

Cashless Policy and Manufacturing sector performance in Nigeria

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Abstract

The study examined the effect of cashless policy implementation on the performance of Nigerian manufacturing sector. The specific objective was to determine the effect of point of sale (POS) channel, web channel and automated teller machine (ATM) channel of cashless policy on the real gross domestic product of the Nigerian manufacturing sector. Ex-post facto research design was employed in the study. Secondary data were obtained from the Central Bank of Nigeria Statistical Bulletin from 2012 to 2022. The time series data were analyzed using descriptive analysis and the Robust Least Square (RLS) regression method for hypotheses testing. It was found that: POS channel of cashless policy has a significant positive effect on the real gross domestic product of the Nigerian manufacturing sector ($p=0.0338$); Web channel of cashless policy has a non-significant positive effect on the real gross domestic product of the Nigerian manufacturing sector ($p=0.3322$); Automated teller machine (ATM) channel of cashless policy has a significant negative effect on the real gross domestic product of the Nigerian manufacturing sector ($p=0.0212$). In conclusion, the implementation of cashless policies in Nigeria has significant implications for the performance of the manufacturing sector, offering opportunities to enhance efficiency, transparency, and financial inclusion while also presenting challenges related to infrastructure, security, and cost. The study recommends that Nigerian government, internet service providers, financial institutions, and manufacturing businesses should enhance cybersecurity measures and invest in internet infrastructure to mitigate risks associated with online transactions in the manufacturing sector.

Keywords: Cashless Policy, Performance of Nigerian Manufacturing Sector, Point of Sale (POS) Channel, Web Channel, Automated Teller Machine Channel, Real Gross Domestic Product

1.0 Introduction

1.1 Background to the Study

In recent years, Nigeria has been striving to modernize its financial infrastructure and enhance its economic efficiency through the adoption of cashless policies. This transition from cash-based transactions to electronic payment systems represents a significant shift in the country's

financial environment (Omokugbo & Festus, 2020). The implementation of cashless policies aims to curb corruption, reduce the informal economy, improve financial inclusion, and boost overall economic growth. In essence, the adoption of cashless policies represents a significant shift in the way financial transactions are conducted, aiming to reduce reliance on physical currency and promote electronic payment systems. The introduction of cashless policies in Nigeria dates back to 2012 when the Central Bank of Nigeria (CBN) launched the Cashless Policy Initiative to promote the use of electronic payment channels and reduce the dominance of cash in the economy (Taiwo, Oluwafemi, Afieroho & Agwu, 2016). The policy was implemented in phases, starting with Lagos State and subsequently expanding to other states across the country. Key components of the cashless policy include the imposition of cash handling charges, the promotion of electronic payment platforms such as mobile money, debit/credit cards, and online banking, and the establishment of regulatory frameworks to govern electronic financial transactions (Agu and Agu, 2020; .

The implementation of cashless policies seems to have had both positive and negative implications for the performance of the Nigerian manufacturing sector. On the positive side, the adoption of electronic payment systems has facilitated greater efficiency, transparency, and security in financial transactions, reducing the risks associated with cash handling and promoting financial inclusion among manufacturers (Acha, Kanu & Agu, 2017). Electronic payment platforms offer manufacturers greater flexibility in managing their finances, facilitating timely payments to suppliers, employees, and other stakeholders, and streamlining procurement and inventory management processes (Matthew & Mike, 2016). Moreover, the shift towards cashless transactions has the potential to reduce the prevalence of informal and illicit financial activities, contributing to a more conducive business environment for manufacturers.

However, the transition to a cashless economy also presents challenges for the Nigerian manufacturing sector, particularly for small and medium-sized enterprises (SMEs) and businesses operating in rural or underserved areas (Ezeanolue, 2022; Rofiat, 2017). One major challenge is the limited infrastructure and connectivity necessary to support electronic payment systems in remote regions, hindering the adoption of cashless solutions among manufacturers in these areas. Additionally, concerns about the security and reliability of electronic payment platforms, including the risk of fraud, cyber-attacks, and system failures, may deter manufacturers from fully embracing cashless transactions (Matthew & Mike, 2016). Moreover, the imposition of cash handling charges and transaction fees by financial institutions may increase the cost of doing business for manufacturers, particularly those with tight profit margins.

Furthermore, the effectiveness of cashless policy implementation in driving economic growth and industrial development in Nigeria hinges on addressing underlying structural challenges facing the manufacturing sector, such as inadequate infrastructure, limited access to finance, and the high cost of production. While cashless policies can enhance efficiency and transparency in financial transactions, they are not a panacea for addressing these broader issues. Therefore, policymakers must complement cashless policy initiatives with targeted interventions to address structural constraints and promote the competitiveness and resilience of the Nigerian manufacturing sector.

1.2 Problem Statement

The implementation of cashless policies in Nigeria's economic sector has been ideally expected to usher in a new era of efficiency, transparency, and financial stability. This is because electronic payment systems streamline transactions, reduce the reliance on physical cash, and enhance the overall competitiveness of manufacturers in the global marketplace. With seamless access to digital financial services, manufacturers could optimize their operations, improve cash flow management, and mitigate the risks associated with cash handling. Moreover, the shift towards cashless transactions would foster greater financial inclusion, empowering manufacturers of all sizes to participate more fully in the formal economy and access the capital necessary for growth and expansion (Omokugbo & Festus, 2020).

However, despite the intentions behind these policies, several challenges persist, hindering their full realization (Ejiobih, Oni, Ayo, Bishung, Ajibade, Koyejo & Olushola, 2019). Limited infrastructure, particularly in rural and underserved areas, impedes the widespread adoption of electronic payment systems among manufacturers. Moreover, concerns about the security and reliability of digital financial platforms, coupled with the prevalence of informal economic activities, contribute to a cautious approach towards embracing cashless transactions. As a result, many manufacturers continue to rely on cash-based transactions, leading to inefficiencies, delays, and vulnerabilities in their financial operations.

Consequently, manufacturers operating in cash-dependent environments face increased risks of theft, fraud, and mismanagement of funds, undermining their financial stability and hindering their ability to invest in innovation and growth (Matthew & Mike, 2016). Moreover, the persistence of cash-based transactions limits the effectiveness of monetary policy interventions aimed at stimulating economic activity and promoting financial inclusion. Furthermore, the reluctance to embrace cashless solutions exacerbates existing disparities in access to financial services, particularly among small scale manufacturers and businesses in rural areas (Ezeanolue, 2022), perpetuating inequalities and stifling economic development. Thus, the failure to fully realize the potential of cashless policy implementation in the Nigerian manufacturing sector not only hampers the sector's performance but also poses broader challenges to the country's economic growth and development agenda, hence the justification for the present study. There are numerous literature on the effect of cashless policy on the Nigerian economy, including those by Henry, Anyanwu, and Amakor (2024), Ogunlade and Amodu (2024), Odumusor (2023), Ezeanolue (2022), Okafor (2020), Agu and Agu (2020), Nwakoby, Chukwu, and Oghenetega (2020), Muotolu and Nwadiolor (2019), Mamudu and Gayovwi (2019), Dabo (2019), Gambo, Ussaini, and Ozah (2019), Phinaonyekwelu and Nnabugwu (2018), and Taiwo, Oluwafemi, Afieroho, and Agwu (2016). However, this study contributes to literature by examining a sector (Nigerian manufacturing sector) which, to the best knowledge of the researcher, no similar study in Nigeria has investigated over the years.

1.2 Objectives of the Study

The main objective of the study is to examine the effect of cashless policy implementation on the performance of Nigerian manufacturing sector. The specific objectives are as follows:

- 1) To determine the effect of point of sale (POS) channel of cashless policy on the real gross domestic product of the Nigerian manufacturing sector.

2) To assess the effect of web channel of cashless policy on the real gross domestic product of the Nigerian manufacturing sector.

3) To ascertain the effect of automated teller machine (ATM) channel of cashless policy on the real gross domestic product of the Nigerian manufacturing sector.

2.0 Literature Review

2.1 Conceptual Review

2.1.1 Cashless Policy in Nigeria

The Central Bank of Nigeria (CBN) introduced the cashless policy in 2011 (Chukwuma, Onodugo & Eeamama, 2020) and implemented it in 2012 to promote a cashless economy and reduce the cost of banking services (Taiwo, Oluwafemi, Afierofo & Agwu, 2016). The policy aims to increase the development and modernization of the Nigerian payment systems, create avenues for economic growth, reduce the cost of banking services, increase financial inclusion, and improve monetary policy's effectiveness in driving economic growth and managing inflation (Ogunlade & Amodu, 2024). The CBN made a significant announcement on January 9, 2023, regarding the full implementation of the cashless policy, introducing stricter limits on cash withdrawals. Under these new regulations, individual bank customers are restricted from withdrawing more than N100,000 in cash over the counter, through Automated Teller Machines (ATMs), or Point of Sale (POS) terminals in a single day. By imposing tighter restrictions on cash withdrawals, the CBN aims to incentivize the adoption of digital payment solutions, enhance transparency in financial transactions, and curb illicit activities such as money laundering and terrorism financing. Moreover, the implementation of these stricter limits underscores the CBN's commitment to modernizing the country's financial infrastructure, fostering greater financial inclusion, and aligning Nigeria with global trends towards a cashless economy (Agbaeze, 2020). However, the effectiveness and implications of these measures for various stakeholders, including bank customers, businesses, and the broader economy, remain subject to scrutiny and ongoing evaluation.

The cashless policy has several prospects for Nigeria's economy. Firstly, it promotes financial inclusion by providing more efficient transaction options that result in a wider reach. This is particularly important for small-scale businesses that often lack access to formal financial services (Ezeanolue, 2022). Secondly, the policy reduces the costs of cash volume handling, robberies and other cash-related crimes, loss of physical cash during fire and flooding incidents, and money laundering, corruption, and leakages. These negative consequences are associated with the usage of physical cash in the Nigerian economy. Thirdly, the cashless policy encourages financial deepening and promotes savings by making it easier and more affordable for the unbanked and under-banked to access financial services (Omokugbo & Festus, 2020). This is crucial for economic growth and development as it increases the funds available for commercial banks to lend to investors (Matthew & Mike, 2016). Fourthly, the policy reduces risks in payments and settlements, thereby promoting the growth of the real sector of the economy. Lastly, the cashless policy provides evidence against bribe givers and takers, especially civil servants and politicians, thereby promoting transparency and accountability in the public sector.

By promoting electronic payment methods, cashless policies can enhance financial inclusion by providing access to banking services for underserved populations (Agbaeze, 2020). Mobile banking and digital payment platforms offer convenient and affordable financial services,

empowering individuals and small businesses to participate more actively in the formal economy (Ezeanolue, 2022). Cashless policies have the potential to stimulate economic growth by promoting efficiency, reducing transaction costs, and increasing the velocity of money circulation (Taiwo, Oluwafemi, Afieroho & Agwu, 2016). Electronic transactions facilitate faster and more secure payments, which can spur business activities, investment, and consumer spending. To maximize the benefits of cashless policy implementation and address its challenges, policymakers in Nigeria should adopt a comprehensive approach that combines infrastructure development, regulatory reforms, and targeted interventions to promote financial literacy and inclusion. Investments in digital infrastructure, including broadband connectivity and mobile banking agents, are essential to expanding access to electronic payment systems, particularly in rural areas.

2.1.1.1 Channels Used in Implementing Cashless Policy

The implementation of a cashless policy encompasses a variety of channels aimed at facilitating electronic transactions and reducing reliance on cash. Among these channels, the most common ones include point of sale (POS) terminals, Automated Teller Machines (ATMs), and web-based payment platforms such as WebPay, among others. Each of these channels serves a unique purpose in enabling cashless transactions and contributes to the overall effectiveness of the policy (Agu & Agu, 2020).

Point of sale (POS) terminals are physical devices located at merchant establishments where customers can make payments using debit or credit cards (Nworie & Okafor, 2023). These terminals are essential for facilitating in-person transactions, allowing businesses to accept electronic payments securely and efficiently. POS terminals play a crucial role in enhancing the convenience and flexibility of payment options for consumers, thereby encouraging the adoption of cashless transactions (Omokugbo & Festus, 2020).

Automated Teller Machines (ATMs) are self-service banking machines that enable individuals to perform various financial transactions, including cash withdrawals, balance inquiries, and fund transfers. While ATMs primarily serve as a means for accessing cash, they also play a role in promoting cashless transactions by providing avenues for depositing cash and transferring funds between accounts (Agu & Agu, 2020). Additionally, ATMs serve as a vital infrastructure component in areas where access to traditional banking services is limited, thereby expanding financial inclusion and promoting the use of electronic payment methods.

Web-based payment platforms, such as WebPay, offer online channels for conducting transactions over the internet. These platforms enable individuals and businesses to make payments, transfer funds, and engage in e-commerce activities securely. With the increasing prevalence of online shopping and digital transactions, web-based payment platforms have become indispensable tools for facilitating cashless transactions and driving economic activity in the digital marketplace (Taiwo, Oluwafemi, Afieroho & Agwu, 2016).

In addition to these primary channels, other emerging technologies and payment solutions, such as mobile payment apps and electronic wallets, are also contributing to the advancement of cashless transactions (Omokugbo & Festus, 2020). These channels leverage mobile devices and digital technologies to enable convenient and secure payments, further accelerating the transition towards a cashless economy.

2.1.2 Challenges of Cashless Policy Implementation in Nigeria

Even though there are numerous benefits of cashless policy implementation, the cashless policy comes with its own challenges such as infrastructural constraints, cybersecurity risk, resistance to change and financial exclusion (Omokugbo & Festus, 2020). Despite significant progress, Nigeria still faces challenges related to inadequate infrastructure, particularly in rural and remote areas. Limited access to electricity, internet connectivity, and banking services hinders the widespread adoption of electronic payment systems, especially among rural populations (Ajayi, 2014).

Also, the shift towards electronic payments exposes individuals and businesses to cybersecurity threats such as fraud, hacking, and identity theft (Taiwo, Oluwafemi, Afieroho & Agwu, 2016). Weak cybersecurity measures and insufficient regulatory frameworks may undermine trust in electronic payment systems, hindering their adoption and utilization (Nworie & Okafor, 2023). In addition, cultural preferences and habits deeply rooted in cash-based transactions pose a challenge to the adoption of cashless policies. Many Nigerians, particularly in rural areas, have a strong attachment to cash and may be reluctant to embrace electronic payment methods due to familiarity and trust issues.

Finally, while cashless policies aim to promote financial inclusion, certain segments of the population, such as the elderly, low-income earners, and those with limited access to technology, may face exclusion from electronic payment channels (Igbara, Emerenini & Daasi, 2015). Ensuring inclusive access to financial services remains a critical challenge for policymakers (Agbaeze, 2020).

2.1.3 Performance of Nigerian Manufacturing Sector

The manufacturing sector plays a pivotal role in the economic advancement of nations, serving as a vital source of goods essential for both individuals and businesses (Ajudua, Nwokoro & Ojima, 2021). It stands as a cornerstone of national industry, encompassing the transformation of raw materials into a diverse range of finished products, spanning from automobiles and electronics to food and textiles (Danmola, Olateju & Aminu, 2017). Often viewed as a barometer of economic vitality, the sector's performance is closely monitored for its implications on overall economic health and stability, as well as its capacity to drive innovation, employment opportunities, and economic expansion (Sola, Obamuyi, Adekunjo & Ogunleye, 2013). From initial design to final distribution and sales, the manufacturing sector's success is gauged through various metrics like Gross Domestic Product (GDP), employment rates, and industrial output. Its flourishing directly bolsters a nation's economic growth, triggering positive repercussions throughout the economy (Neoh & Lai, 2021).

Nigeria's manufacturing sector holds a prominent position within Africa and stands as the largest in the ECOWAS region. Since gaining independence, Nigeria has directed its industrialization policies towards objectives such as bolstering employment, fostering domestic production, accelerating manufacturing-led industrialization, safeguarding foreign exchange reserves, expanding the local market for domestically produced goods, and diminishing reliance on imports. Nonetheless, the sector grapples with a notable reliance on imported inputs, spares, and machinery (Onakoya, Fasanya & Babalola, 2012).

The performance of Nigeria's manufacturing industry is intricately linked to the fluctuations in crude oil prices and the availability of foreign exchange (Markjackson, Johnny & Siaisia, 2018). Given the sector's heavy dependence on imported inputs and machinery, the volatility in oil prices directly impacts its performance. In response to this challenge, successive administrations have implemented various measures and initiatives aimed at managing scarce foreign exchange by imposing restrictions on forex access. These measures include the issuance of import licenses, tariffs, and other quantitative restrictions (Oppong-Baah, Bo, Twi-Brempong, Amoah, Prempeh & Addai, 2022). However, such actions often have adverse repercussions on the manufacturing sector, particularly in terms of restricted access to imported raw materials that are not locally available.

A key measure of the manufacturing sector's vitality lies in its impact on the national Gross Domestic Product (GDP). Manufacturing plays a significant role in many countries' GDP, serving as a foundational element of economic activity (Sade, Esther, Oladipo & Adedokun, 2021). A flourishing manufacturing sector not only boosts the GDP directly but also generates downstream advantages by fostering a varied supply chain, driving up demand for raw materials, and stimulating increased consumption. Furthermore, a robust manufacturing industry elevates a nation's global competitiveness, enticing foreign investment and fortifying exports, thus fostering additional economic expansion.

2.2 Theoretical Framework

This research is anchored on the Theory of Transaction Cost Economics. In 1972, Oliver E. Williamson first introduced the Theory of Transaction Cost Economics (TCE). Stemming from his work in the field of organizational economics, Williamson's theory aimed to explain the role of transaction costs in shaping the structure and boundaries of firms (Ketokivi & Mahoney, 2020). TCE posits that economic actors, such as firms, make decisions based on minimizing transaction costs, which are the costs associated with exchanging goods and services in markets (Tadelis & Williamson, 2012).

The main postulations of the Theory of Transaction Cost Economics revolve around the idea that transaction costs influence the organizational structure of firms. Williamson identified three main types of transaction costs: search and information costs, bargaining and decision costs, and policing and enforcement costs (Ketokivi & Mahoney, 2020). According to TCE, firms exist to mitigate these transaction costs by internalizing certain activities rather than relying solely on market mechanisms. Additionally, TCE suggests that the choice between market and hierarchical governance structures depends on the comparative transaction costs associated with each (Arora, 2020).

The Theory of Transaction Cost Economics holds relevance to the topic of the effect of cashless policy implementation on the performance of the Nigerian manufacturing sector. By transitioning towards a cashless economy, the Nigerian government aims to reduce transaction costs associated with cash handling and increase efficiency in financial transactions. TCE provides a framework for analyzing how this shift in payment systems may affect the manufacturing sector. Specifically, the theory suggests that the adoption of cashless transactions may lead to a reduction in certain transaction costs for manufacturing firms, such as those related to cash handling, payment processing, and financial intermediation. This, in turn, could potentially improve the overall performance and competitiveness of the Nigerian

manufacturing sector by enhancing operational efficiency and reducing resource allocation inefficiencies. The theory of Transaction Cost Economics emphasizes the role of transaction costs in shaping economic behavior. In the context of the cashless policy implementation, Transaction Cost Economics can help analyze how the shift towards electronic payment systems affects transaction costs for manufacturers, including costs associated with cash handling, payment processing, and information asymmetry. The hypothesis raised in this study is that the effect of point of sale (POS) channel, web channel and automated teller machine (ATM) channel of cashless policy on the real gross domestic product of the Nigerian manufacturing sector is significant.

2.3 Empirical Review

Henry, Anyanwu, and Amakor (2024) investigated the effects of Nigeria's cashless policy on economic growth. Employing an ex-post facto research design, they analyzed time series data from the CBN statistical bulletin (2021), including ATM, POS, mobile banking, web pay transactions, and nominal GDP. Their analysis utilized multiple linear regression and the Granger Causality Test, with the Augmented Dickey Fuller (ADF) Unit Root Test ensuring data stationarity. Findings revealed a positive yet insignificant relationship between ATM transactions and economic growth, a negative but significant impact of POS transactions, a negative yet insignificant impact of Web pay transactions, and a negative yet insignificant impact of mobile pay transactions on economic growth in Nigeria.

Ogunlade and Amodu (2024) explored the correlation between Nigeria's cashless policy and economic growth and development. They employed ordinary regression analysis and collected data through structured questionnaires. Their results indicated significant influences of electronic banking services (EBS), electronic transfer services (ETS), and person-to-person (P2P) transactions on economic growth and development, supported by a notably high R-squared value, suggesting strong model alignment with the data. The study concluded that the cashless policy has a substantial positive impact on economic growth and development in Nigeria.

Odumisor (2023) investigated the impact of the cashless policy on the performance of small-scale enterprises in Cross River Northern Senatorial district. Using a descriptive research design, they surveyed 122 staff from selected small-scale businesses, employing Simple Random sampling. Analysis using Ordinary Least Square regression via SPSS 27 revealed significant effects of ATM transactions, internet banking, and POS transactions on small-scale businesses' performance.

Ezeanolue (2022) examined the operational performance of small-scale businesses in Anambra State within a cashless economy framework. Drawing on the Diffusion of Innovation Theory (DIT), they evaluated literature and conducted a descriptive survey on 404 respondents from a population of 2093 individuals working in industrial firms in the South-East region of Nigeria. Their findings highlighted significant improvements in small businesses' performance due to the presence of ATM, POS systems, and online banking, indicating a positive impact of a cashless economy on manufacturing firms' performance.

Okafor (2020) delved into the impact of the cashless policy on business purposes and the performance of deposit money banks in Nigeria from 2009 to 2019. The study aimed to

investigate the effects of automated teller machines (ATMs), point of sale (POS) systems, mobile banking (MB), and internet banking on the performance of deposit money banks. Econometric techniques, including Descriptive Statistics, Augmented Dickey Fuller Tests for Unit Roots, and Ordinary Least Square (OLS), were employed for analysis. Results indicated that ATM, POS, MB, and internet banking positively and significantly influenced return on asset (ROA), leading to the conclusion that the cashless policy has positively impacted the performance of deposit money banks in Nigeria.

Agu and Agu (2020) explored the influence of the cashless policy on economic growth in Nigeria from Q1 2010 to Q4 2018. Quarterly time series data were analyzed using ordinary least squares (OLS) technique, sourced from World Bank Development indicators and Central Bank of Nigeria (CBN) Statistical Bulletin and Annual Report for 2019. Unit Root, Cointegration, and Granger causality tests were conducted. Results revealed the cashless policy's significant influence on economic performance, particularly regarding ATM transactions and POS payment patterns.

Nwakoby, Chukwu, and Oghenetega (2020) investigated the impact of the cashless policy on deposit money banks' profitability in Nigeria from 2009 to 2019. Secondary data from the Central Bank of Nigeria's Statistical Bulletin were analyzed using the ARDL Auto-regressive Distributed Lag model. Point of Sale (POS) Terminal, Automated Teller Machine, Mobile Banking, and Web Payment were explanatory variables, while Profit before Tax served as the dependent variable. Results indicated a negative and insignificant effect of the cashless policy on deposit money banks' profit before tax during the study period.

Muotolu and Nwadiolor (2019) studied the effects of the Central Bank of Nigeria's Cashless Policy on the financial performance of deposit money banks in Nigeria. Panel data from a sample of 14 banks spanning six years (2012 to 2017) were analyzed. Return on Asset (ROA) represented bank performance, while ATM, POS, Internet Banking, NIP, and NEFT transactions served as proxies for the cashless policy. Diagnostic tests including Descriptive Statistic Analysis, Multicollinearity, Correlation, and Heteroskedasticity were conducted. Findings indicated a positive and significant effect of ATM transactions on ROA, while POS, web, NIP, and NEFT transactions had positive but insignificant effects on ROA.

Mamudu and Gayovwi (2019) scrutinized the cashless policy's impact on the Nigerian economy, elucidating its issues, benefits, and challenges. Quarterly time series data from 2011 (Q1–Q4) to 2017 (Q1–Q4) were analyzed. Short-run regression results highlighted the positive and significant impact of cashless policy instruments, particularly ATM and WEB, on gross domestic product (GDP) in Nigeria. Conversely, POS showed an inverse and insignificant impact on GDP.

Dabo (2019) assessed the impact of the cashless policy on Nigeria's economic growth from 2011 to 2019. Data were gathered from secondary sources, specifically annual reports from the Central Bank of Nigeria Statistical Bulletin. The impact of the cashless policy, represented by Automated Teller Machine (ATM), Point of Sale (POS), and Internet Banking (WEB), was analyzed against GDP using multiple regressions. Results revealed an insignificant positive impact of ATM on GDP, while POS and WEB had negative and insignificant impacts on GDP.

Gambo, Ussaini, and Ozah (2019) explored the cashless policy's impact on Nigeria's economic growth from 2011 to 2018, utilizing secondary data from Central Bank of Nigeria Statistical

Bulletins. Multiple regressions were employed to assess the policy's impact on GDP using ATM, POS, and WEB proxies. Findings showed a positive effect of ATM on GDP, whereas POS and WEB had negative effects. The study recommended raising awareness of the benefits of the cashless policy to stimulate business activities and enhance economic growth.

Phinaonyekwelu and Nnabugwu (2018) investigated the government's cashless policy's effect on the performance of Micro, Small, and Medium Enterprises (MSMEs) in Anambra State. Employing a descriptive survey design, they utilized statistical tools including summary statistics, Pearson correlation, and multiple regression analysis. Results indicated positive and significant effects of internet/online banking, automated teller machine, and mobile banking services on MSMEs' performance, suggesting technological innovations in the banking sector have enhanced MSMEs' performance.

Taiwo, Oluwafemi, Afieroho, and Agwu (2016) evaluated the implementation of Nigeria's cashless policy since its inception in 2012 and examined persistent challenges. Primary data were collected through questionnaires administered to 120 respondents from selected banks. Data analysis was performed using SPSS, employing descriptive statistics and one-sample t-test. Results suggested that despite the modern Nigerian economy's inclination toward cashless transactions, the policy's desired impact hinges on effective implementation efforts.

3.0 Methodology

For this study, an *ex-post facto* research design was employed. This design is suitable for investigating causal relationships between past events. Hence, it was chosen because the study seeks to assess the impact of a pre-existing event retrospectively to establish empirical associations (Nworie, Okafor & John-Akamelu, 2022). The rationale behind selecting this design lies in the researcher's aim to measure how the implementation of the cashless policy has influenced the performance of the manufacturing sector in Nigeria from 2012 to 2022.

The data utilized in this study were gotten from secondary sources. Secondary data are the data that has already been collected through primary sources and made readily available for researchers to use for their own research. They are a type of data that have already been collected in the past. The secondary data for this study were obtained from the Central Bank of Nigeria Statistical Bulletin from 2012 to 2022. The data that were generated from the fact book and statistical annual bulletin reports were the value of cashless transactions carried out using automated teller machine, point of sale, and WebPay channels to proxy cashless policy while real gross domestic product was also sourced from the CBN statistical bulletin.

In this study, the time series data was analyzed using the Robust Least Square (RLS) regression method and descriptive analysis. The Robust Least Square method was utilized to investigate the relationship or predictability between the independent and dependent variables, whereas the descriptive analysis was used to summarise the dataset. The use of RLS method helped to address the issue of non-normality of the data distribution.

The study adopted the model by Agu and Agu (2020) which is re-stated below:

$$RGDP = \beta_0 + \beta_1CHE + \beta_2ATM + \beta_3POS + \beta_4WEB + \mu t \dots\dots\dots (1)$$

Where;

RGDP = Real gross domestic product

CHE = Cheque

ATM = Automatic Teller Machine

POS = Point of sale

WEB= WebPay

ε = Error term

From equation 1 above, the model used after modification is stated below:

$$RGDPM_{it} = \alpha_0 + \beta_1 POS_{it} + \beta_2 WEB_{it} + \beta_3 ATM_{it} + e_{it} \text{ ----- (2)}$$

Where;

RGDPM = Real Gross Domestic Product of Manufacturing sector

POS = Point of Sales, measured as the value of point of sale transactions

WEB = WebPay, measured as the value of point of sale transactions

ATM = Automated Teller Machine, measured as the value of point of sale transactions

$\beta_1, \beta_2, \beta_3$ = Coefficient of POS, WEB and ATM, respectively.

The research hypotheses were evaluated using the OLS regression analysis, with consideration given to the probability values (p-values). A significance level of 5% (0.05) was set for the decision rule regarding the p-values. If the obtained p-value was below 0.05, the null hypothesis of statistical insignificance would be rejected. Conversely, if the p-value was greater than or equal to 0.05, the null hypothesis would be accepted.

4.0 Results and Discussion

4.1 Presentation of Data

The data for the study are presented below in Table 4.1.

Table 4.1 Data Presentation

Years	ATM ₦'B	POS ₦'B	RGDPM ₦'B	WEB ₦'B
2012	1984.66	48.01	4783.66	31.57
2013	2828.94	161.02	5826.36	47.32
2014	3679.88	312.07	6684.22	74.04
2015	3970.25	448.51	6586.62	91.58
2016	4988.13	759.00	6302.23	132.36
2017	6437.59	1409.81	6288.90	184.60
2018	6480.09	2383.11	6420.59	675.92
2019	6512.61	3204.75	6469.83	478.14
2020	12004.07	2806.30	6291.59	235617.81
2021	21230.93	24455.42	6502.26	545039.69
2022	32648.02	41035.80	6661.39	783660.03

Source: CBN Statistical Bulletin, 2012 to 2022

4.2 Descriptive Analysis

The descriptive analysis of the study is presented in Table 4.2 below using measures of central tendency and measures of dispersion.

Table 4.2 Descriptive Analysis

	RGDPM	POS	WEB	ATM
Mean	6256.150	7002.164	142366.6	9342.289
Median	6420.590	1409.810	184.6000	6437.590
Maximum	6684.220	41035.80	783660.0	32648.02
Minimum	4783.660	48.01000	31.57000	1984.660
Std. Dev.	542.8943	13301.83	272719.1	9448.056
Skewness	-2.006852	1.909672	1.586677	1.640701
Kurtosis	6.096271	5.081557	3.952508	4.447833
Jarque-Bera	11.77766	8.671788	5.031329	5.895915
Probability	0.002770	0.013090	0.080809	0.052447
Sum	68817.65	77023.80	1566033.	102765.2
Sum Sq. Dev.	2947342.	1.77E+09	7.44E+11	8.93E+08
Observations	11	11	11	11

Source: Descriptive Output from Eviews 10 (2024)

The Real Gross Domestic Product of the Nigerian manufacturing sector (RGDP) exhibits a mean value of 6256.150. The data range from a minimum of 4783.660 to a maximum of 6684.220, with a standard deviation of 542.8943. The distribution of RGDP data is negatively skewed (-2.006852) and exhibits a leptokurtic distribution (kurtosis = 6.096271), indicating heavier tails and a sharper peak compared to a normal distribution. The Jarque-Bera test for normality yields a statistically significant result ($p = 0.002770$), suggesting departure from normality.

Regarding the Point of Sale (POS) channel, the mean value is 7002.164, with a considerable range between the minimum of 48.01000 and the maximum of 41035.80. However, the high standard deviation of 13301.83 indicates significant variability in the data. The skewness value of 1.909672 suggests a positive skew, while the kurtosis of 5.081557 indicates a leptokurtic distribution with heavier tails than a normal distribution. The Jarque-Bera test indicates non-normality ($p = 0.013090$).

For the Web channel, the mean value stands at 142366.6, with a wide range from 31.57000 to 783660.0. The standard deviation is notably high at 272719.1, reflecting substantial dispersion in the data. The skewness value of 1.586677 indicates a positive skew, and the kurtosis of 3.952508 suggests a leptokurtic distribution. The Jarque-Bera test shows departure from normality ($p = 0.080809$).

Regarding the Automated Teller Machine (ATM) channel, the mean value is 9342.289, with a range spanning from 1984.660 to 32648.02. The standard deviation of 9448.056 indicates notable variability in the data. The positive skewness value of 1.640701 suggests a right-skewed distribution, and the kurtosis of 4.447833 indicates a leptokurtic distribution. The

Jarque-Bera test result ($p = 0.052447$) suggests departure from normality, though it is less significant compared to other variables.

4.3 Test of Hypotheses

The test of hypotheses was done with the aid of the estimation output from Robust Least Square regression as shown in Table 4.3 below. The essence of using Robust Least Square regression was to correct for the abnormality in the dataset.

Table 4.3 Robust Least Square Regression

Dependent Variable: RGDPM

Method: Robust Least Squares

Date: 04/20/24 Time: 08:22

Sample: 2012 2022

Included observations: 11

Method: M-estimation

M settings: weight=Bisquare, tuning=4.685, scale=MAD (median centered)

Huber Type I Standard Errors & Covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
POS	0.035171	0.016573	2.122165	0.0338
WEB	0.000984	0.001015	0.969757	0.3322
ATM	-0.074352	0.032274	-2.303794	0.0212
C	6806.714	151.6581	44.88197	0.0000
Robust Statistics				
R-squared	0.202505	Adjusted R-squared	-0.139279	
Rw-squared	0.595259	Adjust Rw-squared	0.595259	
Akaike info criterion	21.24985	Schwarz criterion	27.71879	
Deviance	399520.1	Scale	148.4581	
Rn-squared statistic	7.083065	Prob(Rn-squared stat.)	0.069297	
Non-robust Statistics				
Mean dependent var	6256.150	S.D. dependent var	542.8943	
S.E. of regression	775.1019	Sum squared resid	4205481.	

Source: Robust Least Square Regression Output from Eviews 10 (2024)

The robust least square regression analysis conducted in this study indicates an R-squared value of 0.202505. This R-squared value signifies that approximately 20.25% of the variation in the real gross domestic product (RGDP) of the Nigerian manufacturing sector can be explained by the independent variables included in the regression model, namely the values of the point of sale (POS) channel, the web channel, and the automated teller machine (ATM) channel of the cashless policy. The Prob(Rn-squared stat.) value of 0.069297 suggests that the overall regression model is not statistically significant at the 5% significance level but at 10%

significance level. Despite this, the R-squared value indicates that the model still explains a noteworthy portion of the variance in the RGDP of the Nigerian manufacturing sector. Therefore, while the model may not fully capture all factors influencing manufacturing sector performance, it provides useful hints into the potential effects of cashless policy implementation on the sector's RGDP.

4.3.1 Hypotheses I

H01: Point of sale (POS) channel of cashless policy has no significant effect on the real gross domestic product of the Nigerian manufacturing sector.

Firstly, for the point of sale (POS) channel, the coefficient of 0.035171 suggests that a one-unit increase in the value of transactions through POS terminals is associated with a 0.035171 unit increase in the RGDP of the manufacturing sector. This coefficient is statistically significant at the 5% level ($p = 0.0338$), indicating that the POS channel has a positive and significant effect on manufacturing sector performance. It implies that greater utilization of POS transactions contributes positively to the RGDP of the Nigerian manufacturing sector. The alternate hypothesis was accepted therefore that POS channel of cashless policy has a significant positive effect on the real gross domestic product of the Nigerian manufacturing sector ($p=0.0338$).

4.3.2 Hypothesis II

H02: Web channel of cashless policy has no significant effect on the real gross domestic product of the Nigerian manufacturing sector.

Secondly, regarding the web channel, the coefficient of 0.000984 indicates that a one-unit increase in the value of web-based transactions has a negligible positive increase effect on manufacturing sector RGDP, as the coefficient is close to zero. Additionally, the p-value of 0.3322 suggests that the coefficient is not statistically significant at 5% significance level. Therefore, there is insufficient evidence to conclude that the web channel significantly influences manufacturing sector performance based on the results of this analysis. The null hypothesis was therefore accepted that Web channel of cashless policy has a non-significant positive effect on the real gross domestic product of the Nigerian manufacturing sector ($p=0.3322$).

4.3.3 Hypothesis III

H01: Automated teller machine (ATM) channel of cashless policy has no significant effect on the real gross domestic product of the Nigerian manufacturing sector.

Thirdly, for the automated teller machine (ATM) channel, the coefficient of -0.074352 suggests that a one-unit increase in the value of ATM transactions is associated with a decrease of 0.074352 units in manufacturing sector RGDP. This coefficient is statistically significant at the 5% level ($p = 0.0212$), indicating a negative and significant effect of ATM transactions on manufacturing sector performance. It implies that higher volumes of ATM transactions may have adverse effects on the RGDP of the Nigerian manufacturing sector. Hence, the alternate hypothesis was accepted that Automated teller machine (ATM) channel of cashless policy has

a significant negative effect on the real gross domestic product of the Nigerian manufacturing sector ($p=0.0212$).

4.4 Discussion of Findings

The finding suggesting a positive effect of the Point of Sale (POS) channel on the performance of the manufacturing sector aligns with expectations. POS transactions facilitate faster and more efficient payments, reducing the reliance on cash transactions. For manufacturers, this can translate into smoother and more predictable cash flows, as well as improved inventory management. Moreover, POS transactions enable businesses to expand their customer base by accepting various payment methods, thereby potentially increasing sales. Thus, the positive impact of the POS channel on the manufacturing sector's performance underscores the importance of embracing electronic payment systems in driving efficiency and growth. Similarly, Mamudu and Gayovwi (2019) identified a positive and significant impact of POS transactions on gross domestic product (GDP) in Nigeria, while Dabo (2019), Gambo, Ussaini, and Ozah (2019), Nwakoby, Chukwu, and Oghenetega (2020), and Muotolu and Nwadiolor (2019) concluded that POS transactions had a negative and insignificant effect on GDP.

The study also highlighted a non-significant positive impact of web channels on the performance of the manufacturing sector. The findings showed that there is a positive association between the adoption of web-based platforms and improvements in various aspects of manufacturing, including productivity, efficiency, and competitiveness. One plausible explanation for these results is the enhanced connectivity and accessibility that web channels offer to manufacturing firms. By leveraging online platforms, manufacturers can streamline their supply chains, communicate more effectively with suppliers and customers, and access a broader range of markets. Additionally, web channels facilitate real-time data exchange and analytics, enabling companies to make more informed decisions and optimize their operations. Moreover, the proliferation of e-commerce and digital marketing has opened up new avenues for manufacturers to reach customers directly, reducing dependence on traditional distribution channels and intermediaries. Mamudu and Gayovwi (2019), Okafor (2020), Agu and Agu (2020), and Muotolu and Nwadiolor (2019) identified a positive and significant impact of ATM transactions on either gross domestic product (GDP) or return on asset (ROA) in Nigeria. However, Henry, Anyanwu, and Amakor (2024) found a positive yet insignificant relationship between ATM transactions and economic growth in Nigeria.

The finding indicating a negative effect of the Automated Teller Machine (ATM) channel on the performance of the manufacturing sector may seem counterintuitive, but it can be understood in the context of its limitations. While ATMs offer convenience in accessing cash, especially in areas with limited banking infrastructure, they may not necessarily contribute to enhancing the efficiency of transactions for manufacturers. Unlike POS transactions, which directly facilitate business-to-customer payments, ATM transactions primarily serve individual consumers. Manufacturers typically engage in larger-scale transactions involving suppliers, distributors, and other business partners, where ATM transactions may have limited relevance. Moreover, the fees associated with ATM withdrawals can add to the operational costs for businesses. Hence, the negative impact of the ATM channel on the manufacturing sector's performance underscores the importance of focusing on channels that directly cater to the needs of businesses and facilitate smoother commercial transactions. Mamudu and Gayovwi (2019)

observed a positive and significant impact of web pay transactions on gross domestic product (GDP) in Nigeria, while Dabo (2019), Gambo, Ussaini, and Ozah (2019), and Muotolu and Nwadiolor (2019) found a negative and insignificant effect of web pay transactions on GDP. However, Henry, Anyanwu, and Amakor (2024) noted a negative yet insignificant impact of web pay transactions on economic growth in Nigeria.

5.0 Conclusion and Recommendations

The implementation of a cashless policy in Nigeria has been a significant initiative aimed at modernizing the country's financial system, reducing cash-related crimes, and promoting electronic transactions. As with any policy change, its impact on various sectors of the economy, including the manufacturing sector, warrants thorough examination. This study analysed the effects of different channels of cashless transactions—Point of Sale (POS), web, and Automated Teller Machine (ATM)—on the performance of the Nigerian manufacturing sector. The robust least square regression results showed that while POS transactions have a positive and significant effect on manufacturing sector performance, ATM transactions exhibit a negative and significant impact. However, the web channel does not appear to have a statistically significant positive influence on manufacturing sector RGDP based on the findings of this analysis.

In conclusion, the implementation of cashless policies in Nigeria has significant implications for the performance of the manufacturing sector, offering opportunities to enhance efficiency, transparency, and financial inclusion while also presenting challenges related to infrastructure, security, and cost. While cashless policies have the potential to drive economic growth and industrial development, their success depends on addressing underlying structural challenges and ensuring that the benefits of digital financial innovation are accessible to all manufacturers, particularly SMEs and businesses in underserved areas. By adopting a holistic approach and leveraging technological innovations, Nigeria can leverage the opportunities presented by cashless policies to build a more resilient, inclusive, and dynamic economy. Thus, policymakers must adopt a holistic approach that combines cashless policy initiatives with targeted interventions to strengthen the competitiveness and resilience of the Nigerian manufacturing sector in the digital age. The study recommends the following:

- 1) Nigerian manufacturing businesses should prioritize the adoption and utilization of POS terminals for conducting transactions.
- 2) Nigerian government, internet service providers, financial institutions, and manufacturing businesses should enhance cybersecurity measures and invest in internet infrastructure to mitigate risks associated with online transactions in the manufacturing sector.
- 3) Nigerian banking regulators and ATM service providers should ensure adequate availability and functionality of ATMs, while promoting the adoption of diverse electronic payment options for manufacturing businesses. This can be achieved by investing in technologies that improve ATM infrastructure and alternative electronic payment channels to reduce reliance on cash and minimize disruptions in manufacturing sector operations.

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