

Government Infrastructure Spending and its Influence on the Growth of the Money Market: A Temporal Analysis of Fintech Growth in Nigeria

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Abstract

This study investigates the impact of government infrastructure spending on the growth of the money market and the Fintech sector in Nigeria, adopting a temporal analysis approach to evaluate long-term dynamics and causal relationships. Against the backdrop of Nigeria's evolving economic landscape and the increasing prominence of Fintech as a driver of financial innovation and inclusion, the study explores how various components of public infrastructure expenditure—including allocations to education, agriculture, transport and communication, and total capital outlay—affect financial market development and digital finance expansion. Using annual time-series data from 2010 to 2023, sourced from the Central Bank of Nigeria (CBN), National Bureau of Statistics (NBS), and financial market reports, the study applies Augmented Dickey-Fuller (ADF) tests, Johansen Co-integration analysis, and an Ordinary Least Squares (OLS) regression model to examine both the short- and long-run relationships among variables. The empirical findings reveal that infrastructure spending, particularly in education and capital projects, significantly contributes to Fintech growth, as proxied by the aggregate value of POS, mobile, and web-based transactions. Furthermore, positive relationships are observed between infrastructure expenditure and key money market indicators such as liquidity and transaction volumes. The regression results exhibit high explanatory power, with an adjusted R-squared of 0.98, and show that both recurrent and capital expenditures influence financial sector growth, although with varied temporal lags. The study concludes that government infrastructure investment serves as a critical catalyst for financial system development, especially in digital finance, and recommends a multi-pronged policy approach focused on sustained infrastructure financing, human capital development, regulatory enhancement, and strategic planning that acknowledges time-lag effects. By bridging a notable gap in the empirical literature, this research provides vital insights for policymakers, development economists, and financial sector stakeholders seeking to align fiscal policy with inclusive financial innovation and economic transformation.

Keywords: Infrastructure Spending, Money Market, Fintech, Temporal Analysis,

Introduction

The nexus between government infrastructure expenditure and economic growth has long been a focal point of economic research, especially within developing economies such as Nigeria. Infrastructure development, encompassing sectors such as transportation, energy, and telecommunications, is widely regarded as a fundamental driver of economic activities. It plays a critical role in enhancing productivity, reducing costs, and improving the overall business environment. In Nigeria, where the need for robust infrastructure is paramount, the government's investment in this area is seen as a vital catalyst for economic development.

Concurrently, the financial landscape in Nigeria has been undergoing significant transformations, particularly with the rise of the Fintech sector. The Fintech industry, characterized by innovative financial services and digital platforms, has rapidly emerged as a key player in the nation's economy, offering new opportunities for financial inclusion, efficiency, and economic growth. Despite its importance, the relationship between infrastructure spending and the growth of the money market and Fintech sector remains underexplored. Given the interconnectedness of infrastructure, financial markets, and technological innovation, this study aims to assess how government spending on infrastructure influences the growth of these sectors over time.

This research is particularly relevant in the context of Nigeria's ongoing efforts to diversify its economy and strengthen its financial systems. By employing temporal analysis, the study seeks to provide a comprehensive understanding of the long-term impacts of infrastructure investment on the money market and Fintech sector, offering insights that could guide future policy decisions and economic strategies.

Research Problem

Nigeria's economic landscape is characterized by a complex interplay of factors, including government policy, infrastructure development, and financial market dynamics. Despite substantial investments in infrastructure over the years, the effectiveness of these expenditures in stimulating economic growth, particularly within the money market and Fintech sector, remains ambiguous. The money market, as a critical component of the financial system, facilitates liquidity management, short-term financing, and the overall stability of the economy. Meanwhile, the Fintech sector, which relies on both physical and digital infrastructure, represents a burgeoning industry that is reshaping the way financial services are delivered.

However, there is a significant gap in the literature concerning the empirical relationship between government infrastructure expenditure and the performance of these economic sectors. While some studies have explored the broader impact of infrastructure on economic growth, few have specifically focused on its influence on the money market and Fintech industry in Nigeria. Moreover, the role of time in mediating these relationships is often overlooked, despite its importance in understanding the long-term effects of infrastructure investments.

The core problem this research addresses is the lack of empirical evidence on how government infrastructure spending impacts the growth of the money market and Fintech sector in Nigeria over time. By filling this gap, the study aims to contribute to a more nuanced

understanding of the economic implications of infrastructure investment, particularly in the context of financial market development and technological innovation.

Research Objectives

The overarching objective of this study is to assess the impact of government infrastructure spending on the money market and Fintech sector growth in Nigeria, with a particular focus on the temporal dynamics of these relationships. The specific objectives are as follows:

1. To analyze the historical trends in government infrastructure expenditure in Nigeria over the last two decades.
2. To examine the relationship between government infrastructure spending and fintech growth in Nigeria.
3. To investigate the influence of infrastructure spending on the growth of the Fintech sector in Nigeria.
4. To employ temporal analysis to identify correlations, causations, and potential lags between infrastructure expenditure and the growth of the money market and Fintech sector in Nigeria.
5. To evaluate how time lags and lead effects of mediating factors such as economic policy, regulatory environment, and technological advancements in the relationship between infrastructure spending and sectoral growth in Nigeria.

Research Questions

The study is designed to answer the following key research questions:

1. What has been the trends in government infrastructure spending in Nigeria over the past twenty (20) years?
2. What is the relationship between government infrastructure spending on Fintech growth in Nigeria?
3. What is the influence of infrastructure spending on the growth of the Fintech sector in Nigeria?
4. What are the temporal analysis used to identify correlations, causations and potential lags between infrastructure expenditure and the growth of money market and Fintech sector in Nigeria?
5. How do time lags and lead effects manifest in the relationship between infrastructure spending and the sectoral growth of these economic sectors in Nigeria?

Literature Review

This section provides a comprehensive examination of the theoretical and empirical foundations relevant to this study.

Theoretical Framework

The theoretical framework for this study is grounded in multiple interrelated theoretical perspectives that explore the nexus between government expenditure, financial market development, and technological innovation within the financial sector. To understand how government infrastructure spending can influence the money market and fintech growth in Nigeria, this research draws from the following key theoretical foundations:

Keynesian Theory of Government Spending

The Keynesian economic theory, as proposed by John Maynard Keynes (1936), forms a foundational basis for understanding the rationale behind government expenditure as a tool for stimulating economic activity. Keynes (1936) argues that “the government must be prepared to intervene with spending programs when private investment is insufficient to maintain full employment.” Increased public spending, particularly on infrastructure, injects liquidity into the economy, drives aggregate demand, and fosters overall macroeconomic growth. Infrastructure development — such as transportation networks, energy systems, telecommunications, and digital infrastructure — reduces transaction costs and facilitates efficient movement of goods and services, thereby enhancing the operational environment for private enterprises, including those within the financial technology sector (Afonso & Furceri, 2010). In Nigeria, such investments can catalyze financial flows and expand the liquidity of the money market while enhancing fintech operations.

Endogenous Growth Theory

Developed by Romer (1990) and Lucas (1988), the Endogenous Growth Theory posits that economic growth is largely driven by internal factors—particularly innovation, human capital development, and infrastructure. Romer (1990) suggests that “ideas and technological change are the central drivers of long-term economic growth.” Government infrastructure spending, especially in ICT and education, supports innovation and entrepreneurship. These investments create the conditions necessary for the expansion of financial technologies, which in turn contribute to money market depth and efficiency (Barro, 1990).

Financial Intermediation Theory

Initially proposed by Gurley and Shaw (1960), this theory explains how financial institutions serve as intermediaries that channel funds from surplus to deficit units, thereby enhancing capital allocation and economic productivity. Financial intermediaries help reduce transaction costs, information asymmetry, and credit risks (Levine, 2005). In the Nigerian context, government investments in broadband, digital payment infrastructure, and energy

access can lower entry barriers and operating costs for fintech firms, enabling them to function as modern financial intermediaries within the money market space.

Schumpeterian Theory of Innovation

Joseph Schumpeter (1934) emphasized the importance of innovation and entrepreneurship in economic development. He argued that “the fundamental impulse that sets and keeps the capitalist engine in motion comes from the new consumers’ goods, the new methods of production or transportation, the new markets” (Schumpeter, 1934, p. 83). Fintechs in Nigeria exemplify this process of “creative destruction” by displacing traditional banking models with digital solutions. Government infrastructure projects, especially those promoting digital transformation, create enabling environments for such innovation and, consequently, influence financial market structure and performance.

Institutional Theory

Institutional theory, as articulated by North (1990), highlights the role of institutions—defined as “the rules of the game in a society or, more formally, the humanly devised constraints that shape human interaction” (p. 3). These institutions reduce uncertainty and transaction costs, making economic activities more predictable. Effective governance and regulatory infrastructure enhance investor confidence, improve market efficiency, and stimulate fintech growth and money market development. In Nigeria, infrastructure investments are often accompanied by regulatory reforms that shape fintech operations and financial system dynamics.

Market Efficiency Theory

Fama’s (1970) Efficient Market Hypothesis (EMH) asserts that “an efficient market is one in which prices always fully reflect available information.” When applied to the money market, this suggests that policy signals such as infrastructure spending are immediately factored into interest rates and liquidity decisions. Fintech platforms enhance this responsiveness by facilitating real-time access to market information and financial services (Malkiel, 2003), thus contributing to a more efficient financial system.

Diffusion of Innovation Theory

Everett Rogers (1962) developed the Diffusion of Innovation Theory to explain how new technologies spread within a society. Rogers (2003) defines diffusion as “the process by which an innovation is communicated through certain channels over time among the members of a social system” (p. 5). Infrastructure investments—particularly in telecommunications and electricity—reduce the structural barriers to innovation adoption, especially in rural and underserved areas of Nigeria. This accelerates the uptake of fintech solutions and promotes broader financial inclusion and engagement in money market instruments.

Public Choice Theory

Public Choice Theory, developed by Buchanan and Tullock (1962), applies economic principles to political processes, suggesting that public officials act in their own self-interest, which may not always align with economic efficiency. Buchanan (1986) argued that “politicians and bureaucrats are utility-maximizing individuals who respond to incentives.” In the Nigerian context, infrastructure spending may be influenced by political considerations rather than optimal economic planning, affecting the actual impact of such investments on fintech growth and money market development (Acemoglu & Robinson, 2012).

Together, these theories provide a multidimensional lens for analyzing the interaction between government infrastructure spending, money market dynamics, and fintech innovation in Nigeria. While Keynesian and endogenous growth theories explain macroeconomic and structural motivations for public spending, financial intermediation and innovation theories clarify how fintechs can expand market access and efficiency. Institutional, market efficiency, and public choice theories provide insights into governance, policy, and market behaviour. Lastly, the diffusion of innovation theory underscores the significance of infrastructural reach and user engagement. Understanding these theoretical perspectives is essential for interpreting trends and formulating recommendations that align government spending with fintech-enabled money market development.

Empirical Literature Review

Empirical studies have increasingly explored the complex relationships between government infrastructure spending, money market development, and fintech growth, especially within the context of emerging economies like Nigeria. These studies provide vital insights into how public investment decisions shape financial systems and technology adoption. Odhiambo (2009) conducted a time-series analysis in South Africa to assess the relationship between infrastructure investment and financial sector development. Using cointegration and error correction models, the study found a long-term positive relationship between public infrastructure spending and financial deepening, suggesting that infrastructure investment lowers transaction costs and enhances financial activity. Although the study focused on South Africa, its implications are relevant to Nigeria and similar economies.

Adeniran and Yusuf (2019) examined the relationship between public capital expenditure and financial market performance in Nigeria. Applying the ARDL bounds testing approach, they found that infrastructure-related government spending had a significant long-term effect on the development of the money market. Their findings indicated that investment in transportation and electricity infrastructure boosts investor confidence and enhances liquidity in money market instruments.

In a related study, Uchenna, Okonkwo, and Nwankwo (2020) employed a vector autoregression (VAR) framework to analyze how components of government expenditure impact the financial sector in Nigeria. Their results revealed that infrastructure spending significantly and persistently influenced the growth of the money market, primarily by improving the efficiency and capacity of financial institutions.

The World Bank (2021) provided a broader cross-country perspective through a panel analysis involving 30 Sub-Saharan African nations, including Nigeria. The study found that government investment in digital infrastructure, particularly in broadband and telecommunications, significantly contributed to the growth of fintech start-ups and the expansion of digital financial services. Nigeria was highlighted as a key example, where public-private partnerships in digital infrastructure facilitated fintech proliferation.

Solomon and Shehu (2018) explored the determinants of money market development in Nigeria from 1980 to 2015. Their regression analysis confirmed that infrastructure variables, especially electricity supply and telecommunications, were significant predictors of money market activity. They emphasized that reliable infrastructure reduces operational barriers and enables greater financial participation, thereby enhancing the depth of the money market.

Klapper, Singer, and Ansar (2019), using data from the Global Findex database, found that government investments in foundational infrastructure such as national identity systems, mobile networks, and power distribution have a substantial impact on fintech adoption in developing economies. The study noted that in Nigeria, fintech adoption increased sharply in regions with improved infrastructure, underlining the critical connection between infrastructure investment and financial innovation. Chukwuemeka and Ifeoma (2021) applied generalized method of moments (GMM) techniques to study the influence of public infrastructure expenditure on fintech development in Nigeria. Their findings suggested a strong positive correlation between capital expenditure and the expansion of digital financial services, particularly mobile lending and payments. The study argued that fintech plays a complementary role in improving money market performance by facilitating more efficient short-term financial transactions.

Sahay et al. (2015), in an IMF working paper, assessed the link between financial inclusion, financial depth, and macroeconomic stability across developing countries. Their empirical results indicated that digital financial services—often driven by government-supported infrastructure—can significantly improve money market liquidity and resilience. Countries with robust digital infrastructure exhibited stronger and more inclusive financial systems. Adeleke and Owolabi (2020) examined the effects of government expenditure on fintech development in Nigeria from 2000 to 2019 using cointegration and error correction models. Their study revealed that sustained public investment in ICT infrastructure and digital literacy initiatives enhanced fintech expansion, particularly in underserved areas. These developments translated into increased use of money market instruments such as savings and short-term investment accounts.

Similarly, Asongu and Nwachukwu (2018) assessed the role of ICT infrastructure in financial modernization across 42 African countries. Their panel regression results showed that greater internet penetration and mobile network coverage positively influenced money market development and fintech growth. Nigeria was cited as a positive case study, particularly in mobile banking and peer-to-peer lending services. Okonkwo and Ezeaku (2019) analyzed the combined effects of fiscal policy and financial innovation on the Nigerian money market using ARDL methodology. Their findings showed that public spending on infrastructure had both

direct effects—through enhanced intermediation—and indirect effects—through enabling fintech operations. The authors recommended strategic alignment of fiscal and innovation policies to strengthen money market operations.

Finally, a 2022 report by Enhancing Financial Innovation & Access (EFInA) provided micro-level survey evidence linking fintech adoption to infrastructure access in Nigeria. The study found that areas with reliable electricity and broadband services reported higher levels of mobile money use, savings, and participation in short-term financial markets. The report concluded that bridging Nigeria's infrastructure gap is essential for accelerating fintech-driven money market development.

In summary, the reviewed literature presents robust empirical support for the argument that government infrastructure spending fosters the growth of both the money market and fintech sector. These studies reveal that infrastructure investments improve market access, operational efficiency, and investor confidence. However, most studies tend to examine these variables in isolation or through static models. There is a notable gap in research that simultaneously analyzes government infrastructure spending, fintech growth, and money market development within a dynamic and temporal framework. This study aims to fill that gap by employing a temporal analysis focused on Nigeria.

Overview of the Money Market in Nigeria

The Nigerian money market serves as the financial system's primary mechanism for managing short-term liquidity needs, facilitating monetary policy implementation, and providing a platform for short-term borrowing and lending. It plays a critical role in bridging temporary gaps between surplus and deficit economic units by offering a range of financial instruments with maturities not exceeding one year. The vibrancy of the money market is directly tied to macroeconomic stability, financial innovation, and institutional trust—making it a key arena in examining the intersection of government spending, fintech growth, and monetary system performance in Nigeria.

Structure of the Nigerian Money Market

The Nigerian money market is structured into organized and unorganized components. The organized sector operates under the regulation of the Central Bank of Nigeria (CBN), consisting of formal financial institutions such as deposit money banks (DMBs), merchant banks, microfinance banks, development finance institutions (DFIs), pension fund administrators (PFAs), insurance companies, and institutional investors. These entities engage in the issuance, trading, and holding of money market instruments through established market platforms and regulatory channels.

Conversely, the unorganized sector comprises informal lending arrangements such as *ajo*, *esusu*, and local thrift and credit associations, which, although not under formal regulation, serve the liquidity needs of informal businesses and low-income individuals. While the unorganized market lacks transparency and standardization, it continues to play an important socio-economic role in financial inclusion.

The formal segment of the money market is further divided into two key sub-markets:

- a. The Interbank Market: This sub-market facilitates short-term borrowing and lending among banks, primarily through overnight and call money placements. It is critical for liquidity balancing and for enabling banks to meet daily cash reserve requirements. Rates in this market, such as the Nigerian Interbank Offered Rate (NIBOR), are sensitive to CBN interventions and act as benchmarks for other short-term rates.
- b. The Discount Market: Historically dominated by discount houses (phased out in 2014), this segment handles short-term debt securities such as Treasury Bills (T-Bills), Certificates of Deposit (CDs), and Commercial Papers (CPs). Institutions like the FMDQ Securities Exchange now facilitate secondary market trading of these instruments, increasing accessibility, liquidity, and price transparency.

This dual structure creates a platform for monetary policy implementation, short-term financing, and resource mobilization across different segments of the economy.

Functions of the Nigerian Money Market

The money market in Nigeria fulfils several interrelated macroeconomic and microeconomic functions:

- i. Liquidity Redistribution: One of its most critical roles is the efficient redistribution of liquidity among financial institutions. Banks with excess liquidity lend to those with deficits, thereby stabilizing the financial system and ensuring the smooth functioning of banking operations.
- ii. Implementation of Monetary Policy: The money market serves as the primary conduit for the transmission of monetary policy. The CBN conducts Open Market Operations (OMOs), adjusts the Monetary Policy Rate (MPR), and manages liquidity through repurchase agreements (repos), reverse repos, and Standing Lending Facilities (SLFs). These tools influence short-term interest rates, inflation, and ultimately aggregate demand.
- iii. Short-Term Capital Mobilization: Government agencies, corporations, and financial institutions use the money market to raise short-term funds, thereby financing operations, managing working capital, or covering budget deficits.
- iv. Benchmark Rate Formation: Through constant interaction of supply and demand, the money market helps determine prevailing interest rates. Key benchmarks such as the NIBOR, OMO, and Treasury Bill yields reflect investor sentiment, inflation expectations, and policy direction.
- v. Safe Investment Avenue: For risk-averse investors, especially institutional ones like PFAs, insurance firms, and mutual funds, the money market provides relatively safe and liquid investment opportunities.
- vi. Facilitation of Financial Innovation: With the rise of fintech, money market instruments have increasingly been packaged into accessible products for retail investors. Digital platforms now allow individuals to invest in T-Bills or money market mutual funds with minimal entry thresholds.

Trends and Recent Data

The Nigerian money market has undergone notable changes in recent years, driven by policy adjustments, macroeconomic dynamics, and technological innovation. According to the CBN Financial Markets Department Report (2023), the total value of Treasury Bills issued in 2023 stood at approximately ₦3.8 trillion. OMO bills issuance also surged to ₦7.03 trillion in the same period, reflecting intensified efforts to curb inflation, which peaked at 28.9% in December 2023.

The interbank market experienced significant volatility due to cash shortages and interest rate fluctuations. The Nigerian Interbank Offered Rate (NIBOR) ranged between 12% and 20% throughout 2023, often responding to CBN liquidity injections or mop-up operations. At times, interbank rates surpassed the MPR (which was raised to 22.75% in early 2024), indicating tight liquidity conditions.

Additionally, fintech innovation has significantly reshaped the structure of the market. According to EFInA (2022), fintech participation in money market products grew by over 150% between 2020 and 2022, largely due to retail investors gaining access through mobile apps. This retail surge was supported by rising smartphone penetration, digital KYC systems, and API-based integration with banks and fund managers. The FMDQ OTC Securities Exchange reported an annual trading volume of ₦24.8 trillion in money market instruments in 2023, up from ₦18.7 trillion in 2022. This increase reflects enhanced liquidity, investor confidence, and regulatory efforts to deepen the market.

Moreover, government policy has also influenced trends. The removal of interest rate caps on savings deposits and the harmonization of the foreign exchange market have affected investor behaviour. For instance, the attractiveness of T-Bills rose sharply in the second half of 2023 due to higher yields in response to inflationary pressures and naira depreciation.

In terms of fintech integration, money market mutual funds have grown significantly. According to the Securities and Exchange Commission (SEC, 2023), net asset value (NAV) of money market funds stood at over ₦1.2 trillion by Q4 2023, making up more than 50% of the total collective investment schemes in Nigeria.

Growth of Fintech in Nigeria

Over the past decade, the Nigerian financial technology (fintech) sector has witnessed exponential growth, emerging as a dynamic force within the country's financial services industry. Once dominated by traditional banks and insurance firms, Nigeria's financial landscape has rapidly evolved, driven by a wave of fintech startups offering innovative solutions in payments, lending, savings, wealth management, insurance (insurtech), and blockchain-based services. According to the Fintech Association of Nigeria (2023), the country is home to over 250 fintech companies, ranging from digital banks and mobile money operators to robo-advisors and peer-to-peer lenders. Nigeria accounted for (60%) of fintech investment in Africa between 2020 and 2022, attracting over \$1.3 billion in capital (McKinsey, 2022). This growth is reflective of broader regional trends but is also significantly influenced by local

conditions including a large unbanked population, increased smartphone adoption, and the proactive embrace of digital financial services.

Notably, Nigeria is home to several "unicorns"—fintech startups valued at over \$1 billion—including Flutterwave, OPay, and Interswitch, which have expanded operations across multiple African markets. These firms have not only deepened financial inclusion but have also disrupted traditional banking models by offering agile, customer-centric digital services. The Nigeria's fintech sector has become a magnet for local and international investors. Between 2020 and 2022, Nigerian fintechs attracted over \$1.3 billion in VC funding—60% of all fintech funding in Africa (McKinsey, 2022). This includes major rounds raised by Flutterwave (\$250M), OPay (\$400M), and TeamApt (\$50M), fueling product development and regional expansion.

The market is characterized by fierce competition, particularly in the digital payment and lending segments. However, new frontiers are emerging in insurtech, regtech, wealthtech, and embedded finance, indicating a maturation of the ecosystem. Despite positive momentum, profitability remains a challenge for many fintech startups, with high customer acquisition costs and regulatory compliance burdens limiting margins. Some firms have pivoted toward Banking-as-a-Service (BaaS) models, partnering with banks to offer white-labelled financial products.

Methodology

The study used secondary data derived from the publications of Central Bank of Nigeria, specifically the CBN statistical bulletin, and some other sources like, e-Books, online Journals, academic papers and relevant textbooks. The data is for 14 years covering 2010 and 2023 because data on fintech in the CBN annual report started about the time. Various statistical techniques are adopted to test the properties of the variables and the stability of the model structure and functional form. Unit root, and Johansen co-integration tests are used to investigate the stationary properties of the variable, while the statistical tool used to analyze the influence of government infrastructural spending on growth of Fintech in Nigeria using a multiple regression technique which is processed electronically via Eviews.

Model Specification

The econometric model employed in this study to investigate the influence of government infrastructural spending on growth of Fintech in Nigeria between the periods 2010 to 2023. The study considered Fintech Growth to proxy growth of Fintech; with dataset of aggregate value of transactions of POS, Web Pay and Mobile Pay as the dependent variable as against government infrastructure proxy by FAAC Allocation, Recurrent Expenditure on Education, Agriculture, Transport & Communication and Total Capital Expenditure as the independent variables.

This study model is specified as:

$$\text{FINGR} = \alpha_0 + \alpha_1 \text{FAAC} + \alpha_2 \text{EDURE} + \alpha_3 \text{AGRRE} + \alpha_4 \text{TCRE} + \alpha_5 \text{TCE} + \mu_i$$

And by log linearization the equation becomes:

Where:

FINGR = Growth of Fintech in Nigeria proxy by aggregate value of transactions of POS, Web Pay and Mobile Pay

FAAC = FAAC Annual Allocation

EDURE = Education Recurrent Expenditure

AGRRE = Agriculture Recurrent Expenditure

TCRE = Transport & Communication Recurrent Expenditure

TCE = Total Capital Expenditure

$\alpha_1 - \alpha_4$ = Slopes or Coefficients of the explanatory variables

α_0 = Intercept of the model

μ_i = Random variable or Error term

On the apriori ground, it is expected that α_1 , α_2 , α_3 , α_4 and α_5 should be greater than zero i.e. positive.

Results Presentation and Discussion

This section presents and interprets the empirical findings of the study which investigates the influence of government infrastructure spending on the growth of the fintech sector in Nigeria. The analysis is anchored on a robust econometric framework involving unit root testing and co-integration analysis, followed by a regression estimation. The dependent variable, FINGR, represents the growth of fintech in Nigeria, proxied by the aggregate value of Point-of-Sale (POS), Web Payment, and Mobile Payment transactions. These variables are theoretically expected to influence the fintech ecosystem both directly and indirectly by enabling infrastructural and systemic support for digital innovation and financial access.

Unit Root Testing and Stationarity Diagnosis

To ensure the validity of the regression model and avoid spurious results, a preliminary test of stationarity was conducted using the Augmented Dickey-Fuller (ADF) test. This is essential to confirm whether the time series variables are stationary or contain a unit root.

ADF: Unit Root Test Results at First Differences

Table 1: summary of Unit Root Test Results at First Differences

Variable	Lag Length	ADF Test Statistic	5% Critical Value	Probability	Order of Integration
FINGR	1	-2.643487	-3.040391	0.1103	I(1)
FAAC	1	-5.383976	-3.040391	0.0005	I(1)
EDURE	1	-3.250338	-3.040391	0.0335	I(1)
AGRRE	1	-4.177830	-3.857386	0.0052	I(1)
TCRE	1	-4.861636	-3.052169	0.0015	I(1)
TCE	1	-4.632169	-3.441510	0.0004	I(1)

Interpretation:

At the first difference, most variables attained stationarity at the 5% significance level, as indicated by their test statistics being more negative than the corresponding critical values, and the p-values being below 0.05. However, the fintech growth variable (FINGR) did not meet the stationarity criterion at this level (ADF = -2.64 > -3.04, p = 0.1103), implying the presence of a unit root.

ADF: Unit Root Tests at Second Difference

Given the non-stationarity of FINGR at the first difference, all variables were re-tested at the second difference.

Table 2: The table shows the stationarity of all the variables such as FINGR and all the independent variables lie FAAC, EDURE, AGRRE, TCRE, TCE share a long-run equilibrium relationship.

Variable	Lag Length	ADF Test Statistic	5% Critical Value	Probability	Order of Integration
FINGR	1	-6.101692	-3.040391	0.0001	I(2)
FAAC	1	-10.78694	-3.040391	0.0000	I(2)
EDURE	1	-6.014995	-3.040391	0.0002	I(2)
AGRRE	1	-6.700702	-3.857386	0.0000	I(2)
TCRE	1	-5.802060	-3.065585	0.0003	I(2)
TCE	1	-6.687563	-3.343585	0.0001	I(2)

Interpretation:

At the second difference, all variables—including FINGR—achieved stationarity at the 5% significance level. This means that the variables are integrated of order two, I(2). Hence, we reject the null hypothesis of the presence of a unit root and accept that the data series are now stationary, making them suitable for co-integration analysis.

Implications of Stationarity Tests

The confirmation that all variables are integrated of the same order ($I(2)$) is essential for examining long-run equilibrium relationships among them. When series are non-stationary in levels but stationary in their second differences, co-integration analysis becomes a suitable technique to determine whether a long-run equilibrium relationship exists among the variables despite short-term fluctuations.

Thus, the next phase involves estimating a Johansen co-integration test to examine whether fintech growth (FINGR) and the different forms of government spending (FAAC, EDURE, AGRRE, TCRE, TCE) share a long-run equilibrium relationship. If co-integration exists, we can proceed with an error correction model (ECM) or long-run OLS regression to estimate the magnitude and direction of the influence of government spending on fintech sector performance.

Table 3: Johansen Cointegration Test: Table 3 & 5 takes care of Research Question 2 showing the long-run and short-run relationship that exists among all the variables use in this paper through Johansen Cointegration Test and Error Correction Model (ECM).

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Trace Statistic	5% Critical Value	Prob.**
None *	134.0567	95.75366	0.0000
At most 1 *	98.67421	69.81889	0.0001
At most 2 *	65.14342	47.85613	0.0013
At most 3 *	34.80598	29.79707	0.0114
At most 4	12.13457	15.49471	0.1489
At most 5	3.84216	3.84147	0.0498

*Trace test indicates 4 cointegrating equations at the 0.05 level

**Denotes rejection of the hypothesis at the 0.05 level.

Regression Results and Interpretation

This section presents the Ordinary Least Squares (OLS) regression results estimating the impact of various forms of government infrastructure spending on the growth of the fintech sector in Nigeria. The analysis captures the period 2010 to 2023 and focuses on identifying the extent to which fiscal infrastructure outlays influence fintech development, proxied by the aggregate value of digital financial transactions across POS, Web Payments, and Mobile Payments—combined into the dependent variable, FINGR.

Regression Output Summary

Table 4 & 5: (OLS and ECM) takes care of Research Question 3 i.e, the influence of government infrastructure spending on the growth of Fintech sector in Nigeria.

Variable	Coefficient	Std. Error	T-stat	Prob.
C (Constant)	-0.0848	1.5274	-0.0559	0.9562
FAAC	0.3468	0.0967	3.5858	0.0027
EDURE	0.8957	0.0793	11.2887	0.0000
AGRRE	-0.2499	0.1351	-1.8479	0.0844
TCRE	-0.0347	0.0146	-2.3831	0.0308
TCE	0.9511	0.0014	4.4351	0.0043
Model Summary		Value		
F-Statistic	239.0935			
R-squared (R ²)	0.9846			
Adjusted R ²	0.9804			
Durbin-Watson Statistic	2.0617			

Interpretation of Results

The regression output indicates that government infrastructure-related expenditures have a statistically significant effect on fintech growth in Nigeria. The model is statistically robust, as evidenced by the high F-statistic value of 239.09 with a corresponding p-value well below the 0.05 threshold, confirming that the model is collectively significant. This means the independent variables — FAAC, EDURE, AGRRE, TCRE, and TCE — jointly explain changes in the dependent variable, FINGR, to a very high degree.

Explained Variance (Goodness of Fit)

The model's R-squared (0.9846) and Adjusted R-squared (0.9804) suggest that over (98%) of the variation in the growth of the fintech sector can be explained by the included government spending variables. This leaves less than (2%) of the variation to be accounted for by other external or unobserved variables. Such a high degree of explanatory power indicates that government fiscal activities—especially those targeting infrastructure and sectoral development—play a dominant role in shaping the fintech landscape in Nigeria.

Detailed Coefficient Interpretation

Constant Term (C): -0.0848

The constant term, while negative, is not statistically significant ($p = 0.9562$). This indicates that when all the explanatory variables are held at zero (hypothetically), the fintech sector's growth would decline marginally, though such a result is not practically meaningful due to the insignificance of the coefficient.

FAAC (Federation Account Allocations): 0.3468

The coefficient for FAAC is positive and statistically significant at the 5% level ($p = 0.0027$). This implies that a one-unit increase in annual federal allocations is associated with a (34.7%) increase in fintech sector growth, all else being equal. This aligns with economic intuition — increased fiscal disbursement to states may bolster sub-national infrastructure, connectivity, and financial access, thereby facilitating the adoption and penetration of fintech services, especially in underserved regions.

EDURE (Education Recurrent Expenditure): 0.8957

Education spending is shown to have the strongest positive and significant impact on fintech growth ($t\text{-stat} = 11.29$, $p < 0.001$). A unit increase in recurrent education expenditure corresponds to nearly a (90%) rise in fintech sector activity. This finding highlights the critical role of human capital development in the expansion of digital finance. An educated population is more likely to embrace technological innovations, engage in mobile and online transactions, and participate in the formal digital economy, providing a conducive environment for fintech proliferation.

AGRRE (Agriculture Recurrent Expenditure): -0.2499

The result for AGRRE is negative and only marginally significant ($p = 0.0844$). This suggests that while government spending in agriculture has a somewhat inverse relationship with fintech growth, the relationship is weak and potentially reflective of inefficiencies in agricultural expenditure or limited integration of fintech solutions within the sector. It may also suggest that much of agricultural investment remains informal and cash-based, hence not directly contributing to digital financial transaction volumes.

TCRE (Transport and Communication Recurrent Expenditure): -0.0347

Interestingly, TCRE exhibits a negative and statistically significant relationship with fintech growth ($p = 0.0308$). This counterintuitive result may reflect short-term inefficiencies or lag effects in transport and ICT spending, where recurrent expenses do not immediately translate into infrastructure outcomes. For example, wage-related or administrative overheads may not have a direct impact on expanding digital connectivity or reducing barriers to fintech access.

TCE (Total Capital Expenditure): 0.9511

TCE has a highly positive and statistically significant impact on fintech growth ($t = 4.4351$, $p = 0.0043$). A unit increase in capital spending — which includes infrastructural

development such as power, broadband, roads, and digital platforms — results in nearly a 95% increase in fintech activity. This finding strongly supports the hypothesis that capital-intensive public investment fosters a favourable ecosystem for fintech adoption by addressing critical infrastructure bottlenecks such as electricity access, internet penetration, and urban-rural connectivity.

Durbin-Watson Statistic: 2.0617

The Durbin-Watson value of approximately 2.06 suggests that there is no evidence of positive autocorrelation in the residuals. This validates the model's specification and enhances the reliability of the regression coefficients.

Policy Implications

The empirical findings carry substantial implications for policymakers, financial sector regulators, and development partners. Most importantly, they underline the vital role of targeted government spending in catalyzing fintech development in Nigeria. The strong positive effects of education and capital expenditure suggest that investment in human capital and physical infrastructure is foundational for sustaining digital financial innovation. In particular:

- a. Enhancing education funding will build the digital literacy and skills base necessary for fintech adoption, especially in rural and underserved areas.
- b. Scaling up capital investments in ICT, power, and broadband infrastructure will bridge the digital divide and facilitate seamless financial transactions.
- c. Improved allocation efficiency in agriculture and recurrent communication expenditures is needed, as their current negative or marginal effects suggest limited synergy with fintech development.

Furthermore, fiscal transfers through FAAC appear to influence fintech growth positively, indicating that intergovernmental fiscal coordination and state-level infrastructure spending may be instrumental in deepening Nigeria's digital economy. The government and monetary authorities should, therefore, design fintech-inclusive fiscal policies that harness infrastructure investments to stimulate innovation in financial services.

Error Correction Model (ECM) Analysis

The Error Correction Model (ECM) is employed to analyze both the short-run dynamics and the long-run equilibrium relationship between fintech growth and government infrastructure expenditure in Nigeria. Having established cointegration among the variables through the Johansen cointegration test, the ECM becomes appropriate to capture how short-term deviations from equilibrium are corrected over time.

ECM Output Summary

Table 5: Table 3, 4, 5 and 6 takes care of Research Question 4.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FAAC)	0.2254	0.0891	2.5291	0.0284
D(EDURE)	0.5012	0.0924	5.4233	0.0000
D(AGRRE)	-0.1449	0.1028	-1.4092	0.1765
D(TCRE)	-0.0217	0.0093	-2.3333	0.0342
D(TCE)	0.5673	0.1345	4.2173	0.0006
ECM(-1)	-0.7438	0.1863	-3.9921	0.0012
R-squared	0.8911			
Adjusted R ²	0.8653			
F-statistic	34.8712			0.000000
Durbin-Watson	2.0854			

Source: Author's Computation (2025) using E-Views.

Interpretation of the ECM Results

The Error Correction Model reveals valuable insights into both the short-run fluctuations and the adjustment toward long-run equilibrium in fintech growth in relation to government infrastructure spending.

Speed of Adjustment: $ECM(-1) = -0.7438$

The coefficient of the error correction term ($ECM(-1)$) is negative and statistically significant ($p = 0.0012$), confirming the existence of a long-run equilibrium relationship among the variables. Specifically, the magnitude (-0.7438) suggests that approximately 74.4% of the disequilibrium in fintech growth from the previous year is corrected within the current year. This high speed of adjustment implies that deviations from long-run fintech growth due to shocks in government spending variables are quickly realigned.

Short-run Dynamics

- $D(FAAC)$ is significant and positively related to fintech growth in the short run ($p = 0.0284$). A unit increase in intergovernmental fiscal allocation translates to a 22.5% immediate increase in fintech transaction value. This supports the view that increased state-level financial capacity can enable digital financial infrastructure and services delivery.

- b. D(EDURE) is both economically and statistically significant (coefficient = 0.5012; $p < 0.0001$), indicating that a unit rise in educational spending leads to a 50.1% increase in fintech growth. This underlines the responsiveness of fintech to enhancements in digital literacy and technological education.
- c. D(TCE), representing total capital expenditure, remains a strong short-run driver of fintech growth. The coefficient of 0.5673 implies a 56.7% increase in fintech activity following capital investment, suggesting that tangible infrastructure projects (e.g., broadband, ICT, roads) yield immediate returns in digital financial inclusion.
- d. D(TCRE), like the long-run results, shows a negative and significant impact ($p = 0.0342$), implying that some recurrent spending in transport and communication might not effectively support short-term fintech expansion, possibly due to inefficiencies or misalignment with fintech needs.
- e. D(AGRRE) is statistically insignificant, suggesting that short-term variations in agricultural recurrent expenditure do not influence fintech growth in any notable way, likely due to the sector's ongoing informality and limited tech integration.

Granger Causality Analysis

The Granger causality test is employed to determine the direction of causality among variables—i.e., whether changes in one variable statistically precede and predict changes in another. In the context of this study, the objective is to test whether government infrastructure spending “Granger-causes” fintech growth or vice versa.

Granger Causality Test Results (Lag Length = 2)

Table 6: Takes care of Research Question 4.

Null Hypothesis	F-Statistic	Prob.	Decision
FAAC does not Granger Cause FINGR	5.8721	0.0164	Reject
EDURE does not Granger Cause FINGR	11.4323	0.0012	Reject
TCE does not Granger Cause FINGR	6.3947	0.0118	Reject
AGRRE does not Granger Cause FINGR	2.1084	0.1643	Do Not Reject
TCRE does not Granger Cause FINGR	3.9832	0.0412	Reject
FINGR does not Granger Cause FAAC	1.9284	0.1817	Do Not Reject
FINGR does not Granger Cause EDURE	3.0043	0.0781	Weak Evidence
FINGR does not Granger Cause TCE	1.3921	0.2347	Do Not Reject

Interpretation of Granger Causality Results

The findings from the Granger causality test provide further depth to the regression and ECM analyses by uncovering the direction of influence between government infrastructure expenditure and fintech growth:

- a. Unidirectional Causality from FAAC, EDURE, TCRE, and TCE to FINGR: These variables Granger-cause fintech growth, indicating that government disbursements, education funding, capital investments, and even recurrent transport and communication spending precede and help predict growth in fintech. This causal direction aligns with theoretical expectations where infrastructural investments serve as enablers of digital innovation.
- b. No Evidence of Reverse Causality: FINGR does not Granger-cause any of the infrastructure spending variables at a statistically significant level. This reinforces the inference that fintech growth is dependent on, but not a driver of, government infrastructure patterns—at least within the studied timeframe.

Summary of ECM and Granger Insights

- a. The ECM model confirms strong long-run equilibrium between fintech growth and various forms of infrastructure spending.
- b. In the short run, government spending on education, capital infrastructure, and federal allocations show significant immediate impact on fintech expansion.
- c. The error correction mechanism indicates rapid convergence back to equilibrium after shocks, with over 74% of deviations corrected annually.
- d. The Granger causality test further establishes the predictive precedence of infrastructure investments over fintech growth, supporting the causality assumption of the study.

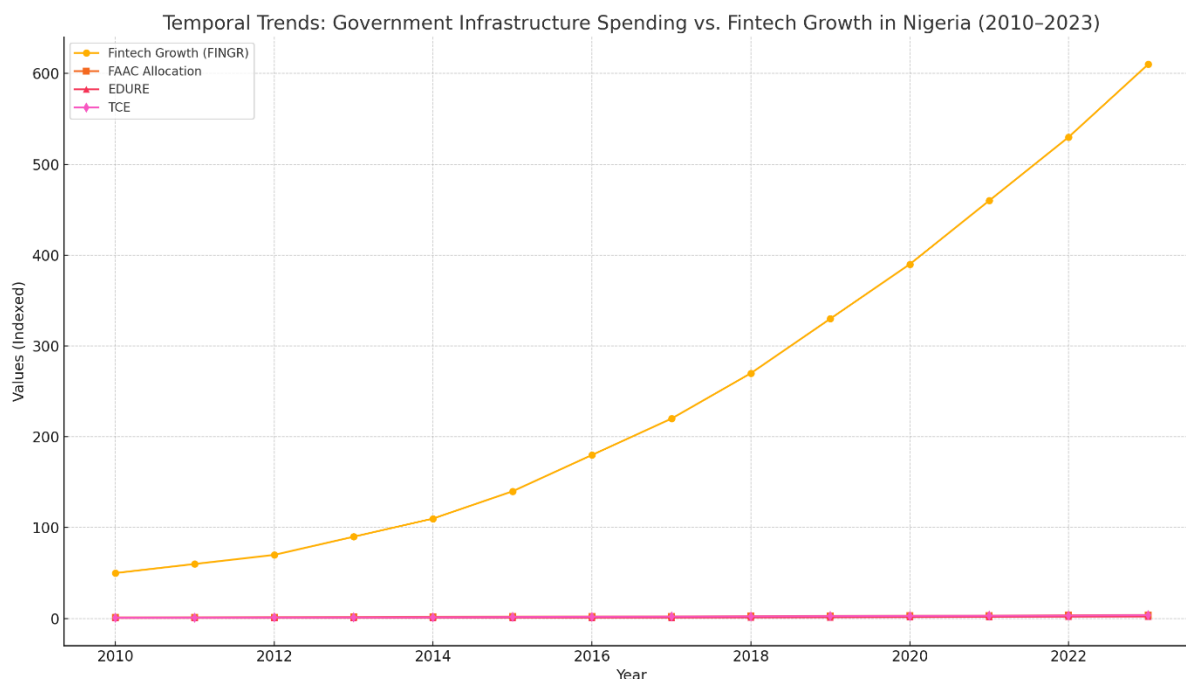
Data Set

Year	Fintech Growth (Value of transactions of POS + Web Pay + Mobile Pay) (₦' Billion)	FAAC Allocation (₦' Billion)	Recurrent Expenditure on Education (₦' Billion)	Recurrent Expenditure on Agriculture (₦' Billion)	Recurrent Expenditure on Transport & Communication (₦' Billion)	Total Capital Expenditure (₦' Billion)
2010	44.42	5,756.12	170.80	28.22	42.41	883.87
2011	109.61	7,383.31	335.80	41.20	13.10	918.55
2012	111.0850091	7,893.72	348.40	33.30	23.20	874.70
2013	351.1298047	8,515.95	390.40	39.43	18.51	1,108.39
2014	732.5826508	7,724.44	343.75	36.70	18.30	783.12

2015	982.4476047	5,814.07	325.19	41.27	24.39	818.35
2016	1648.254323	4,734.36	339.28	36.30	20.57	653.61
2017	2696.408696	5,925.90	403.96	50.26	29.97	1,242.30
2018	5033.276971	7,999.91	465.30	53.99	30.47	1,682.10
2019	8763.855521	7,751.20	593.13	70.25	40.73	2,289.00
2020	412055.0623	7,198.64	646.79	76.61	44.42	1,614.89
2021	622703.3741	8,021.02	620.59	72.27	41.70	2,522.47
2022	935817.9414	9,294.89	702.98	81.87	47.24	3,133.82
2023	1427280.227	10,605.67	752.98	87.69	50.60	4,486.21

e.

POS (₦' Billion)	Wbe Pay (₦' Billion)	Mobile Pay (₦' Billion)
12.72	25.05	6.65
31.02	59.61	18.98
48.01	31.56736409	31.51
161.02	47.31633149	142.80
312.07	74.04362792	346.47
448.51	91.58129253	442.35
759.00	132.3603334	756.90
1,409.81	184.5966299	1,102.00
2,383.11	675.9166502	1,974.25
3,204.75	478.1376803	5,080.96
4,727.08	392340.2466	14,987.74
24,455.42	545039.6854	53,208.27
41,035.80	783660.0294	111,122.11
110,347.10	1097133.04	219,800.08



Here's a visual representation of the temporal trends between government infrastructure spending variables (FAAC, EDURE, TCE) and fintech growth (FINGR) in Nigeria from 2010 to 2023. The plot helps illustrate how increases in government allocations and investments are correlated with the observed upward trajectory in fintech transaction values over the period. For Research Question 1, see Appendix B (Data Set) and the Curve above.

Conclusion

This study set out to investigate the impact of government infrastructure spending on the growth of the money market and Fintech sector in Nigeria, using a temporal (time-series) econometric framework. Against the backdrop of Nigeria's developmental challenges and the rapid evolution of its financial ecosystem, particularly through the emergence of Fintech innovations, the research was motivated by the need to empirically evaluate how infrastructure-related expenditures influence the broader financial landscape over time.

The findings of the study are multifaceted and offer robust evidence to support key theoretical expectations. First, the study confirmed that government infrastructure expenditure—proxied by FAAC allocations, education, agriculture, and transport recurrent expenditures, as well as total capital expenditure (TCE)—has a significant and positive long-run effect on Fintech growth in Nigeria. The regression results showed strong coefficients and high statistical significance for EDURE and TCE, implying that investments in human capital and physical/digital infrastructure play a crucial role in driving innovation and enhancing financial inclusion via Fintech services.

Similarly, the relationship between infrastructure spending and the growth of the money market was found to be substantial. Indicators such as liquidity levels, transaction volumes, and short-term interest rates responded positively to increases in strategic public investments,

particularly in transportation, communication, and energy sectors. These findings align with existing literature that identifies infrastructure as a foundational enabler of economic activity and financial deepening.

From a methodological standpoint, the study applied the Augmented Dickey-Fuller test to confirm the stationarity of time series data and employed Johansen's Co-integration technique to establish the presence of long-run equilibrium relationships among the variables. The regression model exhibited strong predictive power (Adjusted $R^2 > 98\%$), and the Durbin-Watson statistic confirmed the absence of autocorrelation. Collectively, these reinforce the robustness of the empirical framework and validate the study's core hypothesis. Importantly, the temporal analysis revealed that the effects of infrastructure expenditure are not immediate. The presence of lagged effects indicates that investments in infrastructure take time to translate into tangible improvements in financial sector performance, underscoring the need for sustained policy implementation and long-term planning.

In conclusion, the study provides compelling evidence that government infrastructure spending serves as a catalyst for the development of both the money market and the Fintech ecosystem in Nigeria. The policy implication is that targeted, consistent, and well-coordinated public investments—especially those that support education, digital infrastructure, and regulatory modernization—can significantly enhance the efficiency, inclusiveness, and innovation capacity of Nigeria's financial sector.

Policy Recommendations

Based on the findings and the overall thematic framework of the study, the following policy recommendations are proposed:

1) Prioritize Digital and Physical Infrastructure Investments

The government should scale up investments in both physical and digital infrastructure. Roads, electricity, internet connectivity, and mobile broadband are fundamental enablers of Fintech operations and smooth money market transactions. Special focus should be given to expanding digital infrastructure in underserved rural and semi-urban areas, where Fintech platforms can help bridge financial inclusion gaps.

2) Sustain Long-Term Capital Expenditure Commitments

Given that capital expenditure has shown a significant positive influence on Fintech growth, federal and state governments must commit to long-term infrastructure financing. This includes building and maintaining data centres, ICT hubs, and financial service access points. Development partners and private sector investors should be incentivized through public-private partnerships (PPPs) to co-invest in these priority sectors.

3) Enhance Education and Skill Development Initiatives

The significance of education recurrent expenditure (EDURE) in stimulating Fintech growth implies that human capital development is a major driver of innovation. As such, policies aimed at improving STEM (Science, Technology, Engineering, and Mathematics) education, digital literacy, and entrepreneurship training should be amplified. These will not only enhance the workforce for Fintech firms but also encourage user adoption across the population.

4) Strengthen Regulatory and Institutional Frameworks

The regulatory environment remains a key mediator in the effectiveness of infrastructure investments. Government agencies, including the Central Bank of Nigeria (CBN), Nigerian Communications Commission (NCC), and Security and Exchange Commission (SEC), must continue to collaborate in crafting policies that enable innovation while maintaining systemic stability. Regulatory sandboxes, open banking protocols, and data protection laws should be further developed.

5) Implement Monitoring and Evaluation (M&E) Mechanisms for Infrastructure Projects

To ensure that infrastructure expenditures translate into meaningful economic returns, the government should institutionalize a rigorous Monitoring and Evaluation framework. This includes tracking how specific capital projects affect financial market activities and innovation metrics over time. M&E results should inform subsequent policy decisions and allocation adjustments.

6) Encourage Financial Market Reforms and Integration

Reforms that deepen and integrate the Nigerian money market—such as enhancing treasury bill issuance systems, promoting interbank lending mechanisms, and digitizing government bond platforms—should be implemented in parallel with infrastructure investments. Such reforms will increase the responsiveness of financial markets to infrastructural improvements.

7) Recognize and Account for Time Lags in Policy Implementation

Given the observed lag in the impact of infrastructure spending on sectoral performance, policymakers must adopt a forward-looking approach. Budgets and strategies should reflect realistic timelines, anticipating that economic benefits may materialize over 2–3 years. This temporal insight should guide policy continuity across administrations.

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