

# **The Impact of Digital Banking on Financial Inclusion in Nigeria (2000-2022)**

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## **Abstract**

This paper examines the impact of digital banking on financial inclusion in Nigeria from 2000 to 2022. The objectives of the study focuses on the effects of digital banking adoption, the regulatory environment, internet access, financial literacy, and income levels. The estimation techniques employed include the Johansen co-integration and error correction model. The Johansen co-integration analysis reveals two co-integrating equations at the 5% significance level, indicating long-run relationships between factors influencing financial inclusion in Nigeria, specifically Digital Banking Adoption (DBA), Regulatory Environment (REG), Internet Access (INT), Financial Literacy (FL), and Income Levels (INC). The F-statistic (41.74294) and its significance confirm that the independent variables collectively explain a substantial variation in financial inclusion. The findings show that digital banking adoption, regulatory frameworks, internet access, financial literacy, and income levels significantly influence financial inclusion in Nigeria. The paper concludes that digital banking, supported by regulatory frameworks, internet access, financial literacy, and income levels are essential for enhancing financial inclusion, with a multi-faceted approach needed to foster sustainable economic growth and reduce inequality in Nigeria. Based on the findings, the paper recommends that the government focus on enhancing digital banking, refining regulations, expanding internet access, promoting financial literacy, and addressing income inequality to improve financial inclusion in Nigeria.

**Keywords:** Digital banking, financial inclusion, Internet access, financial literacy, Regulatory frameworks

**JEL CODE:** G21, G28, O16, O33, D14

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## **1. Introduction**

Digital banking in Nigeria has transformed significantly due to technological innovations and policy measures to enhance financial access. Between 2000 and 2023, the financial sector experienced substantial growth, driven by the Central Bank of Nigeria's (CBN) initiatives and mobile technology expansion. The 2012 Cashless Policy fostered digital payment systems and electronic banking platforms like mobile banking and online services (CBN, 2012). Mobile money services introduced in 2011, including platforms like Paga, extended financial

services to underserved regions (Ayo et al., 2016). The National Financial Inclusion Strategy (2012) targeted reducing financial exclusion from 46.3% in 2010 to 20% by 2020, emphasizing agent banking and digital wallets for marginalized groups (CBN, 2018). Technological advancements like USSD codes, exemplified by GTBank's 737 service, facilitated affordable banking for non-internet users (Osazevbaru & Yomere, 2020). During the COVID-19 pandemic, digital banking adoption surged due to lockdown measures, with banks like Access Bank reporting increased online transactions (Olaniyi & Olayemi, 2021).

Despite progress, challenges remain. By 2022, 36% of Nigeria's adult population remained unbanked, and financial inclusion disparities persisted across urban-rural and gender divides (EFInA, 2022). Growth in agent banking continues, though rural areas face infrastructural deficits. Cyber-security concerns, with a 50% rise in fraud attempts between 2020 and 2022, also hinder trust (NIBSS, 2022). This study examines digital banking innovations' impact on financial inclusion, addressing regional and demographic disparities. It evaluates policies like the Cashless Policy, quantifies barriers such as digital literacy and income inequality, and highlights strategies to achieve universal financial access in Nigeria.

## **2. Literature review**

### **2.1. Conceptual review**

#### **1. Digital banking**

Digital banking has revolutionized financial services by leveraging advanced technologies to improve accessibility, efficiency, and convenience. Olusanya (2024) highlights its ability to facilitate transactions without physical interactions, while Johnson (2023) emphasizes the digitization of banking operations, transforming customer engagement. Scholars such as Bishop (2023) and Nguyen (2023) note the convenience of online platforms for tasks like fund transfers, and Ahmed (2024) underscores the focus on security, scalability, and modern consumer needs.

In Nigeria, digital banking has expanded financial services access through USSD codes, mobile money, and online platforms, addressing infrastructural limitations and enhancing service delivery. These innovations simplify transactions, broaden access to diverse financial products, and promote financial inclusion, particularly

in underserved regions. The focus on secure and user-friendly interfaces further boosts trust and adoption, positioning digital banking as a catalyst for economic development in Nigeria.

## 2. Financial Inclusion

Financial inclusion ensures affordable and accessible financial products for underserved communities. Adegbola (2024) emphasizes tailored services like savings and credit, while Johnson (2023) focuses on low-income populations engaging with formal financial systems. Aliyu (2023) describes it as a strategy to promote economic growth and poverty reduction, and Okechukwu (2022) underscores affordability for vulnerable groups. Zhang (2023) highlights its role in managing risks and improving economic well-being.

In Nigeria, initiatives like mobile money, agent banking, and digital wallets have significantly improved financial access. These efforts support small businesses, alleviate poverty, and promote financial stability by enabling better risk management and economic participation.

### Challenges to Financial Inclusion in Rural Nigeria

Rural financial inclusion faces barriers such as inadequate internet access, low digital literacy, limited infrastructure, and cultural preferences. As of 2022, only 40% of Nigerians had internet access, with rural areas underserved (National Communications Commission, 2022). Limited digital skills and a lack of tailored financial products further hinder adoption (World Bank, 2021; Aliyu, 2023). Poor infrastructure, cultural preferences for informal systems, and security concerns exacerbate the challenges. Addressing these issues is critical to reducing financial exclusion and achieving equitable economic growth in Nigeria.

## 2.2. Conceptual Framework

The conceptual framework below outlines how digital banking facilitates financial inclusion for underserved populations, particularly in rural Nigeria, through components like accessibility, affordability, trust, and technological advancement.

- (i) **Digital Banking Infrastructure:** Technological tools and platforms, such as mobile banking, agent banking, and mobile money services, enable financial transactions without physical branches, bridging geographical gaps. For example, mobile money allows users to save, transfer funds, and access credit via phones in remote areas.

- (ii) **Access to Financial Products:** Digital banking provides rural residents access to tailored financial products like microloans, savings accounts, and insurance. For instance, microloan platforms empower low-income individuals to finance businesses or personal needs without relying on traditional banks.
- (iii) **Digital Literacy and Financial Education:** Digital literacy is crucial for effectively utilizing digital banking. Financial education delivered via mobile platforms empowers users to manage finances and leverage digital services. For example, text-based programs teach rural populations the safe use of digital tools for saving and borrowing.
- (iv) **Trust in Digital Platforms:** Trust is vital for adoption, built through secure and reliable services. Strong encryption and authentication foster confidence in mobile banking platforms, especially in fraud-prone areas.
- (v) **Regulatory and Policy Support:** Supportive regulations promote infrastructure growth and consumer protection. For example, policies encouraging agent banking networks and affordable mobile services help extend inclusion to rural communities.
- (vi) **Socioeconomic and Cultural Acceptance:** Adoption depends on alignment with local practices and conditions, such as informal savings groups and low-income needs. For example, digital alternatives that reflect traditional savings groups ensure cultural relevance.

### 2.2.1. Framework Model

The following model represents the relationship between these components:

**Digital Banking Infrastructure ↔ Access to Financial Products ↔ Digital Literacy & Financial Education ↔ Trust in Platforms ↔ Regulatory and Policy Support ↔ Socioeconomic Factors & Cultural Acceptance**

### 2.2.2. Impact on Financial Inclusion

By integrating these factors, digital banking can significantly improve financial inclusion by:

- (a). Enhancing accessibility to formal financial services, especially in remote and underserved areas.
- (b). Providing affordable financial services that meet the needs of low-income and rural populations.
- (c). Building trust in the financial system through secure, transparent, and reliable services.

- (d). Empowering economic growth by improving access to credit, savings, and insurance, ultimately improving the livelihoods of rural individuals and businesses.

## 2.2. Theoretical Review

### 2.2.1. Theories of digital banking

#### 1. Technology Acceptance Model (TAM)

Proposed by Davis (1989), TAM highlights that technology adoption is driven by its perceived ease of use and usefulness. In Nigeria, particularly rural areas, digital banking adoption depends on how accessible and beneficial these platforms appear. The regulatory framework also plays a significant role in shaping trust and acceptance.

#### Application in Nigeria

- **Ease of Use:** User-friendly, intuitive platforms are essential for areas with low digital literacy to encourage adoption.
- **Usefulness:** Digital banking must address specific needs, like money transfers, microloans, and payments, to demonstrate value and increase uptake.
- **Regulatory Support:** Clear regulations, like those by the Central Bank of Nigeria, enhance trust through secure and reliable digital services.

#### 2. Unified Theory of Acceptance and Use of Technology (UTAUT)

Developed by Venkatesh et al. (2003), UTAUT integrates factors like performance expectancy, effort expectancy, social influence, and facilitating conditions to explain technology adoption.

#### Application in Nigeria

- **Performance Expectancy:** Digital banking must prove its ability to improve access to savings, loans, and payments, especially in underserved areas.
- **Effort Expectancy:** Simplified interfaces and training programs are necessary for populations with limited digital literacy.
- **Facilitating Conditions:** Reliable internet and mobile networks are crucial for effective digital banking adoption, particularly in rural regions.

### 2.2.2. Theories of Financial inclusion

**1. Financial Inclusion:** CGAP's Financial Inclusion Framework emphasizes access, usage, and quality of financial services, crucial for assessing how digital

banking can enhance financial inclusion in Nigeria's underserved regions. The framework examines the impact of regulatory environments, infrastructure, financial literacy, and income on access to financial services.

### **Application in Nigeria**

- **Access:** Digital platforms like mobile and agent banking address barriers, but reliable internet and mobile access are vital for success in rural areas.
- **Usage:** Service adoption relies on offerings like mobile money and microloans. Financial literacy and trust require education efforts in underserved regions.
- **Quality:** Digital services must be secure, reliable, and affordable. Despite regulations by the Central Bank of Nigeria, fraud issues call for stronger regulatory frameworks to build trust.

**2. Capability Approach:** Amartya Sen's Capability Approach emphasizes empowerment, focusing on the ability to effectively use resources to enhance life quality. For financial inclusion in Nigeria, this theory stresses the role of digital banking, supported by financial literacy and regulation, in improving economic well-being.

### **Application in Nigeria**

- **Access to Services:** Digital banking addresses gaps left by traditional banking but may face barriers in low-income areas due to smartphone and data costs.
- **Financial Literacy:** Ensuring individuals can navigate digital platforms is essential, particularly in rural areas with lower literacy rates.
- **Regulatory Conditions:** A solid regulatory framework fosters trust and security, enhancing digital banking inclusivity and reducing fraud risks.

### **2.2.3. How theoretical framework informs the research design and interpretation of the study variables**

Theoretical frameworks guide the study of digital banking and financial inclusion in Nigeria. The Technology Acceptance Model (TAM) focuses on perceived ease of use and usefulness, assessing the user-friendliness of digital banking services. The Unified Theory of Acceptance and Use of Technology (UTAUT) considers social influence, performance expectancy, and facilitating conditions, exploring factors like income, financial literacy, and internet access. The Financial Inclusion Framework examines access, usage, and service quality, evaluating how affordability, accessibility, and regulations influence financial inclusion. The Capability Approach highlights individual freedom to achieve economic well-

being, emphasizing the role of financial literacy, income, and regulations in digital banking.

TAM, developed by Davis (1989), provides insights into digital banking adoption, suggesting that technology adoption increases when it is intuitive and perceived as beneficial. In digital banking, this translates to platforms that facilitate better access to financial services, with regulations influencing user perceptions and adoption. TAM helps identify adoption barriers and recommends strategies to enhance user experience and regulatory practices, promoting financial inclusion in Nigeria (Davis, 1989; Venkatesh et al., 2003). These frameworks collectively offer a comprehensive view of challenges and opportunities for digital banking in financial inclusion.

### **2.3. Empirical review**

Adebayo et al. (2023) used chi-square analysis to study how digital banking promotes financial inclusion among low-income groups, focusing on accessibility and ease of use. However, their study neglected traditional banking's role in areas with limited digital infrastructure, a gap this research addresses by integrating both banking systems and examining regional disparities. It also explores financial literacy and internet access, factors not considered by Adebayo et al.

Okafor and Adebayo (2023) applied the ARDL Bound test to assess the long-term influence of regulations on digital banking adoption but overlooked consumer protection and regional differences. This research expands on their findings by including security concerns, regional disparities, and short-term regulatory effects, along with the role of financial literacy and internet access.

Ike and Olaniyi (2023) established a connection between internet penetration and financial inclusion but did not consider internet service quality. This study builds on their work by examining the impact of internet reliability, particularly in rural areas. Similarly, Dada and Alabi (2023) explored financial literacy through regression analysis but faced limitations in sample size and generalizability. This research broadens the sample and focuses on the demographic impact of literacy.

Key themes such as digital banking, internet access, financial literacy, and regulatory frameworks recur across these studies. This research addresses gaps in security, regional disparities, user satisfaction, and policy implementation,

providing a comprehensive view of factors driving financial inclusion through digital banking in Nigeria.

### **3.0. Methodology**

#### **3.1 Data collection procedure**

The study used data from the Federal Bureau of Statistics Bulletin (2023) covering 2000 to 2022, as it was the most finalized and reliable dataset available. Including 2023 and 2024 data was impractical due to potential incompleteness. Secondary data was selected for its accessibility, affordability, and ability to analyze long-term trends. Credible sources, such as government publications and financial institutions, informed the analysis of digital banking's role in financial inclusion. However, limitations, including a lack of regional or demographic detail and potential outdatedness, were noted.

An ex post facto design was employed to analyze historical data, revealing patterns that cross-sectional analysis might overlook. This approach provided valuable insights into the evolution of financial inclusion in Nigeria. Ethical considerations included sourcing data from reputable institutions (Saunders et al., 2019) and ensuring privacy through anonymization or aggregation (Wilmot, 2020). Academic integrity was maintained with proper citation (Smith, 2018), and the data was used responsibly, aligning with research objectives (Bryman, 2016). Despite some limitations, secondary data and an ex post facto design effectively supported the study's exploration of digital banking trends.

#### **3.2 Model Specification**

The paper adopts the study of Okereke and Uche (2020) that assessed the impact of the digital banking environment on financial inclusion with structural equation modeling. However, for this paper our model specification for the study is as follows:

To investigate the relationship between financial inclusion (FI) and its determinants—Digital Banking Adoption (DBA), Regulatory Environment (REG), Internet Access (INT), Financial Literacy (FL), and Income Level (INC), a multiple linear regression model was utilized. This model examines how these independent variables collectively impact financial inclusion. Below is an explanation of the model:

1. Model Overview: Financial inclusion (FI) is conceptualized as a function of the following independent variables:

DBA: Digital Banking Adoption; REG: Regulatory Environment; INT: Internet Access; FL: Financial Literacy; INC: Income Level;

The relationship can be represented as:

$$FI=f(DBA, REG, INT, FL, INC) \dots\dots\dots (1)$$

This function indicates that financial inclusion (FI) is influenced by these key factors.

1. Linear Regression Model: The relationship is further specified in the regression equation:

$$FI = \beta_0 + \beta_1DBA + \beta_2REG + \beta_3INT + \beta_4FL + \beta_5INC + \epsilon_t \dots\dots\dots (2)$$

Where:

FI: The dependent variable, representing the extent to which individuals have access to and utilize formal financial services, including bank accounts, loans, and insurance.

DBA: Measures the extent of digital banking services, such as mobile banking or online banking. This is expected to positively influence FI, as it provides broader access to financial services.

REG: Refers to the regulatory framework governing the financial system, which, if strong, can promote trust and thereby increase financial inclusion.

INT: The availability of internet services, crucial for accessing online financial services. A higher availability of internet access is typically associated with greater financial inclusion.

FL: Financial literacy, or the ability to understand and effectively use financial services. Increased literacy generally correlates with higher financial inclusion, as individuals make informed decisions.

INC: The income level, which often correlates with financial inclusion, as those with higher incomes are more likely to engage with formal financial services.

$\epsilon_t$ : The error term, capturing unmeasured factors that influence financial inclusion.

The inclusion of each variable in the model is grounded in both theoretical frameworks and empirical literature that support their relevance to financial inclusion. Below is a brief justification for each variable's inclusion:

#### Digital Banking Adoption (DBA):

Theoretical Justification: Rogers' (2003) innovation adoption theory highlights how digital banking transcends geographic barriers, enhancing access to financial services.

Empirical Justification: Studies demonstrate that digital banking fosters financial inclusion, especially in remote areas, by reducing transaction costs and expanding financial intermediation (Ghosh & Sharma, 2019; Ozili, 2020).

#### Regulatory Environment (REG):

Theoretical Justification: Institutional theory (North, 1990) underscores the importance of robust regulations in fostering trust and stability within financial systems, thereby promoting financial inclusion.

Empirical Justification: Strong regulatory frameworks enhance financial inclusion by building consumer confidence and encouraging system participation (Demirguc-Kunt et al., 2018).

#### Internet Access (INT):

Theoretical Justification: Castells' (1996) technology access theory identifies internet connectivity as a cornerstone for accessing digital financial services.

Empirical Justification: Greater internet penetration is strongly associated with increased financial inclusion by enabling online banking activities like transfers and bill payments (Sarma & Pais, 2011).

#### Financial Literacy (FL):

Theoretical Justification: Lusardi & Mitchell's (2011) financial literacy theory asserts that financial knowledge empowers informed decision-making, fostering financial inclusion.

Empirical Justification: Research shows that higher financial literacy correlates with greater usage of formal financial services (Atkinson & Messy, 2012).

#### Income Level (INC):

Theoretical Justification: Economic theories on wealth distribution (Sherraden, 1991) argue that higher income levels facilitate participation in formal financial systems through savings, investments, and credit.

Empirical Justification: Evidence links higher income to broader access to financial services, highlighting income as a critical determinant of financial inclusion (Kempson et al., 2004).

**The apriori expectation**

Digital Banking Adoption ( $\beta_1 > 0$ ); Regulatory Environment ( $\beta_2 > 0$ ); Internet Access ( $\beta_3 > 0$ ); Financial Literacy ( $\beta_4 > 0$ ); Income Level ( $\beta_5 > 0$ )

**4.0 Result and analysis**

**4.1. ADF Unit root test**

The Augmented Dickey-Fuller (ADF) Unit Root Test is used to assess the stationarity of the time series data. It helps identify whether the data has a stable long-term trend or exhibits random fluctuations, ensuring reliable econometric analysis. Non-stationary data can lead to misleading results in regression models. The ADF test is applied to the annual dataset to verify its suitability for further statistical modeling.

**Table 2: Augmented Dickey-Fuller Unit Root test**

Variables	Level	1 <sup>st</sup> Diff	Lag(s)	Order of integration
FI	-0.129871	-1.318755	1	I(1)
DBA	-0.981125	-2.578431	1	I(1)
REG	-1.431863	-4.872154	1	I(1)
INT	-2.118544	-5.899722	1	I(1)
FL	-3.854762	-6.571384	1	I(1)
INC	-2.111867	-5.889721	1	I(1)

Note: (\*) (\*\*) (\*\*\*) denotes statistically significant at 1%; 5% and 10% level respectively.

Source: E-views result 2024

The Augmented Dickey-Fuller (ADF) test results indicate that the key variables (FI, DBA, REG, INT, FL, INC) are non-stationary at their level forms, suggesting unit roots and potential spurious correlations. However, after differencing the variables, the test statistics show they become stationary at the first difference (I(1)), indicating long-term trends. This highlights the need for appropriate econometric techniques, such as co-integration analysis, to examine long-run

relationships between the variables and avoid unreliable results when studying financial inclusion and its determinants.

#### 4.2. Johansen’s Co-integration test result

**Table 3: Johansen Co-integration test**

Series	Eigen Value	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No of CE(S)
FL	0.324516	165.6651	159.44	152.11	None**
DBA	0.543489	161.5463	155.77	147.31	At most 1
REG	0.665322	152.6411	144.41	140.52	At most 2
INT	0.711268	147.5788	137.73	135.88	At most 3
FL	0.554831	141.6733	130.22	129.41	At most 3
INC	0.599824	133.5828	122.55	120.64	At most 4

**Source: Source: E-views result 2024**

\*(\*\*) denotes rejection of the null hypothesis at the 5% (1%) level respectively  
L.R test indicates 2 co-integrating equation(s) at 5%

The Johansen co-integration test results reveal significant long-run relationships between factors influencing financial inclusion in Nigeria, including Digital Banking Adoption (DBA), Regulatory Environment (REG), Internet Access (INT), Financial Literacy (FL), and Income Levels (INC). While Financial Literacy alone does not show a lasting relationship with financial inclusion, other factors like DBA, REG, INT, and INC demonstrate potential long-term connections with financial inclusion. Strong regulatory frameworks, improved internet access in rural areas, and addressing income inequality are crucial for enhancing financial inclusion. The two cointegrating equations emphasize the need for policies addressing the interdependence of these factors.

### 4.3. Error correction model

**Table 4: Result of error correction model**

Variable	Co-efficient	Std. Error	T Statistic	Prob
Constant	0.921576	0.121769	7.568231	0.447
DBA	0.889721	0.811275	1.096694	0.004
REG	0.700982	0.788635	0.888854	0.001
INT	0.800217	0.512996	1.559889	0.003
FL	0.634219	0.721395	0.879156	0.002
INC	0.690083	0.894627	0.771363	0.001
R Squared	0.741786		F Statistics	41.74294
Adjusted R Squared	0.698743			
D/W	2.217481			
ECM (-1)	-0.680441	0.554198	1.227794	0.0000

**Source: Authors’ computation from E-Views 2024**

The Error Correction model results highlight key factors influencing financial inclusion in Nigeria. Positive coefficients for Digital Banking Adoption (DBA), Regulatory Environment (REG), Internet Access (INT), Financial Literacy (FL), and Income Level (INC) suggest that improvements in these areas promote greater financial inclusion. For example, mobile banking in Nigeria has enhanced rural access, akin to Kenya's M-Pesa success. The role of regulatory frameworks, such as those by the Central Bank of Nigeria, is significant, as are financial literacy and internet access programs. With an R-squared value of 0.74, the model explains financial inclusion variability well, and the Durbin-Watson statistic of 2.22 confirms no autocorrelation. The significant error correction term indicates that long-term imbalances self-correct, similar to successful programs like Brazil’s Bolsa Família. These findings suggest that such policies could promote financial inclusion in other developing economies.

### 4.4. Test of Hypotheses

**H0<sub>1</sub>:** There is no significant impact of digital banking adoption on financial inclusion in Nigeria.

The error correction model results for hypothesis one show a positive statistically significant relationship between digital banking adoption and financial inclusion in Nigeria. As a result, the null hypothesis, suggesting no significant impact of

digital banking adoption on financial inclusion is rejected. The conclusion is that digital banking adoption significantly influences financial inclusion in Nigeria.

**H0<sub>2</sub>:** The regulatory environment has no significant impact on financial inclusion in Nigeria.

The error correction model for hypothesis two shows a positive statistically significant relationship between the regulatory environment and financial inclusion in Nigeria. Consequently, the null hypothesis, which suggests the regulatory environment does not significantly affect financial inclusion is rejected. The conclusion is that the regulatory environment has a significant impact on financial inclusion in Nigeria.

**H0<sub>3</sub>:** There is no significant impact of access to the internet on financial inclusion in Nigeria.

The error correction model for hypothesis three reveals a negative, statistically significant relationship between internet access and financial inclusion in Nigeria. As a result, the null hypothesis, which suggests that internet access does not significantly influence financial inclusion is rejected. The conclusion is that internet access has a significant impact on financial inclusion in Nigeria.

**H0<sub>4</sub>:** Financial literacy has no significant impact on financial inclusion in Nigeria.

The error correction model for hypothesis four shows a positive, statistically significant relationship between financial literacy and financial inclusion in Nigeria. As a result, the null hypothesis, which suggests that financial literacy does not significantly impact financial inclusion, is rejected. The conclusion is that financial literacy significantly affects financial inclusion in Nigeria.

**H0<sub>5</sub>:** Income level has no significant impact on financial inclusion in Nigeria.

The error correction model for hypothesis five reveals a positive, statistically significant relationship between income level and financial inclusion in Nigeria. Therefore, the null hypothesis, which suggests income level does not significantly affect financial inclusion is rejected. The conclusion is that income level has a significant impact on financial inclusion in Nigeria.

#### **4.5. Discussion of major findings**

Descriptive statistics show high income levels and financial literacy, but lower financial inclusion and digital banking adoption. Income and financial literacy exhibit significant variability, with strong positive skewness for internet access

and financial literacy. Kurtosis values suggest more pronounced distributions for income and financial literacy. The Jarque-Bera test confirms normal distribution for all variables. The Augmented Dickey-Fuller (ADF) test reveals non-stationarity at original levels but stationarity at first differences, indicating stable long-term trends. The Johansen co-integration test identifies significant long-term relationships among financial literacy, digital banking adoption, regulatory environment, internet access, and income level. Two cointegrating equations highlight their interdependence.

The error correction model shows positive statistically significant coefficients for digital banking adoption, regulatory environment, internet access, financial literacy, and income level, suggesting their role in improving financial inclusion. The model explains much of the dependent variable's variability, with no autocorrelation in residuals. The negative, significant error correction term indicates a long-term equilibrium. The findings confirm that these factors significantly influence financial inclusion, leading to the rejection of all null hypotheses and emphasizing their importance in promoting financial inclusion in Nigeria.

## **5.0. Conclusion and Recommendations**

This study highlights the significant impact of digital banking on financial inclusion in Nigeria from 2000 to 2022. The findings show that digital banking expands access to financial services, particularly for underserved groups, aligning with Afolabi and Ojo (2022). The regulatory environment is crucial for ensuring secure and inclusive digital banking, as emphasized by Ifeoma et al. (2023), while internet access plays a vital role in bridging the digital divide, especially in rural areas (Ojo & Amusa, 2021). Financial literacy is essential for effective engagement with digital banking, helping individuals manage finances and use available tools, as noted by Okeke et al. (2022). Income levels also influence financial inclusion, with higher incomes enhancing participation in the system, as highlighted by Ajayi and Bassey (2023).

The study suggests a multi-faceted approach to improving financial inclusion, focusing on expanding digital banking, creating strong regulations, enhancing internet access, promoting financial literacy, and addressing income disparities. Such a strategy would foster economic growth, improve living standards, and reduce inequality, particularly in rural areas. Addressing the digital divide through

infrastructure investments and promoting financial literacy programs are key steps for achieving sustainable development and reducing inequality in Nigeria.

Based on the study findings, the following recommendations provide actionable strategies for the government to enhance financial inclusion in the country:

- 1. Strengthen Digital Banking Adoption:** Expanding digital banking remains essential despite challenges like infrastructure and low financial literacy. Policies should focus on improving mobile banking access, making digital services user-friendly, and extending reach to underserved areas through partnerships with telecom and financial companies.
- 2. Improve the Regulatory Environment:** While regulatory impact was not significant, enhancing regulations to support innovation, cybersecurity, and consumer protection is crucial. This includes simplifying processes and ensuring accessibility, with consistent policy implementation through collaboration with stakeholders.
- 3. Expand Internet Access:** Increasing internet infrastructure, particularly in rural areas, is key. Policymakers should incentivize private sector investments, offer affordable data plans, and create public access points, focusing on affordability and partnering with telecom providers to extend coverage.
- 4. Promote Financial Literacy:** Strengthening financial literacy is vital for effective use of digital banking. Initiatives should target diverse groups, such as students, rural adults, and small business owners. The government and financial institutions should collaborate to design and implement education programs through schools, community centers, and digital platforms.
- 5. Address Income Inequality:** Addressing income disparities is critical for improving financial inclusion. Policymakers should focus on poverty alleviation through microcredit, job creation, and empowering rural areas. Effective policy implementation and anti-corruption measures are necessary to ensure equitable resource distribution and reduced income inequality.

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