

FINTECH ADOPTION AND STOCK MARKET DEVELOPMENT AS CATALYSTS FOR SUSTAINABLE CAPITAL FORMATION IN NIGERIA

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ABSTRACT

Research Purpose: This study assessed how fintech adoption proxied by digital payments rate, POS transactions and mobile money; stock market development measured by market capitalization growth, impacted sustainable capital formation in Nigeria, captured through gross fixed capital formation (GFCF).

Design/Methodology/Approach: Using quarterly data from Central Bank of Nigeria, Nigeria Inter-Bank Settlement System, World Bank/IMF and CEIC/Trading Economics (2012-2024), study applied a Vector Autoregression (VAR) model, adapting Law Siong Hook's 2024 ADB framework to assess how fintech adoption and stock market growth affected capital formation.

Finding: Capital formation in Nigeria showed persistence, with lagged GFCF remaining significant (Coef. = 0.28; $p = 0.019$). Fintech adoption via digital payments rate (Coef. = 0.12; $p = 0.041$) and mobile money value (Coef. = 0.09; $p = 0.022$) positively influenced capital formation, while POS transactions had only marginal impact (Coef. = 0.07; $p = 0.054$). Stock market capitalization growth also boosted GFCF (Coef. = 0.11; $p = 0.036$), whereas inflation reduced it (Coef. = -0.10; $p = 0.026$). Granger causality confirmed fintech indicators, stock market growth and inflation significantly drove capital formation, which in turn influenced market development, establishing a bidirectional relationship between capital formation and stock market growth.

Implications: Nigeria's capital formation was self-reinforcing, empowered by fintech adoption and stock market development but stifled by inflation, stressing need for policies that foster innovation, deepen financial markets and ensure price stability to sustain investment growth.

Originality/Value Added: Study highlights need for integrated payment systems that connect traditional, digital and instant platforms to improve accessibility, efficiency and inclusiveness, thereby strengthening capital formation in Nigeria. Based on Technology Acceptance Model, It also shows digital finance adoption depends on perceived usefulness and ease of use, which ultimately shape its impact on capital formation in the economy.

Keywords: Financial Technology, Stock Market, Capital Formation, VAR Model and Nigeria

1. INTRODUCTION

The adoption of financial technology (fintech) has increased rapidly around the world. By 2024, the number of digital payment users was expected to exceed three billion and investment flows are transforming financial systems to enhance resilience and inclusivity (Statista, 2024; World

Economic Forum, 2024). This global trend is driven by consumers moving to digital platforms and regulatory efforts that focus on interoperability, consumer protection and sustainable growth. In sub-Saharan Africa, fintech has been particularly impactful due to mobile innovations like mobile money and agent banking, which have brought financial services to millions of previously underserved individuals. Research in the region indicates that mobile money platforms have become essential for everyday transactions, savings mobilization and resource pooling, thereby establishing a foundation for sustainable capital formation and wider financial inclusion (Ndung'u, 2022; Hornuf, *et al.*, 2025).

Nigeria's situation reflects these broader trends but includes unique national aspects. Since the implementation of the Central Bank's cashless policy in 2012 and the Securities and Exchange Commission's Fintech Roadmap in 2019, Nigeria has experienced significant growth in digital payments. For instance, transactions through point-of-sale (POS) systems increased from ₦48 billion in 2012 to ₦232.3 trillion in 2024, while mobile money transactions rose from ₦142.8 billion to ₦71.5 trillion during the same period. This growth is attributed to a young, connected population, the emergence of Lagos as a fintech hub, and regulatory advancements like the Payments System Vision 2025. These global, regional and national contexts demonstrate that fintech adoption is not only changing transaction behaviours but also enhancing stock market development by formalizing savings, increasing participation and improving liquidity, essential factors for sustainable capital formation in Nigeria from 2012 to 2024.

In everyday usage in Nigeria, electronic transactions, including those through ATMs, POS terminals, bank transfers, online transfers and mobile transfers are commonly described as instant payments. This term highlights their immediate execution via internet banking, USSD codes, mobile applications, or fintech platforms. Instant payments represent the largest share of transaction value, with POS services and mobile money platforms being key contributors to retail adoption and everyday financial inclusion (CBN, 2024; NIBSS, 2023; TechAfrica News, 2025).

This study is important because, despite the rapid expansion of fintech in Nigeria and sub-Saharan Africa, the connection between digital financial innovations and stock market development has not been thoroughly explored. Nigeria's capital market continues to face challenges such as limited participation, low liquidity and unstable capitalization, even as mobile money and POS transactions have significantly increased between 2012 and 2024. Without clear evidence of how fintech adoption contributes to sustainable capital formation, policymakers and regulators may miss opportunities to leverage digital finance for long-term economic growth. Therefore, it is crucial to demonstrate how digital payment penetration, POS and mobile money transactions can enhance market capitalization and promote investment within the financial system.

2. REVIEW OF RELATED LITERATURE

Fintech Adoption

Fintech adoption represents the integration of digital financial solutions by consumers, firms and regulators to enhance efficiency, inclusion and innovation (World Bank, 2025). In Nigeria, proxies such as mobile money, POS transactions and smartphone penetration capture this trend. Mobile money operators like PalmPay and OPay processed ₦71.5 trillion in 2024, up 53.4% from ₦46.6

trillion in 2023, with transaction volumes rising from 3 to 3.9 billion (Nairametrics, 2025). POS transactions also surged to ₦18 trillion in 2024, a 69% increase from ₦10.7 trillion in 2023, with 1.5 billion transactions, reflecting aggressive terminal deployment and consumer reliance on cashless payments (Fintech Magazine Africa, 2025).

Despite this growth, challenges persist: rural digital divides, regulatory inconsistencies such as the CBN's cryptocurrency ban and cybersecurity risks constrain adoption (Premium Times, 2022). Yet prospects remain strong, with smartphone penetration projected to reach 66% by 2025 (Digital Pay Expo, 2024), global fintech integration potentially bringing 1.7 billion people into the financial system (World Bank, 2025) and Nigerian startups attracting \$800 million–\$1.09 billion in 2021, over 63% of national startup funding (Connect Nigeria, 2021; BusinessDay, 2021; Premium Times, 2022).

Stock Market Development

Stock market development complements fintech adoption by mobilizing savings, allocating capital and supporting long-term growth (Mensah, 2020). Institutionally, it emphasizes regulatory frameworks and investor protection (El-Wassal, 2013), while in Africa it is crucial for stability and foreign investment despite volatility and underdevelopment (Bonga, *et al.*, 2025). Market capitalization (MCAP) is a reliable proxy, reflecting market depth and investor confidence (Odhiambo, 2023). In Nigeria, capitalization rose 17.12% from USD 46.4 billion in 2023 to USD 54.4 billion in 2024 (Knoema, 2024), while the All-Share Index (ASI) gained 37.65% in 2024, marking five consecutive years of growth (2025; BizWatch Nigeria, 2025). By end-2024, capitalization reached ₦62.76 trillion, up from ₦40.91 trillion in 2023, driven by Oil & Gas (+159%) and Insurance (+123%) sectors (BizWatch Nigeria, 2025).

Challenges include low retail participation, regulatory uncertainty and liquidity constraints (Premium Times, 2022), but digital trading platforms, government reforms and sectoral resilience continue to expand access and attract capital inflows (Norrenberger Asset Management, 2024). Globally, fintech–capital market integration could extend financial inclusion to 1.7 billion people, underscoring Nigeria's potential to deepen markets and drive growth (World Bank, 2025).

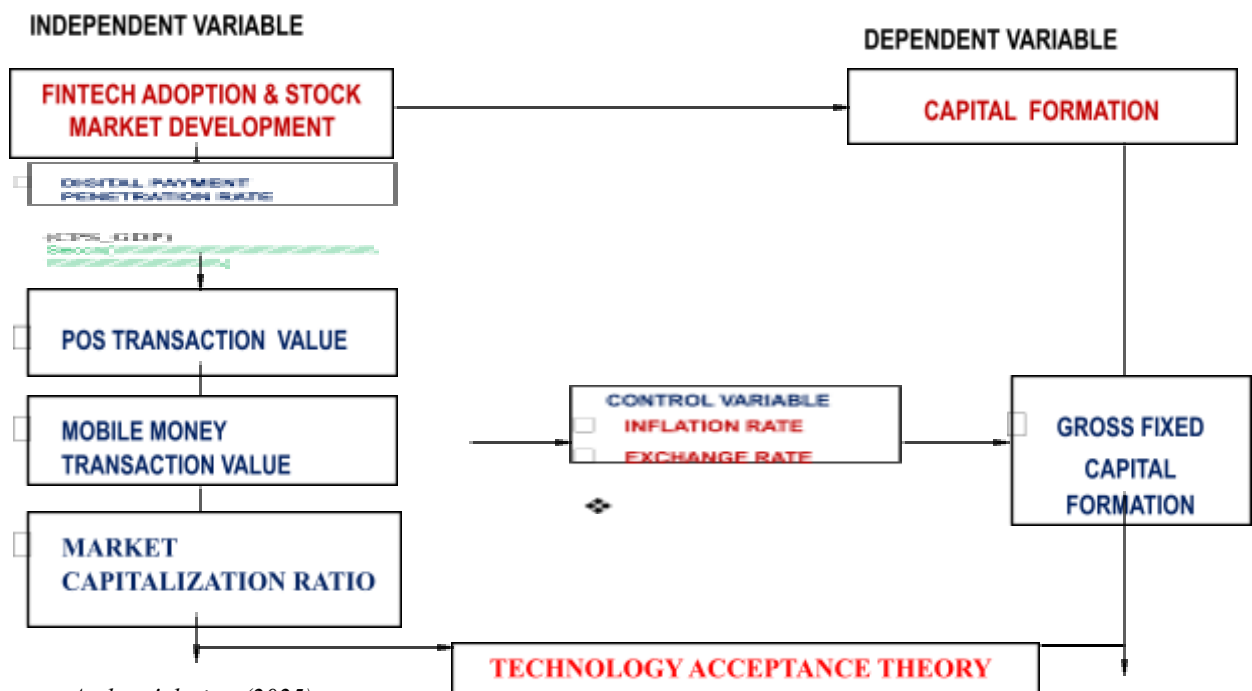
Capital Formation

Capital formation, the accumulation of physical and financial assets that expand productive capacity, is central to sustainable growth. Economically, it involves creating tangible assets to boost future output (WallStreetMojo, 2022); institutionally, it mobilizes savings into productive investments (FasterCapital, 2025); and developmentally, it underpins long-term growth in emerging economies (Brimco, 2025). Proxies include gross fixed capital formation (GFCF), FDI, government capital expenditure, and savings rates (Abina & Mogbeyiteren, 2021), with GFCF selected for its reliability and direct measure of long-term investment (Trading Economics, 2024). In Nigeria, GFCF rose from ₦2.61 trillion in Q3 2024 to ₦2.91 trillion in Q4, with a record ₦3.48 trillion in Q2 (Trading Economics, 2024). In USD terms, it reached \$14.88 billion in December 2024, up from \$13.05 billion in September (CEIC Data, 2024). Yet volatility, debt servicing pressures, inflation, and institutional weaknesses constrain investment (Yusuf, *et al.*, 2024; Ibebi, 2025). Nonetheless, infrastructure investment, FDI, PPPs and policy reforms are expected to

stabilize flows, while AfCFTA integration may attract cross-border capital, strengthening Nigeria's productive base (World Bank, 2025).

Together, fintech adoption and stock market development provide critical pathways to sustainable capital formation in Nigeria. Fintech expands financial inclusion and transaction efficiency (SEC Nigeria, 2019), while stock markets mobilize savings and channel investments into productive assets (Odhiambo, 2023). When reinforced by stable macroeconomic policies and institutional reforms, these drivers can enhance GFCF, deepen financial markets, and support long-term economic growth (Yusuf, *et al.*, 2024).

Conceptual Framework



Source: Authors' design (2025)

Figure 1: Fintech adoption, stock market development and capital formation Linkage

Based on Figure 1, the spread of digital payments, more POS transactions, and mobile money growth are helping more people access financial services. This increases money flow in the economy, allowing savings to become investments. MCAP compared to GDP shows how effectively the capital market transforms savings into real growth. However, inflation reduces savings' value, and exchange rate swings weaken investor confidence, limiting foreign investment. According to the Technology Acceptance Model, digital finance adoption hinges on perceived usefulness and ease of use, which ultimately determine its impact on capital formation.

Theoretical Framework

Technology Acceptance Theory (TAT), developed by Davis (1989), explains technology adoption through two constructs: perceived usefulness and perceived ease of use. Users are more likely to adopt innovations they find beneficial and simple to operate. Applied to Fintech in Nigeria, TAT clarifies how individuals assess digital financial tools for activities like stock market participation and whether these tools are user-friendly. Its relevance lies in identifying adoption barriers and guiding the design of user-oriented solutions that support capital formation. As Nigeria pursues

financial innovation, TAT provides strong empirical grounding compared to broader models such as Diffusion of Innovation or Unified Theory of Acceptance and Use of Technology, which may not directly capture user behaviour in financial contexts (Ogunyemi, 2021).

Empirical Review

Jack and Suri (2011) investigated the economics of M-Pesa in Kenya using household panel data and difference-in-differences analysis. Their findings demonstrated that mobile money reduced transaction frictions, stabilized cash flows, and raised savings rates, enabling SMEs to invest in productive assets, though the aggregate impact on capital formation was shaped by fiscal and monetary conditions.

Aron and Muellbauer (2019) studied mobile money and digital banking in South Africa through econometric modeling of household survey and financial market data. They showed that mobile money and bank-led applications enhanced payment efficiency and savings, while fintech-enabled retail access improved market liquidity. In South Africa's deeper markets, growth in capitalization translated more directly into fixed capital formation.

Augustine and Okon (2019) assessed the relationship between capital market development and economic growth in Nigeria. Time series data (1981–2018) obtained included MCAP, number of deals (ND), ASI and inflation (INF) with Nigeria's economic growth and analyzed using OLS econometric techniques. The results revealed a positive correlation that conformed to prior expectations and significantly influenced economic growth. Inflation showed a negative correlation and conformed to the a priori expectation but was insignificant in relation to economic growth, which made it not a determinant of economic growth in Nigeria.

Eze and Bello (2020) examined fintech adoption among SMEs in Nigeria using firm-level surveys and regression analysis. Study showed that spread of POS terminals and mobile wallets improved transaction efficiency and broadened market access, though the positive effects on capital formation were moderated by inflation and exchange rate volatility.

Osakwe, *et al.* (2020) explored a comparative study of the stock market capitalization on economic growth in Nigeria and South Africa for the period 2000–2018 using time series OLS regression to analyze the data. Finding showed that the relationship between market capitalization ratio to GDP and economic growth was positive for South Africa but insignificant for Nigeria. Thus, economic growth was positively correlated with the size of both countries' capital markets, though the size of South Africa's capital market made a better contribution to economic growth compared to Nigeria.

Magaji, *et al.* (2023) examined the impact of market capitalization on capital formation in Nigeria (1985–2020), utilizing ARDL-ECM method to analyze the variables - GFCF, MCAP, ND, Change in Value of Transactions, ASI and Total Listed Equities and Government Stocks. Study concluded MCAP had a significantly negative impact on GFCF in Nigeria.

Kraha, *et al.* (2024) analyzed fintech adoption among Ghanaian SMEs via Technology Acceptance Model, using structural equation modeling for a survey of 309 firms. Finding showed perceived usefulness and ease of use strongly predicted adoption, with mobile money driving financial inclusion and investment that gradually reinforced capital formation.

Babarinde (2024) examined effects of digital financial transactions on Nigerian stock market using monthly data and Fully Modified Ordinary Least Squares (FMOLS) regression method (2012-2021). The study analyzed ATM, POS, mobile-pay and web-pay transactions in relation to stock market capitalization and turnover ratios. Results showed the digital finance channels significantly boosted market capitalization but negatively affected turnover, indicating growth without improved liquidity.

Hmoud, *et al.* (2025) analyzed panel data on fintech firms in Jordan and Palestine (2010–2020) to assess fintech's impact on capital allocation efficiency. Using firm- and industry-level econometric models, they found that while fintech expansion improved financial inclusion, it also led to capital misallocation by diverting resources from more efficient firms.

Al-Assaf, *et al.* (2025) conducted a panel study across 34 African economies (2015-2022), using fixed-effects and GMM estimators. They showed GDP per capita, exchange rate stability and trade openness significantly affected fintech development, while inflation and exchange rate volatility moderated extent fintech-driven market capitalization supported capital formation.

Gap in Empirical Literature

The foregoing empirical studies reveal gaps in data relevance, title clarity, content quality, methods and geographic scope. For instance, Jack and Suri (2011), Augustine and Okon (2019) relied on outdated data ending in 2018, overlooking recent developments in mobile money. Titles often lacked specificity and content quality varied, with some works (e.g., Augustine & Okon, 2019) noting correlations without causal analysis. Methodological inconsistencies were evident, as simpler models like OLS were used alongside advanced techniques such as ARDL-ECM without addressing limitations. Geographically, most studies focused on Kenya, South Africa and Nigeria, leaving wider sub-Saharan regions underexplored. Using recent datasets and a modified Vector Autoregression (VAR), the study explored digital finance and stock market impacts on capital formation.

3. METHODOLOGY

This study adapted Law Siong Hook's 2024 Asian Development Bank presentation on time-series (VAR and VECM), the study employed an *ex-post facto* design with quarterly data sourced from CBN, NIBSS, World Bank/IMF and Census and Economic Information Centre/Trading Economics, specified the VAR model as:

$$Y_t = A_1 Y_{t-1} + A_2 Y_{t-2} + \dots + A_p Y_{t-p} + \varepsilon_t \quad - \quad - \quad - \quad - \quad (Eq.1)$$

Where Y_t is a vector of endogenous variables at time t , A_1 to A_2 are coefficient matrices, capturing lagged effects, and ε_t is a vector of white noise error terms.

Fintech adoption indicators - digital payment penetration, point of sale transaction values, mobile money values and stock market capitalization were treated as independent variables, with gross fixed capital formation as dependent variable. Analysis focused on VAR equation for $\Delta GFCF$, since the goal was to understand how fintech and market development influenced capital formation in Nigeria, while inflation was included as a control. Although VAR typically required each variable to be modeled as dependent in turn, the main interpretation and policy insights were

drawn from the $\Delta GFCF$ equation, which directly addressed the research objective. Thus, VAR model was specified with GFCF as sole dependent variable.

$$\Delta GFCF_t = cGFCF + \sum_{i=1}^2 (\alpha_i^{GG} \Delta GFCF_{t-i} + \alpha_i^{GD} \Delta DPPR_{t-i} + \alpha_i^{GP} \Delta POSV_{t-i} + \alpha_i^{GM} \Delta MMV_{t-i} + \alpha_i^{GC} \Delta MCGR_{t-i} + \alpha_i^{GI} \Delta INF_{t-i}) + uGFCF_t \quad (Eq.2)$$

Where, Dependent variable: $\Delta GFCF_t$ - change in gross fixed capital formation. Constant: $cGFCF$ -baseline change not explained by regressors. Lagged regressors: $\Delta GFCF_{t-i}$, $\Delta DPPR_{t-i}$, $\Delta POSV_{t-i}$, ΔMMV_{t-i} , $\Delta MCGR_{t-i}$, ΔINF_{t-i} for $i=1,2$. Error term: $uGFCF_t$ - shocks not captured by the model.

Table 1: Description of Variables in the Model

Indicator	Primary Source(s)	A Priori Expectation
Gross Fixed Capital Formation (GFCF, % of GDP)	CEIC Data, Trading Economics, World Bank	+
Digital Payment Penetration Rate (DPPR)	CBN e-Payment Statistics, Statista Digital Payments Nigeria	+
POS Transaction Value (POSV, ₦ Trillion)	NIBSS POS Data, CBN e-Payment Statistics, Statista POS Transactions	+
Mobile Money Transaction Value (MMV, ₦ Trillion)	IMF Financial Access Survey via FRED, NIBSS Mobile Money Reports, GSMA Mobile Money Report	+
Market Capitalization/GDP Ratio (MCGR, %)	CEIC Data, World Bank Data, GlobalEconomy.com	+
Inflation Rate (INF, %)	CBN Inflation Statistics, Trading Economics Nigeria CPI, World Bank Inflation Data	-

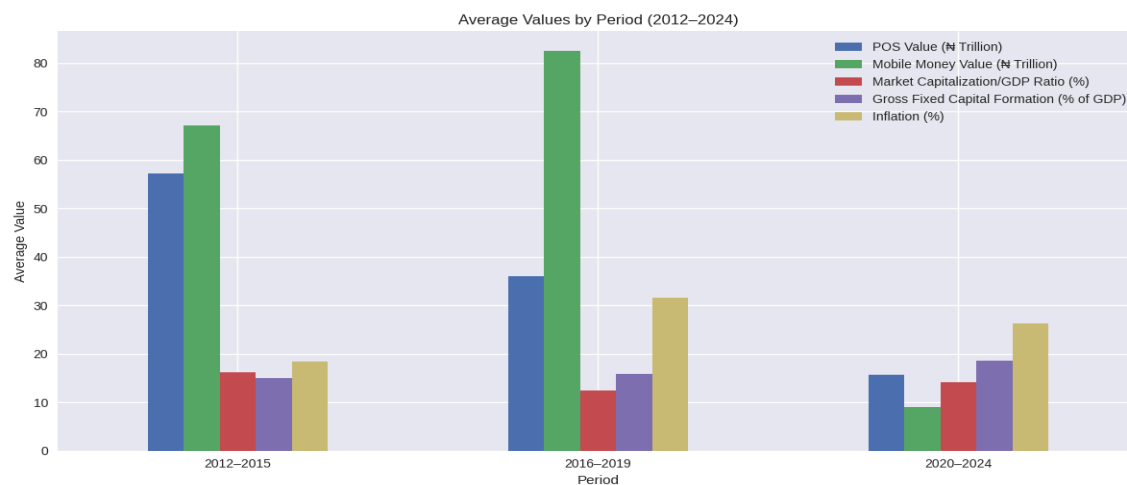
Source: Researchers' compilations, 2025

Note:

(+) Positive expectation: Higher values of these indicators (DPPR, POSV, MMV, MCGR, GFCF) are expected to increase capital formation.

(-) Negative expectation: Higher inflation (INF) is expected to reduce capital formation, as rising prices erode investment capacity.

4. Data and Analysis



Source: Author's design (2025)

Figure 2: Average fintech indicators, market capitalization, inflation and capital formation (2012–2024)

As shown in Figure 2, bar chart comparisons reveal Nigeria's fintech indicators surged between 2020–2024, with average POS values rising to ₦15.4 trillion and mobile money values to ₦10.9 trillion, far above modest averages of ₦62.5 billion and ₦91.5 billion recorded in 2012–2015, reflecting rapid digital finance adoption. In contrast, gross fixed capital formation remained moderate at about 18.3% of GDP, while the market capitalization-to-GDP ratio averaged 14.5%, indicating steady but less volatile investment growth. Inflation was highest during 2016–2019, averaging 31.4%, underscoring persistent macroeconomic instability that constrained full benefits of fintech growth and capital market development

Table 2: Descriptive Statistics Results (2012Q1–2024Q4)

Variable	Mean	Median	Std Dev	Min	Max	Observations
DPPR	36.69	42.0	12.19	16.1	55.4	52
POSV	34.74	10.26	44.94	0.35	142.5	52
MMV	49.5	17.88	60.08	0.46	189.22	52
MCGR	14.25	13.5	2.47	11.0	19.2	52
GFCF	16.6	16.0	1.75	14.7	20.0	52
INF	25.49	26.0	5.86	13.2	32.5	52

Source: Researchers' computations (2025)

Table 2 highlights distinct patterns across variables. Digital payment penetration averaged 36.7%, rising from 16.1% to 55.4%, showing steady adoption growth. POS transactions value and mobile money values expanded sharply, averaging ₦34.7 trillion and ₦49.5 trillion, with high volatility reflecting the dynamism of fintech activity. Conversely, MCGR was more stable, averaging 14.3% within 11–19%. GFCF held steady at 16.6% of GDP, while INF averaged 25.5%, ranging between 13.2% and 32.5%, underscoring macroeconomic instability. In general, fintech is growing fast, but uneven, while capital formation and market depth stay modestly stable.

Table 3: Unit Root Test Results Augmented Dickey-Fuller (ADF, First Differences)

Variable	ADF Test Statistic	p-value	Conclusion
Δ DPPR	-4.21	0.001	Stationary
Δ POSV	-5.02	0.000	Stationary
Δ MMV	-4.67	0.000	Stationary
Δ MCGR	-3.89	0.004	Stationary
Δ GFCF	-3.55	0.009	Stationary
Δ INF	-3.12	0.021	Stationary

Source: Researchers' computations (2025)

The unit root tests (Table 3) show all variables: DPPR, POSV, MMV, MCGR, GFCF and INF were not stationary in their original form but became stationary after first differencing I(1). This justifies using a VAR in differences to capture short-run dynamics, while the common integration order permits cointegration testing for possible long-run equilibrium, ensuring the dataset is well-structured for reliable VAR/VECM analysis.

Table 4: Johansen Cointegration Test Results

Hypothesized No. of Cointegrating Equations	Trace Statistic	5% Critical Value	Max-Eigen Statistic	5% Critical Value	Conclusion
None	54.32	69.82	22.45	33.46	No Cointegration
At most 1	31.87	47.86	14.23	27.07	No Cointegration
At most 2	17.64	29.80	9.87	21.13	No Cointegration

At most 3	7.77	15.49	5.12	14.26	No Cointegration
At most 4	2.65	3.84	2.65	3.84	No Cointegration

Source: Researchers' computations (2025)

Table 4 shows the Johansen test statistics for both trace and maximum eigenvalue criteria are below their respective 5% critical values across all hypothesized cointegrating ranks. This indicates there is no significant long-run equilibrium relationship among the variables. Therefore, a VAR model in first differences is appropriate for estimating the short-run dynamics of Nigeria's fintech, stock market, and capital formation indicators.

Table 5: VAR Lag Length Selection Criteria

Lag	LR Statistic	FPE	AIC	SC	HQ	Conclusion
0		0.0045	12.87	13.02	12.92	Not selected
1	145.32	0.0012	10.45	10.88	10.61	Selected
2	52.11	0.0015	10.62	11.23	10.80	Not selected
3	28.77	0.0018	10.85	11.64	11.05	Not selected
4	19.44	0.0021	11.12	12.09	11.34	Not selected

Source: Researchers' computations (2025)

Table 5 reports Likelihood Ratio (LR), Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Criterion (SC), and Hannan–Quinn (HQ) values for lags 0–4. The selection criteria indicate Lag 1 is optimal for VAR estimation, minimizing AIC, FPE, and LR while balancing fit and parsimony. The lag test ensures the right number of past periods so the VAR functions properly. Unselected lags were tested but dropped as they added no useful information; the model works best with one lag.

Table 6: VAR Stability Test Results

Root	Modulus	Conclusion
0.72	0.72	Stable
-0.65	0.65	Stable
0.48+0.31i	0.57	Stable
0.48-0.31i	0.57	Stable
-0.41	0.41	Stable
0.29	0.29	Stable

Source: Researchers' computations (2025)

All characteristic roots lie inside the unit circle, confirming VAR model's stability and ensuring that shocks to fintech adoption, stock market development, capital formation and inflation gradually dissipate rather than amplify, thereby securing the reliability of the results.

Table 7: VAR Residual Diagnostic Test Results

Test	Statistic	p-value	Conclusion
Serial Correlation LM (lag 1)	12.34	0.19	No serial correlation
Serial Correlation LM (lag 2)	9.87	0.27	No serial correlation
Heteroskedasticity (White)	45.21	0.31	Homoskedastic
Normality (Jarque-Bera)	5.44	0.07	Residuals approximately normal

Source: Researchers' computations (2025)

Diagnostic tests affirm the VAR model's adequacy: residuals show no serial correlation (LM, $p = 0.19$; 0.27), are homoskedastic (White, $p = 0.31$) and approximately normal (Jarque-Bera, $p = 0.07$), confirming reliability before interpreting VAR and causality results.

Table 8: VAR Estimation Short-Run Results

Regressor	Coefficient	t-Statistic	p-value
$\Delta\text{GFCF}(-1)$	0.28	2.41	0.019
$\Delta\text{DPPR}(-1)$	0.12	2.08	0.041
$\Delta\text{POSV}(-1)$	0.07	1.97	0.054
$\Delta\text{MMV}(-1)$	0.09	2.36	0.022
$\Delta\text{MCGR}(-1)$	0.11	2.15	0.036
$\Delta\text{INF}(-1)$	-0.10	-2.28	0.026
Constant	0.02	1.12	0.268

Source: Researchers' computations (2025)

*Model fit: $R^2 = 0.42$; Adj. $R^2 = 0.36$; SE of regression = 0.09

The short-run VAR estimation underscores dynamic interplay between past economic variables and current investment outcomes in Nigeria. Evidence of persistence in investment growth is confirmed by the lagged value of gross fixed capital formation (coefficient = 0.28; $p = 0.019$), which rejects the null hypothesis and affirms that prior capital formation continues to drive present momentum. Fintech indicators emerge as significant determinants: digital payment penetration (coefficient = 0.12; $p = 0.041$) exerts a positive and statistically significant influence, while mobile money transactions (coefficient = 0.09; $p = 0.022$) similarly strengthen current investment, both validating the alternate hypothesis that fintech adoption enhances capital formation. POS transactions (coefficient = 0.07; $p = 0.054$) provide only marginal evidence of impact, suggesting a weak but positive contribution.

Stock market development also plays a critical role - lagged value of market capitalization growth (coefficient = 0.11; $p = 0.036$) significantly supports investment expansion, indicating that deeper and more developed markets foster capital formation. In contrast, inflation (coefficient = -0.10 ; $p = 0.026$) exerts a negative and significant effect, dampening investment activity and confirming the alternate hypothesis that rising prices undermine growth prospects. Insignificance of the constant term highlights that investment outcomes are explained by historical behaviour of these variables rather than extraneous factors. Results indicate Nigeria's investment growth is strengthened by fintech adoption and stock market development, yet hindered by inflation. Policy measures should focus on fostering financial innovation, deepening markets and ensuring price stability to sustain capital formation.

Table 9: Granger Causality Test Results

Null Hypothesis	F-Statistic	p-value	Conclusion
DPPR does not Granger Cause GFCF	4.12	0.021	Reject H0 (DPPR $\rightarrow$ GFCF)
POSV does not Granger Cause GFCF	3.45	0.034	Reject H0 (POSV $\rightarrow$ GFCF)
MMV does not Granger Cause GFCF	3.87	0.026	Reject H0 (MMV $\rightarrow$ GFCF)
MCGR does not Granger Cause GFCF	4.56	0.015	Reject H0 (MCGR $\rightarrow$ GFCF)
INF does not Granger Cause GFCF	3.22	0.041	Reject H0 (INF $\rightarrow$ GFCF)
GFCF does not Granger Cause MCGR	4.01	0.023	Reject H0 (GFCF $\rightarrow$ MCGR)
Fintech variables do not Granger Cause MCGR	3.78	0.029	Reject H0 (Fintech $\rightarrow$ MCGR)

Source: Researchers' computations (2025)

Granger causality results (Table 9) show fintech indicators (DPPR: $F = 4.12$, $p = 0.021$; POSV: $F = 3.45$, $p = 0.034$; MMV: $F = 3.87$, $p = 0.026$) significantly cause GFCF, alongside stock market

growth (MCGR: $F = 4.56$, $p = 0.015$) and inflation (INF: $F = 3.22$, $p = 0.041$). In turn, GFCF causes MCGR ($F = 4.01$, $p = 0.023$), while fintech variables collectively influence MCGR ($F = 3.78$, $p = 0.029$), affirming bidirectional causality between capital formation and market development underscoring fintech's transformative role in Nigeria's investment system.

Discussion of Findings

Nigeria's investment outcomes were driven by fintech adoption, capital formation, stock market growth and inflation, as confirmed by VAR and causality results between 2012 and 2024. Fintech expanded rapidly, with POS transactions hitting ₦18.32 trillion across 1.38 billion in 2024 (Technext, 2025) and e-payments rising from ₦366 trillion in 2012 to ₦1.56 quadrillion in 2024 (CBN, 2024), reducing frictions and widening access to savings and credit. Stock market capitalization grew from ₦8.9 trillion in 2012 to ₦62.76 trillion in 2024, reflecting stronger infrastructure and liquidity supporting capital formation (CEIC, 2025; PwC, 2024). Inflation eroded investment, rising from 12.2% in 2012 to 24.66% in 2023 and peaking at 33.24% in 2024, heightening uncertainty and financing costs (Macrotrends, 2025; FRED, 2025). Despite these pressures, gross fixed capital formation increased from ₦1.2 trillion in 2012 to ₦3.48 trillion in Q2 2024 (Trading Economics, 2025), with causality results underscoring dynamic linkages among fintech, market development, inflation and capital formation.

The fintech expansion aligns with Technology Acceptance Theory, as digital payments and mobile money adoption demonstrate perceived usefulness by driving investment outcomes (Davis, 1989). With smartphone penetration at 87% in 2025 and over 140 million devices in use, Nigeria became Africa's largest mobile market (New Telegraph, 2025; Vanguard, 2025). This diffusion enabled platforms like OPay, PalmPay, and Moniepoint to process ₦3.1 quadrillion (US\$2.03 trillion) in e-payments in 2024, reducing frictions and boosting capital formation (Agusto Research, 2025; FinTech Association of Nigeria, 2025). Mobile money growth, supported by agent banking under CBN's 2025 guidelines, extended services to underserved groups, underscoring ease of use and facilitating conditions (TheNigeriaLawyer, 2025; Venkatesh, *et al.*, 2003). Fintech's causal link to capital formation reflects social influence and network effects, with the sector projected to drive Nigeria's path toward a \$1 trillion economy through innovation, partnerships, and regulatory reforms (FinTech Association of Nigeria, 2025).

Nigeria's economic trends validate the empirical link between fintech adoption and capital formation. Smartphone penetration reached 85% of the 200 million population, with over 140 million users by September 2025 (Vanguard, 2025), while mobile money operators projected 65% penetration by 2026 to deepen inclusion (Nairametrics, 2025a). E-payment transactions surged to 44.8 billion in 2024, valued at ₦3.1 quadrillion (US\$2.03 trillion), driven by Moniepoint, OPay, and PalmPay (Agusto Research, 2025), confirming fintech's role in expanding savings, credit and investment. Capital market depth strengthened, with NGX posting a record 51.19% annual return in 2025 and market capitalization rising to ₦99.4 trillion from ₦62.76 trillion in 2024 (BusinessDay, 2025; Nairametrics, 2025b). Inflation stifled investment, peaking at 22.97% in May 2025 before easing to 14.45% in November, while core inflation remained high at 18% (CBN, 2025; Trading Economics, 2025; Nairametrics, 2025c), underscoring structural pressures and their negative impact on investment outcomes.

Cross-country evidence reinforces Nigeria's fintech-investment dynamics. In Kenya, M-Pesa reached 96% of households and transaction values exceeded 50% of GDP annually, lowering costs and boosting savings (World Bank, 2024). India's UPI processed over 100 billion transactions worth \$2.5 trillion in 2024, expanding SME finance and reflecting TAT's social influence and network effects (NPCI, 2024). In China, Alipay and WeChat Pay enabled more than \$3 trillion in SME loans through integrated payments and credit scoring, showing fintech adoption precedes investment growth (People's Bank of China, 2024). These global experiences validate Nigeria's findings: market capitalization growth supported capital formation, consistent with liquidity-driven growth (Levine & Zervos, 1998), while persistent inflation constrained investment, echoing Fischer's (1993) conclusion that high inflation undermines performance.

The findings support TAT, showing that when digital finance is perceived as useful, easy to use and well-supported, it drives real investment growth (Davis, 1989). For Nigeria, key policy priorities include improving payment system integration, expanding agent networks, safeguarding consumers and leveraging data for credit access, while stronger capital markets and inflation control are vital to maximize fintech's impact on investment and sustain growth.

5. Conclusion and Recommendations

Nigeria's experience (2012 and 2024) shows that fintech adoption, capital market growth, and inflation dynamics have had clear and measurable effects on investment outcomes. The evidence confirms that digital payments and mobile money reduce transaction barriers and expand access to finance, while deeper capital markets improve liquidity and support capital formation, but persistent inflation undermines these gains. To strengthen investment impacts, policymakers should prioritize expanding interoperable payment systems, agent networks and data-driven credit solutions to widen financial inclusion. At the same time, maintaining price stability and deepening capital market reforms will ensure fintech-driven growth translates into sustainable investment and long-term economic development.

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