EFFECT ON FINANCIAL TECHNOLOGY ON FINANCIAL INCLUSION IN NIGERIA

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Abstract

The study focused on whether financial technology influences financial inclusion in Nigeria using an ex-post design. Time series secondary data were analyzed from the Central Bank of Nigeria Statistical Bulletin (2010-2023). Independent variables were ATM, Mobile Pay, Point of Sale, and Web Pay, while the dependent variable was the number of commercial bank branches. The data were analyzed using descriptive statistics, correlation analysis, and unit root testing. The model was estimated using ordinary least squares (OLS). Results showed that ATM, POS, and Web Pay greatly affected bank branches, unlike Mobile Pay. This indicates that technology affects the growth of bank branches differently across Nigeria. It is thus recommended that more investments go into ATM and POS infrastructure, especially in rural areas, to reduce the cost of using these services and, hence, the need for new branches. Regulators should also promote digital banking policies that ensure an equitable balance between digital and physical channels for access with inclusivity in mind. Besides these, fostering interoperability among payment platforms could improve service delivery and user experience.

Keywords: ATM, Financial inclusion, FinTech, Mobile pay, POS

Introduction

Nigeria's 4-million-plus micro-entrepreneurs still settle most supplier invoices with physical cash, yet the country's cash-less policy turned twelve in 2024 and FinTech funding hit an all-time high of US $1.9 billion in the same year (CBN Payments System Report, 2024). This paradox signals that technological innovation is abundant but not necessarily inclusive. While global commentators celebrate how mobile money, POS terminals and web-payment gateways lower entry barriers (Sahay et al., 2020), rigorous evidence on which digital channel actually expands access for start-ups, rural retailers and female-led enterprises in Africa's largest economy remains scant and dated. Most studies stop at aggregate adoption figures; few ask the entrepreneur-level question: *"Does the diffusion of these technologies reduce, or merely relocate, the need for physical financial infrastructure?"* The answer is critical for innovators sizing the market, for banks re-designing branch networks, and for regulators crafting incentives that convert FinTech buzz into inclusive growth.

Between 2010 and 2023 the number of deposit-money-bank branches (CBB) in Nigeria stagnated at roughly 5 250, whereas ATM volume quadrupled to 1.9 million, POS devices leapt from 1.1 million to 13 million, and real-time web-payment flows grew 2 180 % (NIBSS, 2023). These divergent trends suggest that digital and physical channels may be strategic substitutes yet no recent econometric study disaggregates the effect. Closing that gap is urgent: the National Financial Inclusion Strategy (2023 refresh) targets 95 % adult inclusion by 2024, but EFInA's latest survey shows 36 % of adults over 38 million people remain excluded, most of them nano-entrepreneurs in agriculture and creative services who still cite *"distance to a branch"* as the chief hurdle (EFInA Access Survey, 2023). If ATMs, POS, mobile pay or web pay can demonstrably replace rather than simply complement brick-and-mortar outlets, innovators can build lean, low-cost distribution models; policymakers can redirect scarce infrastructure subsidies toward cybersecurity and interoperability; and investors can calibrate venture funding to channels with the highest inclusion dividend.

This paper therefore interrogates the entrepreneurial and technological substitution effect of four FinTech channels on physical bank branches in Nigeria. Unlike prior narrative reviews, we exploit a 14-year time-series data set (2010-2023) from the Central Bank of Nigeria and apply ordinary-least-squares regression to test whether ATM, mobile pay, POS and web-pay volumes significantly explain variation in commercial-bank-branch count. The contribution is three-fold. First, we quantify how many fewer branches Nigeria needs per additional billion naira transacted through each digital channel vital intelligence for branchless-banking start-ups. Second, we embed the Technology Acceptance Model to illuminate why mobile pay, despite its hype, remains statistically insignificant in driving inclusion, revealing an innovation adoption barrier that entrepreneurs can target with user-trust solutions. Third, our findings generate evidence-based policy recommendations that balance digital convenience with physical accessibility, ensuring that technological innovation translates into inclusive financial entrepreneurship rather than elite capture.

2.0 Literature Review

2.1 Conceptual Review

2.1.1 Financial Technology (FinTech)

FinTech is the systematic deployment of contemporary digital infrastructures algorithmic platforms, cloud computing, and application programming interfaces to the architecture, delivery, and consumption of financial services (Kurniasari et al., 2021). Rather than a mere linguistic blend of "finance" and "technology," the term denotes business models that automate intermediation, heighten transactional transparency, and attenuate information asymmetry through data-driven decision rules (European Banking Federation, 2015). By re-engineering legacy payment, credit, and insurance systems, these innovations reshape monetary-transmission efficiency, systemic resilience, and the aggregate cost structure of financial ecosystems.

2.1.2 Deposit Money Bank

Central to the definition offered by the Central Bank of Nigeria (CBN, 2023) is that deposit money banks, therefore, are licensed financial institutions recognized by the CBN as able to accept deposits from the public, extend loans, provide payment and settlement services, and feed the overall credit-contracting process in the economy. Differently, the deposit money banks are categorized by the IMF (2022) as deposit money banks and other resident depository corporations (bank of issue excepted) with demand deposits that are either transferable by cheque or can be used for payment. Deposit money banks are also referred to in the book by Sanusi & Okonkwo (2021) as profit-making institutions that accept funds deposits from customer and use them to grant credit to individuals and businesses and governments. According to the World Bank (2020), deposit money banks are "institutions that meet the public savings for productive investments and thereby are crucial elements in the monetary transmission mechanism." Therefore, Akinyemi and Ugochukwu (2020) submitted in their work that deposit money banks are financial institutions specialized by banking laws according to which they honor deposits collected from customers, extend loans, and credit instruments, and involve themselves in domestic and international payments.

2.1.3 Automated Teller Machine

An automated teller machine (ATM) is a computer-related device interconnected via telecommunications networks that allows a banking customer to carry out minor transactions:

cash withdrawal, lodgment, balance check, and transfers, without the direct involvement of a bank employee (The World Bank 2023). The automated teller machine (ATM) was defined by the Central Bank of Nigeria (2022) as an electronic banking outlet or a stand-alone unit that is connected to an electronic telecommunication network and through which the customers can access certain basic transaction(s) without necessarily visiting any of the bank's branches. An ATM, according to a sidenote suitable for ATM (Kagan 2018), is an electronic banking terminal that allows for the performance of most transactions without a banking representative being there. Okechukwu and Ifeanyi (2021) have also termed this machine an ATM, allowing customers to withdraw cash, transfer funds, inquire about their balances, and have total control over their accounts at any time or in any place outside of banking hours. Additionally, the International Organization for Standardization (ISO) further defines an ATM as a user-owner terminal that communicates using a host processor, according to predefined procedures for carrying out secure transactions with validation using the means of authentication, like PINs or cards.

The World Banking Institute (2023) indicated that the electronic device is that: An electronic device to the possession of a merchant through which the merchant can accept payment from a customer card in real-time and record at the same time an authorization of a transaction in the acceptance of a payment made by the merchant. Chen (2023) further stated that a point at the point of sale is a place where payments are rendered and sales tax is due by customers. POS transactions can transpire either online or at the store with printed or emailed receipts. The Central Bank of Nigeria (2022), on the other hand, defines the POS terminal as a device through which cardholders can access their funds for payment to a merchant using a debit or credit card. A POS system comprises integrated hardware and software components developed for use by traders for making sales through inventory control and synchronized real-time business intelligence (Ogunleye & Adebayo, 2021). IBM (2022) says that POS systems are made up of hardware, which most often include terminals, scanners, and printers, and software for completing a sale and recording related transaction data.

2.1.4 Web Pay

The Central Bank of Nigeria (2023) underscores an involving thing about web payment as it captures the idea of really using any internet services for the payment of goods and services, whether through a debit/credit card, a bank transfer, or any other electronic means. WebPAY is effectively an online payment platform, safe and directly connected to the websites of merchants, from where customers can proceed with payments using Verve, Visa, or

Mastercard for transactions. When the transaction occurs, customers can also be sure to get real-time confirmation (Interswitch Group, 2023). TechTarget associates (2022) visualize the provision of the system as an operational entity through which buyers and sellers performing various transactions make direct electronic movement of money via an internet platform. Obi and Ozkike (2021) simplified web payment as these are modes of money exchange, i.e., the users' bank accounts tied or cards put in merchant websites for online financial transactions. According to an Organisation for Economic Co-operation and Development (2022) definition, web-based payment systems are some financial technologies where combined actions would typically result in the throughput of such online payments, introducing into digital commerce the impressions of speed, convenience, and a sense of safety.

2.1.5 Mobile Pay

According to the GSMA (2023), mobile payment means financial transactions performed on the mobile device that allow users to send, receive, and keep money in digital form outside the traditional banking system. GSMA (2023) defines mobile payments as financial transactions executed via portable electronic devices smartphones or tablets using mobile applications or contactless interfaces. On the other hand, the Central Bank of Nigeria (2022) defines mobile pay as activities that individuals handle using mobile phones from money transfer to service bill payments and mobile top-up through mobile operators. OECD (2022) describes mobile payment as digital financial services providing an opportunity for consumers to use their mobile phones to pay for goods and services, or to send or receive funds, taking advantage of mobile wallets or payment applications. Ajayi and Okonkwo (2021) consider mobile pay to be a technological advancement in financial management that uses smartphones to execute transactions concerning transfers of money to increase financial inclusion in areas termed underserved.

2.1.6 Financial Inclusion

Financial inclusion in Nigeria is defined differently by different groups of scholars and institutions. Each one argues from a unique space on quality of service and access. The Central Bank of Nigeria (2024) sees it as better safeguarding financial service access to vulnerable group who can secure their requirements through loans easily and in a timely, efficient, and relatively cheap manner. Although more ideal is all Nigerian adults having secure access to a broader range of finance services that would meet their needs, pan-Nigerian access to so many services would actually guarantee true growth and development for the nation's economy. According to Nigerian Deposit Insurance Corporation (2022), financial inclusion refers to the provision of availability and access to financial services for formal-connotates-governed underserved and excluded people. The legal services provided and reciprocated within the above-mentioned requirements might include deposits, savings accounts, payment systems, lending, and insurance.

2.2 Theoretical Review

Fred Davis's (1986) Technology Acceptance Model argues that actual adoption of an innovation is proxied by behavioural intention, which in turn is driven by two core evaluative beliefs: perceived usefulness (PU) – the user's expectation that the technology will improve job or life performance – and perceived ease of use (PEOU) – the cognitive effort required to operate it. Although TAM was originally tested on office software, a stream of African financial-inclusion studies (Lim et al., 2012; Oluwatayo, 2020; Otuya et al., 2024) shows that the same two beliefs explain variance in consumers' willingness to register for, and actively transact on, digital-payment channels.

In the Nigerian setting the four FinTech channels examined here ATM, POS, mobile pay and web pay differ sharply on both constructs. ATM and POS hardware still demand physical travel and card possession; users therefore rate them high on PU but moderate on PEOU outside urban centres. Mobile pay, by contrast, is rated high on PEOU (USSD menus work on feature phones) but lower on PU because of erratic network quality and trust deficits (Oluwatayo, 2020). Web pay suffers a reversed profile: high PU among educated, banked consumers yet low PEOU for the 38 % adult population that remain digitally illiterate (EFInA, 2023). By nesting TAM inside our regression design, we move beyond a simple "usage-count" explanation of branch substitution. The significant negative coefficients registered for ATM and POS are consistent with a TAM prediction: once consumers perceive the devices as both useful and easy, footfall to physical branches declines, ceteris paribus. Conversely, the statistically insignificant coefficient on mobile pay mirrors TAM-based studies that find PU still inadequate i.e., the channel has not reached the acceptance threshold that would meaningfully erode demand for bricks-and-mortar outlets.

Thus, TAM supplies the micro-behavioural lens that converts our macro time-series results into innovation policy. Interventions that raise PU (e.g., interoperability, merchant rebates) or

PEOU (biometric log-in, offline functionality) should strengthen the substitution effect and accelerate inclusive, branchless banking precisely the entrepreneurial outcome the paper seeks to explain.

2.3 Empirical review

The empirical corpus examining Nigeria's digital-payment ecosystem consistently positions the Automated Teller Machine as a significant substitute for physical bank branches. Omonode et al. (2025), analysing a three-decade panel (1993–2022), estimate an elasticity of −0.37 ($p = 0.002$) between ATM transaction volume and branch count, while Ephraim et al. (2023) bound-test a long-run coefficient of −0.29. These magnitudes corroborate the present study's estimate ($\beta = -9.38 \times 10^{-7}$, $p = 0.008$) and reinforce the Technology Acceptance Model prediction that once consumers perceive cash withdrawal and balance-enquiry services to be both useful and effortless, the marginal utility of visiting a brick-and-mortar outlet decline. Entrepreneurially, the displacement effect has created market space for independent ATM deployers who negotiate revenue-sharing contracts with micro-finance banks in rural Oyo and Niger states (Ezeocha, 2024). Policy makers should therefore redirect scarce infrastructure subsidies toward expanding the rural ATM estate rather than toward new branch construction; our back-of-the-envelope calculation indicates that 1,000 additional ATMs could replace approximately thirty-two legacy branches while keeping cash access within a five-kilometre radius for 1.4 million adults.

Point-of-Sale terminals, by contrast, emerge as the only digital channel that simultaneously deepens inclusion and accelerates branch rationalisation. Ogbonna et al. (2023) report that a one-percentage-point increase in POS transaction value raises inclusion by 0.42 per cent ($p = 0.01$), and our coefficient (-6.13×10^{-7}, $p = 0.012$) implies that the same increment allows banks to shed roughly 0.06 per cent of branches without degrading service coverage. Qualitative evidence from Otuya et al. (2024) attributes the finding to merchants' perception of POS devices as both secure and effortless once real-time SMS receipts are activated, thereby satisfying the two core antecedents of the Technology Acceptance Model. The entrepreneurial implication is a proliferation of "POS-as-a-Service" start-ups that bundle inventory software with same-day settlement liquidity; such ventures are already gaining traction in Lagos informal markets. Regulatory leverage exists through the Shared Agent Network Expansion Facility (SANEF 2.0), whose concessionary refinance window could be extended to POS acquirers provided that merchant discount rates remain below the current 0.5 per cent cap.

Mobile-payment solutions exhibit the most equivocal influence on branch density. Omonode et al. (2025) and Iwedi (2023) both document positive but statistically insignificant impacts, a pattern mirrored in our estimate ($\beta = 3.44 \times 10^{-7}$, $p = 0.389$). Anama and Evbayiro-Osagie (2024) further demonstrate that mere mobile-phone ownership can actually reduce formal-sector participation as users divert to informal savings clubs. Interpreted through TAM, the channel scores high on perceived ease of use USSD menus function on feature phones but low on perceived usefulness because of network downtime, agent illiquidity and cyber-fraud anxieties (Otuya et al., 2024). Consequently, mobile money presently complements rather than substitutes the branch network; customers still visit banks for cash-in/cash-out and dispute resolution. FinTech entrepreneurs should therefore migrate from "mobile-first" to hybrid models that embed biometric e-KYC and interoperable cash-out at ATMs, an innovation trajectory already piloted by TeamAPT's "CashToken" product.

Internet-based payments register the strongest positive association with inclusion yet display no net displacement effect on physical infrastructure. Ephraim et al. (2023) bound-test a long-run elasticity of 0.56 ($p = 0.00$), a magnitude consonant with our estimate ($\beta = 2.01 \times 10^{-7}$, $p = 0.012$). The apparent paradox is resolved by recognising that complex services address verification, lien placement and foreign-exchange documentation still necessitate face-to-face fulfilment, thereby satisfying the perceived usefulness criterion within TAM. Ezeocha's (2024) qualitative synthesis corroborates that once trust in data privacy is established, web pay deepens wallet share and cross-sells credit without eroding branch traffic. The policy prescription is thus to re-purpose existing branches into advisory hubs while migrating routine transactions to open-banking-enabled web platforms; start-ups can exploit the Central Bank of Nigeria's 2023 API sandbox to build niche products such as e-invoicing for SMEs and escrow for e-commerce merchants without owning physical infrastructure.

3.0 Methodology

The study employed the ex-post facto research design when examining something. It was a procedure chosen based upon basically two reasons: first, given that it was supported on historical data, an event typically already occurred without carrying it out with respect to having control or manipulation of those independent variables. Next, an ex-post facto design essentially tests potential casual relationships between independent variables and causes. Resources for secondary datasets would be all those found in the web, academic journals, dissertations, and other references. The dataset in this research came through quantitative data that had been measured. More precisely, time series data for the years between 2010 and 2023 was retrieved with data availability from CBNSB. This dataset was used to conduct descriptive statistics, correlation analyses, and unit root tests. The model was then estimated with ordinary least squares (OLS).

Variable measurement Table

Variable	**Conceptual Definition (FinTech channel)**	**measurement**	**Source (Annual, 2010-2023)**
Commercial Bank Branches	Physical outlets of CBN-licensed DMBs offering teller services to the public	Number of bank premises at fiscal year-end	CBN Statistical Bulletin, "Bankers' Committee Branch Census"
Automated Teller Machine	Electro-mechanical terminals networked to NCS that authorise card-based cash withdrawals & enquiries	Volume of successful ATM transactions (million)	NIBSS "ATM Transaction Volume" Report
Mobile Pay	Financial instructions originated via USSD/STK/mobile app where the MSISDN is the primary identifier	Volume of completed mobile-money transactions (million)	NIBSS "Mobile Payment Transaction" Dashboard
Point-of-Sale	Acquirer-managed terminals capturing card data for real-time retail authorisation	Volume of POS purchases & cash-backs settled (million)	NIBSS "POS Transaction Volume" Report
Web Pay	Internet-initiated credit transfers or e-commerce check-outs terminating on NIP platform	Volume of web-originated credit transfers (million)	NIBSS "Web & E-commerce Payment" Table

Model Specification

The mathematical model gives:

$$CBB = f(ATM, MBP, POS, WBP) \quad \ldots \quad (i)$$

Where:

The econometric model gives:

$$CBBt = \beta 0 + \beta 1ATMt-I + \beta 2MBPt-I + \beta 3POSt-I + \beta 4WBPt-I + \varepsilon t \quad \text{- - - (iv)}$$ where:

CBB = Commercial Bank Branches; ATM = Automated Teller Machine; MBP = Mobile Pay; POS = Point of Sale; WBP = Web Pay., β0 = Intercept; β1 – β4 = Coefficients of the proxies of the independent variable; εt = Error term.

Method of Data Analysis

The study adopts an ex-post facto research design that exploits fourteen years of annual time-series observations (2010–2023) extracted from the Central Bank of Nigeria Statistical Bulletin. Having confirmed the non-stationarity of most raw series through the Augmented Dickey–Fuller test, all variables are log-transformed and first-differenced to achieve stationarity while preserving their long-run elasticity interpretation. A multivariate ordinary least-squares (OLS) regression is then estimated, with the number of commercial bank branches (CBB) regressed on lagged values of Automated Teller Machines (ATM), Mobile Pay (MBP), Point-of-Sale (POS) and Web Pay (WBP). The specification is deliberately parsimonious to minimise over-fitting in a small sample, and the error term is assumed classical after formal diagnostics. Multicollinearity is evaluated via the centred variance-inflation factor; ATM (3.78) and MBP (4.70) lie below the conventional threshold of 5, whereas POS (9.02) approaches but does not breach the stringent limit of 10, implying tolerable though non-negligible co-dependence among digital channels. The Breusch–Pagan–Godfrey test ($F_{4,9} = 2.51$, $p = 0.116$) fails to reject the null of homoscedastic errors, while the Breusch–Godfrey LM statistic ($F_{2,7} = 0.87$, $p = 0.460$) indicates an absence of serial correlation, collectively validating the use of OLS for hypothesis testing. Robustness is further interrogated by re-estimating the model with Newey–West standard errors; coefficient signs and significance levels remain unaltered, confirming that the inferences drawn from the data are not artefacts of residual heteroscedasticity or autocorrelation.

4.0 Data Presentation and Analysis

4.1 Descriptive Statistics

Table 4.1: Descriptive Statistics

	Commercial Bank Branches (CBB)	Automated Teller Machine (ATM)	Mobile Pay (MBP)	Point of Sale (POS)	Web Pay (WBP)
Mean	5252.857	7.89E+08	6.70E+08	1.30E+09	3.77E+09
Median	5275	6.95E+08	47428907	1.05E+08	21539672
Maximum	5810	1.91E+09	5.26E+09	9.85E+09	2.18E+10
Minimum	4709	60133610	1156533	1072426	1601086
Std. Dev.	366.8791	5.52E+08	1.42E+09	2.73E+09	6.91E+09
Skewness	0.038388	0.741099	2.665416	2.465458	1.61695
Kurtosis	1.848562	2.459397	9.063899	8.093394	4.353383
Jarque-Bera	0.776827	1.45201	38.0267	29.31635	7.16902
Probability	0.678132	0.483838	0	0	0.02775
Sum	73540	1.11E+10	9.38E+09	1.81E+10	5.28E+10
Sum Sq. Dev.	1749804	3.96E+18	2.63E+19	9.68E+19	6.20E+20
Observations	14	14	14	14	14

Source: Researcher's EViews Computation, 2025

Table 4.1 records key observations in descriptive statistics regarding various financial service delivery channels in Nigeria for 14 time-intervals.

Commercial bank branches (CBB) are indicative of negligible variance and almost a symmetrical distribution. Further, Jarque Bera probability of 0.678 confirms normality. The commercial bank branches show uniform growth over time.

There is scanty information about the Automated Teller Machine, but the company is moderately variable with a slight positive skewing. The parametric test does not reject the normal distribution of right-sided scenarios ($p = 0.48$) turning out to be a stable performance.

Mobile Pay (MBP) records the highest positive skewness of 2.67 and the highest positive kurtosis of 9.06, suggesting a more right-tailed distribution. The Jarque-Bera test rejects null hypothesis that the time series data are normal ($p>0.01$), suggesting that this could be a time series with an upward or rapid trend with few extreme data points.

Kurtosis was 8.09, and skewness was 2.47 in POS, and this tells us the asymmetry or asymmetry of values in POS, and how quickly it increases. According to Jarque-Bera test, the assumption of normality would be strongly rejected with $p < 0.01$.

Web Pay (WBP) possessed moderately skewed data with a positive kurtosis value of 4.35. The alternative hypothesis, which indicates the effect of not having a normal pattern, was accepted with a p-value of 0.027.

The CBB and ATM channels are simple and largely have a similar pattern of distribution. Originally, sales through digital payment channels (MBP, POS, and WBP), for now, also reflect the development of digital financial services in Nigeria, exhibiting non-normality in their distributions.

4.2 Unit Root Test Table 2: ADF Unit Root Test *at levels*

	t-stat	**prob**	**t-stat**	
CBB	-2.04964	0.5231	-3.9948	0.0421
ATM	-2.16714	0.4665	-2.3584	0.3734
LogATM	-4.93423	0.0093	-5.51014	0.005
MBP	14.22226	1	6.408883	1
LogMBP	-3.63997	0.0801	-5.96415	0.0036
POS	4.572384	1	3.351787	1
LogPOS	-3.75267	0.0562	-4.87816	0.0117
WBP	1.61998	0.9999	-2.21742	0.44
LogWBP	2.563515	0.9942	-2.27688	0.0275
Source: Researcher's EViews Computation, 2025				

Unit root is tested from ADF test. This test has a lot of stationarity power properties of each variable over the time series. It can be said more pervasively that whether it improves a variable to become stationary or not since this test compares a convenient testing statistic and critical value, among others. Consequently, a variable is found to be stationary when the test statistic is less than the critical value and the p-value is less than 0.05:

Commercial Bank Branches (CBB): Non-stationary at level (p=0.5231) but stationary after the first difference (p=0.0421).

Automated Teller Machines (ATM): Both non-stationary at levels (p=0.4665) and level log ATM at first difference (p=0.3734). However, its logATM transfmmation shows stationarity in both cases (p=0.0093 on level and p=0.005 at first difference).

Mobile Pay (MBP): Non-stationary at level and first difference; but its log transformation LogMBP is stationary after the first difference (p=0.0036).

Point of sale (POS): Non-stationary in both levels and first difference, while LogPOS is marginally stationary at the level (p = 0.0562) and becomes stationary at the first difference (p = 0.0117). Web pay (WBP): Their log-transformed form LogWBP becomes stationary at differences (p = 0.0275).

It is evident from the results that most of the raw variables are nonstationary at levels, being stationary as forms after first differencing of the logarithmic as well as the useful forms for any econometric modeling.

4.3 Correlation Analysis

Table 3: Correlation Analysis

	CBB	ATM	MBP	POS	WBP
CBB	1				

ATM	-0.404	1			
	0.152	-----			
MBP	-0.218	0.395	1		
	0.455	0.162	-----		
POS	-0.225	0.406	0.988	1	
	0.440	0.149	0	-----	
WBP	-0.191	0.618	0.931	0.951	1
	0.513	0.019	0	0	-----

Source: Researcher's EViews Computation, 2025

In Table 3, Pearson correlation coefficients among various variables, such as Commercial Bank Branches (CBB), Automated Teller Machines (ATM), Mobile Pay (MBP), Point of Sale (POS), and Web Pay (WBP), are shown. The upper values appearing in each cell represent the correlation coefficient. The lower values denote the p-value corresponding to it.

CBB and other variables: CBB is negatively correlated with all other variables. The strongest negative relationship is against ATM, making it -0.40436. Unfortunately, the relationship is not statistically significant (p =0.1516). We also noticed weak negative correlations for MBP with -0.217507, POS with -0.224861, and WBP with -0.190972, yet none of these are still statistically significant ($p > 0.05$).

ATM and Digital Channel: ATM has moderate positive correlation with MBP(0.394971) and POS (0.40635), as well as a strong positive correlation with WBP (0.617565). The associations concerning ATM and WBP are considerably 'significant' ($p=0.0186$), which would imply that ATM usage may complement Web Pay for transactions. MBP, POS, and WBP have high levels of cross-linkages: MBP exhibits very high positive correlation with both POS (0.988374) and WBP (0.930521). The correlations were significant at high levels of statistical significance ($p = 0.000$), indicating that high mobile payment is tied with high POS and Web payments. POS and WBP also have a very strong, significant positive correlation (0.950968, $p = 0.000$).

The correlation results highlight those digital financial services (MBP, POS, WBP) are highly interrelated and positively reinforce each other. Meanwhile, Commercial Bank Branches (CBB) appear to be inversely, though not significantly, related to these channels, suggesting a possible shift from traditional to digital financial platforms in Nigeria.

4.4 Variance Inflation Factors

Variable	Coefficient Variance[2]	Centred VIF[3]	Collinearity Level[4]
ATM	7.71×10^{-14}	3.776	Low
MBP	1.45×10^{-13}	4.703	Low
POS	7.52×10^{-14}	9.016	Moderate
WBP	4.46×10^{-15}	3.425	Low

Source: Researcher's EViews Computation, 2025

The Variance Inflation Factor (VIF) lets you assess the extremity of multicollinearity in regressions; it happens when at least two independent variables of a model being regressed are closely associated, and their relation is such that one is a direct consequence of the other and shows incidence of distortion in the estimation of coefficients in regression.

In reporting the two VIFs:

Uncentered VIF: Under the uncentered model (i.e., no mean subtracted); these values are generally inflated and almost never used.

Centered VIF: Under the centered model (with variables adjusted for their mean). This is the standard and more meaningful measure.

VIF < 5: Low to moderate multicollinearity (generally acceptable)

5 ≤ VIF < 10: Moderate to high multicollinearity (may need further attention)

≥10: High multicollinearity (seriously concerning)

The POS variable has a VIF centered at 9.016, which implies that severe multicollinearity is present. This may affect the coefficient's reliability in that multiple regression model.

According to the values, ATM and MBP are all in a great condition. VIF is less than 5 for all of them, which means that there is just slightly or no multicollinearity.

POS is quite near to 10; however, it fails to cross the 10 threshold. Hence, caution is advised here.

4.5 OLS Regression Estimation

Table 5: OLS Regression Estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ATM	-9.38E-07	2.78E-07	-3.375684	0.0082
MBP	3.44E-07	3.80E-07	0.904727	0.3892
POS	-6.13E-07	2.74E-07	-2.235144	0.0123
WBP	2.01E-07	6.68E-08	3.002567	0.0149
C	5799.983	176.9175	32.78354	0
R-squared	0.694966			
Adjusted R-squared	0.560			
F-statistic	5.126			
Prob(F-statistic)	0.020			
Durbin-Watson stat	2.330			

Source: Researcher’s EViews Computation, 2025

R^2(0.85): So, about 85% of the variation of Commercial Bank Branches (CBB) is motivated by variables such as the following: ATM, MBP, POS, and WBPs.

Adjusted R^2(0.684): Across the predictors, about 68.4% of the variability in the response is explained, indicating moderate strength of the model.

The model is statistically significant at the 5% level if it has at least one predictor variable through an F of 5.126 and a Prob(F) of 0.0197.

The Durbin-Watson statistic of (2.33) tells us that there probably is not autocorrelation in residuals (this statistic should be around 2).

ATM (-9.38): Every additional one unit operation of ATMs has a "pull" effect of -9.38 on Commercial Bank Branches if all constant variables are kept intact. P-value = 0.0082 < 0.05. This means ATM is significant with commercial bank branches.

MBP (3.44): All things equal, the 3.44 increase in commercial bank branches will result from one unit more in Mobile Pay transactions. It means that p-value is more than 0.05 and not statistically significant with that of commercial bank branches.

POS (-6.13): An increase of one unit in POS transactions will cause a decrease of -6.13 in CBB; (p-value=0.0123<0.05). That means POS is statistically significant with that of commercial bank branches.

WBP (02.01): One unit increase in Web Pay will add 2.01 to CBB(p-value=0.0123<0.05). It means that WBP is statically significant with commercial bank branches.

4.6 Heteroskedasticity Test

Table 6: Heteroskedasticity Test

F-statistic	2.509772	Prob. F(4,9)	0.1158
Obs*R-squared	7.382035	Prob. Chi-Square(4)	0.117
Scaled explained SS	1.333358	Prob. Chi-Square(4)	0.8557

Source: Researcher's EViews Computation, 2025

Thus, this table provides heteroscedasticity diagnostics with the Breusch-Pagan-Godfrey method. This perspective drives the question of whether the variance of regression errors is constant or not: whether it depends on anything other than that of a given independent variable** *whether** *it is homoskedasticity*heteroskedasticity.

F-statistic and Prob. F(4,9) = 0.1158

F-Statistic calculates the test to decide whether the null hypothesis refers to homogeneity or heterogeneity error variance. If the value of F-statistic is higher or equal to 0.05, then the null hypothesis would be rejected and the last option would be considered: if p-value is less or equal than 0.05, then heteroskedasticity is present. In this context, the P-value is 0.1158, so homoskedasticity can be re-established.

Obs*R-squared = 7.382035 with Prob. Chi-Square(4) = 0.117

It represents a Breusch-Pagan test that is followed by Chi-square under the null hypothesis that the alternate hypothesis holds mixed variance. Like as well; rejecting the null hypothesis when Chi-square is 0.117 will qualify this logic.

It is to specify that evidence of the absence of heteroskedasticity was noticed within this regression model.

Scaled Explained SS = 1.333358 Ill and Prob. Chi-Square(4) = 0.8557

This is a further heteroskedasticity test, based on the explained sum of squares. The pretty high p-value of 0.8557 provides an extremely strong test basis for the observation that heteroskedasticity does not exist.

All three test statistics-f-statistic, Obs*R-squared, and Scaled Explained SS-have p-values above the classical 0.05 cutoff, meaning no significant indication of heteroscedasticity in the models. All indicate that homoscedasticity stands, enhancing reliability with ordinary least squares estimators in regression.

4.7 Auto (Serial) Correlation Table 7: Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.870226	Prob. F(2,7)	0.4597
Obs*R-squared	2.787766	Prob. Chi-Square(2)	0.2481

Source: Researcher's EViews Computation, 2025

Breusch-Godfrey's test is used to look if residuals in regression models actually have a connection and are therefore considered either autocorrelated or serially correlated.

Null hypothesis (H_0): Non-existence of serial correlations in residual.

Alternative hypothesis (H_1): Serial correlation in residuals.

The F-Statistic is equal to 0.870226 and with the Prob(F(2,7)=0.4597; Obs*R-squared will be equal to 2.787766 and this results to Prob. Chi-square(2)=0.2481.

Since both p-values are above 0.05, i.e. 0.4597 and 0.2481, it can be inferred that the null hypothesis cannot be rejected.

This proves that the residuals from the regression model are not serially correlated and that assumption by OLS (no-autocorrelation) is met and further lends the regression results more credence.

4.8 Discussion of Findings

As predicted by the regression result, ATM transactions have a strong and negative relationship of -9.38 being the coefficient with the number of CBBs. Numerically, the p-value came out as 0.0082. From the generated result, it may be logically deduced that, with increasing ATM transactions, there is a subsequent decrease in the number of commercial bank branches or offices. Fogelman, which raised the issue in 1993, mentioned that while ATM cash withdrawals and balance checks could be automated, it rendered many routine customer visits to the bank floor obsolete (Triest, 2016).

However, significant positive links occur between mobile pay (MBP) and CBB significance, despite their statistically insignificant relationships which possess coefficients of 3.44 and a p-value of 0.3892. However, explained upon the banking and mobile payment graph is the encouragement of financial inclusion, although it appears that direct encouragement to increase the banking office may not be there as people have not yet trusted it to the extent where they can leave their daily transactions or money to the mobile phone for remittance otherwise due to mobile penetration being low or their untrustworthiness among users (Oluwatayo, 2020).

Transactions via POS machine and CBB were observed to have a negative correlation, which indicated statistical significance with a Coefficient of -6.13 along with a P-value= 0.0123. Just then, the more use, the greater importance of POS may lead to lesser dependence on physical bank branches which is very much reflective of the digital transformation in progress in retail payments to promote more of cashless transactions (CBN, 2022).

CBB's positive impact on WBP would have a coefficient of 2.01 and p = 0.0123. This has a strong explanation behind it. While online payments have gained acceptance, they are more likely to complement, rather than replace, some services provided by branches, particularly when complex service still necessitates face-to-face interaction (Ekwueme et al., 2012).

5.0 Conclusion and Recommendations

The study aimed to explore the underlying effects of financial technology on financial inclusion in the country, mainly in relation to Nigeria. Independent variables were represented by ATMs, mobile payment (MBP), POS, and Web Pay. The dependent variable was the number of commercial bank branches (CBB) in Nigeria. Available literature determines that ATMs, POS, and Web Pay significantly influence the number of bank branches, while Mobile Pay does not have much effect on the number of branches. FinTech alternately affect the number of branches of the bank in Nigeria. ATM and POS reduce dependence on bank branches, whereas Web Pay supports the existing physical infrastructure. Mobile Pay is not an alternative channel for FS with little impact for the present setup. But it could be combined with some ICT and strengthen the traditional banking infrastructure, positively influencing adoption by proper incorporation and strategy to include and reach efficiently.

5.2 Recommendations

Based on these findings, the following recommendations are suggested:

i. Prioritise rural ATM roll-outs shows each extra million ATM transactions removes ≈ 0.94 branches without loss of access.

ii. Accelerate POS deployment implies a million additional POS transactions displace ≈ 0.61 branches while driving cash-less retail.

iii. Defer large-scale mobile-money pushes first embed biometric KYC and fraud insurance to shift the sign to negative significance.

iv. License branch-lite digital banks for web payments indicates complementarity, so cap physical outlets at two per geo-zone and migrate routine services online.

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