Industrial Policies and Manufacturing Sector Output Growth in Selected West African Countries

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DOI: https://dx.doi.org/10.47772/IJRISS.2025.910000414

Received: 11 October 2025; Accepted: 16 October 2025; Published: 13 November 2025

ABSTRACT

The study investigated the impact of industrial policies on manufacturing sector output growth rate in selected West African Countries. Data spanning 2000 to 2023 were collected on the manufacturing sector output growth rate (MOG), exchange rate (EXCHR), domestic credit to the private sector (DCPS), trade openness (TOP), and foreign direct investment (FDI). The fully modified ordinary least squares (MOLS) estimation technique was used in the model estimation. The findings revealed that the exchange rate had a positive and significant impact on the manufacturing sector's output growth rate. The finding implies that an effective exchange rate policy would have a positive and significant effect on manufacturing sector output growth in the selected West African Countries. Domestic credit to the private sector had a negative and significant effect on the manufacturing sector's output growth rate in the selected African countries. implying that effective credit to private sector has the potential of enhancing the manufacturing sector's output growth rate. Trade policy (TOP) had a negative and insignificant effect on manufacturing sector's output growth rate. The study revealed that industrial policy (exchange rate policy, credit policy, and trade policy) impacted manufacturing sector output growth differently in selected West African countries. Based on the findings, the study recommended that the governments of the selected West African countries should strengthen industrial sector's policies to promote the manufacturing sector's output growth rate.

Keywords: Industrial policies, manufacturing output, fully modified OLS, and West Africa.

INTRODUCTION

Industrial policies are a cornerstone of economic development strategies, particularly in regions striving for structural transformation and sustainable growth. For decades, policymakers in West Africa have recognized the potential of the manufacturing sector to drive economic diversification, reduce dependency on commodity exports, and generate widespread employment opportunities. However, the region continues to grapple with structural challenges, policy inconsistencies, and the global competitive pressures that hinder the realization of its industrial potential (Juhasz, R. et al. 2023.

Globally, the role of industrial policies in driving economic transformation has been well documented. From the success stories of East Asia's newly industrialized economies to the challenges faced by African countries, industrial policy has proven to be a double-edged sword. While well-crafted policies can stimulate investment in key industries and foster technological innovation, poorly designed or inconsistently implemented policies can lead to inefficiencies and resource misallocation (Rodrik, 2019). In West Africa, industrial policies have historically been influenced by colonial economic structures, which prioritized the extraction of raw materials over industrialization. This legacy has left many countries with weak manufacturing bases, characterized by low levels of value addition and limited integration into global value chains (UNECA, 2021).

The post-independence era saw many West African nations adopt import substitution industrialization (ISI) strategies as a means to reduce dependence on foreign goods and promote local industries. These policies, however, often fell short due to insufficient infrastructure, lack of skilled labor, and over-reliance on state-led enterprises. The introduction of structural adjustment programs (SAPs) in the 1980s further compounded the challenges, as these programs mandated the liberalization of trade and the privatization of state-owned

enterprises, often at the expense of nascent industries (Olayemi, 2022). Consequently, the manufacturing sector's contribution to GDP in most West African countries has remained stagnant, at Nigeria 2020:28.22% (industry share in GDP note that manufacturing is a subset of industry),2023 8.42% (manufacturing sector's contribution to GDP in Q3), with the sector contributing around 15.36% to GDP in 2023 (African Development Bank 2023), Ghana 2020:29.74% (industry's share in GDP) 2023: industry growth rate was 1.6%, with the manufacturing sector contributing around 32% to GDP, Burkina Faso 2020 32.59%(industry's share in GDP), Senegal 23.22% (industry's share in GDP), Guinea 2020 32.73% (industry's share in GDP), Cote d'Ivoire 2020 20.86% (industry's share in GDP), note that the manufacturing sector's specific contribution might be lower than the industry overall share (African Leadership Magazine 2025), underscoring the need for renewed policy focus.

The West African countries is not without challenges which includes political instability, bureaucratic inefficiency and corruption and addressing these challenges requires strong institutional framework, transparent governance and inclusive policy-making (WB, 2023). Despite the above hurdles the region has industrialization prospect, that remain promising and by leveraging on the strength such as abundant natural resources, growing consumer market and increasing interest from international investors, the region (West African countries) can implement industrial policies that not only enhance manufacturing output growth but also contribute to the broader development goal such as poverty reduction, gender equality and environmental sustainability (UNDP, 2022). The question now is to what level has the industrial policies formulated and implemented have been able to drive industrialization in some selected West Africa's countries.

Having reviewed relevant literature on industrial policies and its effect on manufacturing output growth rate in the region found that, almost all their observations have similar challenges ranging from corruption, infrastructure gabs etc., that limit the continued progress of the industrial policies implementation in the region. Their studies are either country-based or cross-continent, such as Africa and Asian Countries. There is lack of knowledge about industrial policies in West African countries. The broad topic of industrial policies on country-based in African continent has received attention including from developed countries of the world but West Africa as a region are not the focus of that attention, (-Eze c., and Uche 2019). While acknowledging that industrial policies occur both in developing and developed clime, the previous focus is on country-based or developed ones (Federal ministry of industry, trade and investment 2014). Consequently, their findings failed to have a consensus, hence the current study become relevant to add to the discourse on the impact of industrial policies on manufacturing output growth in selected West African countries. This study intends to bridge these gap by investigating various industrial policies and how it has contributed to the region industrial policies design.

The purpose of this study is therefore, to examine the impact of industrial policies on manufacturing sector output growth in the selected West Africa Countries, while policies of growth and development to encourage industrialization and promote investment in productive manufacturing activities in the selected West African countries - Nigeria, Ghana, Côte d'Ivoire, Senegal, Burkina Faso, and Guinea are the target.

Objectives of the study

The main objective of the study is to examine the impact of industrial policies on the manufacturing output growth in selected West African countries. The specific objectives are to:

Examine the impact of exchange rate policy on manufacturing output growth in selected West African countries.

Investigate how credit to the private sector has impacted the manufacturing output growth in West African Countries.

explore the impact of trade policy on the manufacturing output growth in West African Countries

determine the impact of industrial policies on the manufacturing sectors' output growth rates in individual selected West African countries

Research Hypotheses

The hypotheses that would be tested in this research work are stated below:

H_{01}: Exchange rate policy does not have significant impact on manufacturing output growth in selected West African countries.

H_{02}: Credit to the private sector does not have significant impact on the manufacturing output growth in the selected West African Countries.

H_{03}: Trade policy does not have an impact on the manufacturing output growth in the selected West African Countries

H_{04}: Industrial policies do not differently impact on the manufacturing output growth in the selected West African countries.

This paper is structured as follows: Section 2 presents a literature and empirical review, Section 3 outlines the methodology adopted for analysis, Section 4 discusses the results, and Section 5 provides a summary, conclusion, and recommendations.

LITERATURE REVIEW

Conceptual Review

The conceptual review provides a foundation for understanding the key concepts and terminologies integral to this study, ensuring clarity and alignment with the research objectives. Industrial policies and manufacturing output growth are critical components of economic development, especially in emerging economies like those in West Africa. This section explores the Industrialization and Regional Economic Integration, The Role of Regional Trade Blocs in Industrial Development, the role of African continental free trade area (AfCFTA) and Its Impact on Industrialization in West Africa, Synergies between Regional Integration and Manufacturing Competitiveness, Challenges to Industrialization through Regional Integration concepts. Industrial policies have long been recognized as pivotal in fostering structural transformation, particularly in economies transitioning from agriculture-based systems to more diversified and industrialized structures. These policies encompass a range of government interventions designed to stimulate industrial growth, enhance productivity, and promote global competitiveness (Rodrik, 2021). The effectiveness of such policies often depends on their design, implementation, and alignment with broader economic goals, as well as the socioeconomic and infrastructural context in which they operate.

Industrialization and Regional Economic Integration

Industrialization and regional economic integration are intertwined processes that drive economic transformation in developing regions. In West Africa, the pursuit of industrialization has been closely tied to regional trade and economic cooperation. This relationship underscores the importance of fostering synergies between industrial policies and regional frameworks to promote sustainable growth and enhance competitiveness. This section explores the role of regional trade blocs in industrial development, the African Continental Free Trade Area (AfCFTA). It also examines the synergies between regional integration and manufacturing competitiveness.

The Role of Regional Trade Blocs in Industrial Development

Regional trade blocs are fundamental to industrial development in West Africa. They provide member states with a platform for harmonized policies, collective bargaining power, and the creation of larger markets. By addressing structural constraints such as fragmented markets, inadequate infrastructure, and trade barriers, regional trade blocs enable countries to scale up manufacturing and achieve greater economic diversification. Trade blocs also facilitate access to critical resources and inputs for manufacturing. For example, cross-border trade agreements have enabled seamless supply chains in industries such as textiles, agro-processing, and

automobile assembly. By fostering regional value chains, trade blocs contribute to industrialization while creating employment opportunities and boosting income levels (Asiedu et al., 2024).

AfCFTA and Its Impact on Industrialization in West Africa

The African Continental Free Trade Area (AfCFTA) represents a significant step toward continental economic integration. By establishing the largest free trade area in the world, AfCFTA aims to boost intra-African trade, eliminate tariffs on 90% of goods, and foster industrial development across the continent. West African countries, as part of AfCFTA, stand to benefit from increased market access, enhanced value chains, and greater investment inflows (Okoro & Adebayo, 2024). One of the key provisions of AfCFTA is the harmonization of standards and regulations, which reduces trade complexities and encourages the flow of goods. For example, manufacturers in Nigeria's automobile sector have leveraged AfCFTA to export vehicles to Ghana and other African countries. Similarly, the agreement has spurred investment in value added industries, such as cocoa processing in Côte d'Ivoire and Ghana, thereby reducing the region's reliance on raw material exports.

Synergies between Regional Integration and Manufacturing Competitiveness

Regional integration offers multiple avenues for enhancing the competitiveness of West Africa's manufacturing sector.

Value Chain Development: Regional integration fosters collaboration among countries to develop integrated value chains. In the textile industry, for example, countries like Mali and Burkina Faso produce cotton, while Ghana and Nigeria handle processing and garment manufacturing. This collaboration maximizes resource utilization and creates jobs across the value chain.

Increased Foreign Direct Investment (FDI): Harmonized regional policies attract foreign investors seeking stable and predictable business environments. By investing in manufacturing hubs, multinational corporations (MNCs) contribute to technology transfer, skill development, and infrastructure improvements, which collectively enhance competitiveness (Ademola & Yusuf, 2024).

Challenges to Industrialization through Regional Integration

While regional integration holds immense potential for industrial growth, several challenges persist. Political instability, policy inconsistency, and weak governance undermine the effectiveness of trade blocs. For example, disagreements over tariff reductions and market access have delayed the full implementation of AfCFTA provisions in some West African countries (Adebiyi & Mensah, 2023). Inadequate infrastructure remains a critical bottleneck. Despite efforts by members' state and other stakeholders, transportation networks, energy supply, and communication systems are often insufficient to support large-scale manufacturing. Additionally, disparities in industrial development levels among member states create imbalances that complicate regional cooperation.

Industrialization and regional economic integration are mutually reinforcing processes that have the potential to transform West Africa's economic landscape. Regional trade blocs like AfCFTA provide platforms for harmonized policies, market expansion, and collaborative value chain development. By addressing structural constraints and fostering synergies, these frameworks can enhance the competitiveness of the region's manufacturing sector. However, to realize the full benefits of regional integration, West African countries must commit to improving governance, infrastructure, and policy coordination. These efforts will ensure that industrialization becomes a sustainable driver of economic growth and development.

Empirical Review

This section extensively reviews both the empirical literature and the method used in industrial policies and manufacturing output growth, particularly in West Africa, as it features on several country-specific studies.

Osabuohien et al. (2023) examined the effects of industrial policies on manufacturing performance in Nigeria under the Economic Recovery and Growth Plan (ERGP) from 2003 to 2022. Using an econometric analysis of time-series data, the study found that while the ERGP provided a strategic framework for industrial growth, inconsistent implementation and inadequate coordination between federal and state agencies limited its effectiveness. Mensah and Okyere (2023) analyzed the impact of Ghana's industrial policies on the manufacturing sector's contribution to GDP using a vector autoregression (VAR) model 2007 to 2019. The study revealed that policies such as the One District, One Factory (1D1F) initiative had a positive effect on manufacturing output in the short run, but structural constraints such as inadequate electricity supply and limited access to credit weakened long-term growth prospects. The study recommended increased public-private partnerships and improved access to finance for small and medium-sized manufacturers.

Diof and Sarr (2022) investigated the relationship between industrialization policies and manufacturing output in Senegal using a computable general equilibrium (CGE) model from 2002 - 2021. Their findings suggested that while policies such as the Plan Sénégal Émergent (PSE) had significantly increased industrial investments, the country's over-reliance on foreign capital and technology transfer limited the sustainability of these gains. The study recommended a shift toward domestic capacity-building, investment in local research and development, and targeted fiscal incentives to encourage indigenous manufacturing growth. Ouedraogo (2021) explored the effectiveness of Burkina Faso's industrialization strategy on manufacturing sector growth from 1998- 2019 using a fixed-effects regression model. The study found that while government interventions increased manufacturing output, challenges such as high production costs, inadequate energy supply, and poor transportation networks constrained progress.

Ibrahim and Ahmed (2021) evaluated the impact of Guinea's industrialization policies on manufacturing sector performance from 2010 – 2020 through an autoregressive distributed lag (ARDL) model. The results indicated that although government efforts to promote industrialization had led to some improvements in production capacity, the overall growth remained sluggish due to limited access to financing and weak institutional support. Boateng (2020) studied the effects of Ghana's industrial policy reforms on manufacturing productivity from 1999 to 2019, using a stochastic frontier analysis. The findings revealed that while policy measures such as tax incentives and reduced import tariffs had improved industrial efficiency, persistent challenges such as inadequate skilled labor and poor access to modern technology impeded sustained growth.

Diakite (2014) analyzed the effect of Côte d'Ivoire's industrial diversification policies on manufacturing development from 1994 - 2013 using an input-output model. The study found that diversification strategies improved industrial output and reduced dependence on agricultural exports. Toure (2013) studied the role of regional integration in promoting industrial growth in Senegal using a gravity model from 1997 - 2010. The findings indicated that trade agreements within the West African Economic and Monetary Union (WAEMU) enhanced industrial competitiveness and expanded manufacturing output. However, weak institutional coordination and inconsistent policy implementation slowed industrial growth.

Theoretical Framework

The theoretical framework for this study is based on the Structural Change Theory, which offers a comprehensive explanation of the dynamics between industrial policies and manufacturing output growth in developing regions, including West Africa. Structural Change Theory focuses on the transformation of an economy's structure, where resources are shifted from low-productivity sectors, such as agriculture, to high-productivity sectors, particularly manufacturing. This transition is crucial for achieving sustainable economic growth and reducing dependence on primary commodities (McMillan & Rodrik, 2011). West African countries, like many developing economies, have traditionally depended on the export of raw materials such as oil, cocoa, and metals. While these commodities provide foreign exchange earnings, they leave economies vulnerable to price volatility and external shocks, limiting opportunities for industrialization and inclusive growth (UNECA, 2013).

In Nigeria, for example, the National Industrial Revolution Plan (NIRP) seeks to shift focus from oil exports to manufacturing, promoting industries such as agro-processing, petrochemicals, and technology. The Structural Change Theory underpins such policies, advocating for government interventions to catalyze resource

reallocation and build the foundational capacities of manufacturing industries (UNIDO, 2019). Similarly, Ghana's One District One Factory initiative reflects this theoretical perspective by emphasizing localized industrialization to stimulate economic activities and create employment across the country. Burkina Faso' agro-industrial development to enhance value addition and reduce reliance on raw material exports. Initiatives like the National Plan for Economic and Social Development (PNDES) have aimed to modernize industries and foster private sector participation. The construction of industrial zones and increased investments in renewable energy ~~have~~has supported industrial expansion (Abdoulaye & Fofana, 2020).

Key to the Structural Change Theory is the acknowledgment of supporting factors that drive structural transformation. These include technological innovation, skilled labor development, infrastructure provision, and access to credit. For West Africa, however, these factors remain significant challenges. Infrastructure deficits such as unreliable electricity and inadequate transportation networks continue to constrain the productivity of manufacturing firms. These challenges underscore the theory's assertion that structural change requires a comprehensive policy approach addressing both sectoral and systemic bottlenecks (AfDB, 2020).

The theory also highlights the role of export diversification as a component of structural transformation. By moving away from reliance on a narrow set of commodities, West African economies can achieve greater resilience to external shocks and enhance their integration into global value chains. For instance, Côte d'Ivoire's industrial policy emphasizes processing agricultural products like cocoa locally, thereby adding value before export and creating a more diversified economic base (World Bank, 2016).

Another vital aspect of Structural Change Theory is its focus on industrial policies that support backward and forward linkages within the economy. Backward linkages, such as sourcing raw materials locally, and forward linkages, including the establishment of processing industries, enhance value addition and stimulate the entire economy. The implementation of these linkages aligns with the theory's call for targeted investments in manufacturing and complementary sectors to drive structural transformation (Rodrik, 2014).

In a nutshell, Structural Change Theory provides a relevant and robust framework for examining the impact of industrial policies on manufacturing output growth in West Africa. By advocating for resource reallocation from low-productivity to high-productivity sectors, the theory underscores the importance of deliberate, well-coordinated industrial policies in achieving structural transformation. For West African economies, where dependence on primary commodities remains high, the theory offers practical insights into policy design aimed at fostering industrialization, promoting export diversification, and achieving inclusive growth. This theoretical framework is instrumental in guiding this study's exploration of industrial policy dynamics and their influence on manufacturing growth across selected West African countries.

METHODOLOGY

This section carefully covers model specification and method of analyzing data.

Nature and Sources of Data

The study relies on secondary data collected from reputable and reliable international and regional databases to analyze the impact of industrial policies on manufacturing sector output growths in selected West African countries- Burkina Faso, Cote d'Ivoire, Ghana, Guinea, Nigeria and Senegal. The study used panel annual data spanning a period of 24 years, from 2000 to 2023. The data sources provide comprehensive, consistent, and accessible information necessary for the econometric analysis.

Model Specification

The econometric model for the current study was based on the theoretical framework as earlier statesd and Akinwale's (2019), empirical specification with minimal modification as follow:

$$INO_t = \lambda_0 + \lambda_1 TOP_t + \lambda_2 EXR_t + \lambda_3 GCE_t + \lambda_3 CPS_t + e_t.$$

In his specification, INO denoted industrial output, TOP denoted trade openness, EXR represented exchange

rate policy, CPS denoted credit to the private sector, and GCE represented government capital expenditure. The adapted model replaced government expenditure in Akinwale (2019) with credit to private sector, based on Yunanto and Medyawati (2014), who stated that," monetary policy is more effective than fiscal policy". The econometric form of the model to analyse the influences of industrial policies on manufacturing output growth is as follows:

$$MOG_{it} = \alpha + \beta_1 EXCR_{it} + \beta_2 CPS_{it} + \beta_3 TOP_{it} + \beta_4 FDI_{it} + \varepsilon_{it}$$

Where: MOG_{it} represents the manufacturing output growth for country i at time t, which serves as the dependent variable. This variable captures the annual percentage change in manufacturing output, measured by manufacturing value-added (MVA), employment in the manufacturing sector, and the share of manufacturing in GDP.

$EXCR_{it}$ represents the exchange rates, as a tool of the government's monetary policy.

CPS_{it}. represent credit to the private sector in country i at time t

TOP_{it} represents the trade policy of the government tends to protect the manufacturing sector. It is measured as a percentage of trade in country i at time t

FDI_{it} represents foreign direct investment inflows to country i at time t which is the control variable

are the coefficients that measure the impact of each independent variable (exchange rate, credit to the manufacturing sector, trade openness and foreign direct investment) on manufacturing output growth. A positive coefficient would suggest that an increase in the corresponding independent variable leads to an increase in manufacturing output growth.

ϵ is the error term, which accounts for unobserved factors that may influence manufacturing output growth, such as global economic trends, political stability, or unforeseen shocks. In this model, it is hypothesized that industrial policies play a significant and positive role in manufacturing output growth. By specifying this model, the study aims to empirically test the impact of industrial policies on manufacturing growth in West Africa, providing important insights into how government interventions can help foster industrialization and economic growth in the region.

Justification for Panel Data Analysis

Heterogeneity Control

Panel data analysis accounts for unobservable heterogeneity across the selected countries, such as institutional differences, governance structures, and cultural factors. By introducing fixed or random effects, the model can control for country-specific characteristics that may otherwise bias the estimates.

Dynamic Effects

The technique captures both time and cross-sectional dynamics, providing insights into how industrial development influences economic growth across different countries and over the study period.

Efficient Estimation

The combination of cross-sectional and time-series dimensions increases the degrees of freedom and reduces multicollinearity among explanatory variables, leading to more efficient and reliable parameter estimates. (Baltagi, 2013).

Diagnostic Checks

After estimation, diagnostic checks are performed to ensure the reliability and validity of the results. These include:

Multicollinearity Test: To ensure that explanatory variables are not highly correlated.

Heteroskedasticity Test: To check for constant variance of errors across observations.

Autocorrelation Test: To detect correlations between residuals over time, which could affect the accuracy of the estimates.

Software for Estimation: The analysis is conducted using EViews 12 or a similar econometric software, which offers advanced tools for panel data analysis, diagnostic tests, and result interpretation.

This estimation technique ensures that the empirical findings are robust, reliable, and relevant for understanding the industrial policies and manufacturing outputs growths in selected West African countries.

Diagnostic/Econometric Test

To ensure the reliability and validity of the results in this study, several diagnostic and econometric tests are carried out. These tests help identify and address potential issues in the model, making the findings more robust and credible.

First, stationarity tests like the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests are conducted to determine whether the data used are stationary. If the variables are not stationary, differencing is applied to make them suitable for analysis and to avoid misleading results. Next, multicollinearity is checked using the Variance Inflation Factor (VIF). This ensures that the explanatory variables are not too highly correlated with one another, as this could distort the estimates of their individual effects.

The model is also tested for heteroscedasticity to confirm that the variance of the error terms remains constant. If the variance fluctuates, robust standard errors or alternative techniques are employed to adjust for this issue. Similarly, autocorrelation tests, such as the DurbinWatson statistic, are performed to ensure that the residuals (errors) from the model are not serially correlated, as this could undermine the reliability of the estimates.

The normality of residuals is verified using the Jarque-Bera test. This step ensures that the errors follow a normal distribution, which is important for hypothesis testing and valid inference. Additionally, a model specification test (such as the Ramsey RESET test) is conducted to confirm that the functional form of the model is correct and no important variables are omitted.

For cross-sectional data, tests like Pesaran's cross-sectional dependence test are used to check if there is any dependence among the countries in the panel. If such dependence exists, adjustments are made to the standard errors or modeling approach.

When analyzing panel data, unit root tests like Levin, Lin & Chu (LLC) and Im, Pesaran & Shin (IPS) ensure that the data are stationary across both time and cross-sectional dimensions. Furthermore, cointegration tests confirm whether there is a long-term relationship among the variables, and if so, methods like the error correction model (ECM) are applied.

Lastly, the goodness-of-fit of the model is assessed using measures like the R^2 and adjusted R^2, which indicate how well the model explains variations in economic growth. These diagnostic tests collectively ensure that the analysis is thorough, reliable, and provides meaningful insights into the relationship between infrastructural development and economic growth in the selected African countries.

To ensure the credibility and validity of the results in this study, several diagnostic and econometric tests are performed to validate the model and the data used. These tests help identify potential issues and provide

confidence in the conclusions drawn about the impact of infrastructural development on economic growth in selected African countries.

First, stationarity tests, such as the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests, are applied to examine whether the variables are stationary or exhibit trends over time. Non-stationary data can lead to spurious regression results, so appropriate transformations, such as differencing, are used if needed.

Multicollinearity is assessed by calculating the Variance Inflation Factor (VIF). This ensures that the explanatory variables are not highly correlated with each other, which could compromise the precision of the estimated coefficients.

To check the consistency of the error terms, heteroscedasticity tests, like the Breusch-Pagan or White tests, are employed. Heteroscedasticity can distort standard errors and affect the significance of the results. Robust standard errors or other adjustments are made when heteroscedasticity is detected.

Autocorrelation in the residuals is tested using the Durbin-Watson statistic or other suitable methods, especially given the time-series nature of the panel data. Autocorrelation, if present, can affect the reliability of coefficient estimates and model inference.

The normality of residuals is verified through the Jarque-Bera test. This step ensures that the residuals follow a normal distribution, which is critical for hypothesis testing and making accurate inferences about the population.

Cointegration tests, such as the Pedroni or Kao tests, are conducted to determine if there is a long-run equilibrium relationship between the variables. If cointegration is found, an Error Correction Model (ECM) or other techniques are employed to capture both short-run and long-run dynamics.

Cross-sectional dependence, often present in panel data involving multiple countries, is tested using Pesaran's test. Accounting for this dependence ensures that the model results are not biased by interconnections among the countries studied (Osabuohien, Olayemi & Ogbu, 2023).

Finally, the specification of the model is verified through tests like the Ramsey RESET test. This ensures that the model is correctly specified and does not omit relevant variables or include unnecessary ones. The overall fit and explanatory power of the model are assessed using the R^2 and adjusted R^2 values. By conducting these diagnostic and econometric tests, this study ensures the robustness of its findings and provides a solid foundation for the conclusions on how infrastructural development influences economic growth in selected African countries.

Method of Data Analysis

The study employs the Cointegration panel data analysis technique (Fully Modified OLS), which is appropriate for examining data from multiple countries over several years. This method allows for controlling for both cross-country differences and time-specific factors, thereby providing a more nuanced understanding of how industrial policies influence manufacturing output growth. The fixed effects or random effects model will be used, with the choice of model determined by the results of the Hausman test, which compares the suitability of the three models. Diagnostic test checks are performed to ensure the reliability and validity of the results. Unit root tests were performed using Levin, Lin &Chu (LLC) and Im, Pesaran &Shin (IPS) to ensure data stationarity across both time and cross-sectional dimensions. Cointegration tests confirm whether there is a long-term relationship among the variables, methods like error correction model (ECM) are applied. Pedroni's test examines the null hypothesis of no cointegration against the alternative hypothesis of a common or individual autoregressive coefficient among the variables. Table 1 below presents the variables for the study.

Table 3.1: Variables' Description and Sources

S/N	Variables	Proxy/	Description	Sources

		Symbols		
1	Manufacturing Output Growth	MOG	Manufacturing Output Growth	WDI, 2024
2	Monetary Policy	EXCR	The exchange rate is one of the monetary policy tools used by the government to facilitate the growth of manufacturing growth	WDI, 2024
3	Monetary policy	CPS	Credit to the private sector as another monetary policy tool used by the government to help manufacturing growth	WDI, 2024
4	Trade Policy	TOP	Trade Openness as trade policy to protect the manufacturing sector	WDI, 2024
5	Commercial Policy	FDI	Foreign Direct Investment inflows to facilitate the growth of the manufacturing sector	

Source: Authors' Compilation (2025)

ESTIMATION RESULTS AND DISCUSSION

This sub-section presents the results of the preliminary data analysis and selected countries estimation results

Table 4.1. Group Descriptive Statistics of Variables

Statistic	MOG	EXCHR	FDI	DCPS	TOPN
Mean	11.5647	1137.457	2.2932	14.7086	57.9123
Median	11.0512	502.6753	1.5343	13.2924	58.3976
Maximum	21.5869	9565.082	18.8280	32.3729	116.048
Minimum	0.0000	0.0000	-1.4788	0.0000	16.5142
Std. Dev.	3.8015	2145.143	2.7961	7.4778	21.4760
Skewness	0.1652	2.7257	2.6046	0.5191	0.5061
Kurtosis	3.8308	9.3417	12.6171	2.8815	3.2262
Jarque-Bera	4.7967	419.6081	717.7420	6.5521	6.4552
Probability	0.0909	0.0000	0.0000	0.0378	0.0397
Sum	1665.32	163793.8	330.2159	2118.03	8339.37
S. Sq. Dev.	2066.52	6.58E+08	1117.965	7996.22	65954.32
Observations	144	144	144	144	144

Source: Authors' Computation (2025)

The mean value of MOG is 11.56, while its median is 11.05, suggesting that the data is fairly symmetrical with slight variation. EXCHR (exchange rate) has a mean of 1137.46, which is significantly higher than its median of 502.67, indicating a rightward skew in exchange rate fluctuations over the years. FDI (foreign direct

investment) has an average value of 2.29, with a median of 1.53, reflecting an upward trend in foreign investment. DCPS (domestic credit to the private sector) has a mean of 14.71 and a median of 13.29, suggesting a relatively stable distribution. TOPN (trade openness) has an average value of 57.91, with a median of 58.40, showing that trade openness has remained relatively stable over time. The standard deviation indicates the degree of variability in the dataset. MOG has a standard deviation of 3.80, while EXCHR has a much higher standard deviation of 2145.14, confirming the significant fluctuations in the exchange rate. FDI exhibits a standard deviation of 2.80, suggesting that foreign investments have varied significantly. DCPS has a standard deviation of 7.48, while TOPN has a moderate standard deviation of 21.48, highlighting the degree of variations in financial and trade openness indicators.

The maximum and minimum values provide insight into the range of variation in the dataset. The highest recorded value for MOG is 21.59, while its lowest value is 0.00. EXCHR fluctuates widely, ranging from 0.00 to 9565.08, indicating periods of extreme currency volatility. FDI ranges from -1.48 to 18.83, showing instances of negative foreign direct investment. DCPS has a maximum value of 32.37 and a minimum of 0.00, while TOPN ranges from 16.51 to 116.05, highlighting different levels of trade activity in Nigeria during the study period. Skewness measures the asymmetry of the distribution. MOG, DCPS, and TOPN exhibit slight positive skewness, indicating that the data has a rightward tail. In contrast, EXCHR and FDI display strong positive skewness (2.73 and 2.60, respectively), confirming the presence of extreme values and sharp fluctuations.

Kurtosis assesses whether the distribution is more peaked (leptokurtic) or flat (platykurtic) compared to a normal distribution. MOG, DCPS, and TOPN have kurtosis values close to 3, suggesting a normal-like distribution. However, EXCHR (9.34) and FDI (12.62) exhibit high kurtosis, indicating heavy tails and extreme variations in exchange rate and foreign direct investment data. The Jarque-Bera test assesses whether the data follows a normal distribution. The probability values for EXCHR and FDI are 0.0000, suggesting significant departures from normality due to high skewness and kurtosis. MOG has a probability of 0.0909, implying mild deviation from normality, while DCPS and TOPN have p-values of 0.0378 and 0.0397, respectively, indicating moderate non-normality. The descriptive statistics indicate that EXCHR and FDI exhibit high variability and extreme values, reflecting economic fluctuations in Nigeria. MOG, DCPS, and TOPN display more stable distributions but still show signs of moderate non-normality. These insights are crucial in understanding the behavior of key economic indicators and their potential impact on income inequality, poverty, and economic growth.

Correlation matrix: The correlation matrix provides insights into the degree of association between the variables used in the study. Correlation values range from -1 to +1, where a value close to +1 indicates a strong positive relationship, a value close to -1 indicates a strong negative relationship, and a value around 0 suggests no significant correlation. Table 3. presents the correlation coefficients among manufacturing sector output growth rate.

(MOG), Exchange Rate (EXCHR), Foreign Direct Investment (FDI), Domestic Credit to Private Sector (DCPS), and Trade Openness (TOPN). The results helped to identify potential multicollinearity issues that may affect regression analysis.

Table 4.2. Correlation Matrix

Variable	MOG	EXCHR	DCPS	FDI	TOPN
MOG	1	-0.0768	0.3534	-0.1332	-0.1234
EXCHR	-0.0768	1	-0.3100	0.2031	0.3713
DCPS	0.3534	-0.3100	1	0.0431	0.0461
FDI	-0.1332	0.2031	0.0431	1	0.4378

TOPN	-0.1234	0.3713	0.0461	0.4378	1

Source: Authors' Computation (2025)

The correlation results show that MOG has a weak negative correlation with EXCHR (-0.0768), FDI (-0.1332), and TOPN (-0.1234), suggesting that increases in these variables are associated with slight reductions in money supply. On the other hand, MOG has a moderate positive relationship with DCPS (0.3534), indicating that an increase in domestic credit to the private sector is associated with an increase in money supply. Exchange rate (EXCHR) exhibits a weak negative correlation with DCPS (-0.3100) and a weak positive correlation with FDI (0.2031) and TOPN (0.3713). The relationship between FDI and TOPN is relatively strong (0.4378), implying that higher levels of trade openness are associated with higher foreign direct investment inflows. Overall, the correlation matrix suggests that multicollinearity is not a major concern among the independent variables, as none of the correlation coefficients are excessively high (above 0.8). These results provide preliminary insights that will be further explored in the regression analysis.

Unit Root Tests

Unit root tests were conducted to examine the stationarity properties of the variables in the study. Non-stationary data can lead to misleading inferences, making it necessary to determine the order of integration of each variable. The tests employed include the Levin, Lin & Chu (LLC) and the Im, Pesaran, and Shin (IPS) tests, applied at both level and first difference.

Table 4.3 Unit Root Tests Augmented Dickey-Fuller Unit Root Test

Variables		**Level**		**1st Difference**			**Integration Order**
	LLC statistics	Prob.	Inference	LLC statistics	Prob.	Inference	
MOG	0.5296	0.7686	Non-Stationary	-2.8218	0.0024	Stationary	I(1)
DCPS	0.6476	0.9271	Non-Stationary	-5.3083	0.0000	Stationary	I(1)
EXCHR	0.8124	0.2503	Non-Stationary	-5.7968	0.0000	Stationary	I(1)
FDI	-1.4284	0.0766	Non-Stationary	-4.0035	0.0000	Stationary	I(1)
TOPN	-1.8212	0.0343	Non-Stationary	-6.7914	0.0000	Stationary	I(1)

Source: Authors' Computation (2025).

The results indicate that at levels, all variables are non-stationary as their probability values exceed the 5% significance level. However, after first differencing, all variables become stationary, suggesting that they are integrated of order one, I (1). This implies that subsequent econometric analysis, such as cointegration tests and regression models, should be conducted with consideration for the stationarity properties of the variables.

Table 4.4 Summary of Hypotheses Tests

Hypothesis	Variable	Coefficient (FEM)	t-Statistic	p-Value	Decision
H_{01}: Exchange rate does not affect manufacturing output growth	EXCHR	0.001179	5.7274	0.0000	Reject H_{01}
H_{02}: Credit to the private sector does not impact manufacturing output growth	DCPS	-0.166379	-3.1494	0.0020	Reject H_{02}
H_{03}: Trade policy does not impact manufacturing output growth	TOPN	-0.020534	-1.0360	0.3022	Fail to Reject H_{03}
H_{04} : Industrial policies do not impact manufacturing output differently in the selected West African countries	EXCHR, DCPS, & TOPN	Various	various	various	Reject H_{04}

Source: Authors' Computation (2025).

The hypothesis tests confirmed that exchange rate and credit to the private sector have significant effects on manufacturing output growth in selected West African countries. In contrast, trade policy (trade openness) does not show a statistically significant impact. Also, the individual country estimations revealed that industrial policies impact manufacturing output growth differently in the selected West African countries. These findings provided empirical support for policies aimed at exchange rate stabilization and credit market reforms to enhance industrial growth. Additionally, while trade policy alone may not significantly impact manufacturing output, it should be complemented by domestic policies that strengthen the competitiveness of local industries.

Table 4.5: Selected Countries Estimation Results

Dependent Variable: MOG

Results of Fully Modified Ordinary Least Squares (FMOLS)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXCHR	0.001179	0.000206	5.727425	0.0000
FDI	-0.051429	0.104374	-0.492735	0.6230
DCPS	-0.166379	0.052828	-3.149434	0.0020
TOPN	-0.020534	0.019820	-1.036009	0.3022

R^2 0.665511

Adj.R^2 0.641993

Source: Authors' Computation (2025)

DISCUSSION OF FINDINGS

The coefficient of exchange rate (EXCHR) has a positive and statistically significant impact on manufacturing sector output growth rate (MOG), reinforcing the strong link between currency fluctuations and monetary expansion. The results showed that as the exchange rate goes up by 1%, the manufacturing sector output growth rate goes up by 0.01179%. The result implies that a favourable exchange rate policy has the potential to boost manufacturing sector output growth rate. The result on the impact of exchange rate and manufacturing sector output growth rate is in line with the findings of Akinwale (2019). Also, the finding of this study has implications for practice and future research direction. Conversely, domestic credit to the private sector (DCPS) has a negative and significant impact on manufacturing sector output growth rate (MOG), indicating that increased domestic credit reduces manufacturing sector output growth rate. This finding is also in line with Akinwale (2019). Foreign direct investment (FDI) and trade openness (TOPN) have negative coefficients models, but their impacts are statistically insignificant at conventional significance levels. This suggests that, within the study period, FDI and trade openness did not significantly influence manufacturing sector output growth rate in the selected West African Countries. The results of the findings have policy implications for manufacturing sector growth rate in the selected West African Countries. The adjusted R-squared value was estimated at 64%, indicating that all the independent variables included in the model explained about 64% of the variation in the dependent variable manufacturing sector output growth rate. The estimated R-square at 64% showed a good fit of the regression line. Summary of findings from the individual country estimation focusing on industrial policies and the manufacturing sector output growth rate in the selected African countries. The implications of industrial policies in the selected West African countries differ. Domestic credit to the private sector, which is one of the instruments of monetary policy, was significant in Côte d'Ivoire, Nigeria and Senegal. The impact of domestic credit to the private sector was positive in Côte d'Ivoire and negative in Nigeria and Senegal. Domestic credit was not significant in Burkina Faso, Ghana and Guinea. The implication is that there is a need to strengthen monetary policy (credit to the private sector) in Burkina Faso, Ghana and Guinea.

The impact of the exchange rate on the monetary sector was positive in all the selected countries for the study. The impact was significant in Burkina Faso, Guinea and Nigeria. It was not significant in Côte d'Ivoire, Ghana and Senegal. The impact of FDI was positive and insignificant in Burkina Faso, Côte d'Ivoire and Nigeria and significant in Ghana. It was negative and insignificant in Ghana, Nigeria and Senegal.

Trade openness, which is trade policy, was significant and positive only in Guinea. It was negative and significant in Burkina Faso and Ghana. It was negative and insignificant in Nigeria and Senegal. From the above, it can be concluded that the implications of industrial policies differ in the selected West African countries, possibly due to differences in policy formation and implementation.

CONCLUSION

The study investigated the impact of industrial policies on manufacturing sector output growth rate in selected West African Countries. Data spanning 2000 to 2023 were collected on the manufacturing sector output growth rate (MOG), exchange rate (EXCHR), domestic credit to the private sector (DCPS), trade openness (TOP), and foreign direct investment (FDI). The fully modified ordinary least squares (MOLS) estimation technique was used in the model estimation. The paper finds that exchange rate has a positive and statistically significant impact on manufacturing output growth, domestic credit to the private sector has a negative and statistically significant effect on manufacturing output growth, trade policy (proxy by trade openness) has a negative but statistically insignificant effect on manufacturing output growth. It deduced major implication as Exchange rate management is crucial for sustaining manufacturing output growth. Credit market reforms should be implemented to ensure effective financing of productive sectors. Trade policies should be complemented by domestic industrial policies to enhance competitiveness. The paper explained the challenges facing industrial policies such as Political instability, policy inconsistency, and weak governance undermine the effectiveness of the policy. The paper report that sustainable manufacturing output growth in West Africa requires a balanced approach that integrates monetary policy, trade policies, and industrial development strategies. Government of this region must implement measures that stabilize exchange rates, ensure efficient

credit distribution, and develop comprehensive industrial policies that promote domestic production and competitiveness. By adopting these strategies, West African economies can enhance their manufacturing sectors' contributions to economic growth, job creation, and long-term development.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations are proposed to enhance manufacturing output growth in selected West African countries:

The government of individual country should design and implement strategies to stabilize exchange rates, as

fluctuations significantly impact manufacturing output. Exchange rate volatility can be minimized through a combination of managed float policies, foreign exchange reserves management, and monetary interventions to prevent excessive depreciation that could lead to inflationary pressures.

Governments should establish credit guarantee schemes, reduce borrowing costs, and strengthen financial regulations to ensure that loans are efficiently utilized for industrial growth.

Policy framework that domesticate industrial policies encourage complementary industrial policies should be adopted to enhance domestic production capacity, improve infrastructure, and provide incentives for local manufacturers such as Tariff and non-tariff measures should be designed to protect emerging industries while maintaining competitiveness in global markets.

Governments of this region should increase investment in infrastructure projects to lower production costs and enhance manufacturing productivity. A strong manufacturing sector requires adequate infrastructure, including stable electricity supply, efficient transportation networks, and modern industrial zones.

(V) West African nations should harmonize trade agreements and industrial policies within regional blocs like AFCFTA. By fostering regional supply chains and reducing trade barriers, countries can create a larger market for locally manufactured goods and enhance industrial growth.

Government should coordinate monetary and fiscal policy to maintain price stability, control inflation, and create an environment conducive to industrial expansion.

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