CASHLESS PAYMENT ADOPTION AND TRADE SECTOR PERFORMANCE IN NIGERIA: EVIDENCE FROM TIME-SERIES ANALYSIS

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Abstract
This Study Evaluates the Empirical Relationship Between Cashless Payment Adoption and Trade Sector Performance in Nigeria Using Quarterly Time-Series Data from 2015-2025. The Analysis Disaggregates electronic payment adoption into four primary channels Point-of-Sale (POS), NIBSS Instant Payment (NIP), Mobile payments (MOB), and Web-based transactions (WEB) while wholesale and retail trade output serves as the measure of trade sector performance. Employing Ordinary Least Squares (OLS) estimation with Heteroskedasticity and Autocorrelation Consistent (HAC/Newey-West) standard errors on transformed stationary growth rates (log differences), the study tests the dynamic short-run transmission of payment digitalization to real sector performance. Diagnostic tests confirm the absence of severe multicollinearity (mean Variance Inflation Factor equal to 1.44) and heteroskedasticity. The empirical findings indicate that overall cashless payment growth does not exert a statistically significant joint effect on trade sector performance (F-statistic equal to 1.580, p-value equal to 0.199, R-squared equal to 0.035). At the channel-specific level, POS (coefficient equal to 0.007, p-value equal to 0.156) and Mobile payments (coefficient equal to negative 0.002, p-value equal to 0.576) exhibit statistically insignificant short-run effects. Conversely, NIP (coefficient equal to negative 0.014, p-value equal to 0.033) and Web payments (coefficient equal to negative 0.022, p-value equal to 0.029) demonstrate negative and statistically significant short-run coefficients. Grounded in the Technology Acceptance Model (TAM) and Financial Intermediation Theory, the results indicate that rapid payment system adoption is an enabling condition rather than a sufficient standalone driver of sectoral growth. The short-run frictions reflect transaction latency during peak periods, structural infrastructure bottlenecks, and nominal transaction value increases driven by macroeconomic inflation rather than real sector expansion. The study recommends targeted policy interventions by monetary authorities to expand payment infrastructure capacity, enhance cybersecurity frameworks, and reduce transaction cost structures to foster real economic growth.

Keywords: Cashless payment adoption, digital payments, financial intermediation theory, nigeria, technology acceptance model, time-series analysis, trade sector performance.

1.0 Introduction

The global financial system has undergone a profound transformation as economies increasingly shift from cash-based transactions toward electronic and digital payment systems. Advances in financial technology (FinTech), widespread internet connectivity, smartphone penetration, mobile banking, digital wallets, contactless cards and real-time payment infrastructure have significantly changed how individuals and businesses exchange financial value (Daud et al., 2022). Digital payment systems have increasingly become an important component of modern financial systems because they facilitate faster transactions, improve accessibility to financial services and reduce some of the costs associated with conventional cash-based transactions (World Bank, 2022). The expansion of digital payments has also been reinforced by the growing digitalisation of commerce, as businesses increasingly require payment platforms capable of supporting transactions across physical and online markets (Kilay et al., 2022). Evidence from developing economies suggests that the adoption of digital financial technologies can improve business efficiency by facilitating faster transactions, strengthening financial record keeping and expanding opportunities for firms to participate in digitally enabled markets (Nahar, 2022). Consequently, cashless payment adoption has moved beyond being merely a technological innovation to become an increasingly important component of contemporary commercial and economic activity.

The economic significance of electronic payment systems derives largely from their capacity to improve the efficiency with which financial transactions are completed. Conventional cash transactions may involve costs associated with cash handling, transportation, security, reconciliation and physical storage, whereas electronic payment platforms can facilitate the rapid transfer and recording of funds between buyers and sellers (Udefi et al., 2025). Faster payment settlement can improve business liquidity, enable firms to meet supplier obligations more efficiently and support timely inventory replenishment. Digital payment records may also improve financial monitoring and provide businesses with transaction information that can support accounting, budgeting and decision-making (Daud et al., 2022). In addition, the ability to receive electronic payments allows businesses to serve customers who increasingly prefer digital transaction channels, potentially expanding market reach and transaction frequency. Empirical evidence from developing economies supports this relationship, with studies reporting that digital payment adoption can improve business performance, supply-chain coordination, transaction speed and operational responsiveness among small and medium enterprises (Hope, 2021; Kilay et al., 2022; Nahar, 2022). These mechanisms are particularly relevant to trade because the buying and selling of goods and services depend fundamentally on the efficient exchange of value between market participants.

The transition toward digital payments has been particularly pronounced in Africa, where mobile telecommunications and financial technology have provided alternative pathways to formal financial services in environments historically characterized by limited conventional banking infrastructure. Mobile money, agency banking and other digital financial services have expanded the capacity of households and businesses to make and receive payments without depending exclusively on physical bank branches or cash transactions. The expansion of these technologies has also supported small businesses by improving access to payment services and facilitating

commercial transactions within increasingly digital markets. Evidence from Kenya, Uganda and other African economies indicates that mobile and digital payment solutions can improve transaction speed, customer reach, operating cash flow and business performance among small enterprises (Hope, 2021; Auma, 2023; Niyongere & Osunsan, 2023). Similar evidence from Cameroon shows that the adoption of electronic payment systems among SMEs is influenced by factors such as perceived security, owner education and firm characteristics, demonstrating that the expansion of payment infrastructure does not automatically guarantee uniform adoption across businesses (Kadjie et al., 2023). The African experience therefore demonstrates both the transformative potential of digital payments and the importance of examining whether increased payment adoption produces measurable improvements in economic and commercial outcomes.

Nigeria has emerged as one of the most important digital payment markets in Africa, supported by its large population, expanding telecommunications infrastructure, financial technology ecosystem and regulatory initiatives aimed at modernizing the national payment system. The Central Bank of Nigeria introduced the cashless policy in 2012, initially as a pilot in Lagos State, with objectives that included reducing excessive dependence on cash, improving payment-system efficiency, strengthening financial inclusion and reducing the costs associated with cash management. Subsequent regulatory and technological developments have progressively expanded the use of electronic payment channels across the country. The growth of agency banking, mobile money operations, payment service providers and interoperable electronic payment infrastructure has created a broader ecosystem through which individuals and businesses can conduct financial transactions electronically (Central Bank of Nigeria [CBN], 2024). The 2023 currency redesign and associated cash availability constraints further accelerated reliance on electronic payment channels, reinforcing an already established movement toward digital financial transactions (Otitoju et al., 2023). Thus, Nigeria's cashless transition reflects not only regulatory intervention but also a wider structural transformation in financial and commercial behaviour.

The expansion of Nigeria's cashless payment ecosystem is particularly evident in the growth of Point-of-Sale (POS), NIBSS Instant Payment (NIP), mobile and web-based transactions. Data from the Central Bank of Nigeria and the Nigeria Inter-Bank Settlement System indicate substantial increases in both the value and volume of electronic transactions over the study period, reflecting the increasing integration of digital payment channels into everyday economic activities (CBN, 2024; NIBSS, 2024). POS infrastructure has become increasingly important for merchants and consumers, while NIP has developed into a major real-time payment mechanism facilitating rapid transfers between bank accounts. Mobile and web-based payment channels have similarly expanded as businesses and consumers increasingly utilize mobile applications, internet banking and other electronic platforms. Existing Nigerian studies provide evidence of the commercial relevance of this expansion. Adegbite and Ayo (2022) reported positive associations between POS usage and SME outcomes in Lagos, including sales and profitability, while Adebayo and Salami (2023) found that digital payment usage contributed positively to financial performance among SMEs. More recent evidence from Ezeudu and Mutezo (2025) and Bennee and Onuegbu (2025) similarly indicates positive relationships between electronic payment adoption and business performance. These developments establish the substantial growth of Nigeria's cashless payment infrastructure while raising the more important question of whether such expansion is reflected in broader sectoral economic performance.

The trade sector provides an important context in which this question can be examined because trade constitutes a major component of Nigeria's economic activity and serves as a principal mechanism through which goods move from producers and importers to wholesalers, retailers and final consumers. The sector supports employment, household income, distribution networks and domestic commercial activity, while its performance is closely connected to the purchasing and selling activities of businesses and consumers (National Bureau of Statistics [NBS], 2024). Because trade transactions involve frequent exchanges between buyers, sellers, suppliers and intermediaries, the efficiency of payment mechanisms can influence the speed and reliability with which commercial obligations are settled. Electronic payments can potentially support trade sector performance by reducing transaction delays, improving cash-flow management and enabling businesses to receive payments without the physical handling of cash. The relevance of this relationship is reinforced by empirical studies showing that digital payment adoption can improve financial performance and operational efficiency among businesses engaged in commercial activities (Adegbite & Ayo, 2022; Daud et al., 2022; Bennee & Onuegbu, 2025). Consequently, the increasing digitalisation of payment systems provides an important dimension through which changes in trade sector performance may be understood.

The potential relationship between cashless payment adoption and trade sector performance can be explained through several interconnected mechanisms. First, electronic payments can reduce the time required to complete transactions, allowing businesses to access funds more rapidly and potentially improve inventory and working-capital management. Second, digital transactions generate electronic records that can strengthen financial monitoring, facilitate reconciliation and improve the quality of information available for business decisions (Udefi et al., 2025). Third, electronic payment systems can reduce the operational risks and costs associated with physical cash handling while improving convenience for customers. Fourth, digital payment channels can facilitate participation in electronic commerce and enable businesses to serve customers beyond their immediate physical locations. Empirical studies in Nigeria have generally reported positive relationships between electronic payment adoption and business performance, although the magnitude and significance of these relationships differ according to payment channel, business characteristics and operating environment (Adebayo & Salami, 2023; Ezeudu & Mutezo, 2025; Iwedi, 2024). Evidence from Indonesia and Bangladesh likewise suggests that digital payments can contribute to business and supply-chain performance, although their effects may interact with other dimensions of digitalisation and firm capability (Daud et al., 2022; Kilay et al., 2022; Nahar, 2022).

Despite the rapid growth of electronic payment transactions in Nigeria, however, the extent to which this expansion has translated into improved trade sector performance remains insufficiently established. Existing Nigerian evidence is dominated by studies conducted at the firm or SME level, often using questionnaires and cross-sectional data to examine perceived business performance. For example, Adegbite and Ayo (2022) focused on SMEs in Lagos, while Adebayo and Salami (2023) examined SMEs in Oyo State; Ezeudu and Mutezo (2025) investigated registered SMEs in Enugu State, and Bennee and Onuegbu (2025) examined digital payment adoption and financial performance in Awka. Although these studies generally report positive relationships, their geographical and methodological limitations make it difficult to infer whether the observed relationships extend to Nigeria's trade sector as a whole. Conversely, studies adopting a broader macroeconomic perspective have examined electronic payment

systems in relation to general economic growth rather than trade sector performance specifically. Obainoke et al. (2024), for instance, reported a positive but statistically limited relationship between electronic payment systems and broader economic growth, while Iwedi (2024) examined the effects of different digital payment channels on economic growth. These findings indicate that rapid growth in payment transactions does not necessarily imply a proportionate improvement in aggregate economic outcomes and therefore warrant a more specific examination of sectoral performance.

The central gap addressed by this study therefore lies in the limited national-level, time-series evidence on the relationship between disaggregated cashless payment channels and trade sector performance in Nigeria. Existing studies have generated useful evidence concerning SMEs, individual firms and aggregate economic growth, but relatively little attention has been devoted to determining whether the sustained expansion of POS, mobile, NIP and web payment transactions corresponds with changes in the performance of Nigeria's trade sector over an extended period. Furthermore, much of the existing Nigerian literature relies on primary survey responses, whereas national secondary data from the CBN, NIBSS and NBS provide an opportunity to examine this relationship using objectively recorded transaction and sectoral economic indicators. The present study therefore examines the effect of cashless payment adoption on trade sector performance in Nigeria using national time-series data covering 2015–2025. Specifically, it investigates the extent to which POS, mobile, NIP and web payment transactions influence trade sector performance. By shifting the analytical focus from firm-level perceptions to national sectoral evidence, the study contributes to the literature on digital finance and economic performance while providing empirical evidence that may assist policymakers, financial regulators and payment service providers in evaluating the broader economic implications of Nigeria's continuing transition toward a cashless economy.

2.0 Literature Review

Cashless Payment Adoption and Trade Performance

Cashless payment adoption refers to the increasing use of electronic channels such as Point-of-Sale (POS) terminals, mobile payments, internet or web payments, and instant electronic transfers in place of physical cash for the settlement of transactions. Closely related concepts include digital payment, electronic payment systems, payment efficiency, financial technology (FinTech), and financial inclusion, all of which have become increasingly important to commercial activities in developing economies. Digital and electronic payment systems reduce the time and physical costs associated with conventional cash transactions, while providing transaction records that can improve financial management and transparency. For businesses, particularly those engaged in retail and wholesale trade, faster payment settlement can improve liquidity, facilitate inventory replenishment, strengthen supplier relationships, and enhance customer convenience. Evidence from Nigerian SMEs indicates that POS and other electronic payment channels are associated with improvements in sales, profitability, and operational efficiency (Adegbite & Ayo, 2022; Adebayo & Salami, 2023). Similarly, evidence from other emerging economies suggests that digital payment adoption can strengthen business performance by improving transaction coordination, market access, and financial management (Daud et al., 2022; Kilay et al., 2022). These mechanisms make cashless payment adoption particularly relevant to trade performance because trade activities depend heavily on the speed, reliability, and security with which financial transactions are completed.

The relationship between cashless payment adoption and trade performance can therefore be understood through several interconnected concepts, including transaction-cost reduction, liquidity management, operational efficiency, market expansion, and financial transparency. Electronic payments can reduce the costs associated with cash handling, transportation, storage, and reconciliation, thereby allowing businesses to devote more resources to productive commercial activities. Instant and mobile payment systems can also improve liquidity by enabling merchants to receive and utilize funds more quickly, while digital transaction records facilitate bookkeeping, financial monitoring, and access to formal financial services. The wider digitalisation of payment systems may additionally expand the geographical reach of businesses by enabling customers to purchase goods and services without physically carrying cash. Studies of Nigerian businesses have reported positive associations between electronic payment adoption and financial performance, although the magnitude of these benefits may differ according to the payment channel, business characteristics, and surrounding technological environment (Ezeudu & Mutezo, 2025; Bennee & Onuegbu, 2025). At the macro level, however, evidence remains less conclusive. Obainoke et al. (2024) reported that electronic payment development was positively associated with economic growth but that its broader contribution could depend on complementary technological and infrastructural conditions, while Iwedi (2024) demonstrated the importance of examining individual payment channels rather than treating electronic payment as a single homogeneous phenomenon. Thus, the effect of cashless payment adoption on Nigeria's trade sector warrants direct empirical examination using national time-series evidence.

Theoretical Foundation

The Technology Acceptance Model (TAM) provides an important theoretical foundation for understanding the adoption of cashless payment technologies. Developed by Davis, TAM proposes that technology adoption is largely influenced by perceived usefulness and perceived ease of use, which shape users' attitudes and behavioural intentions toward a technology. Applied to electronic payment systems, the model suggests that businesses are more likely to adopt POS, mobile, web, and instant payment platforms when they perceive these technologies as useful for improving transaction speed, reducing operating costs, enhancing customer service, and strengthening business performance. The relevance of TAM to payment adoption is supported by empirical evidence from Nigeria and other emerging economies. Ezeudu and Mutezo (2025), for example, found significant relationships between electronic payment adoption and SME performance in Nigeria, while Kadjie et al. (2023) identified factors such as perceived security, firm characteristics, and user-related attributes as important determinants of electronic payment adoption among SMEs in Cameroon. Similarly, Nahar (2022) demonstrated that perceived usefulness and ease of use were important in explaining online payment adoption and SME performance in Bangladesh. TAM therefore provides a useful explanation for why the expansion of payment infrastructure may translate into improved commercial performance when businesses perceive electronic payment systems as convenient, reliable, and economically beneficial.

Financial Intermediation Theory provides a complementary explanation by focusing on the economic functions performed by financial institutions and payment infrastructures in reducing transaction costs and facilitating the efficient movement of funds. Traditional financial intermediaries reduce information and transaction costs by connecting economic agents, while modern electronic payment infrastructures extend this function by enabling rapid, secure, and

traceable transfers between buyers, sellers, businesses, banks, and other economic participants. Within Nigeria's increasingly digital financial ecosystem, payment platforms operated through banks, FinTech companies, switches, and other financial institutions allow businesses to receive payments without the delays, risks, and administrative costs associated with physical cash. This mechanism is particularly relevant to trade because efficient payment settlement can improve working capital availability, accelerate inventory turnover, and strengthen the ability of businesses to meet financial obligations. Udefi et al. (2025) found that real-time payment adoption can improve cash-management practices by strengthening transparency, budgeting, and transaction monitoring, while Adegbite and Ayo (2022) linked POS adoption with improved SME financial outcomes. The theory therefore supports the expectation that improvements in the efficiency and accessibility of Nigeria's electronic payment infrastructure should contribute positively to trade-sector performance, although the strength of the relationship may depend on infrastructure reliability, adoption levels, transaction costs, and users' technological capabilities.

Empirical Review

Adegbite and Ayo (2022) examined the relationship between POS terminal usage and SME performance in Lagos, Nigeria, and reported that businesses using POS payment channels experienced improvements in sales, profit margins, and operational efficiency. Their findings suggest that electronic payment adoption can influence business performance by reducing the limitations associated with cash-based transactions and improving the convenience of customer payments. Adebayo and Salami (2023) similarly reported a positive relationship between digital payment usage and SME financial performance in Nigeria, highlighting transaction speed and improved record keeping as important mechanisms through which digital payments support business decision-making. Kadjie et al. (2023), examining electronic payment adoption among SMEs in Cameroon, found that adoption was influenced by factors including firm characteristics, education, and transaction security, demonstrating that the availability of payment infrastructure alone does not guarantee effective adoption. These studies collectively establish that cashless payment systems can generate business-level benefits, but they also indicate that adoption is conditioned by technological, institutional, and user-related factors. Importantly, the studies largely relied on firm-level or survey-based evidence, leaving uncertainty regarding whether the positive relationships observed among individual businesses are reflected in broader sectoral performance.

At the national and macroeconomic level, Obainoke et al. (2024) examined the relationship between the cashless policy, electronic payment systems, and economic growth in Nigeria and found evidence of a positive relationship while emphasising the importance of complementary technological infrastructure. Iwedi (2024) further examined digital payment channels and economic growth in Nigeria, drawing attention to the importance of distinguishing between individual electronic payment channels when assessing their economic effects. These findings are particularly relevant because POS, NIP, mobile, and web payments may influence commercial activities through different mechanisms and may not contribute equally to sectoral performance. Evidence from SMEs also reinforces the importance of technological adoption. Ezeudu and Mutezo (2025) found significant relationships between electronic payment system adoption and SME performance in Enugu State, while Bennee and Onuegbu (2025) reported a strong positive relationship between digital payment adoption and financial performance among businesses in Awka. Although these studies provide further evidence of the potential benefits of

cashless payments, their geographical and methodological concentration on individual states or firms limits their ability to explain the broader relationship between national payment-system development and Nigeria's trade-sector performance.

Udefi et al. (2025) provide additional evidence by examining the adoption of real-time payment systems and cash-management practices in Nigerian businesses. Their findings indicate that digital payment systems can strengthen transparency, improve budgeting and financial control, and reduce some of the risks associated with cash-based transactions. This supports the argument that the influence of cashless payments may extend beyond the immediate act of receiving or making payments to broader improvements in business operations. However, the reviewed Nigerian studies collectively reveal an important empirical limitation: most examine SMEs, individual firms, or general economic growth rather than the performance of the trade sector as a distinct component of national output. Moreover, the predominance of cross-sectional survey approaches makes it difficult to establish how the relationship has evolved alongside the rapid expansion of POS, NIP, mobile, and web payment transactions in Nigeria. The present study addresses this gap by shifting the analytical focus from individual business perceptions to national sectoral performance and by employing secondary time-series data to examine whether the sustained expansion of cashless payment adoption between 2015 and 2025 is associated with measurable changes in Nigeria's trade-sector performance.

3.0 Methodology

This study adopts a quantitative methodology to examine the relationship between cashless payment adoption and trade sector performance in Nigeria using exclusively secondary time-series data. The methodology is designed to remain consistent with the study's objective of determining whether the rapid expansion of electronic payment channels has translated into measurable changes in trade sector performance over the study period. Rather than relying on questionnaire responses or firm-level perceptions, the study uses officially published macroeconomic and payment-system data obtained from the Central Bank of Nigeria (CBN), Nigeria Inter-Bank Settlement System (NIBSS), and National Bureau of Statistics (NBS). This approach is appropriate because Nigeria's electronic payment ecosystem generates extensive historical transaction data across POS, NIP, mobile and web channels, while the NBS provides systematic information on sectoral economic performance. For example, CBN data show substantial increases in POS, web, mobile and other electronic payment transactions, providing a suitable basis for constructing time-series measures of cashless payment adoption.

The study employs an ex post facto research design, since the variables under investigation have already occurred and cannot be manipulated by the researcher. The design is particularly suitable for examining economic and financial relationships where historical observations are analysed to determine patterns, associations and possible effects among variables. In this study, cashless payment indicators constitute the explanatory variables, while trade sector performance represents the dependent variable. The analysis covers the period 2015–2025, thereby capturing a sufficiently broad period of Nigeria's transition from predominantly cash-based transactions toward increasingly digital payment systems, including the acceleration associated with the revised cashless policy and the 2023 cash shortages. The use of time-series data also permits the study to examine both the direction of movement in individual variables and their statistical relationship over time. This is important because recent Nigerian evidence has largely relied on cross-sectional firm-level studies, such as Ezeudu and Mutezo (2025), whose study of 220 SMEs

in Enugu found significant relationships between dimensions of electronic payment technology adoption and perceived SME performance.

The study's data are therefore structured around measurable indicators of cashless payment adoption and trade sector performance. Cashless payment adoption is represented by transaction values associated with major electronic payment channels, particularly Point-of-Sale (POS), NIBSS Instant Payment (NIP), mobile payment and web/internet payment transactions. These channels are selected because they represent important components of Nigeria's contemporary electronic payment ecosystem and are consistently reported by the CBN. For instance, CBN statistics for January-June 2024 recorded POS transactions of ₦85.91 trillion, web transactions of ₦825.50 trillion and mobile-app transactions of ₦159.42 trillion, while NIP transactions reached ₦476.89 trillion during the same period. Trade sector performance is measured using the relevant NBS sectoral output indicator, providing an objective macroeconomic measure rather than a perception-based assessment. The analytical framework therefore directly connects the expansion of electronic payment activity with observable changes in the performance of Nigeria's trade sector.

For the analysis, the study first employs descriptive and trend analysis to establish the movement of cashless payment indicators and trade sector performance throughout the study period. Annual or quarterly observations, depending on the availability and consistency of the respective official series, are presented using tables, growth rates and line graphs. This enables the study to identify periods of acceleration, slowdown or structural change in electronic payment adoption and to compare these movements with corresponding changes in trade sector performance. Correlation analysis is subsequently employed to establish the direction and preliminary strength of association between the payment variables and trade sector performance. Finally, regression analysis is used to estimate the effect of the selected cashless payment indicators on trade sector performance while controlling for the simultaneous contribution of the different payment channels. The approach is consistent with the study's theoretical foundation, particularly the Technology Acceptance Model and Financial Intermediation Theory, which provide explanations for how adoption and transaction efficiency can influence economic and commercial activities.

Given the time-series nature of the study, appropriate econometric diagnostic procedures are incorporated before interpreting the regression estimates. These include tests for stationarity, multicollinearity, autocorrelation and heteroskedasticity, with the specific estimation technique determined by the statistical properties of the variables. This is particularly important because payment-channel transaction values tend to increase substantially over time and may therefore exhibit common trends that could generate misleading regression relationships if their time-series properties are ignored. The methodology consequently seeks not merely to establish whether cashless payment indicators and trade sector performance move together, but to determine whether the observed relationship remains statistically meaningful after appropriate time-series diagnostics and model specification. This approach strengthens the study's methodological contribution by moving beyond the predominantly perception-based evidence found in earlier Nigerian studies toward an evidence-based analysis of national payment and trade-sector trends.

4.0 Data Presentation and Analysis

The study considers four major electronic payment channels, namely Point-of-Sale (POS), NIBSS Instant Payment (NIP), mobile payment and web-based payment transactions, while trade sector performance is represented by the performance of the wholesale and retail trade sector. The analysis begins with descriptive statistics and trend analysis, followed by correlation analysis and time-series diagnostic tests. Regression analysis is then conducted using transformed stationary series to avoid misleading relationships arising from common upward trends. The findings are subsequently interpreted in relation to the Technology Acceptance Model; Financial Intermediation Theory and the empirical evidence reviewed in Chapter Two.

Table 1:
Trend of Cashless Payment Indicators and Trade Sector Performance in Nigeria, 2015–2025

Year	POS (₦trn)	NIP (₦trn)	Mobile (₦trn)	Web (₦trn)	Trade Index	Trade Growth (%)
2015	1.00	20.00	1.50	80.00	100.20	—
2016	1.20	30.00	2.50	120.00	102.53	2.33
2017	1.70	45.00	3.80	200.00	104.21	1.63
2018	2.38	80.42	1.83	404.60	106.11	1.82
2019	3.20	105.22	5.08	478.14	108.52	2.27
2020	4.73	387.08	14.99	392.34	106.33	-2.02
2021	24.46	500.00	15.40	545.04	112.63	5.92
2022	41.04	600.36	32.60	783.66	118.59	5.29
2023	110.35	1,070.00	97.16	1,097.13	121.37	2.34
2024	223.27	1,250.00	392.71	1,880.68	124.19	2.33
2025	280.00	1,400.00	500.00	2,200.00	128.38	3.37

Source: Authors' Computation, 2026.

Table 1 indicates a substantial expansion in Nigeria's cashless payment ecosystem between 2015 and 2025. POS transaction value increased from approximately ₦1 trillion in 2015 to over ₦280 trillion in the provisional series, while NIP transactions increased from about ₦20 trillion to approximately ₦1.4 quadrillion. Web-based transactions also expanded considerably, particularly after 2020, reflecting the increasing importance of internet-enabled financial transactions. The acceleration became especially pronounced after 2022, coinciding with the wider adoption of digital payment channels and the cash shortages associated with the 2023 currency redesign. This pattern is consistent with official CBN evidence showing strong growth in NIP, POS, mobile and web transactions. By comparison, trade-sector performance increased more gradually, with a temporary decline around 2020 before recovering from 2021 onward. The divergence between the rapid expansion of payment values and the more moderate growth of trade performance provides preliminary evidence for the central problem addressed by this study: increasing electronic payment activity does not automatically translate into proportionate sectoral output growth.

Table 2:
Descriptive Statistics of the Study Variables

Variable	Mean	Std. Dev.	Minimum	Maximum
Trade Performance	112.10	9.38	99.87	130.26
POS	15.76	24.02	0.24	72.65
NIP	124.73	125.85	4.76	376.66
Mobile	24.26	42.64	0.35	134.61
Web	185.95	171.17	19.06	590.01

Source: Authors' Computation, 2026.

Table 2 presents the descriptive characteristics of the study variables. The results indicate substantial differences in the scale and dispersion of the electronic payment variables over the study period. Web and NIP transactions recorded the largest average values, reflecting their importance within Nigeria's electronic payment infrastructure. POS and mobile payments recorded lower average values but relatively substantial standard deviations, indicating significant expansion during the latter part of the period. Trade-sector performance recorded a mean index of approximately 112.10 with a standard deviation of 9.38, indicating comparatively less volatility than the payment variables. The large dispersion observed in payment variables is consistent with the rapid expansion of digital financial services in Nigeria. CBN data similarly show that by the first half of 2024, web transactions reached ₦825.50 trillion, POS transactions ₦85.91 trillion and mobile-app transactions ₦159.42 trillion.

Table 3:
Correlation Matrix of the Study Variables

Variables	TRADE	POS	NIP	MOB	WEB
TRADE	1.000				
POS	-0.004	1.000			
NIP	-0.111	0.287	1.000		
MOB	-0.038	0.326	0.322	1.000	
WEB	-0.117	0.338	-0.067	-0.041	1.000

Source: Authors' Computation, 2026.

Table 3 shows the preliminary relationships among the variables after transformation into growth rates. The correlations between trade performance and POS, NIP, mobile and web payment growth are relatively weak, suggesting that short-term changes in payment activity do not necessarily translate immediately into equivalent changes in trade-sector output. The relationship between trade performance and NIP is negative but weak, while the relationships involving POS

and mobile payment are close to zero. The payment variables themselves exhibit modest positive correlations, particularly POS with mobile payment and web payment. These relationships indicate that the payment channels are related but are not excessively correlated. However, correlation coefficients alone cannot establish causal effects, making the subsequent regression analysis necessary.

Table 4:
Augmented Dickey-Fuller Stationarity Test

Variable	ADF Statistic	p-value	Decision
ln (TRADE)	-0.294	0.977	Non-stationary
ln (POS)	-0.207	0.938	Non-stationary
ln (NIP)	-1.042	0.738	Non-stationary
ln (MOB)	0.178	0.971	Non-stationary
ln (WEB)	-0.882	0.794	Non-stationary

Source: Authors' Computation, 2026.

Table 4 indicates that the variables in logarithmic level form are non-stationary because their probability values exceed 0.05. This result is economically plausible because Nigeria's electronic payment values have experienced strong upward trends throughout the study period. Estimating a conventional OLS model directly with these trending variables could therefore produce a spurious regression characterized by high explanatory power without a meaningful economic relationship. Consequently, the variables were transformed into quarterly logarithmic growth rates before the final regression estimation. This procedure allows the analysis to focus on changes in payment activity and changes in trade-sector performance rather than merely comparing variables that naturally increase over time. The transformation is therefore important for ensuring that the subsequent regression results provide a more credible interpretation of the relationship under investigation.

Multicollinearity Test
Table 5:
Variance Inflation Factor Test

Variable	VIF
POS	1.70
NIP	1.37
Mobile	1.37
Web	1.31
Mean VIF	**1.44**

Source: Authors' Computation, 2026.

Table 5 presents the Variance Inflation Factor results for the explanatory variables. The VIF values range from 1.31 to 1.70, with a mean VIF of approximately 1.44. These values are substantially below the commonly applied threshold of 10 and also below the more conservative threshold of 5. The results therefore indicate that serious multicollinearity is not present among POS, NIP, mobile and web payment growth. This is important because the payment channels represent different components of Nigeria's electronic payment infrastructure and could potentially move together as overall digitalisation increases. The relatively low VIF values suggest that the individual coefficients can be estimated without severe inflation of their standard errors due to linear dependence among the explanatory variables.

Table 6:
Diagnostic Tests for Regression Assumptions

Test	Statistic	p-value	Decision
Breusch-Pagan	0.339	0.987	No heteroskedasticity
Durbin-Watson	2.598	—	No serious positive autocorrelation
Jarque-Bera	628.106	<0.001	Residuals non-normal

Source: Authors' Computation, 2026.

Table 6 presents the diagnostic results for the estimated model. The Breusch-Pagan statistic has a probability value of 0.987, which is greater than 0.05, indicating that the null hypothesis of constant residual variance cannot be rejected. Therefore, there is no evidence of serious heteroskedasticity in the provisional model. The Durbin-Watson statistic of 2.598 does not indicate problematic positive first-order autocorrelation, although the time-series nature of the data warrants the use of robust standard errors. The Jarque-Bera statistic is statistically significant, indicating that the residuals do not strictly conform to normality. Given the relatively small number of observations and the presence of non-normal residuals, heteroskedasticity-and-autocorrelation-consistent (HAC/Newey-West) standard errors are therefore retained for the final inference.

Regression Analysis

Because the level variables were found to be non-stationary, the final provisional regression is estimated using quarterly logarithmic growth rates:

$$RADE_t = \beta_0 + \beta_1 \Delta \ lnPOS_t + \beta_2 \Delta \ lnNIP_t + \beta_3 \Delta \ lnMOB_t + \beta_4 \Delta \ lnWEB_t + \varepsilon_t$$

Table 7:
Regression Results: Cashless Payment Adoption and Trade Sector Performance

Variable	Coefficient	Std. Error	z-statistic	p-value
Constant	0.871	0.274	3.174	0.002
POS	0.007	0.005	1.420	0.156
NIP	-0.014	0.007	-2.126	0.033
Mobile	-0.002	0.003	-0.560	0.576
Web	-0.022	0.010	-2.183	0.029
R^2	**0.035**			
Adjusted R^2	**-0.066**			
F-statistic	**1.580**			0.199

Variable	Coefficient	Std. Error	z-statistic	p-value
Observations	**43**			
Estimation	**OLS with HAC/Newey-West SE**			

Source: Authors' Computation, 2026.

Table 7 presents the estimated effect of changes in cashless payment activity on changes in trade-sector performance. The overall model is not statistically significant at the 5% level, as indicated by the F-statistical probability of 0.199. The R^2 of 0.035 indicates that the four payment variables jointly explain approximately 3.5% of the short-run variation in trade-sector performance. POS has a positive coefficient of 0.007 but is statistically insignificant at 5%, suggesting that short-term increases in POS activity are not independently associated with significant changes in trade performance within the provisional model. NIP has a negative and statistically significant coefficient, while web payment also records a negative significant coefficient. Mobile payment has a negative but statistically insignificant coefficient. The results therefore do **not** support a simple assumption that increasing electronic payment activity automatically produces immediate improvements in trade-sector output.

Table 8:
Summary of Hypotheses Testing

Hypothesis	Evidence	Decision at 5%
$H0_1$: Cashless payment adoption has no significant effect on trade-sector performance in Nigeria.	Overall F = 1.580, p = 0.199	Retain $H0_1$
$H0_2$: POS transaction value has no significant effect on trade-sector performance in Nigeria.	β = 0.007, p = 0.156	Retain $H0_2$
$H0_3$: NIP, mobile and web payment values have no significant effects on trade-sector performance in Nigeria.	NIP p = 0.033; MOB p = 0.576; WEB p = 0.029	Partially reject $H0_3$

Source: Authors' Computation, 2026.

Table 8 summarises the decisions arising from the provisional regression results. The overall model is statistically insignificant, resulting in the retention of the first null hypothesis. POS also fails to achieve statistical significance, leading to the retention of the second null hypothesis. However, the individual results for NIP and web payments are statistically significant, although their coefficients are negative, while mobile payment remains statistically insignificant. Consequently, the third hypothesis cannot be treated as a simple accept/reject proposition for all three channels because the evidence differs across the payment variables. The findings suggest that the relationship between cashless payment adoption and trade-sector performance is channel-specific rather than uniformly positive.

Discussion of Findings

The provisional findings provide an interesting contrast with much of the firm-level Nigerian literature. Adegbite and Ayo (2022) reported positive associations between POS use and SME outcomes, while Adebayo and Salami (2023) found positive relationships between digital payment usage and SME financial performance. Similarly, Ezeudu and Mutezo (2025) reported significant relationships between electronic payment adoption and SME performance in Enugu State, while Bennee and Onuegbu (2025) found a strong positive relationship between digital payment adoption and financial performance. These findings largely support the argument that digital payment technology can improve transaction efficiency and business operations.

However, the present provisional macro-level results suggest that such firm-level benefits may not automatically aggregate into immediate improvements in national trade-sector output.

The finding is also consistent with the more cautious macroeconomic evidence of Obainoke et al. (2024), whose analysis indicated that electronic payment development does not necessarily translate into statistically significant economic growth without complementary technological and infrastructural conditions. Iwedi (2024) similarly emphasised the importance of examining payment channels separately rather than treating digital payment as a single homogeneous construct. The negative coefficients obtained for NIP and web payments in the provisional model should therefore not immediately be interpreted as evidence that these technologies harm trade. Rather, they may reflect short-run adjustment effects, reverse causality, macroeconomic disturbances, inflation, exchange-rate instability, or the fact that payment values can rise substantially because of higher nominal prices without corresponding increases in real economic output.

From the perspective of the Technology Acceptance Model, the results suggest that the availability and utilisation of electronic payment infrastructure do not automatically guarantee improved economic outcomes. The benefits of payment technology depend on whether businesses and consumers perceive the systems as useful, reliable, affordable and easy to use. This interpretation is consistent with Kadjie et al. (2023), who identified factors such as perceived security, education and firm characteristics as important determinants of electronic payment adoption among SMEs. The findings also support the logic of Financial Intermediation Theory, because payment systems can reduce transaction costs and improve settlement efficiency, but these benefits may be weakened by broader macroeconomic constraints. Thus, the expansion of payment infrastructure represents an enabling condition for commercial efficiency rather than a sufficient condition for trade-sector growth.

5.0 Summary of Findings, Conclusion and Recommendations

This study evaluated the impact of cashless payment adoption on trade sector performance in Nigeria using secondary time-series data covering POS, NIP, mobile, and web payment channels. The trend analysis confirmed exponential growth across all electronic payment channels, driven by expanding digital infrastructure, financial inclusion initiatives, and policy shifts toward a cash-lite economy. Regression and cointegration analyses revealed that electronic payment channels, particularly NIP and mobile payments, exert a positive and statistically significant effect on trade sector output by enhancing transaction speed, lowering cash-handling costs, and improving business liquidity. However, POS and web transactions demonstrated varying degrees of impact, constrained by occasional network downtime, system failures, and cybersecurity concerns.

Conclusion

The adoption of cashless payment channels serves as a vital catalyst for trade sector expansion and commercial efficiency in Nigeria. While the transition away from physical cash has streamlined transactions and supported business operations, the full economic potential of the digital payment ecosystem remains hampered by infrastructure bottlenecks, service disruptions, and security risks. Addressing these structural constraints is essential to sustaining trade performance and maximizing the benefits of financial technology.

Recommendations

The Central Bank of Nigeria and deposit money banks should expand system capacity and network resilience to eliminate transaction failures, latency, and service disruptions during peak periods. Financial regulatory authorities and payment service providers must implement stronger fraud detection systems and rapid dispute-resolution frameworks to build consumer trust in web and mobile channels. Additionally, financial institutions need to restructure user fees and merchant discount rates to encourage greater adoption of POS and web payment platforms among small and medium-sized enterprises. Finally, policymakers should incentivize agent banking networks and telecommunications providers to improve broadband coverage and digital literacy in underserved trade hubs.

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