AN EMPIRICAL ANALYSIS OF FINANCIAL TECHNOLOGY ON INCOME VELOCITY IN NIGERIA (2009-2024)

Okoi Innocent Obeten
Department of Banking and Finance
University of Calabar, Nigeria
innobetokoi@gmail.com

Ikoh Itoro Moses
Department of Banking and Finance,
University of Uyo. Nigeria
itoroikoh@uniyo.edu.ng

Agunbiade, Israel Adebowale
Department of Banking and Finance
Osun State University, Osogbo, Nigeria
agunbiadeadebowale98@gmail.com

Okoi, Comfort Innocent
Department Business Management
University of Calabar, Nigeria
edukponomini@gmail.com

https://doi.org/10.57233/ijamer.v1i3.15

Abstract
Financial technology is crucial for the development of emerging economies. It advances income velocity and supports economic growth. There is a lack of comprehensive empirical studies that assess the dynamic impact of financial technology on the income velocity in Nigeria, despite the rapid expansion of digital payment systems and fintech adoption in Nigeria. The time frame for this study was from 2009 to 2024. The study employed a historical research design. Stationarity tests were carried out, and the autoregressive distributed lag (ARDL) model was applied. Key findings were Nigerian Interbank Settlement System (NISS) had a positive, significant long-term effect on Income velocity (INC) but an adverse, insignificant short-term effect. Mobil banking's (MOB's) effect on INC was positive but insignificant in both the long run and short run. Point of Sale (POS) showed no significant impact in the long run or the short run. Internet banking (INT) showed an insignificant increase in INC in the long run and the short run. An increase in financial technology led to a decrease in income velocity in the long and short run implies a limited impact of the digital payment system reduced economic activity, cash hoardings, limited financial inclusion, monetary policy challenges, inadequate infrastructure, and increased savings by individuals. In the short run, the policy implication is to encourage spending and investment, possibly through targeted fiscal policies or incentives for digital transactions. In the long run, Nigeria should focus on addressing underlying economic issues, promoting financial inclusion, and diversifying the economy to boost money circulation.

Keywords: Financial inclusion and fintech, financial innovation, financial technology, income velocity (velocity of money), Nigerian interbank settlement system (NIBSS).

1.0 Introduction

The widespread adoption of financial technology has changed transaction processes for both individuals and businesses. Financial technology is now essential for sustaining and expanding financial institutions, especially as the number of banks in Nigeria has grown. Financial innovation or technology reduces reliance on physical cash, encouraging efficiency and financial inclusion. A crucial aspect of financial innovation policies is their impact on income velocity. Financial innovation can alter income velocity by changing how quickly and frequently money moves through financial

institutions. These changes may impact economic transactions, monetary policy, and financial stability. Income velocity illustrates how quickly money changes hands and measures the efficiency of the economic activity and the monetary system. Income velocity is a key economic indicator because it measures the number of times currency is used in transactions. Income velocity signals the health and efficiency of the economy (Khatun, M., & Siddiqui, 2023). High velocity means that electronic payment systems are used more frequently, which reduces the need for cash (CBN, 2011). A financial technology policy that increases transaction speed can help provide financial services to the financially exclusive persons in Nigeria (Afonso, 2018). With modern methods like electronic banking, significant progress has been made in the sector. The financial sector's role as intermediary, now supported by technology, continues to drive economic development. Financial technology initiatives, often spearheaded by governments or central banks, seek to minimize reliance on physical cash and promote electronic payments. These initiatives aim to enhance transaction speed and efficiency, reduce cash-handling costs, and promote financial inclusion. Financial technology primarily seeks to decrease the necessity for physical cash. Additionally, financial technology tools and policies contribute to the reduction of money laundering and terrorism financing by creating digital transaction records that facilitate the monitoring of suspicious activities.

Unstable income velocity in Nigeria disrupts the smooth functioning of financial technology by creating unpredictable transaction flows that weaken revenue stability, distort digital payment usage, and complicate liquidity management for fintech firms. When money circulates erratically, consumers either hoard cash or engage in sudden bursts of spending, making digital transaction volumes volatile and reducing the reliability of data that fintech use for credit scoring, risk assessment, and product design. This instability also strains agent networks, increases settlement risk, raises operational costs, and makes pricing and forecasting more difficult, ultimately slowing fintech adoption and undermining the efficiency of digital financial services in the country.

The study of financial technology on income velocity is essential in Nigeria because it helps to understand how the rapid adoption of digital financial services affects the speed at which money circulates in the economy, influencing monetary policy effectiveness, financial inclusion, and overall economic growth. With financial innovation and a cashless policy, banking has improved with quicker services, increased circulation of money, and reduced reliance on cash. This study examines the relationship between financial technology and income velocity, exploring how the transition to digital payments affects economic transaction dynamics and impacts the broader Nigerian economy.

Before the advent of financial technology, Nigerian banks and organizations relied on traditional systems that were slow and inefficient. Transactions needed physical cash deposits, cheques, in-person service, and options like MoneyGram. Customers who transact business in banks, do paperwork, and wait in queues. These changes led to faster transactions and shorter queues. However, even with Central Bank of Nigeria (CBN) interventions, the velocity of money in Nigeria remains volatile. This creates fluctuations in growth and stability. This unpredictability raises questions about the effectiveness of monetary policy. Inaccessibility to formal banking services and high inflation reduce the naira's purchasing power and money velocity. Nigeria's large

informal sector results in unrecorded economic activity, making it more challenging to measure velocity.

This increasing number of digital platforms creates new challenges for monetary policy and economic activity. More use of the Nigerian interbank settlement system, point of sales, and internet banking transactions could change money velocity. This may speed up transactions and affect monetary policy tools. Moreover, most existing studies treat fintech adoption and income velocity dynamics separately without establishing a clear causal or econometric linkage between specific fintech channels and changes in income velocity across Nigeria's diverse economic sectors. It is against this backdrop that this study examines the effect of financial technology tools on income velocity in Nigeria.

The objectives of this study are to:

i. Examine the effect of Nigeria Inter-Bank Settlement System (NISS) instant payment value on income velocity in the Nigerian economy.
ii. Determine the effect of Point-of-Sale (POS) transactions on income velocity.
iii. Examine the impact of Internet Banking (INT) on income velocity.
iv. Determine the effect of Mobile Banking (MOB) on income velocity in the Nigerian economy.

The study hypotheses are formulated based on the objectives as follows:

H_{01}: Nigeria Interbank Settlement System does not have a significant relationship with income velocity

H_{02}: Point of sale does not have a significant relationship with income velocity

H_{03}: Internet banking does not have a significant relationship with income velocity

H_{04}: Mobile banking does not have a significant relationship with income velocity.

Understanding what drives changes in income velocity is important for policymakers, economists, and institutions in the following ways. The findings of the study will offer causal evidence for policymakersadjusting monetary tools in digital markets, financial institutions, and fintech firms on how digital payments reshape economic activity in Nigeria**.** It is significant to the economy because changes in income velocity may alter consumption smoothing, cash flows of businesses, and the speed of recovery after shocks - important for poverty and growth policy**.** Fintech can materially alter velocity, so studying this link informs macro policy calibration. In terms of institutions, if fintech raises velocity, central banks need to account for faster money turnover when setting reserves, liquidity injections, or inflation targets. The study findings will help regulators balance promotion of fintech (for inclusion) with systemic risk management.

2.0 Literature Review

The conceptual connection between these variables - Nigerian interbank settlement system (NISS), Point of Sale (POS), internet banking (INT), and Mobile banking (MB) with the velocity of money is as follows: The increased adoption of digital payment systems, facilitated by NIBSS, POS, INT, and MOB, potentially increases the velocity of money. Digital transactions can lead to increased financial inclusion and reduced cash hoarding, which can also contribute to higher velocity. These systems enable near-instant transactions, reducing settlement times and increasing the speed at which money circulates. In theory, the widespread adoption of these digital payment systems could lead to an increased velocity of money, as transactions become faster, more efficient, and more convenient.

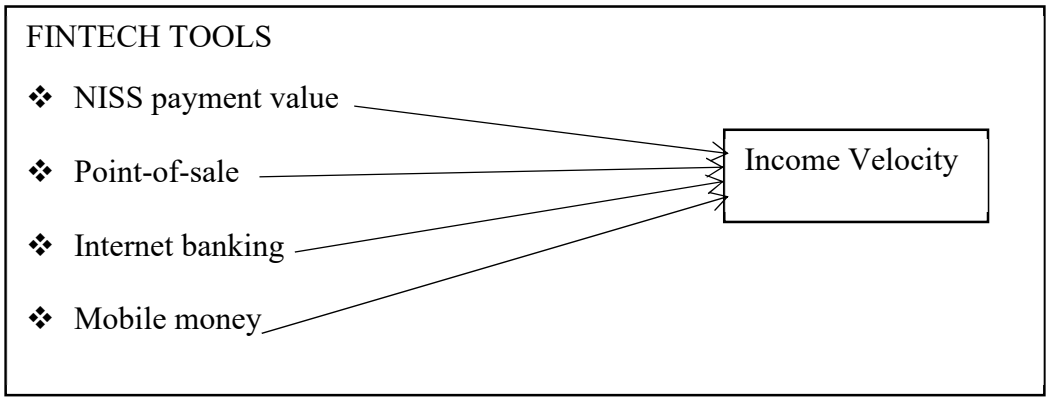


FIG. 2: Conceptual framework of FINTECH tools and income velocity

Empirical Review

Financial technology represents the convergence of finance and technology, utilizing innovative digital tools to improve the delivery and management of financial services. It facilitates the electronic storage of funds in digital wallets or cards, enabling users to make purchases through vending machines or point-of-sale terminals within business environments. Fintech covers a wide spectrum of applications such as mobile payments, digital lending, blockchain technology, artificial intelligence, and robo-advisory platforms (Okoi et al., 2025; Arner et al., 2016). By leveraging technological advancements, fintech aims to enhance operational efficiency, reduce transaction costs, and broaden access to financial services thereby fostering the transaction velocity of money. Fintech has revolutionized multiple dimensions of financial services, including payments, lending, and insurance. For example, mobile payment platforms have facilitated smooth and instant transactions, while digital lending systems have expanded credit accessibility for previously underserved populations (Ozili, 2018). However, the rapid expansion of fintech has also introduced significant regulatory and policy challenges. In response, regulators are striving to develop environments that foster innovation while ensuring consumer protection and maintaining financial stability (Zetzsche et al., 2017).

Friedman (1987) emphasizes that the velocity of money is a vital concept in monetary economics, as it shapes the effectiveness of monetary policy and the overall performance of an economy. A higher velocity of money reflects a more efficient use of currency, enabling a greater volume of transactions and potentially stimulating economic growth. The velocity of money is typically measured as the ratio of nominal Gross Domestic Product (GDP) to the money supply. According to Mishkin (2016), fluctuations in money velocity have important implications for economic policy because they influence the transmission mechanism of monetary control. Specifically, when the velocity of money rises, a given money supply can sustain higher economic activity, whereas a decline in velocity may necessitate an expansion in the money supply to maintain the same level of economic performance. Understanding the velocity of money is crucial for policymakers seeking to make well-informed monetary policy decisions. Keynes (1936) posits that the velocity of money is affected by several factors, including interest rates, consumer confidence and inflation expectations. By closely tracking fluctuations in money velocity, policymakers can better predict the potential impacts of their policy measures and make necessary adjustments to foster economic stability and growth.

Amaegberi et al. (2022) investigated the relationship between Nigeria's digital policy and money velocity for the period 2012-2021. In their study, the velocity of money, cheque value, ATM transaction value, POS transaction value, internet transaction, mobile payment value, and NIBSS instant payment value were employed as variables. The study found that these variables exhibited a short-run relationship with the velocity of money. Furthermore, the results indicated that the implementation of the digital policy has contributed to an increase in money velocity, and limited the need to carry large volumes of cash. Furthermore, Effiom and Edet (2021) investigated the impact of the financial innovation policy on the performance of SMEs in Nigeria. Their findings revealed that financial innovation exerts a positive and significant influence on SME output. Specifically, among the seven financial innovation instruments examined ATM, POS terminals, Web or Internet Banking, Cheques, Nigeria Inter-Bank Settlement System, Electronic Funds Transfer, NIBSS Instant Payment, and Mobile Money Operations all but one were found to be significant predictors of SME growth in both the short and long run.

In a related study, Jain (2023) analyzed the effect of financial technology on the money supply using India as a case study. The research explored the influence of cashless transactions on consumer perceptions, with particular attention to rural populations and behavioral changes following the COVID-19 pandemic. The study further assessed the implications for businesses, with a focus on micro, small, and medium enterprises (MSMEs). The findings demonstrated that a cashless economy can substantially reduce corruption and revealed a positive long-term correlation between the development of a financial technology economy and economic growth. Similarly, Mamudu and Gayovwi (2021) examined the impact of digital tools on the Nigerian economy, highlighting its benefits, challenges, and implementation issues. The study established a long-run relationship among cheque value, ATM, POS, mobile payments, and the Nigeria Electronic Funds Transfer with Gross Domestic Product. The short-run regression results indicated that ATMs, web-based transactions, and NEFT had a positive and significant effect on Nigeria's GDP, while CHEV, POSV, and MOBP exhibited inverse and statistically insignificant.

Furthermore, Khatun and Siddiqui (2023) investigated the determinants influencing movements in the income velocity of money, USA. The analysis of quarterly changes in money velocity revealed dynamic interdependencies between successive periods, suggesting that variations in money velocity are not random but influenced by preceding trends. Furthermore, the study established that the level of financialization within the economyas proxied by the ratio of financial assets to GDP exerts a positive and statistically significant effect on the velocity of money. In a related study, Uugulu (2022) examined the nexus between financial innovations and the velocity of money in Namibia. The findings revealed an inverse relationship between financial innovation and money velocity. Moreover, the results indicated a positive relationship between GDP and the velocity of money, while the opportunity cost of holding money was statistically insignificant. Similarly, Njoku et al. (2020) investigated the effect of digital banking on economic growth in Nigeria. Their findings demonstrated that digital banking significantly contributes to Nigeria's economic growth. Nevertheless, disaggregated results showed that Point of Sale (POS) transactions, Internet Banking, and Mobile Banking individually did not exert a significant influence on economic growth, whereas Automated Teller Machines (ATMs) were found to have a significant effect. In further support, Ihegboro (2022) assessed the effect of electronic banking on Nigeria's economic growth between 2009 and 2019 and similarly reported a significant

positive relationship between electronic banking and economic growth. Ibrahim and Daniel (2019) examined the influence of electronic banking on the non-banking sector using a questionnaire-based survey design. Their findings indicated that e-banking exerts both beneficial and adverse effects: while it enhances service delivery, it simultaneously exposes the sector to increased risks of electronic fraud and unauthorized data breaches. Similarly, Osakwe and Akunna (2023) evaluated the influence of WebPay and point-of-sale (POS) terminals on the total deposits of deposit money banks in Nigeria, employing Ordinary Least Squares (OLS) analysis. Their results revealed that WebPay usage exerts a negative yet statistically insignificant effect on bank deposits. Further evidence is provided by Otuonye and Idris (2023), who investigated the relationship between electronic banking innovation and Nigeria's economic growth from 2008 to 2022 using the ARDL bounds testing approach. Their results confirmed a long-run association between the variables, with Automated Teller Machines (ATMs) and Internet Banking (IB) exerting positive and statistically significant effects on economic growth. Conversely, Mobile Banking Services (MBS) and POS transactions demonstrated negative and statistically significant impacts on growth. Additionally, pairwise Granger causality analysis indicated a unidirectional causal flow from POS and Internet banking to economic growth.

In another study, Isibor et al. (2018) assessed the role of e-banking technology in customer satisfaction and economic growth using a Paired Sample t-test conducted via SPSS. The rejection of the null hypotheses affirmed that e-banking significantly enhances customer satisfaction and contributes to economic growth in Nigeria. Likewise, Siyanbola (2013), utilizing the chi-square method, established a significant relationship between cashless banking and economic performance. Although the findings indicated that cashless banking positively influences the Nigerian economy, it was also shown to adversely affect employment levels.

In this study, we reviewed financial technology policy tools and income velocity in the context of Nigeria. In the reviewed literature, most of the variables used were: point of sale, mobile banking, Automated Teller Machine and Internet Banking, web pay, Cheques cleared value, Point of sale value, Web Internet transfers payment value, Mobile payment value, National electronic funds transfer value, Mobile payment value and NIBSS instant payment value (NIPVAL) were used as exogenous variables (Otuonye and Idris, 2023; Osakwe and Akunna, 2023; Amaegberi, et al., 2022; Ihegboro, 2022;Njoku et al., 2020; Ugulu, 2022; Effiom and Edet, 2021). Most of the authors used economic growth and SMEs' performance as their endogenous variables: Eze (2020); Jain (2023); Otuonye and Idris (2023); Isibor et al. (2018); Effiom and Edet (2021); Mamudu and Gayovwi (2021); and Njoku et al. (2020). However, only a few studies, both outside and within Nigeria, have used the income velocity of money as a dependent variable (Amaegberi et al., 2022; Khatun and Siddiqui, 2023; Uugulu, 2022), which is the reason for this study. Again, we used a different measurement for the income velocity of money, namely the Gross Domestic Product (GDP), as opposed to the money supply which makes the study different from others.

Theoretical Framework

Fred Davis (1989) introduced the Technology Acceptance Model (TAM) in his dissertation. TAM explains how users decide to use a novel technology. It is a widely used theory for technology adoption. The model indicates that several factors, particularly Perceived Usefulness (PU) and Perceived Ease of Use (PEOU), influence

the decision to use a technology. According to TAM, actual use depends directly or indirectly on the user's behaviour, attitude, and views about the system's expediency and ease (Okoi et al 2025; Ajayi, 2014). Perceived Usefulness (PU) is seen as the extent to which a person anticipates the use of a specific technology that will boost their job performance, productivity, or overall effectiveness of a given task. Conversely, Perceived Ease of Use (PEOU) refers to the simplicity of the application of this technology by the users. People tend to adopt technology that is easy to operate as it reduces the learning curve (Davis, 1989; Venkatesh & Davis, 2000). TAM, ultimately promotes higher acceptance and continued use.

The justification for the use of this model (Fig.1) is that TAM affects behavioral adoption of financial technology, which then influences how often money circulates in the economy. High perceived usefulness and ease of use lead to more fintech adoption, which can increase the velocity of money.

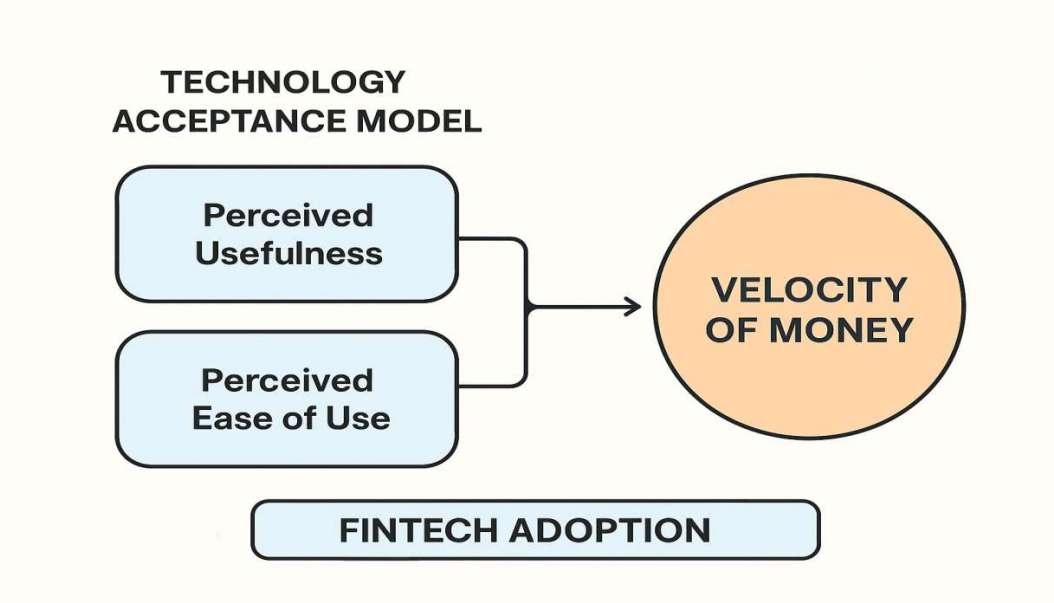


FIG 1: TAM with the Income velocity of money

3.0 Methodology

Data was sourced from the Central Bank of Nigeria (CBN) and the Nigerian Bureau of Statistics. The model of the relationship between fintech variables and income velocity variables was established based on the following equation:

INV = f (NISS, POS, INT, MOB)

The formulation of the maintained hypothesis (model specification) in the econometric equation is as follows:

$$\text{Log INC} = C_o + C_1 \text{logNISS} + C_2 \text{logPOS} + C_3 \text{logINT} + C_4 \text{logMOB} + e_t$$

We formulated a model of financial technology indices and income velocity, proxied by Gross Domestic Product (GDP) divided by the money supply (Okoi et al., 2025; Effiom & Edet, 2020). The study adopted an autoregressive distributed lag (ARDL) model to investigate the relationship and effect of financial technology and income velocity in Nigeria. Thus, the econometric form of this model is:

$$\Delta LogINCt = b_0 + \sum_{k=1}^{n} b_1\ \Delta LogNISSt + \sum_{k=1}^{n} b_2\ \Delta LogPOSt + \sum_{k=1}^{n} b_3\ \Delta LogINTt +$$

$$\sum_{k=1}^{n} b_4\, \Delta LogMBt + \text{a1}\Delta LogNISSt - k + a2\, \Delta LogPOSt - k + a3\, \Delta LogINTt - k + a4\, \Delta LogMOBt - k + e1$$

Where:
INC = Income velocity (measures the velocity of money and is an index of liquidity)
NISS = Nigerian interbank settlement system (measures the efficiency, volume, and valueof financial transactions)
POS = Point of Sale (measures the value and volume of POS transactions)
INT= Internet banking (measures the value of online-based transactions efficiency, and customer behavior
MOB= Mobile banking (measures the value of mobile transactions)

4.0 Results and Discussion

Table 1:
Phillips-Perron (Pp) Unit Root Test

Variables	At Level	At 1st Difference	Order of integration
LVOM	-2.0984	-9.2759	I(1)
LNISS	-2.4979	-8.0448	I(1)
LPOS	1.8723	-8.2058	I(1)
LMOB	-3.1897	-7.1538	I(1)
L INT	-1.6056	-6.3503	I(1)
TEST OF CRITICAL VALUES:			
1%= -3.596616			
5%= -2.933158			
10%= -2.604867			

Source: E-views 10.0 statistical software, 2025.

Table 2:
ARDL cointegrating and long run form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNISS	1.493297	0.428985	3.481002	0.0015
LMOB	0.002311	0.602671	0.003835	0.9970
LPOS	1.182888	0.622535	1.900115	0.0668
LINT	0.087870	0.134173	0.654898	0.5174
C	-22.297974	5.770117	-3.864388	0.0005

Source: E-views 10, statistical software, 2025.

Table 3:
ARDL Short Run (Error Correction Term (ECT) Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LVOM(-1)	0.377626	0.146828	2.571900	0.0151
LNISS	-0.532355	0.401322	-1.326502	0.1944
LNISS (-1)	0.593297	0.354820	1.672108	0.1046
LNISS (-2)	0.178739	0.359081	0.497770	0.6222
LNISS (-3)	0.689707	0.332846	2.072149	0.0467
LMOB	0.001439	0.375032	0.003836	0.9970
LPOS	-0.148673	0.698046	-0.212984	0.8327

LPOS(-1)	0.884871	0.668949	1.322779	0.1956
LINT	0.054688	0.087936	0.621901	0.5386
C	-13.87768	5.435151	-2.553319	0.0158
R-squared	0.984737	Mean dependent var		15.40568
Adjusted R-squared	0.980306	S.D. dependent var		1.894283
S.E. of regression	0.265834	Akaike info criterion		0.396330
Sum squared resid	2.190699	Schwarz criterion		0.814275
Log likelihood	1.875225	Hannan-Quinn criterion.		0.548523
F-statistic	222.2320	Durbin-Watson stat		2.185482
Prob(F-statistic)	0.000000			

Source: E-views 10, statistical software, 2025.

Table 4:
ARDL error correction regression result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNISS)	-0.532355	0.260826	-2.041033	0.0498
D(LNISS(-1)	-0.868446	0.358939	-2.419484	0.0216
D(LNISS(-2)	-0.689707	0.301533	-2.287334	0.0292
LMOB	0.001439	0.375032	0.003836	0.9970
D(LPOS)	-0.148673	0.513141	-0.289731	0.7740
LINT	0.054688	0.087936	0.621901	0.5386
CointEq(-1)*	-0.622374	0.103689	-6.002291	0.0000

Source: E-views 10, statistical software, 2025.

The results presented in Table 1 indicate that none of the study variables exhibited a unit root at conventional significance levels, as most were stationary at the 1%, 5%, and 10% significance thresholds. Put differently, the variables were initially non-stationary in their levels; therefore, the null hypothesis of unit roots could not be rejected at the level values. However, after first differencing, variables such as INC, NISS, POS, MOB, and INT attained stationarity, leading to the rejection of the null hypothesis of a unit root. Given these integration properties, the Autoregressive Distributed Lag (ARDL) model is deemed appropriate, as it accommodates a mix of I(0) and I(1) variables and performs reliably in small-sample contexts.

Following the order of integration outcomes and consistent with ARDL methodology, the study proceeded to test for potential long-run cointegration among the variables. The ARDL bounds test confirmed the existence of a long-run equilibrium relationship among the variables in the model. Consequently, long-run coefficients were estimated to examine the sustained impact of the explanatory variables on income velocity. The results in Table 2 show that NISS, LPOS, LMOB, and LINT jointly exert a statistically significant positive influence on income velocity over the long term. This suggests that increases in these financial technology indicators lead to a substantial increase in long-run income velocity. Specifically, income velocity is estimated to decline by

approximately 22.29% in response to increases in financial technology adoption (NISS, POS, INT, and MOB) under ceteris paribus conditions. This reduction implies that, in the long run, lower income velocity may necessitate an expansion in money supply to sustain a given level of economic activity.

Furthermore, the Nigerian Interbank Settlement System (NISS) is expected to exert a significant long-run effect on income velocity. This means that an effective NISS enhances liquidity and monetary transmission by allowing faster and more reliable fund transfers between banks, which in turn accelerates the pace at which money moves through the economy. Conversely, mobile payment systems and point-of-sale transactions were found to have insignificant long-term effects on income velocity, while the influence of internet banking is negligible in the long term. The insignificance could imply limited deep economic penetration; structural and infrastructural barriers might have affected fintech channels.

The ARDL short-run results in Table 3 reveal that the intercept coefficient of -13.8776 implies a 13.87% decline in income velocity when all explanatory variables are held constant. This suggests that, ceteris paribus, the rate at which money circulates in the economy decreased by approximately 13.87%, indicating subdued monetary and economic activity. These findings are consistent with Uugulu (2022), but diverge from the results of Amaegberi et al. (2022) and Mamudu and Gayovwi (2021), whose analyses on Nigeria's cashless policy reported contrasting outcomes. Furthermore, the independent variables (NISS, POS, MOB, and INT) jointly explained roughly 98% of the variation in income velocity, while the high F-statistic value (222.23) confirms the overall statistical significance of the model. The significance of the short-run ARDL model demonstrates that the explanatory variables collectively influence short-run movements in income velocity in Nigeria.

A closer assessment of the estimated coefficients shows that current-period changes in NISS exert a negative but statistically insignificant impact on income velocity. For POS transactions, current-period changes also indicate a negative and insignificant short-run effect, suggesting that a 1% increase in POS transactions results in a 0.14% decline in income velocity, ceteris paribus. Conversely, the previous lag of POS demonstrates a positive but statistically insignificant short-run influence.

Similarly, current-period changes in mobile banking (MOB) show a positive but insignificant effect on income velocity, indicating that a 1% increase in mobile banking usage leads to a marginal 0.0014% rise in income velocity in the short run. Internet banking (INT) also displays a positive and insignificant short-run effect, with a 1% increase in Internet transactions associated with a 0.05% increase in income velocity.

Given the established long-run relationship among the variables, the error correction term (ECT) must be negative, statistically significant, and fall between 0 and -2. The ECT measures the speed at which deviations from long-run equilibrium are corrected in the short run. A negative and significant coefficient confirms a return toward equilibrium following a shock, while a positive value would indicate divergence. The results presented in Table 4 confirm the expected negative and highly significant ECT value, affirming a stable and meaningful long-run relationship between financial technology variables and income velocity. The ECT coefficient of -0.6223 indicates that approximately 62.23% of any disequilibrium from the long-run path is corrected within one year, holding other factors constant.

5.0 Conclusion and Recommendation

The study aims to investigate the impact of financial technology tools on income velocity, both long run and the short run. It was discovered that the long-run income velocity equation revealed that mobile banking, point-of-sale transactions, and internet banking were statistically insignificant. However, income velocity decreased by 22.29 percent, suggesting that financial technology tools may not have increased the velocity of money in Nigeria. The insignificant relationship may be attributed to limited financial inclusion in certain rural areas of Nigeria. Moreover, the Nigerian Interbank Settlement System (NISS) was positive and significant. The positive relationship between NISS and the income velocity may imply that monetary policy decisions can be transmitted more effectively through the financial system. The Nigerian Interbank Settlement System (NISS) enables the immediate settlement of transactions, thereby increasing the income velocity. The significance of NISS indicates that it plays a crucial role in enhancing the efficiency of Nigeria's financial system.

In the short run, the income velocity equation indicates that the current period of the Nigerian interbank settlement system has a negative and insignificant value. This implies that the Nigerian interbank settlement system (NISS) might not have an immediate impact on the velocity of money, suggesting that its effects may be more pronounced in the long run. A negative relationship could indicate inefficiencies in the fund transfer process, hindering the velocity of money, and an insignificant relationship might imply liquidity constraints or other short-term factors limiting the effectiveness of the Nigerian interbank settlement system (NISS). The negative relationship might be due to short-term volatility or shocks in the financial system, which NISS is unable to mitigate. Mobile banking transactions in the current period were positive and insignificant in the short run. The positive but insignificant impact of mobile banking transactions on the velocity of money in Nigeria suggests that Mobile banking may be expanding access to financial services, contributing positively to the economy. The insignificant relationship could suggest that either the volume or value of transactions is not substantial enough to significantly impact the velocity of money. Moreover, other Nigerian economic conditions, regulations, or consumer behavior might be influencing the velocity of money more strongly than mobile banking transactions. The Point of sale in the current period was negative and statistically insignificant, meaning that POS transactions might not be widespread or frequently used enough to significantly impact the velocity of money. It could also mean that Nigeria's economy might still be heavily reliant on cash transactions, reducing the impact of POS transactions on money velocity. It also implies that other payment channels, such as mobile banking or online transactions, may have a more significant impact on the velocity of money. The current period for internet banking was positive and insignificant, suggesting that Internet banking may be contributing to increased financial activity, but its impact on money velocity is not yet substantial. The insignificance could suggest that internet banking adoption is limited to a specific segment of the population, thereby restricting its broader impact, and other economic or financial factors might be more influential on the velocity of money, overshadowing the effect of internet banking.

Generally, the overall model was significant, meaning that considering all these payment systems jointly Nigeria Interbank Settlement System, Mobile Banking, Point of Sale, and Internet banking the combined impact on the velocity of money in Nigeria is significant. This suggests that the payment systems complement each other, driving financial activity and influencing money velocity, indicating that Nigeria's digital payment infrastructure is evolving, thereby facilitating economic transactions. The

significant relationship could indicate opportunities for economic growth, financial inclusion, and increased economic activity. Although this collective significance contrasts with some earlier individual payment channels having insignificant impacts. It highlights the importance of a diverse and robust digital payment ecosystem. Therefore, banks need to continually strengthen their financial technology tools to provide resilient banking services, thereby promoting the velocity of money in Nigeria. Banks should charge affordable fees for services to encourage their customers to utilize these services. The Central Bank of Nigeria should implement policies that enhance the liquidity, interoperability, and transactional efficiency of financial technology systems to ensure that fintech adoption stimulates rather than slows the circulation of money in the economy. Telecom operators should strengthen network reliability, reduce transaction costs, and enhance the speed and accessibility of mobile financial services to promote more frequent money circulation and mitigate the negative impact of financial technology on income velocity in both the long and short run.

References

Ajayi, L.B. (2014). The effect of cashless monetary policy on the Nigerian banking industry: Issues, prospects, and challenges. *International Business and Finance Management Research,* 2(1): 29-41

Amaegberi, M., Ekainsai, S. Z., & Okonma, M. C. (2022). Cashless policy and velocity of money in Nigeria: A quantitative approach. *Wilberforce Journal of the Social Sciences (WJSS), 7*(1), 15-32. DOI:10.36108/wjss/2202.70.0120.

Arner, D. W., Barberis, J., & Buckley, R. P. (2016). The evolution of fintech: A new post-crisis paradigm? *Georgeto. Journal of International Law, 47*(4), 1271-1319. https://dx.doi.org/10.2139/ssrn.2676553.

Central Bank of Nigeria. (2011). Cashless Nigeria: A policy framework. CBN Publication.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3),319-340. DOI: 10.2307/249008.

Demirguc-Kunt, A., Klapper, L., & Singer, D. (2018). The global findex database 2017: measuring financial inclusion and the fintech revolution. *World Bank.*http://dx.doi.org/10.1596/978-1-4648-1259-0

EFCC (Economic and Financial Crimes Commission, 2019). EFCC and the Fight against Money Laundering.

Effiom, L. & Edet, S. E. (2020). Financial innovation and the performance of small and medium-scale enterprises in Nigeria. *Journal of Small Business & Entrepreneurship*, *1*(3), 19- 29. http://dx.DOI:10.1080/08276331.2020.1779559.

Ejiofor, V.E. and Rasaki, J.O. (2012). Realising the benefits and challenges of cashless economy in Nigeria: It Perspective. *International Journal of Advances in Computer Science and Technology*, 1(1), 7-13 http://warse.org/pdfs/ijacst02112012.pdf.

Eze, G. (2020). Cashless policy and financial inclusion in Nigeria. *International Journal of Research and Scientific Innovation (IJRSI).* https://doi.org/10.13140/RG.2.2.33053.87520, 12(1),1-12.

Friedman, M. (1956). The quantity theory of money: A restatement in studies in the quantity theory. In studies in the quantity theory of money, University of Chicago Press, Chicago, 3-21. - References - Scientific Research Publishing

Ibrahim, A. U. & Daniel, C. O. (2019). Impact of e-banking on the development of the banking sector in Nigeria. *International Journal of Managerial Studies and Research (IJMSR), 7*(2), 19-27. http://dx.doi.org/10.20431/2349-0349.0702004

Ihegboro, I. M (2022). An Empirical Investigation into the impact of electronic banking on the economic growth of Nigeria. *Global Journal of Management and Business Research, 22*(1), 23-34. An Empirical Investigation into the Impact of Electronic Banking on the Economic Growth of Nigeria

Isibor, A. A., Omankhanlen, A. E., Okoye, L. U., Achugamonu, B. U., Adebayo, M. E., Afolabi, G. T., & Ayodeji, O. E. (2018). The impact of electronic banking technology on customer satisfaction and economic growth in Nigeria. *International Journal of Civil Engineering and Technology (IJCIET), 9*(12), 35-54.http://www.iaeme.com/ijciet/issues.asp?JType=IJCIET&VType=9&IType=12

Jain, R. (2023). The impact of cashless transactions on money supply: A case study of India. *International Journal of Innovation and Economic Development · February 2020, 1*(2), 2-36. DOI:10.13140/RG.2.2.22551.55209

Keynes, J. M. (1936). The general theory of employment, interest, and money. Macmillan. 1366_KeynesTheoryofEmployment.pdf

Khatun, M &Siddiqui, S. (2023). What drives movements in the income velocity of money? A case study of the U.S. *American. Finance and Banking Review 8*(1), 14-20. DOI:10.46281/amfbr.v8i1.2149

Mamudu, Z. U. & Gayovwi, G. O. (2019). The cashless policy and its impact on the Nigerian economy. *International Journal of Education and Research, 7*(3), 111-132.

Mishkin, F. S. (2007). The economics of money, banking, and financial markets. Pearson, New York.

Njoku, C. O., Nwadike, E. C. & Azuama, G. U. (2020). Effect of electronic banking on the economic growth of Nigeria (2009-2018). *The International Journal of Business Management and Technology*, 4(3), 9-19.

Odior, S. E. and Banuso, B. F. (2012). Cashless banking in Nigeria: Challenges, benefits, and policy implications. *European Scientific Journal*, 8(12), 34-46. https://ir.unilag.edu.ng/handle/123456789/8164

Ogedebe, P. M. and Jacob, B.P. (2012). E-payment: Prospects and challenges in the Nigerian public sector. *International Journal of Modern Engineering Research*, 2(5), 3104 - 3106. X02531043106.pdf

Okey, O. O. (2013). The Central Bank of Nigeria's cashless policy: benefits and challenges. *Journal of Economics and Sustainable Development*, 2(14), 128-133.

Okoi, I. O., Faithpraise, E. E., Asukwo, J., Obo, E., Eba, A., & John, J. (2025). Dynamic effect of financial technology on financial development in Nigeria. *Investment*

Management and Financial Innovations, 22(3), 426-438. https://doi.org/10.21511/imfi.22(3).2025.32

Osakwe, C. I. & Akunna, R. C. (2023). The effect of internet banking on the growth of deposit money banks in Nigeria. *Journal of the Management Sciences*, 60(1), 48-61. https://journals.unizik.edu.ng/jfms/article/view/2552

Osazevbaru, H. O, &Yomere, G. O. (2015). Benefits and challenges of Nigeria's cash-less policy. *Kuwait Chapter of Arabian Journal of Business and Management Review* 4 *(*9):1-10.

Otuonye, J. G. & Idris, M. I. (2023). The effect of electronic banking innovations on economic growth in Nigeria. *EKSU Journal of Multidisciplinary Studies, 1*(3), 236-256.

Ozili, P. K. (2018). Impact of digital finance on financial inclusion and stability. *International Journal of Financial Research, 9*(2),115-125.

Sanusi, L. S. (2012). Banking reform and payment systems in Nigeria. CBN Publication.

Siyanbola, T. U. (2013). The impact of cashless banking on the Nigerian Economy. *Canadian Journal of Accounting and Finance, 1*(2), 9 -19.

Uugulu. T. M. (2022). The nexus between financial innovations and velocity of money: evidence from Namibia: A thesis submitted in partial fulfilment of the requirements for the Master's degree of Science (M.Sc), the University of Namibia

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science, 46*(2),186-204.

Zetzsche, D. A., Buckley, R. P., & Arner, D. W. (2017). The future of financial regulation: Innovation and stability in a changing world. *European Business Organization Law Review, 18*(3), 511-542.