-4.343615	-2.930500
	Prob.	0.9399	0.0193	0.0075	0.0059	0.1626
	Results	$\{I(0)\}$	$\{I(1)\}$	$\{I(1)\}$	$\{I(1)\}$	$\{I(0)\}$
First Difference	T-Statistics	0.292132	-7.952685	-9.066448	-7.897096	-7.798457
	Prob.	0.9981	0.0000	0.0000	0.0000	0.0000
	Results	$\{I(0)\}$	$\{I(1)\}$	$\{I(1)\}$	$\{I(1)\}$	$\{I(1)\}$
Second Difference	T-Statistics	-6.258173	-8.838404	-7.387498	-10.31707	-13.55622
	Prob.	0.0000	0.0000	0.0000	0.0000	0.0000
	Results	$\{I(1)\}$	$\{I(1)\}$	$\{I(1)\}$	$\{I(1)\}$	$\{I(1)\}$

Source: Researcher' Computation using E-Views 12, (2026).

According to the ADF Unit-Root Test results, when taking the first differences of all the variables, GDPC can't be rejected as it has a unit root and is non-stationary in its original form; However, all the null hypotheses are rejected at the 5% significance level at second differencing. This means

that the series are stationary in their second difference or integrated of order one, I(2). Therefore, the relationship between variables can be analyzed using regression.

While GDPC series becomes stationary only after differencing twice, in simpler terms, the original data has strong trends or structural shifts that are not removed with just one differencing and this suggest persistent non-stationarity, which could be due to long-term economic cycles, inflationary pressures, or policy shifts affecting GDP over time.

Table 4.4 Least Square

Dependent Variable: LNGDPC

Sample: 2012Q1 2024Q4

Included observations: 52

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.446589	1.719080	3.750023	0.0005
LNWEB	-0.106306	0.060316	-1.762488	0.0845
LNMBP	0.225054	0.056177	4.006177	0.0002
LNPOS	-0.317946	0.072483	-4.386515	0.0001
LNCSP	0.220357	0.191716	1.149391	0.2562
R-squared	0.724110	Mean dependent var		7.667896
Adjusted R-squared	0.700629	S.D. dependent var		0.260186
S.E. of regression	0.142360	Akaike info criterion		-0.969702
Sum squared resid	0.952521	Schwarz criterion		-0.782082
Log likelihood	30.21224	Hannan-Quinn criter.		-0.897773
F-statistic	30.83937	Durbin-Watson stat		0.364552
Prob(F-statistic)	0.000000			

Source: Researcher's Computation using E-Views 12, (2026).

Sighting the E-views regression output in table 4.4, a keen observation of the result showed that the R-squared and Adjusted R-squared was approximately 0.72411 and 0.700629 respectively. According to the probability of the F-Statistics ($0.0000 < 0.05$), the model is statistically significant. Furthermore, a Durbin-Watson value of 0.364552 demonstrates that the model has no autocorrelation.

Interpretation of Regression Coefficients

According to Regression Coefficients, the values of the model are given below as;

$$\text{LnGDPC}_t = \beta_0 + \beta_1 \text{LnWEB}_t + \beta_2 \text{LnMBP}_t + \beta_3 \text{LnPOS}_t + \beta_4 \text{LnCSP}_t + \mu_t \dots (3.3)$$

$$\text{LnGDPC}_t = 6.447 - 0.106\text{WEB}_t + 0.225\text{MBP}_t - 0.318\text{POS}_t + 0.220\text{CSP}_t + 0.260\mu_t$$

Constant: The value of the intercept (β_0) which is 6.447 shows a statistically significant baseline level of sustainable development in Nigeria when all predictors are zero with its prob value of 0.0005 which is less than 5%.

WEB: The estimate coefficient (β_1) which is -0.106 shows an insignificant impact with its prob > 0.844. The result shows web-based payments have a negligible and negative impact on SD. In other words, a unit changes in WEB transactions will cause an insignificant decrease of 0.106 in GDP Per Capita which is a proxy of sustainable development.

MBP: The estimate coefficient (β_2) which is 0.225 is highly significant and exhibit a positive impact on GDPC with a prob < 0.0002, thus, a unit increase in mobile banking payments will strongly contribute to sustainable development.

POS: Although, the estimate coefficient (β_3) which is -0.318 is equally significant at 5% with a prob < 0.0001; this result shows that POS usage is associated with a significant decline in sustainable development by 0.318.

CSP: In contrast, the estimate coefficient (β_4) which is 0.220 is positively signed although insignificant at the 5% level as its prob > 0.2562; showing that poverty alleviation can contribute towards achieving sustainable development however, based on this result, it does not strongly predict sustainable development in this model.

Error Term: In addition, the value of 0.260 represents the stochastic error term (μ) which includes all variables that influence sustainable development in Nigeria but not included in the study.

Policy Implications

Mobile banking payments (MBP) emerges as the most impactful digital financial inclusion channel. This aligns with the theoretical framework (Sen's Capability Approach and Finance-Led Growth Hypothesis), suggesting that mobile banking empowers individuals by expanding access to financial services, enabling savings, and supporting investments, all of which foster sustainable development.

POS transactions (POS), surprisingly, show a significant negative impact. This could reflect limited rural penetration, infrastructure challenges, or usage patterns that don't translate into broader economic empowerment. This supports findings from Andrew, et al (2024), who noted POS systems' limited reach among unbanked populations.

Web payment (WEB) transactions are statistically insignificant, possibly due to low internet penetration, or digital literacy barriers in rural Nigeria. This echoes Ikechukwu (2021), who emphasized the importance of mobile over we-based platforms in Africa's informal economy.

Household consumption expenditure (CSP), while positively signed, lacks statistical significance. This may suggest that consumption alone does not drive sustainable development unless paired with inclusive financial access and productive investment, reinforcing the multidimensional nature of poverty and development, (Sriyana, 2025).

V. SUMMARY, RECOMMENDATIONS AND CONCLUSION

This study investigated the combined impact of digital financial inclusion and poverty alleviation on sustainable development in Nigeria, using GDP per capita as a proxy. Drawing from theoretical frameworks such as the Financial Inclusion Theory, and Sen's Capability Approach, the analysis revealed that mobile banking payments significantly contribute to sustainable development, while POS transactions have a negative impact. Web-based payments and household consumption expenditure (CSP) showed limited statistical significance. These findings underscore the uneven effectiveness of digital finance channels and highlight the need for targeted strategies to maximize their developmental impact.

Recommendations

Based on the findings, the following recommendations can be considered by policy makers for strategic actions:

- i. Given mobile banking strong positive impact, policymakers should prioritize mobile banking expansion especially in underserved regions. Partnership with telecoms and fintechs can help bridge access gaps;
- ii. While POS system may not be reaching or benefiting the right demographics, targeted deployment in rural areas and integration with microenterprise support programs could improve its effectiveness;
- iii. To unlock the potential of web-based payments, investment in digital education and broadband infrastructure are essential particularly in remote communities;
- iv. Since consumption expenditure of household alone does not significantly predict sustainable development, combining financial access with health education, and entrepreneurial initiatives amongst others could yield more holistic development outcomes;

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