

Digital Payments, mobile banking, insurance penetration and inclusive economic development: Evidence from Nigeria

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Abstract

Original Research Article

The study examines the relationship between digital payment transaction value, mobile banking penetration and insurance penetration and inclusive economic growth in Nigeria between 2009 and 2024 using per capita income as the proxy variable. The study adopted an ex-post facto research design, using annual secondary data sourced from the World Bank's World Development Indicators and the Central Bank of Nigeria Statistical Bulletin as the data collection instrument. Using descriptive statistics, correlation analysis, augmented Dickey-Fuller unit-root test and the Autoregressive Distributed Lag bounds-testing approach, short run and long run estimates have been developed and the bounds test shows a long run relationship among the variables. The study finds that, in the short run, digital payment transaction value and mobile banking penetration have positive and insignificant effects. In addition, insurance penetration has an important negative effect. The study also finds that in the long run, mobile banking penetration has a positive and meaningful effect, while the value of digital payment transaction and insurance penetration have meaningful negative effects. These include expanding access to mobile banking, shifting digital payments towards productive uses, and reforming the insurance market to stimulate more inclusive economic growth.

Keywords: Digital payments; mobile banking; financial inclusion; inclusive economic development; per capita income; insurance penetration, Nigeria.

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1. INTRODUCTION

Over the past one and a half decades, the role of finance technology, digital payments, mobile banking, insurance services and household welfare in a country's economy (Eguavoen & Adekunle, 2025; Ozili, 2024), have been increasingly influential in influencing the transition of Nigeria's financial system, digital financial development has therefore become another form of development in the Nigerian

economy (Eguavoen & Adekunle, 2025). Financial inclusion is rapidly changing from mere concern about physical access to banking to people being enabled by technology to use financial services such as transferring funds and taking payment of money through digital means such as on cell phone, mobile banking; Insurance offers people and businesses another way to deal with financial difficulties and keep the ability to do productive work (Hasan, Sayem, & Hossain,

2024, Wezel & Ree, 2023, Ozili, 2024). Digital payment and mobile banking reduce some of geographical and transaction costs barriers to traditional bank system, while insurance can additionally enable people cope with financial crisis and maintain productive potential (Wezel & Ree, 2023, Ozili, 2024).

The Nigerian historical context since 2009 is a convenient one to analyse trends, especially since both per capita income and penetration of insurance in Nigeria expanded throughout this period, at times considerably, while at same time a wide set of advancements occurred in the context of digital finance. Back in 1990, the digital financial sector was not as advanced as nowadays, and the value of digital payment transactions as well as of other similar payment system and financial services amounted to ₦30,081.07 billion for Nigeria, per capita income of the country represented US\$5,927.46 and mobile payment penetration stood at only 0.003 with an insurance penetration of only 0.43% (World Bank, 2024; CBN, 2024; Van Wezel & Ree, 2023). This situation reflects an economic setup where at the very beginning digital finance related activities and mobile usage are almost negligible whereas economic advancement in the country begins to show progress.

Between 2009 and 2012, the Nigerian financial system began to experience a gradual movement towards technology-enabled financial intermediation, although the available evidence indicates that this transition was initially modest compared with the dramatic expansion that occurred later (CBN, 2024; Wezel & Ree, 2023). Digital payment transaction value increased from ₦30,081.07 billion in 2009 to ₦20,119.64 billion in 2010, ₦23,974.00 billion in 2011 and ₦27,108.44 billion in 2012, while per capita income increased from US\$5,927.46 to US\$6,301.18, US\$6,585.36 and US\$6,670.84, respectively (CBN, 2024; World Bank, 2024). Over the same period, mobile banking penetration increased from 0.003 in 2009 to 0.012 in 2010, 0.030 in 2011 and 0.043 in 2012, indicating that mobile-based financial services were beginning to emerge as an additional channel of financial access (CBN, 2024). Insurance penetration, however, moved in the

opposite direction, declining from 0.43 percent in 2009 to 0.37 percent in 2010 and 2011, and subsequently to 0.35 percent in 2012, highlighting the relatively slow development of insurance participation compared with emerging digital financial services (CBN, 2024).

This timeframe of 2013-2015 served as a more visible phase for the expansion of the wave of mobile banking and digital finance in Nigeria, corroborating previous evidence which shows that technological diffusion can facilitate expanding financial inclusion, but needs adequate financial infrastructure and institutions to achieve this goal (Wezel & Ree, 2023; Hasan et al., 2024). The value of digital payments transactions has increased from ₦36,007.17bn to ₦46,219.62bn, up to ₦49,884.31bn for years 2013, 2014 and 2015 respectively whereas income per capita showed an increase from US\$7,004.13 to US\$7,396.13, up to US\$7,307.84 in 2015 (CBN, 2024; World Bank, 2024). The penetration rate of mobile banking has also shown much stronger expansion during this phase from 0.176% in 2013, up to 0.384% in 2014 and 0.465% in 2015, revealing the increasing importance of mobile usage for transactions and financial access (CBN, 2024). Insurance penetration was quite modest and did not show any significant increase for the years 2013, 2014 and 2015 (0.33 percent), as indicated before, this was expected given the relatively slow trend in penetration in insurance coverage compared to penetration rates on mobile payments (CBN, 2024).

Year 2016 was a significant turning point as mobile banking and digital payments continued to grow and at the same time per capita income started becoming volatile, showing that financial digital technologies and economy welfare does not growth in proportion (CBN, 2024; World Bank, 2024). Values of digital payment transactions rose to ₦65159.80 billion. Mobile banking grew from 0.621 in 2015 to 0.738, while per capita grew from \$7307.84 in 2015 to \$7072.50 in 2016 (CBN, 2024; World Bank, 2024). Also, insurance penetration has declined from 0.34percent in 2015 to 0.31 in 2016, implying that financial digital growth is not an immediate increase in the level of insurance penetration and access to insurance

products(CBN, 2024). This divergence is noteworthy because it cautions us not to consider financial transactions as a simple marker of financial Inclusion in financial progress, a notion highlighted recently by studies associating financial digital inclusion with broader developmental gains (Ozili, 2024)

The expansion deepened between 2017 and 2019, with more widespread integration of mobile and electronic channels in all manner of economic transactions within the Nigerian digital financial system (CBN, 2024; Eguavoen & Adekunle, 2025). Digitized financial transaction volume rose from ₦104,674.25 billion in 2017 to ₦138,901.31 billion in 2018 and ₦171,496.00 billion in 2019, whereas penetration in mobile banking moved from 0.959, 1.529 to 3.489 over same period (CBN, 2024). Over the same three year span, per capita income rose from \$7,036.67 in 2017 through \$7,158.17 in 2018 to \$7,551.39 in 2019, indicating a gradual increase in economic well-being alongside a fast growth in digitized economic transactions (World Bank, 2024). Penetration increased from 0.32% in 2017 and 0.31% in 2018 to 0.71% in 2019; indicating that for insurance, the latter part of financial development saw improvement in penetration coverage (CBN, 2024).

The Year 2020 particularly presents an interesting breaking point in as much as the COVID-19 pandemic led to greater adoption of remote and tech-enabled transactions. Recent empirical studies found the use of digital financial services to be an increasingly vital channel for ensuring the continuity of financial and economic activities amidst disruptions (Hasan et al., 2024; Ozili, 2024). In the period between 2019 to 2020, there was significant growth in value of digital payment transactions from ₦171,496.00 billion to ₦445,672.62 billion which translates to about 160% increase in just a year; as well as penetration of mobile banking usage increased from 3.489% to 9.716% (CBN, 2024), however, per capita income reduced from US \$7, 551.39 in 2019 to US \$7, 414. 77 in 2020. It would be logical for the expansion in digital financial services activity to occur at such a time of high economic disruption (World Bank, 2024) yet, there is a modest increase in insurance

penetration from 0. 71% to 0.72%, which may indicate relatively increased resilience of insurance usage amidst financial contractions during that period (CBN, 2024).

The post-2020 period shows an even starker acceleration in digital finance activities in Nigeria: the value of digital payment transactions increased from ₦1,069,712.62 billion in 2021 to ₦1,451,083.63 billion in 2022 and ₦353,516.26 billion in 2023 before shooting up to ₦2,117,351.75 billion in 2024 (CBN, 2024). The growth in mobile banking penetration from 30.22% in 2021 to 54.91% in 2022, 93.76% in 2023, and 144.08% in 2024 over the same period also suggests massive proliferation in mobile penetration for the provision of financial services. This phenomenal pace in the digitisation of finance activity is in agreement with some of recent Nigeria-level evidence indicating that both financial inclusion indices and technological innovations are increasingly becoming more prominent in their contribution to economic outcomes (Eguavoen and Adekunle 2025 and Ozili 2024). However, the marked increases in digital financial activity create an interesting empirical puzzle because an increase in the scale of transactions does not automatically produce an equivalent welfare gains for the population (Hasan et al., 2024).

This upward trend in per capita income over the same post-2020 timeframe serve to give critical context to the enormous expansion of digital finance, given that it rose from \$7,588.48 in 2021 to \$8,304.96 in 2022, \$8,705.43 in 2023 and \$9,086.88 in 2024 (World Bank, 2024). Hence even though per capita income significantly improved post-2021, the scale and rapidity of this rise trailed the pace that was evidenced in digital payment transactions value and mobile banking penetration rate (CBN, 2024; World Bank, 2024). This disconnect adds to the conclusion that digital financial development is not the same as inclusive economic development, in that benefits from digital financial growth were contingent upon how well increased access could translate to the creation of productive resources, earning of income, effective risk management and wide financial inclusion.

The first problem addressed in this article is the

uncertain economic payoff of the rapid expansion of digital payments and mobile banking; despite the growing use of technology-enabled financial services, evidence suggests that digital financial inclusion does not automatically produce immediate or proportionate improvements in macroeconomic performance, particularly where infrastructure, financial literacy and effective utilisation remain constrained (Aruwa et al., 2025; B & P, 2025). The Nigerian economy shows particular and striking paradox as between 2009 and 2024 the volume of digital payment has increased by ₦30,081.07 billion in 2009 to ₦2,117,351.75 billion in 2024, while mobile banking penetration increased from 0.003 to 144.083 over the same period (CBN, 2024), yet per capita income goes from \$5,927.46 to \$9,086.88 over the same period. This may imply that the extraordinary expansion of digital financial activity may not have translated proportionately into improvements in individual economic welfare (Eguavoen & Adekunle, 2025).

Furthermore, recent Nigerian evidence shows that financial inclusion can influence economic growth, but existing studies have largely relied on conventional indicators such as credit to the private sector, ATM transactions and aggregate GDP, rather than examining the specific contribution of digital payment transaction value, mobile banking penetration and insurance penetration to per capita income, which more directly captures the welfare dimension of development (Saranu et al., 2024; Musa, Salisu, & Magaji, 2024; Adeniji, 2025). Similarly, recent evidence on digital payment systems in Nigeria reports a positive relationship between digital payment platforms and economic growth, with mobile payments emerging as particularly important, but the study focuses on aggregate economic growth rather than inclusive economic development measured through per capita income (Adeniji, 2025). Other recent research has examined agency banking and mobile-money operations primarily from the perspective of financial inclusion, leaving unanswered the crucial question of whether increased digital financial access subsequently improves economic welfare (Aruwa, Afolabi, Obaitan, Shokunbi, & Uwuigbe, 2025).

The problems therefore raises a fundamental development question concerning whether Nigeria's rapid transition towards digital finance has translated into broader economic welfare and whether insurance penetration strengthens or complements that process (Wezel & Ree, 2023; Ozili, 2024). Specifically, the study asks to what extent has the increasing value of digital payment transactions contributed to improvements in per capita income in Nigeria, given the extraordinary expansion of electronic payment activities over the study period? It is also pertinent to ask whether the rapid increase in mobile banking penetration has significantly improved per capita income, or whether the expansion of mobile-based financial access has remained largely transactional without producing commensurate welfare gains. Furthermore, the study seeks to establish whether insurance penetration has contributed significantly to per capita income in Nigeria, particularly given the relatively low and fluctuating level of insurance penetration despite the substantial expansion of other digital financial services. Beyond these individual relationships, an important question is whether digital payment transaction value, mobile banking penetration and insurance penetration, taken together, have significantly influenced per capita income in Nigeria, and whether the interaction of these dimensions of financial inclusion provides a stronger explanation of inclusive economic development than any single dimension considered independently.

Consequently, the broad objective of this study is to examine the effects of digital payments, mobile banking insurance penetration on inclusive economic development in Nigeria. The specific objectives are to:

1. analyse the effect of digital payment transaction value on per capita income in Nigeria;
2. examine the effect of mobile banking penetration rate on per capita income in Nigeria;
3. investigate the extent to which insurance penetration affects per capita income in Nigeria; and

4. examine the joint effect of digital payments, mobile banking and insurance penetration on per capita income in Nigeria.

The study is delimited to these three dimensions of financial development and uses per capita income as the proxy for inclusive economic development, without extending the analysis to other dimensions such as poverty, employment or income inequality. The choice of the period (2009 – 2024) is justified by the remarkable transformation of Nigeria's financial system during these years, particularly the rapid expansion of digital payments and mobile banking, alongside the comparatively slow and fluctuating development of insurance penetration and changes in per capita income.

2. LITERATURE REVIEW

Digital payment transaction value represents the volume of transactions paid through electronic means, which is indicative of the frequency of digital finance participation, while mobile banking penetration represents the level of access to financial services provided through mobile enabled platforms, which reduces geographically based restrictions on access and transaction costs of financial access (Lui et al, 2025). Insurance penetration (total premiums divided by GDP) represents the depth of insurance participation, i.e., how many households and firms are covered by insurance against various forms of financial risks, whereas per capita income can be taken to represent aggregate resource of a nation which this paper will use as a proxy for inclusive development (Asogwa and Munyenyembe, 2025; Lui et al, 2025). These four variables have conceptual relations because while digital payment eases transaction, mobile banking increases financial inclusion, whereas insurance protects against various financial risks, and overall participation is reflected in per capita income (Amobi et al., 2025; Asogwa and Munyenyembe, 2025).

The theory that underpins this research is financial inclusion theory. According to the theory, adequate access to affordable, useful, and responsible financial services allows individuals and enterprises, especially those on the margins

of the formal financial sector, to participate more fully in their economies, thereby increasing their own economic welfare (Ozili, 2024; Wezel & Ree, 2023). Access to services such as payments, banking, savings, credit, and insurance can also lower transaction costs, raise productive activity, and help manage risks, thereby producing positive economic effects (World Bank, 2022; Ozili, 2024). The theory fits this study well in that the digital payment transaction value, mobile banking penetration, and insurance penetration can be seen as proxies for financial inclusion and per capita income reflects economic welfare. Specifically, when more people use digital payments, it lowers the cost of financial transactions and makes them faster; more penetration of mobile banking means that financial services reach people who previously were outside traditional banks; finally, more use of insurance protects households and businesses from financial shocks. These channels are expected to increase economic participation and per capita income (Wezel & Ree, 2023; Ozili, 2024). In the context of this study, financial inclusion theory provides a framework for exploring whether an increase in Nigeria's use of digital financial services and insurance has contributed to inclusive economic growth.

The links between digital Payments, mobile banking, insurance penetration and inclusive economic development have been addressed by multiple scholars, both in Nigerian and outside Nigerian contexts. The role of digital payments on economic growth using an ARDL approach for the period 2012-2024 found evidence of positive effects of digital payments with mobile payments being the most significant effect, thus lending direct support to the assertion that growth in digital transactions leads to enhanced economic activity. Employing FMOLS on the period 2009-2023, Eguavoen and Adekunle (2025) showed that ATM, private credit, bank branches and volume of mobile-money transactions positively impacted economic growth in Nigeria while the number of registered mobile money accounts did not show a significant impact on economic growth, this is highly relevant to the context of the study as it reflects a view that actual utilisation could be more significant to the economy than nominal

availability in a case such as Nigeria's where penetration may be high but usage relatively less beneficial.

Complementing the Nigerian evidence, electronic payment systems' impacts on Nigeria's economic growth over 2012-2022 indicated a strong significant relationship between the variables employed; thus asserting the argument that the ongoing transition to a cashless system could be having productive not just transactional impacts. Corroborating this, the works of Jimoh and David (2024) who explored the relationship between digital financial inclusion and economic growth in sub-Saharan Africa using a digital financial-inclusion index found the results to be state dependent, suggesting that, the returns from digital finance differ from country to country with varying levels of growth. Using ARDL estimation over 2004-2021 for MENA countries, Khalifa (2025) found both short-run and long-run links between digital financial-service indicators and economic growth, suggesting the existence of accumulative rather than immediate developmental payoffs of digital finance.

Evidence from other developing regions further strengthens this argument. Hasan, Sayem, and Hossain (2024) found that the economic performance was associated with better performance from financial-inclusion variables that pertain to mobile money. Dianda (2025) using the two-step System GMM, establishes a strong case for mobile money's stimulating effects on the regional growth and development through a greater savings mobilisation, higher capital accumulation and more job creation. By combining a set of fixed, as well as mobile telecommunications (ICT), alongside the mobile-money services in their empirical framework of a 22-year span across 146 countries, Ahmad, Green, and Jiang (2023) confirmed that the adoption of mobile-money enhances financial-inclusion which in turn brings about economic-development. A closer evaluation of previous literature on this area by Osabutey and Jackson (2024) indicates that mobile-money services can "bridge some of the financial-infrastructure gaps in developing economies with the capacity of a greater number of previously excluded people performing financial transactions, though several issues of

infrastructure deficit, digital illiteracy, security concerns, and an unequal distribution of benefits can have detrimental consequences" their investigation however shows promising signs for Mobile Money for Financial-Inclusion in sub-Saharan Africa (SSA). Using data from 38 countries across Sub-Saharan African economies over the period 2000-2023, Lambon and Ocansey (2025) confirm that the effect of mobile money on economic growth was in part conditional on overall financial sector stability. Also at individual level, and with specific reference to Burkina Faso, N'dri and Kakinaka (2020) concluded on the positive effect of financial inclusion, including mobile money usage, on individuals' welfare thus proving the impact may not only be on individual access but beyond welfare outcomes.

Horvey, Odei-Mensah and Liebenberg (2024) used GMM and dynamic panel-threshold models and found that the development of the insurance sector stimulates economic activity, however, the relationship is nonlinear. They indicate that the relation between the degree of insurance penetration of less than 2.12 percent thresholds and economic growth is negative, and higher penetration leads to economic growth. Looking at a sample from Nigerian data, Okeke (2024) used data between 2012 and 2022 and covered variables: insurance premiums, insurance investment and insurance assets with economic indicators that define human and real GDP and concluded that there exists a development connection between insurance activity, including sectors development and economic success.

Similar to previous studies but covering insurance claim, Asogwa and Munyenymbe (2025) examined insurance claims and economic growth in Nigeria using annual data from 1990–2023 with the use of an ARDL model., The results indicated that life assurance, fire, motor insurance, oil-and-gas insurance-all impact on economic activity. Complementing this evidence, Linus, Oladipo, Yalouli, Okafor, and Lawal (2025) investigated insurance penetration and financial development in Nigeria over 2003–2023, thereby shifting attention from individual insurance products towards the broader depth of insurance-market development. Avom et al.

(2023) investigated financial innovation and financial inclusion via mobile-money in Africa and found that the use of mobile-money innovation contributes to improvement in financial inclusion thus overcoming some of the existing barriers.

In the face of a plethora of empirical studies linking the expansion of digital payment services, the growth in mobile banking, insurance sector development, and the overall economy, there still remains a prominent empirical lacuna in the Nigerian literature. These works treat digital payment systems, mobile money, inclusive financing, or insurance sector expansion mostly in isolation and when examining their macro- economic implication, the most observed measure is aggregate growth or GDP, and not per capita income. Per capita income (PCI), directly signifies any improvement in economic well-being by an individual. Also, only relatively few papers explored the individual interaction of value of transactions of digital payments, mobile penetration and that of insurance. The insurance papers till recent decades are on insurance claim, premium, investment portfolio or generalized financial sector rather than examining insurance penetration alongside digital financial variables as complementary channels of inclusive development. Hence, the Nigerian economic situation does lack sufficient and contemporary empirical investigations concerning how all these trends translate to improvements in per capita income.

3. METHODOLOGY

This study utilizes an ex-post-facto research design based on secondary data. Annual secondary data from the World Bank's World Development Indicators are used to obtain the data on per capita income (real GDP). Data for the value of digital payment transactions, penetration of mobile money and insurance are collected from the Central Bank of Nigeria's Statistical Bulletins. The data was therefore subjected to the following analysis, which initially starts by conducting descriptive

statistics and correlation analysis to reveal the underlying characteristics of the variables and investigate the initial association among them.

Subsequently, the Augmented Dickey-Fuller (ADF) unit-root test is performed to determine the order of integration of the data in order to avoid spurious regressions. Based on this, the Autoregressive Distributed Lag (ARDL) bounds testing approach to cointegration is adopted to investigate the existence of a long-run equilibrium relationship among the variables. The analysis further includes appropriate diagnostic test for the existence of serial correlation, heteroskedasticity, and for normality of data and proper models' specifications, while the diagnostic for the models' stability over the period examined is carried out using CUSUM and CUSUMSQ statistic parameters. The coefficients estimated are interpreted bearing the specific goals of the study in view and supported by appropriate statistical inferences on based of standard 5% significance level criteria.

Model Specification

Following the objectives of the study, the functional relationship between inclusive economic development and the explanatory variables is specified as:

$$PCI_t = f(DPV_t, MBP_t, INSP_t) \quad [1]$$

Where PCI represents per capita income, DPV denotes digital payment transaction value, MBP represents mobile banking penetration, and INSP denotes insurance penetration. The corresponding econometric model is expressed as:

$$PCI_t = \beta_0 + \beta_1 DPV_t + \beta_2 MBP_t + \beta_3 INSP_t + \varepsilon_t \quad [2]$$

Where β_0 is the intercept, β_1 – β_3 are the parameters measuring the effects of the respective explanatory variables on per capita income, and ε_t is the stochastic error term. In line with the study's objectives, $\beta_1 > 0$, $\beta_2 > 0$, and $\beta_3 > 0$ are theoretically expected, implying that greater digital payment activity, wider mobile banking penetration and deeper insurance

penetration should contribute positively to inclusive economic development. Given the relatively large scale of digital payment transaction values and the possibility of nonlinear proportional relationships, the estimable model is expressed in logarithmic form as:

$$\ln PCI_t = \beta_0 + \beta_1 \ln DPV_t + \beta_2 \ln MBP_t + \beta_3 \ln INSP_t + \varepsilon_t \quad [3]$$

The ARDL representation corresponding to the above long-run relationship is specified as:

$$\Delta \ln PCI_t = \alpha_0 + \sum_{i=1}^p \alpha_i \Delta \ln PCI_{t-i} + \sum_{j=0}^{q_1} \beta_j \Delta \ln DPV_{t-j} + \sum_{k=0}^{q_2} \gamma_k \Delta \ln MBP_{t-k} + \sum_{l=0}^{q_3} \delta_l \Delta \ln INSP_{t-l} + \varepsilon_t \quad [4]$$

The differenced terms capture the short-run dynamics, while the lagged-level terms establish the long-run relationship among the variables. The model is appropriate for the study because the ARDL framework permits estimation where the variables are a mixture of I(0) and I(1), provided none is I(2).

4. DATA ANALYSIS

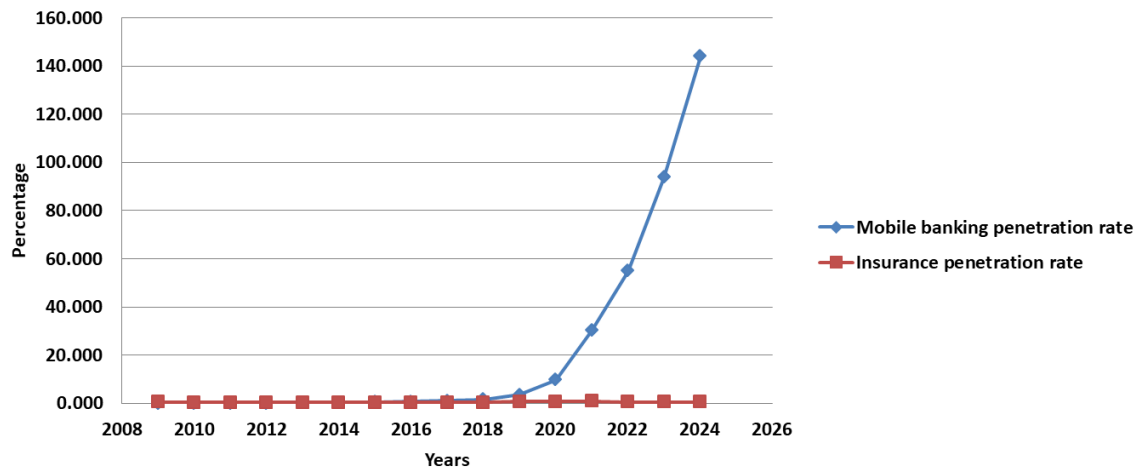


Fig 1: Trend Analysis of Nigeria's mobile banking penetration rate and insurance penetration rate, 2009 – 2024

Mobile banking penetration and insurance penetration in Figure 1 shows drastically different pattern. While mobile banking penetration rate had a significant increase from 0.003% in 2009 to 144.083% in 2024 with a substantial increase from 2019, which moved from 9.716% in 2020, 30.219 in 2021, 54.912% in 2022, and 93.761% in 2023, insurance penetration rate has remained low and fluctuated. It declined from 0.43% in 2009 to 0.31% in 2018

and increased to 0.71% in 2019, 0.72% in 2020, and 0.88% in 2021 before dropping in 2022 (0.50%) and 2023 (0.50%) and recovering slight rise of 0.58% in 2024. The conflicting pattern indicates that the expansion of Nigeria's digital banking has outpaced the deepening of insurance while raising an important concern whether it does translate to adequate financial-risks protections in the pursuit of inclusive development.

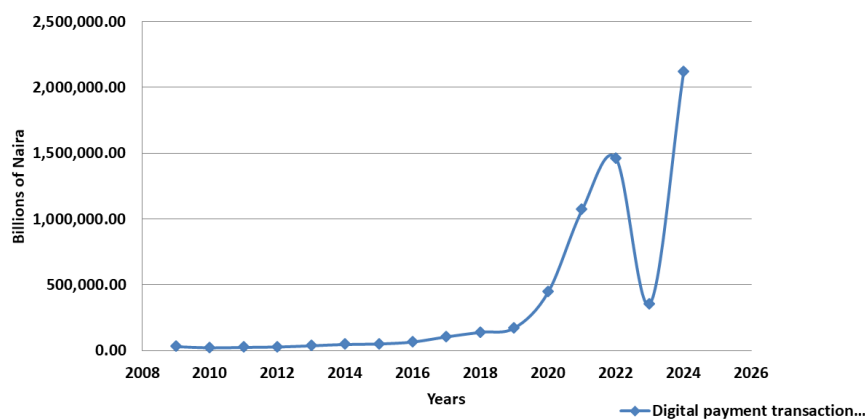


Fig 2: Trend Analysis of digital payment transaction value in Nigeria, 2009 – 2024

Figure 2 showed that the digital payment transaction volume increased from ₦30,081.07 billion in 2009 and went to decrease at ₦20,119.64 billion in 2010 before kept increasing to ₦49,884.31 billion in 2015, ₦104,674.25 billion in 2017, and ₦171,496.00 billion in 2019. Thereafter, it expanded

tremendously reaching ₦445,672.62 billion in 2020, ₦1,069,712.62 billion in 2021, and ₦1,461,083.63 billion in 2022. Although it declined from 2023 at ₦353,516.26 billion then dramatically recovered to ₦2,117,351.75 billion in 2024, which is the highest in the research period.

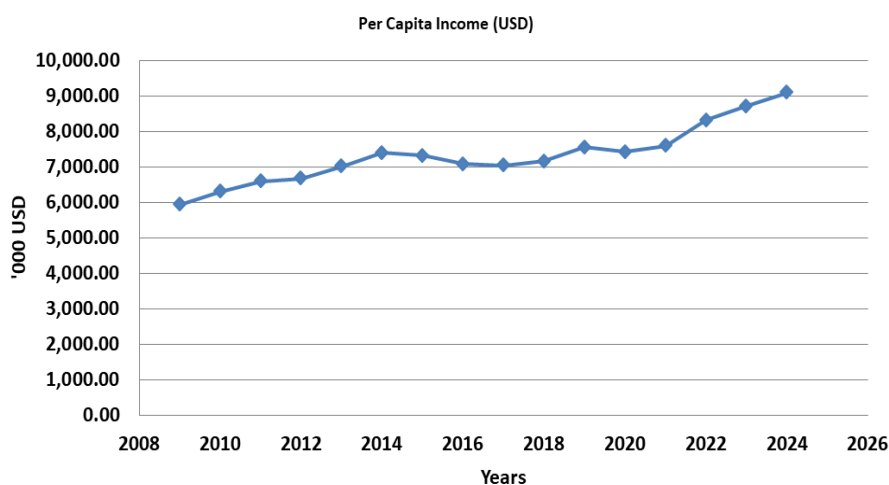


Fig 3: Trend Analysis of Nigeria's per capita income (USD), 2009 – 2024

Figure 3 implies the average value of per capita income steadily grows from US\$ 5927.46 in 2009 to US\$6670.84 in 2012. Afterwards it expands again to US\$7,396.13 in 2014 then declined to US\$7,036.67 in 2017. From then on, average per capita income recovered and increased to US\$7,158.17 in 2018, US\$7,551.39

in 2019, yet decreased marginally to US\$7,414.77 in 2020. After this point, the trend shows a consistent increasing to US\$7,588.48 in 2021, US\$8,304.96 in 2022, US\$8,705.43 in 2023 and reached to the max value of US\$9,086.88 in 2024 in the study period.

Table 1: Descriptive Statistics

	PCI	DPV	MBP	INSP
Mean	7319.512	385060.2	21.28244	0.458750
Median	7233.005	84917.03	0.848500	0.370000
Maximum	9086.880	2117352.	144.0830	0.880000
Minimum	5927.460	20119.64	0.003000	0.310000
Std. Dev.	830.9726	621070.7	41.90724	0.176744
Skewness	0.561256	1.833808	2.033246	1.147321
Kurtosis	2.940446	5.111754	5.955329	3.118419
Jarque-Bera	0.842387	11.94061	16.84688	3.519600
Probability	0.656263	0.002553	0.000220	0.172079

Source: *Eviews 13 Output*

Table 1 reveals that the means of PCI, DPV, MBP, and INSP are 7319.51, 385,060.20, 21.28, and 0.459, respectively, whereas the standard deviations are 830.97, 621,070.70, 41.91, and 0.177. The PCI, DPV, MBP and INSP can be considered highly dispersed as indicated by the varying standard deviation values (the DPV for instance seems highly dispersed with 621,070.70). All the variables are positively skewed although DPV (1.83) and MBP (2.03) exhibited

skewness, suggestive of a faster growth over time of these variables. Table 1 also shows the Jarque-Bera and it reveals that both PCI (0.6563) and INSP (0.1721) are normal distribution, DPV (0.0026) and MBP (0.0002) deviate significantly from normal distribution at 5 per cent level. Therefore, from the statistical distribution we conclude there was expansion/growth in the digital-financial variables in Nigeria during the period of study.

Table 2: Pairwise Correlation Matrix

	PCI	DPV	MBP	INSP
PCI	1.00000	0.83961	0.94816	0.44536
DPV	0.83961	1.00000	0.92877	0.70934
MBP	0.94816	0.92877	1.00000	0.57934
INSP	0.44536	0.70934	0.57934	1.00000

Source: *Eviews 13 Output*

The correlation results in Table 2 indicate positive relationships among all the variables. PCI has a strong positive correlation with DPV (0.8396) and an even stronger correlation with MBP (0.9482), while its correlation with INSP (0.4454) is moderate. Similarly, DPV is strongly correlated with MBP (0.9288) and moderately

strongly correlated with INSP (0.7093), while MBP and INSP record a positive correlation of 0.5793. The results suggest that increases in digital payment activity, mobile banking penetration and insurance penetration tend to be associated with higher per capita income.

Table 3: ADF Unit Root Test

Variables	ADF at Level	ADF at First Difference	Order of Integration
PCI	-0.3343 [0.8978]	-4.7457 [0.0112]	Stationary after first difference, I(1)
DPV	4.5317 [0.0018]	-1.8337 [0.3472]	Stationary at Level, I(0)
MBP	-1.4126 [0.5480]	-5.5392 [0.0014]	Stationary after first difference, I(1)
INSP	-1.4413 [0.5343]	-3.1465 [0.0499]	Stationary after first difference, I(1)

Source: *Eviews 13 Output*

Table 3 shows the Augmented Dickey-Fuller (ADF) results. The result indicate that the variables are a mixture of I(0) and I(1) processes. DPV is stationary at level, with an ADF statistic of 4.5317 and a probability value of 0.0018, indicating I(0) stationarity. In contrast, PCI, MBP and INSP are non-stationary at level but

become stationary after first differencing, with respective ADF statistics of -4.7457 (0.0112), -5.5392 (0.0014) and -3.1465 (0.0499), confirming that they are I(1). Thus, none of the variables is integrated beyond first order, making the dataset suitable for the ARDL bounds-testing approach to cointegration.

Table 4: Bounds Test

Test Statistic	Value	k
F-statistic	6.2748	3
	I(0) Bound	I(1) Bound
5% Significance	3.23	4.35

Source: *Eviews 13 Output*

The ARDL Bounds Test result in Table 4 produces an F-statistic of 6.2748 with 3 regressors ($k = 3$). At the 5% significance level, the lower bound, I(0), is 3.23, while the upper bound, I(1), is 4.35. Since the calculated F-statistic of 6.2748 exceeds both the I(0) and I(1) critical bounds, the null hypothesis of no long-

run relationship among PCI, DPV, MBP and INSP is rejected at the 5% level. This confirms the existence of a long-run cointegrating relationship among the variables and therefore justifies proceeding to estimate the long-run ARDL coefficients and the associated Error Correction Model (ECM).

Table 5: Short Run and Long Run Estimates

Short Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.

D(PCI(-1))	0.937546	0.305141	3.072506	0.0277
D(DPV)	0.028446	0.024556	1.158417	0.2990
D(MBP)	0.046809	0.029425	1.590803	0.1725
D(INSPI)	-0.056985	0.014364	-3.967210	0.0182
D(INSPI(-1))	-0.070798	0.016379	-4.322486	0.0092
CointEq(-1)	-1.167057	0.379964	-3.071497	0.0277
Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DPV	-0.019958	0.007765	-2.570251	0.0026
MBP	0.040109	0.012099	3.315067	0.0051
INSPI	-0.062151	0.017903	-3.471541	0.0211
C	8.918075	0.463994	19.220234	0.0000

Source: Eviews 13 Output

In the short run, digital payment transaction value (DPV) (0.0284; p -value = 0.2990) and mobile banking penetration (MBP) (0.0468; p -value = 0.1725) have positive but insignificant effects on per capita income (PCI), while insurance penetration (INSPI) has a negative and significant effect (-0.0570; p -value = 0.0182). The lagged insurance penetration (INSPI) effect is also negative and significant (-0.0708; p -value = 0.0092). The error-correction coefficient is -1.1671 (p -value = 0.0277), confirming significant adjustment toward long-run equilibrium.

In the long run, digital payment transaction value (DPV) has a negative and significant effect on per capita income (PCI) (-0.0200; p -value = 0.0026), whereas Mobile Banking Penetration (MBP) has a positive and significant effect (0.0401; p -value = 0.0051). Insurance penetration (INSPI) also has a negative and significant effect (-0.0622; p -value = 0.0211). Thus, mobile banking penetration (MBP) emerges as the only variable with a positive and statistically significant long-run relationship with per capita income (PCI), while digital payment transaction value (DPV) and insurance penetration (INSPI) exhibit inverse long-run relationships.

Discussion of Findings

The results show inconclusive but economically meaningful evidence on the effect of digital financial development, insurance penetration, and inclusive economic growth on Nigerian growth. For short-term, digital payment transaction value (DPV) and mobile banking penetration rate (MBP) effects on per capita income were positive, but non-significant. This implies that a hike in DPV and MBP does not impact real welfare positively or does not yield immediately. This result contrasts with Adeniji (2025) and Obainoke et al. (2024), who reported positive and significant relationships between digital payment systems and economic growth in Nigeria. The difference may reflect the use of per capita income rather than aggregate GDP in the present study, as well as the distinction between the volume of digital transactions and their actual contribution to productive economic activity. However, this accords the work of Eguavoen & Adekunle (2025), because actual mobile-money usage is significant but number of active mobile-money accounts is non-significant in impacting Nigeria's development.

In the long run, however, mobile banking penetration (MBP) has a positive and statistically significant effect on per capita income, indicating that sustained expansion of mobile-enabled banking is associated with improved

economic welfare. This finding strongly supports the financial inclusion perspective and is consistent with Hasan, Sayem, and Hossain (2024), who found that mobile-money-related financial inclusion contributes positively to economic growth, as well as Dianda (2025), who reported that digital financial inclusion stimulates growth through savings mobilisation, productive investment, capital accumulation and employment. It also agrees with Ahmad, Green, and Jiang (2023) and N'dri and Kakinaka (2020), whose findings indicate that mobile money can enhance financial inclusion and ultimately improve economic or household welfare. The result therefore suggests that the developmental benefits of mobile banking may require time to materialise, as sustained access and utilisation gradually reduce transaction barriers and broaden participation in formal economic activities.

Interestingly, it was found that an expansion in DPV has a negative and statistically significant long run impact on PCI. Contrary to other studies like Adeniji (2025), and Obainoke et al (2024) that have confirmed a positive impact of digital payments on economic growth, the present research finding does not negate the welfare aspect of digital payment. It is only that this rapid growth in the transaction value has not correspond with productively income generating activities. It could be as well argued that DPV must not be directly translated as financial inclusion for growth; large amounts of electronically exchanged amount reflects the amount of money in circulation which does not always means increase in the total income of the households. This seems consistent to Osabutey and Jackson (2024) who are wary of overestimating mobile money's welfare benefit, since they argued that infrastructure, digital divide, security threats and unequal dissemination of this payment option hinder their broader economic development impacts, and It is further reinforced by the work of Jimoh and David (2024) finding on digital financial inclusion-growth link being country specific.

The result concerning insurance penetration (INSP) is also interesting. Insurance penetration (INSP) has a negative and statistically significant impact on PCI both in the short-run and in the

long-run while, theoretically, better insurance coverage should facilitate economic welfare via reduction of uncertainty experienced by households and businesses against risks and liabilities. The result is different from Horvey, Odei-Mensah and Liebenberg (2024) where they found that insurance development is a contributor to economic growth beyond a threshold of insurance penetration. This finding is therefore a crucial avenue through which the current result may be explained; low and fluctuating insurance penetration may portray that the insurance market in Nigeria may not be deep enough to deliver the welfare enhancing benefits found in the developed systems. The negative finding also contrasts with Okeke (2024) and Asogwa and Munyenymbe (2025) in their work on the developmental implications of insurance sector activities in Nigeria (albeit on insurance premiums, assets, claims and the activities of particular sectors of the insurance market, not on the same penetration variable as measured here).

The immediate adverse effect of insurance penetration could also be interpreted as arising from the fact that a higher rate of participation in insurance entails extra costs in form of premium outlays that can only materialise as benefits in the shape of protection against loss, investment mobilisation and indemnification for loss of asset(s), investment outlays, or personal injury over the long run. Thus, the negative long run long-run relationship could indicate the presence of the deeper economic, structural and organizational constraints for the Nigerian insurance industry that do not allow a priori insurance penetration from being mechanically translated into higher average income. This is important because Linus et al. (2025) concentrate on the insurance penetration and financial development in Nigeria only. This perspective means we should not look at the present finding as having found insurance detrimental to development. Instead, it indicates we had not been having the insurance benefit so far as Nigeria has developed in terms of a higher rate of penetration so far in relation to her capacity, market size and depth. The presence of the error correction result further reiterates our conclusions as it demonstrates that from what the

relationship is currently; this would eventually adjust and move toward the long run relationship. Hence, the paper has advanced the literature by providing evidence in Nigeria that more on the breadth and depth utilization of insurance penetration and financial development can potentially make positive impact than the mere expansion of digital access to banking and Payment.

5. Conclusion and Recommendations

The study confirms that digital financial development does not produce homogenous effects on the country's economic development. While in the short run, value of digital payment transaction and penetration rate of mobile banking positively impact per capita income (insignificantly), penetration rate of insurance is negative (significantly impacting per capita income). In the long run, penetration rate of mobile banking positively impacts per capita income (significantly), while value of digital payment transaction and penetration rate of insurance negatively impact per capita income (significantly). The evidence implies that mobile banking penetration provides the strongest positive contribution to inclusive economic development, while the rapid expansion of digital payment transactions and the relatively shallow insurance market have not yet translated proportionately into higher per capita income.

In conclusion, Nigeria has tremendous potential for its digital finance transformation development. However, to effectively capitalize these benefits, development comes not from increasing mere transaction value but the ability to generate productive economy from mobile banking penetration and provide essential financial-risk coverage from insurance development in Nigeria.

Based on the findings for the three explanatory variables, the study recommends the following:

1. Given that the impact of the value of digital payment transaction is positive but insignificant in the short-run, negative but significant in the long-run on per capita income, governments should not concentrate solely on

increasing the monetary value of digital payment transactions but ensure they contribute to useful economic activities. Policies should target the use of digital payment platform, among smallholder farmers, entrepreneurs, business men, income earners of various sectors to ensure that increase in the value of digital payment translate into improvements in economic welfare.

2. Given the positive and significant impact of mobile banking penetration on per capita income in the long-run, the relevant governments and other financial bodies should invest policies in deepening and sustainability of mobile banking adoption. Such policies are those that promote wider access, especially to the poor; reliability and reduced cost associated with mobile banking. Long-run positive impact reveals mobile banking as the most powerful financial channel in boosting inclusive development among the selected variables.
3. Due to negative and significant effect of insurance penetration on per capital income, policies on insurance market in Nigeria are critical to re-examine the insurance market structure and mechanism rather than believing automatic improvement in welfare outcomes with higher penetration of insurance products. Governments are to investigate ways of bringing the cost down, increasing transparency of policies, public confidence and claims settlement process and the accessibility of insurance products in the country. The reasons behind why increase in insurance penetration had not enhanced per capita income should be keenly examined.

References

- Adeniji, K. A. (2025). Digital payment system and economic growth in Nigeria: A longitudinal study (2012 – 2024). *Journal of Mathematical and Statistical Computing*, 2(2), 52–57.

<https://www.fnasjournals.com/index.php/FNAS-JMSC/article/view/726>.

- Ahmad, A. H., Green, C. J., Jiang, F., & Murinde, V. (2023). Mobile money, ICT, financial inclusion and growth: How different is Africa?. *Economic Modelling*, 121, 106220. <https://doi.org/10.1016/j.econmod.2023.106220>
- Amobi, O. K., Ojeh, A., Udefi, G. N., & Nkwo, F. N. (2025). Impact of digital payment systems on the financial inclusion of Nigerian citizens. *Contemporary Journal of Management and Accounting*, 13(2).
- Aruwa, I. Y., Afolabi, V. O., Obaitan, K. I., Shokunbi, O. S., & Uwuiigbe, U. (2025). The role of digital payment solutions in enhancing financial inclusion in Nigeria: A case study of agency banking and mobile money operations. *International Journal of Research and Innovation in Social Science*, 3795–3809.
- Asogwa, O. J., & Munyenyebe, U. C. (2025). Insurance claim settlement and economic growth in Nigeria. *International Journal of Research and Innovation in Social Science*, 9(2), 2172–2180.
- Avom, D., Bangaké, C., & Ndoya, H. (2023). Do financial innovations improve financial inclusion? Evidence from mobile money adoption in Africa. *Technological Forecasting and Social Change*, 190, 122451.
- Central Bank of Nigeria. (2024). *Statistical bulletin*. Abuja, Nigeria: Author.
- Dianda, P. (2025). Digital financial inclusion in WAEMU countries: Does the development of digital financial services stimulate economic growth? *International Journal of Economic Perspectives*, 19(8), 88–105.
- Eguavoen, J. O., & Adekunle, S. A. (2025). Financial inclusion and economic growth in Nigeria. *NIU Journal of Humanities*, 10(2), 77–86. <https://doi.org/10.58709/niujhu.v10i2.2198>
- Hasan, M. M., Sayem, M. A., & Hossain, B. M. S. (2024). Resolving the paradox: How mobile money drives economic growth through financial inclusion. *Heliyon*, 10(19), e38755. <https://doi.org/10.1016/j.heliyon.2024.e38755>
- Horvey, S. S., Odei-Mensah, J., & Liebenberg, A. P. (2024). Insurance market development and economic growth in Africa: Contingencies and thresholds of structural transformation. *Heliyon*, 10(21), e40046.
- Jimoh, L., & David, O. O. (2024). State-dependency in the nexus between digital financial inclusion and economic growth in Sub-Saharan Africa. *International Journal of Professional Business Review*, 9(6), e04675.
- Khalifa, J. (2025). The effect of digital financial services and financial inclusion on economic growth: Evidence from MENA region. *Journal of Regional Economics*, 4(1).
- Lambon, J. I., & Ocansey, E. O. N. D. (2025). Influence of mobile money on economic growth in Sub-Saharan Africa as moderated by financial stability. *African Journal of Accounting and Financial Research*, 8(3), 17–38.
- Linus, J. O., Oladipo, B., Yalouli, T., Okafor, S. O., & Lawal, F. C. (2025). Insurance penetration and financial development in Nigeria, 2003–2023. *International Journal of Research and Innovation in Applied Science*. 534-542
- Lui, A. T., Ozor, P., Emma-Ebere, O., Uzochukwu, S., Ezemonye, L., & Odejimi, D. (2025). Improving women’s digital and financial inclusion in Nigeria: A nudging and capacity based human rights framework. *Journal of Banking Regulation*, 26(4), 891–909.
- Musa, I., Salisu, A., & Magaji, S. (2024). Financial inclusion, poverty reduction, and economic growth in Nigeria: An empirical study using SVAR approach (1980–2020). *Journal of Economics, Innovative Management and Entrepreneurship*, 2(3).

- N'dri, L. M., & Kakinaka, M. (2020). Financial inclusion, mobile money, and individual welfare: The case of Burkina Faso. *Telecommunications Policy*, 44, 101926.
- Odejimi, D., et al. (2025). Improving women's digital and financial inclusion in Nigeria: A nudging and capacity based human rights framework. *Journal of Banking Regulation*.
- Okeke, I. C. (2024). Insurance sector: a prerequisite to a sustainable economic growth and development in Nigeria, *International Journal of Research and Innovation in Applied Science*, 9(8), 582-590
- Osabutey, E. L. C., & Jackson, T. (2024). Mobile money and financial inclusion in Africa: Emerging themes, challenges and policy implications. *Technological Forecasting and Social Change*, 202, 123339.
- Ozili, P. K. (2024), Women digital financial inclusion and economic growth in Nigeria. *Journal of Internet and Digital Economics*, 4(3), 161–178, doi: <https://doi.org/10.1108/JIDE-07-2024-0027>
- Saranu, S., Yusuf, T. I., Gambo, N., & Maitala, F. H. (2024). Financial inclusion and Nigerian economic growth: An empirical investigation (2001–2021). *International Journal of Quantitative and Qualitative Research Methods*, 12(1), 76–86.
- Wezel, T., & Ree, J. J. (2023). Nigeria—Fostering financial inclusion through digital financial services: Nigeria. *IMF Selected Issues Papers*, 2023(020). <https://doi.org/10.5089/9798400237195.018>
- World Bank. (2022). *The Global Findex Database 2021: Financial inclusion, digital payments, and resilience in the age of COVID-19*. Washington, DC: World Bank.
- World Bank. (2024). *World development indicators*. Washington, DC: World Bank.