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Industrial Sector Growth and Institutional Quality in Nigeria: Comparative Analyses of Economic, Financial, and Political Institutions

Nijerya Endüstri Sektörü Büyümesi ve Kurumsal Kalite: Ekonomik, Finansal ve Politik Kurumların Karşılaştırmalı Analizleri

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Abstract

Despite several industrial strategies and programs adopted and implemented by the Nigerian government to improve the sector, it is obvious that its contribution toward national development has continued to decline. The official record of the World Bank showed that the interval growth of industrial sector shares to GDP between the periods of 1996 and 1999, 1999 and 2007, 2007 and 2014, and 2014 and 2019 stood at −7.78%, −2.32%, 0.17%, and −1.69%, respectively. One of the factors that has further made the problem more severe has been the country's inherent weak institutional settings. This study uses different stand-ins to find out how economic, financial, and political systems affect the growth of the industrial sector in Nigeria between 1996: Q1 and 2019: Q4. These include economic institutions consisting of government effectiveness, regulatory quality, control of corruption, and rule of law; financial institutions comprising of contract-intensive money, lending rate, and financial deepening; and political institutions consisting of voice and accountability and political stability and absence of violence. Using the vector error correction model estimator, the results of the economic institutions showed that government effectiveness, regulatory quality, and rule of law negatively impacted industrial output growth, while control of corruption influenced the industrial sector positively. For financial institutions, contract-intensive money, lending rates, and financial deepening influenced industrial output growth positively. As regards political institutions, industrial output growth is negatively influenced by voice and accountability but positively influenced by political stability and absence of violence. We further discovered that financial institutions have the greatest impact on industrial sector growth, followed by economic institutions and political institutions. The study suggests the need for effective institutional settings that continuously ensure public service quality, contract enforcement, a stable political atmosphere, low interest on credit, and monitoring the activities of public officers to guarantee industrial output growth in Nigeria.

Keywords: Economic institutions, financial institutions, industrial output, political institutions

Öz

Nijerya hükümeti tarafından sektörü iyileştirmek için benimsenen ve uygulanan birçok endüstri stratejisi ve programına rağmen, sektörün ulusal kalkınmaya olan katkısının azalmaya devam ettiği açıktır. Dünya Bankası'nın resmi kaydına göre, 1996–1999, 1999–2007, 2007–2014 ve 2014–2019 dönemleri arasında endüstri sektörü paylarının GSYİH'ye aralıklı büyümesi sırasıyla -7.78%, -2.32%, 0.17% ve -1.69% olarak gerçekleşmiştir. Sorunu daha da ağırlaştıran faktörlerden biri, ülkenin yerleşik zayıf kurumsal ayarları olmuştur. Bu çalışma, 1996:Q1 ve 2019:Q4 arasında Nijerya'da ekonomik, finansal ve politik sistemlerin endüstri sektörü büyümesini nasıl etkilediğini bulmak için farklı göstergeler kullanmıştır. Ekonomik kurumlar; hükümet etkinliği, düzenleyici kalite, yolsuzlukla mücadele ve hukukun üstünlüğü gibi; finansal kurumlar; sözleşmeye dayalı para, kredi oranı ve finansal derinleşme; ve politik kurumlar; ses ve hesap verebilirlik ile politik istikrar & şiddetin olmaması

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gibi unsurları içerir. Vektör Hata Düzeltme (VEC) modeli tahmincisi kullanılarak, ekonomik kurumların sonuçları hükümet etkinliği, düzenleyici kalite ve hukukun üstünlüğünün endüstriyel çıktı büyümesi üzerinde olumsuz etkili olduğunu, yolsuzlukla mücadele kontrolünün ise endüstri sektörünü olumlu etkilediğini göstermiştir. Finansal kurumlar açısından, sözleşmeye dayalı para kredi oranları ve finansal derinleşme endüstriyel çıktı büyümesini olumlu etkilemiştir. Politik kurumlar açısından, endüstriyel çıktı büyümesi ses & hesap verebilirlik tarafından olumsuz etkilenirken, politik istikrar & şiddetin olmaması tarafından olumlu etkilenmiştir. Finansal kurumların, endüstri sektörü büyümesi üzerinde en büyük etkiye sahip olduğunu, bunu ekonomik kurumların ve politik kurumların izlediğini keşfettik. Çalışma, sürekli olarak kamu hizmeti kalitesini, sözleşme uygulamasını, istikrarlı bir politik atmosferi, kredide düşük faizi ve endüstriyel çıktı büyümesini garanti altına almak için kamu görevlilerinin faaliyetlerini izlemeyi sağlayacak etkili kurumsal ayarların gerekliliğini önermektedir.

Anahtar Kelimeler: Ekonomik kurumlar, finansal kurumlar, politik kurumlar, endüstriyel çıktı

Introduction

Nigeria's institutional settings and leadership have stayed weak since her political transition to the Fourth Republic in 1999. This is because the central authority is struggling to not only run society but also improve the social and economic conditions of its people. In addition, many contended that Nigeria's democratic traditions were weakened by the many years of military dictatorship that preceded the Fourth Republic, and this made it harder for the country to get the benefits of democracy even after 1999. According to Akanji (2019), this viewpoint has some merit owing to the fact that the period of military dictatorship in Nigeria hindered not only the country's institutional and political development but also its organic evolution as a society. Thus, there have been a lot of military interventions and unhealthy competition in the country's politics, which has had a big impact on her institutional structure and growth path.

The weak institutional settings in Nigeria have made some of the problems (such as management incompetence, lack of expertise, insufficient learning opportunities, and a lack of investment in people, among other things) facing her industries more complex over the last decades. A developing country like Nigeria generally has low-quality institutions that fail to support productive investments and also protect property rights (Ubi & Udah, 2014). Statistical evidence from the World Bank (2020a) database revealed the state of the weak economic and political institutional framework in Nigeria, as all indices tend to have negative values. The average value of Nigeria's institutional quality from 1996 to 2016 was −1.127, denoting weak institutional quality (the standard value ranges from +2.5 to −2.5, indicating a strong institutional framework and weak institutional settings, respectively). The six components that comprised the economic and political governance quality were weak, as their average values were −0.732, −0.886, −1.028, −1.165, −1.180, and −1.772 for voice and accountability, rule of law, government effectiveness, control of corruption, regulatory quality, and political stability and absence of violence, respectively. Nigeria has a weak rule of law, a lot of corruption, and bad institutions. High lending rates have also been an ongoing problem, making it difficult for people and small businesses to gain access to finance. The availability and circulation of physical currency and demand deposits are constrained by reasons such as cash hoarding, informal economic activities, and inadequate financial inclusion. When compared to the GDP of other countries, the amount of domestic credit extended to the private sector in Nigeria has always been low. This has led to low output growth in Nigeria's industries amidst an abundance of natural resources (resource curse) when compared to the Asian Tiger countries (like Korea, Taiwan, Hong Kong, and Singapore) and the newly industrialized countries (NICs) with strong institutions and rapid economic growth while having fewer natural resources (Avalos, 2013).

Also, this has caused overreliance on a single commodity (crude oil) as the country's main source of income because the corrupt practices of the political elites have turned the blessing into a curse as the proceeds are not used to develop other important sectors (Alimi et al., 2015). For instance, the Nigerian industrial sector comprises three basic industries: solid minerals, crude petroleum and natural gas, and manufacturing industries. The government's heavy reliance on oil exports as a primary funding source has bedeviled the overall growth of the country, where a larger proportion of its citizens continue to live below US$1.2 per day and in abject poverty (Aimi & Yinusa, 2016). The Central Bank of Nigeria (2020) confirmed that crude petroleum and natural gas sector activities dominate the industrial sector, as they account for over 75% of total industries' outputs from 1983 to 2007 and over 60% from 1981 to 2012. However, the three subsectors' contribution to national growth (real GDP) revealed that crude petroleum and natural gas are not sustainable, as they continue to fall drastically as a result of the dismay in the Niger-Delta community by the militants, which was mainly recorded in the last decades. The industrial sector's output growth was also slowed by inadequate government support meant to boost its competitiveness, insufficient funds, and the high cost of funding for the industry (Odijie, 2019).

What's more, there has been a worrying decline in industrial development's contribution to national output growth, despite the adoption of a number of industrial strategies and programs designed to boost industrial development. These include the Import Substitution Strategy, indigenization policy, the Structural Adjustment Programme, export promotion, incentives for local industries, and import liberalization. Lately, from the 1980s to the New Millennium, statistical evidence has shown that the industrial sector has been vital to Nigeria's economic growth and development, as it accounts for more than 35% of the country's GDP (Central Bank of Nigeria,

2020). Afterward, the industry's share of the national gross domestic product (GDP) has continued to fall over time, losing its percentage share to other sectors. The official record of the Central Bank further revealed that the industrial sector's shares in GDP fell from 44.19% in 1990 to 31.29% in 2002, rose in the next year (2003) to 34.36%, and continued to drop to 31.15%, 24.06%, 21.74%, 19.29%, and 17.75% in 2005, 2008, 2012, 2015, and 2016 respectively (Central Bank of Nigeria, 2020).

In addition, there are three reasons why it is not an easy task to quantify the impact of institutions on economic growth. First, there has been increased focus on how institutional integration and institutional transformation contribute to industrial and nationwide productivity. Second, following the growing body of literature, there is not a single complete explanation of economic, political, and financial institutions, how they work, or the different ways they might be able to affect economic outcomes. North (1990) argued that the key to much study lies in the precise definition of what institutions are, how they differ from organizations, and how they impact transactions and output. Third, institutions cover a wide range of indicators, including the quality of institutions (enforcing property rights), political unrest (coups, riots, and civil wars), political regime characteristics (constitutions, elections, and executive authority), social capital (the level of civic engagement and organizations), and social characteristics (income disparity, religion diversity, ethnicity, religion, and differences in historical background). Each of these indicators has the ability to have a unique effect on growth, and they have all been used in previous research (such as Avalos, 2013; Robert, 2011; Sala-i-Martin & Subramanian, 2013) to help explain the characteristics of the indicators in question. However, several authors (such as Nathan & Okon, 2013; Ologunla, Kareem, & Raheem, 2014; Temple, 1999) either fail to acknowledge or downplay the limitations of the aforementioned research in terms of data, methodology, and variable identification. This study therefore investigates the effects of economic, financial, and political institutions on industrial output growth in Nigeria within the period 1996: Q1–2019: Q4.

The remainder of the research is divided into four parts. A brief literature review was presented in the second part, while the data and methods of analysis were reviewed in the third part. Section four presents the empirical analysis of the data, and the study finishes with recommendations for boosting industrial output growth.

Literature Review

There are few studies focusing on the institutions-industrial growth nexus as opposed to the institutions-economic growth relations. The majority of the works reviewed focus on the links between institutions and output growth, with only a few studies on the relationship between institutions and industrial growth being reviewed first. Using data samples from developed countries from 1974 to 1989 from the International Country Risk Guide (ICRG) and Business Environmental Risk Intelligence (BERI), Knack and Keefer (1995) examine the effect of property rights on economic performance in some developed countries using two alternative measures of institutions provided by country risk evaluators to potential investors. Two private international investment risk services, the ICRG and the BERI, give assessments of contract enforceability and expropriation risk that are included as economic indicators. In contrast to proxies like the Gastil indices of liberties and the frequency of revolutions, coups, and political assassinations, the study found that property rights have a more direct impact on investment and growth. In addition, institutions continue to have an impact on growth even when accounting for investment. In other words, the safety of people's property affects not only how much money is put into something but also how well it is used. When institutions are also considered, the evidence for conditional convergence becomes even more compelling. When the ICRG and BERI indices of institutional quality were present, the coefficients on initial income that are used to analyze conditional convergence or diminishing returns to capital took on greater statistical and economic significance. Similarly, Mauro (1995) argued that subjective corruption indexes are negatively correlated with GDP growth and FDI. Corruption has been shown to have a statistically significant negative link with investment and growth.

Barro (1999) examined democracy's determinants using a panel analysis of over 100 industrialized and developing nations from 1960 to 1995. Per capita GDP, primary schooling, and a smaller gender gap in elementary school attainment improve democracy. The Lipset–Aristotle hypothesis, which claims that higher per capita income and primary school completion strengthen democracy as measured by electoral rights and civil liberties, is supported by the data. Democracy declines when urbanization and natural resource dependence rise. It showed that democracy rises with middle-class income, not country size. Based on mortality rate variations, Acemoglu, Johnson, and Robinson (2001) examined how institutions affect economic performance in 64 developing nations. By using panel ordinary least squares (OLS), institutions and economic performance are robust to controlling variables like climate, ethnolinguistic fragmentation, latitude, religion, health condition, soil quality, natural resources, and current racial composition. They further stated that colonial practices did not predetermine institutions and could be modified.

Grigorian and Martinez (2000) examined the economic benefits of institutions, particularly rule of law, in 27 emerging Asian and Latin American nations from 1982 to 1997. The result showed that institutional quality and legal factors significantly affected industrial growth in 27 Asian and Latin American nations. Also, institutional quality strongly boosts industrial growth. They proved that a good set of laws and rules, a few problems with administration, and proactive law enforcement all help industrial output growth by making investments and resource allocation more effective. The study also found that their findings are resilient to investment rate endogeneity. Using 113 Middle Eastern countries between 1971 and 1997, Ross (2001) examines whether oil hinders democracy. The study demonstrated that oil hinders democracy. It also showed

that oil harms democracy more in poor countries than in rich ones, and a surge in oil exports will hurt impoverished countries more than rich ones. Even in underdeveloped countries, oil exports hinder democracy.

Isham, Woolcock, and Busby (2005) found that countries dependent on natural resources and plantation crops had poor institutions and a higher economic and social divide. The empirical finding on export structure classifications shows that countries that export point sources like coffee and cocoa do poorly on many governance metrics, even when a lot of other possible variables are taken into account. It showed that governance impacts more than natural resource exporters. Countries with scattered natural resource exports that rely mostly on livestock and agricultural commodities from small family farms have seen stronger growth recoveries. The study by Brunnschweiler and Bulte (2006) looked at the connections between natural resources, institutional quality, resource dependence, and economic growth in 89 developing countries and 29 developed countries (including G7 countries). The data, collected from 1970 to 2000, was cross-sectional. The variables are resource abundance (measured by the natural log of per capita investment in 1994 and the natural log of per capita subsoil assets in 1994), resource dependence (exports of agricultural raw materials, minerals, and natural resources as a ratio of GDP from 1970 to 1980), trade openness, regional dummies, and quality of institutions (measured by the quality of bureaucracy in 1996 and the rule of law in 1996). Resource abundance improves institutional quality, while resource reliance does not. Quality institutions decrease resource dependency, but resource abundance, openness, and regime type increase it.

Using a cross-country data collection that included 77 industrialized and developing countries (G7 countries included) from 1965 to 1990, Sachs and Warner (1995) investigated the factors that led to economic growth. The variables include: natural resources (proxied by the total export of primary agriculture, fuels, and minerals as a ratio of GDP), institutions (captured by the unweighted average of these variables such as bureaucratic quality, rule of law, risk of expropriation, corruption in government, and government repudiation of contracts), trade openness (measured by the log of real GDP per economically active population), and the size of the domestic market—all considered factors of economic growth. They discovered that weak economic policies and poor institutional frameworks (particularly a lack of openness to international markets) dampen economic expansion. It was also shown that the presence of natural resources retards economic development for reasons like the Dutch Disease and enhanced rent-seeking motivations. The study found that the most important growth indicators are those that are within the purview of individual communities. The authors draw the conclusion that countries with robust economic reforms have had rapid economic development.

Ahmad (2011) researched how institutions affected economic growth in 69 developing nations from 1984 to 2008. The panel GMM showed that institutions influence growth through factor productivity. Secure property rights and bureaucratic efficiency affect output growth in all emerging countries, but East Asian countries also benefit from political institutions. During high growth in East Asia, secure property rights and autocratic rule greatly determine growth, but there is no clear evidence of institutional importance post-crisis. Ahmadov, Mammadov, and Aslanli (2013) examined government effectiveness (oil rent, income per capita, politics index, and foreign direct investment) in resource-rich Caspian Basin countries with transition economies (Turkmenistan, Azerbaijan, Russia, and Kazakhstan) from 1996 to 2011. The Hausman test assessed technique appropriateness in the panel fixed effects study. Except for Russia, where oil rents improved institutional quality, empirical research showed that the primary resource-related variables negatively affect institutional quality and total natural resources marginally negatively affect it. The study found that total natural resource income reduces government effectiveness. Foreign direct investment, income per capita, and the political index also affected government efficiency. Yildirim and Gokalp (2015) used panel fixed and random effects to study institutions and macroeconomic performance in 38 developing countries from 2000 to 2011. Institutional structure indicators like legal system integrity, trade barrier regulations, foreign investment restrictions, private sector banking share, and employment-dismissal variables improve developing countries' macroeconomic performance. However, institutional variables like collective bargaining, government expenditures, transfers, and subsidies, civil liberties, the black market exchange rate, judiciary independence, and military tutelage (political stability) hurt developing countries' macroeconomic performance. Uddin, Ali, and Masih (2021) examined human capital, institutions, and economic growth in 120 developing nations between 1996 and 2014. The dynamic system GMM shows that human development and institutions boost economic growth. Institutions and human development interact to negatively impact emerging countries' economic progress.

Furthermore, studies relating to the Nigerian economy were reviewed. Robert (2011) studied the political economies of Nigeria's resource curse and the Niger Delta crisis. According to the resource curse, greed, poor resource management, and weak governance quality in developing countries like Nigeria lead to poverty, underdevelopment, and economic crises despite abundant natural resources. Sala-i-Martin and Subramanian (2013) examined the natural resource curse by examining how price volatility, exchange rate overvaluation, institutional quality, and natural resources affected production growth in Nigeria from 1970 to 1998. Oil and natural resources negatively damage institutional quality, which negatively impacts growth. The finding is resilient to estimating methods and factors. Nigeria's long-term economic performance is due to oil waste and corruption, not Dutch disease. Likewise, Akinwale (2012) also examined Nigeria's resource curse empirically. The study found that corruption, poor institutions, low technology, and Dutch disease directly affect Nigeria's resource curse, whereas crude oil price volatility

does not. Nathan and Okon (2013) examined Nigeria's poor performance compared to Brazil and Canada due to its over-dependence on oil and weak institutions. Nigeria was compared to Canada and Brazil in terms of income per capita, oil rent to GDP, corruption index, government performance, and inflation rate. Granger causality and conventional least squares were employed between 2000 and 2010. The causality tests reveal that corruption levels explain the output growth gap between Nigeria and Canada. Corruption and government effectiveness in Canada and Nigeria were found to be bidirectional. According to parameter estimations, the biggest disparity in growth performance between Brazil and Nigeria, and Canada and Nigeria was corruption. A 10% corruption gap decrease will reduce the growth gap among Canada and Nigeria, and Brazil and Nigeria by 4.52% and 5.65%, respectively.

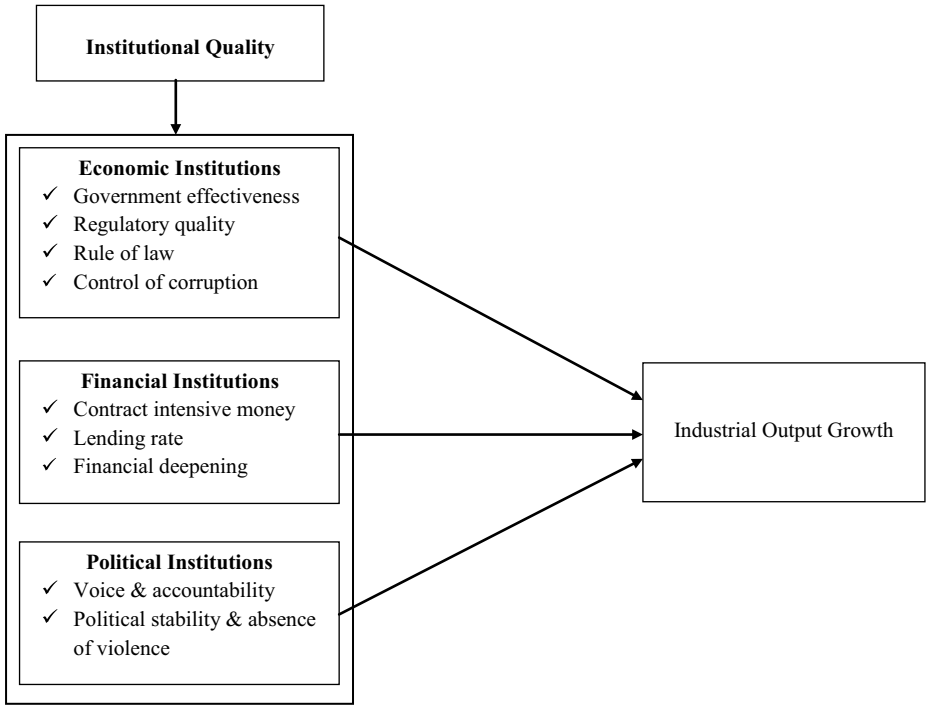
Ubi and Udah (2014) studied the effects of institutional quality and control of corruption on Nigeria's economic growth between 1970 and 2012 using OLS and Error Correction Model (ECM). Results demonstrated that institutional quality (as measured by contract-intensive money) and corruption control statistically and significantly affected economic performance. The inference is that corruption has drastically damaged institutional quality, and practically all political and economic activity in Nigeria has rent-seeking undertones that hurt economic performance. Udah, Ubi, and Efiom (2016) examined Nigeria's economic performance and institutional quality between 1970 and 2010 using the cointegration and error correction models. Property rights and governance efficacy are crucial to the country's economic performance. Property rights and governance structure, along with strong reform programs and political leadership, define macroeconomic reform outcomes, economic performance, and sustainable development. Olayungbo and Adediran (2017) used autoregressive distributed lag to look at the growth effects of institutional quality and oil revenue in Nigeria from 1984 to 2014. The results showed that Nigeria's corruption score (indicating poor institutional settings) boosts output growth in the short term but slows it in the long term. Oil revenue boosts short-term economic growth but slows long-term growth. The findings validated Nigeria's resource curse, or Dutch disease. Thus, oil revenue affects Nigeria's growth compared to the institutional framework. Institutional settings are more essential to understanding oil revenue's impact on economic growth.

Concerning other factors of output growth, Ukoha (2000) examined Nigerian manufacturing capacity utilization for the period 1970–1998. Results revealed that capital investment in manufacturing activities, the exchange rate, and real income per capita increased manufacturing capacity utilization, whereas loans and advances to manufacturing and price instability decreased it. Odior (2013) examined how macroeconomic factors affected Nigerian industrial productivity between 1975 and 2011. The results of this study, which employed the vector error correction model (VECM), demonstrated that a significant boost in industrial productivity in Nigeria is achieved by the provision of credit via loans and advances and foreign direct investment. However, a broad money supply has a less significant impact on manufacturing sector productivity. Afaha and Ologundudu (2014) employed cointegration and error correction models to investigate the macroeconomic factors that affected the performance of the Nigerian industrial sector from 1979 to 2010. The findings showed that exchange rates and interest rate spread negatively impacted Nigeria's manufacturing subsector and that a rise in the index is a sign of high inflation, not real growth. Aiyedogbon and Anyanwu (2015) examined the macroeconomic factors of Nigerian industrial productivity from 1981 to 2013. Using the OLS method, they found that the exchange rate boosts Nigerian industrial productivity. The study also found that the interest rate, foreign direct investment, and real GDP directly affect the industrial production index. However, broad money supply, consumer price index, and manufacturing sector loans hurt Nigerian industrial sector development.

Otalu and Anderu (2015) examined Nigerian industrial sector growth variables. Industrial growth was determined by capacity utilization, gross capital creation, labor, education as assessed by school enrollment, inflation rate, exchange rate, trade openness, and power generation. The results from the cointegration and ECM approaches reveal that all factor determinants have a persistent effect on industrial output growth. Capital and labor have a big impact, and the exchange rate is positive and considerable, suggesting that currency appreciation may hurt industrial sector growth. Sokunle and Chase (2016) examined how government incentives and foreign direct inflows affected manufacturing and economic growth in 26 sub-Saharan African nations between 2008 and 2010. They found that interest rates, inflation, government incentives, and FDI did not affect manufacturing sector development. The report reveals that corruption and political instabilities in several African countries have slowed manufacturing sector expansion in sub-Saharan African countries. Mohsen, Chua, and Che Sab (2015) examined Syria's 1980–2010 industrial output factors. The following estimators were used in the study: the Johansen cointegration test, the Granger causality test, impulse response functions, variance decomposition analysis, and stability tests. Industrial production is positively associated with manufactured exports, capital, agricultural output, and population but adversely related to oil prices. Industrial output depends most on agricultural output growth. In the short and long run, oil prices, capital, population, manufacturing exports, and agricultural output were bi-directionally causative of industrial output.

The empirical evidence from the reviewed studies on the quality of institutions and growth is mixed and can best be described as inconclusive. Various estimation strategies have been applied to examine the connection between institutional quality and industrial output growth, which may account for the contradictory findings in the empirical literature. Based on the nature of the data, this investigation uses a suitable econometric method, such as a vector error correction model. In Figure 1, we provide a conceptual

Figure 1.
Conceptual Links Between Institutional Quality and Industrial Output Growth.



connection between institutional quality and industrial output growth. The study shows that the abolition of free riding is essential to the growth and development of any economy's manufacturing sector, along with other economic activities, financial advancements, and political will. Because of the importance of economic institutions, it is clear that measures to improve government efficiency, regulatory quality, the rule of law, and corruption control are required, particularly in developing countries where these elements are still in short supply. For instance, a country's industrial sector can be revitalized and lead to long-term sustainable growth and development if the government is given the freedom it needs to function independently, effective policies are developed and put into place, contracts are upheld, and people's efforts are recognized.

The quality of a country's financial institutions is measured by how well they serve all of its citizens, regardless of their socioeconomic status. To achieve this goal, it is possible to regulate the supply of money and offer low- or zero-interest loans to the people. This would allow the manufacturing sector to accomplish its goals and improve related industries like agriculture and the service industry. Political institutions also play a significant role in supporting the expansion and improvement of industrial output. In order to encourage local and foreign investors to contribute to the country's development through business, it is necessary to guarantee every citizen the right to select and challenge the people controlling the affairs of the state.

Material and Methods

Theoretical Underpinning

The study employs the traditional neoclassical growth theory, which is found relevant to illustrating the relationship between institutional quality and industrial sector growth. It looks like the typical Cobb–Douglas production function that is used to show the Solow version of neoclassical theory, which says that output and factor inputs are linked:

$$Y = f(K, AL) \quad (1)$$

where Y is production output, K is capital, L is labor, and A represents total factor productivity. The factor inputs are made up of labor and capital. The model's nonfunctional version expresses the assumption of constant return to scale as follows:

$$Y = K^{\alpha} AL^{\beta} \quad (2)$$

$$\alpha + \beta = 1 \quad (3)$$

However, the dimensions of factor intensity are specified as follows: $\beta = 1 - \alpha$

Equation (2) can therefore be rewritten as:

$$Y = K^{\alpha} AL^{1-\alpha} \quad (4)$$

Equation (4) assumes a constant return to scale based on the classical growth hypothesis. It predicts that output will increase at a pace equal to and possibly even exceeding that of the growth of factor inputs. In the Solow model, the more capital is used, the slower the pace at which output grows. Depreciation, or the loss of productive value, affects the capital stock at a constant rate throughout time.

The neoclassical growth model was originally created for a closed economy, based on the ideas of continuous returns to scale and exogenous technological progress (Matveenko & Korolev, 2011).

It was not assumed that international trade would play a significant role in the expansion of production. But if increasing returns are included, intercountry trade's scale impacts become critical to any account of development. Solow points out in his keynote talk that open-economy growth theory has not received much attention, even though there are a number of significant contributions from scholars like Helpman and Krugman (1985), Grossman and Helpman (1991), Jones and Scrimgeour (2004, 2008), Korolev and Matveenko (2006), and Matveenko (2006), etc.

The traditional neoclassical model attributes the convergence of per capita income to shared technologies, a constant savings rate, and a growing population. When a developing nation gains access to more advanced technology, it might experience rapid economic growth until it reaches a stable state in which its per capita income and growth rate are equal to those of the more developed nation. While there are basic assumptions that underpin all neoclassical growth models, there are a number of variations.

According to Dawson (1998), two distinct ways were offered for how institutional quality influences growth. The scholar offered that economic, financial, and political institutions can influence output growth via total factor productivity or investment channels. Under the investment channel, he claimed that if economic, financial, and political institutions affect investment, it then implies that economic, financial, and political institutions affect output growth indirectly. Besley (1995) offered three points on the direct links between institutions and investment: (a) investments may be shielded from expropriation by the state or other individuals if secure property rights are in place; (b) if the institutions that regulate credit markets and the enforcement of contracts are favorable, roadblocks to the financial and contractual arrangements needed to carry out investment can be removed; and (c) institutions that make it easier for people and businesses to transact economically boost both the benefits of trade and the possibility for investment returns.

On the other hand, the effect of economic, financial, and political institutions on growth via the total factor productivity channel indicates that differences in institutional settings across countries may lead to variations in their productive efficiency. It implies that a country with abundant resources may lack growth and development because the system has weak institutional settings that can support efficient allocation of resources (Dawson, 1998). It was therefore assumed that institutional quality affects growth through total factor productivity and not through investment. This is because, following the investment channel, investment was omitted, which would not be appropriate in this regard. Therefore, the assumption that economic, financial, and political institutions affect total factor productivity enters into the model by specifying technology, *A* as a function of institutional quality (*IQ*).

$$A = A_0 e^{IQ} \tag{5}$$

Thus, incorporating equation (5) into equation (4) and taking the natural logs of both sides, it then becomes:

$$\ln Y = \ln A_0 + \alpha \ln K + (1-\alpha)\ln L + IQ \ \text{ while } \ln e=1 \tag{6}$$

The functional form of equation (6) in mathematical form with stochastic term and a time-specific effect is therefore specified as follows:

$$iy_t = \gamma_0 + \alpha k_t + \beta l_t + \mathrm{B} iq_t + \varepsilon_t \tag{7}$$

Note: $\ln Y = iy$, $\ln A = \gamma_0$, $\ln K = k$, $\ln L = l$, $IQ = iq$

Therefore, the augmented version of the Solow growth model indicates that investment growth, labor growth rate, and institutional quality are determinants of output with positive relationship expectations. Past studies that used the neoclassical theoretical growth model are Barseghyan and Guerdjikova (2011), Ajide (2014), Aguirre (2017), and so on.

Model Specification and Data Description

The theoretical model solved in the last subsection (see equation 7) is employed for analyzing the nexus between economic institutions, financial institutions, political institutions, and industrial output growth (*iy*) in Nigeria. In addition, to control the fact that economic institutions (*ei*), financial institutions (*fi*), and political institutions (*pi*) presumably have a direct effect on industrial output growth, exogenous factors (control variables (*X*)) are incorporated in equation (7) as follows:

$$iy_t = \gamma_0 + \alpha k_t + \beta l_t + \Phi ei_t + \Theta fi_t + \Psi pi_t + \rho X_t + \varepsilon_t \tag{8}$$

However, following the lead of literature such as Ajide (2014), macroeconomic variables such as foreign direct investment (*fdi*) and trade intensity measured by total trade to GDP (*ti*) are considered control factors. Therefore, the empirical model for this study is specified as:

$$iy_t = \gamma_0 + \alpha k_t + \beta l_t + \Phi ei_t + \Theta fi_t + \Psi pi_t + \rho_1 fdi_t + \rho_2 ti_t + \varepsilon_t \tag{9}$$

In this study, economic institutions (*ei*) are made up of four types of indices that were used by Lehne, Mo, and Plekhanov

(2014) to look at institutional settings. These are government effectiveness (*gef*), regulatory quality (*rqv*), rule of law (*rlw*), and control of corruption (*ccn*). According to Osabuohien (2011), financial institutions are measured using three indicators, which consist of contract-intensive money (*cim*) proxied by the total money supply less currency outside the banking system divided broad money (M_2), lending rate (*lr*), and financing deepening (*fd*) measured by commercial banks credit to the private sector to GDP. According to Lehne, Mo, and Plekhanov (2014), political institutions (*pi*) are a vector of voice and accountability (*vac*) and political stability and absence of violence (*psav*). Industrial output growth (*iy)* measured by a total percentage value of industrial output of GDP; *k* is capital investment proxy by gross fixed capital formation to GDP; *l* is labor force; *ti* is trade intensity proxied as the percentage of total trade volume to GDP; Φ is a vector of the parameters of economic institutions; Θ is a vector of the coefficients of financial institutions; Ψ is a vector of the parameters of political institutions; $\gamma_0, \alpha, \beta, \rho_1, \rho_2$ are parameter estimates; *t* is time; and ε is error term. The database of the World Bank is used as a source for the data on economic and political institutions, while the Central Bank of Nigeria is the source for the remaining data sets. Table 1 presents the measurement of all the indicators, while a natural logarithm was used to equate them on the same level.

A Priori Expectation

The a priori expectation hypothesizes that institutional quality indicators have a direct relationship with industrial output growth. It implies that an economy whose institutional framework is strong and reliable will drive overall output growth as well as industry. Concerning economic institutions, the study presumes that government effectiveness in terms of its independence from political pressures and quality of public services fostering private investment would enhance industrial output growth. Also, the government's propensity to create and enact policies and rules that are both pro-growth and private-sector-friendly (i.e., regulatory quality) would increase industrial output growth. Similarly, growth in industrial output is expected to be positively related to the strength of institutions like contract enforcement, property rights, the police, and the courts (rule of law). The same is true for economic success; when corruption is under control, it becomes more of a result of hard work and skill than personal connections and bribes, which is beneficial for expanding industrial output.

Regarding political institutions, the study assumes that voice and accountability, political stability, and the absence of violence directly relate to industrial output growth. For voice and accountability, an economy where citizens select and challenge the government and also limit the executive power has a higher tendency to attract and sustain investment that is capable of driving industrial output growth. The higher the probability of political stability and the absence of politically motivated violence, the more likely it is that an investor will increase its level of investment toward improving industrial output growth. As regards financial institutions, the study assumes that contract-intensive money and financial deepening positively relate to industrial output growth. The two financial institution variables are factors that attract private investment toward enhancing industrial output growth. However, interest rates have an indirect link with industrial output growth. Thus, a low interest rate attracts investment from the private sector, which then drives industrial output growth.

Estimation Approaches

This study used the Vector Error Correction (VEC) model approach to analyze the links among institutions and industrial output growth in equation (9) based on the results of the unit root tests. Stationarity at the first difference and the occurrence of a long-run link among the variables favored the VEC model estimator as the most acceptable method to use. The short-term and long-term estimations, as well as the direction of our variables, can be obtained with the use of the VEC model approach. As stated by Rahmaddi and Ichihashi (2011), cointegrating analysis, a feature of long-run equilibrium, reveals the nature of the long-term interaction between the variables.

Ethics Committee Approval

Because the data sets are preexisting data that reputable organizations (the Central Bank of Nigeria and the World Bank) have already collected, there is no clearance from an ethics council for this study. These statistics are intended to be used for analysis and decision-making. The fact that the data sets are already available to the general public and are freely available makes them part of the public domain of information. In addition to this, the data sets have already been compiled in accordance with the ethical guidelines and procedures of these organizations.

Results

Descriptive Analysis

Table 2 shows the descriptive statistics of the variables. The average value of industrial output growth, which is calculated by industrial output as a percentage of GDP, was 26.49%. The highest and lowest values were 37.85% and 17.02%, respectively. It shows that the Nigerian industrial sector accounts for 26.49% of all economic activities carried out by all sectors of the Nigerian economy. The mean values of economic institution variables measured by government effectiveness (*gef*), regulatory quality (*rqv*), rule of law (*rlw*), and corruption control (*ccn*) were −1.022, −0.899, −1.166, and −1.168, respectively, while their maximum and minimum values were −0.878, −0.631, −0.837, and −0.859, and −1.256, −1.454, −1.431, and −1.450. As a result, the Nigerian economic institutions are weak in terms of the quality of public services, government policy formulation and implementation, promoting private sector development, contract enforcement and property rights, and promoting citizens' effort and competence during the specified periods. One of the main reasons for the country's weak economic institutional settings is the country's unstable political structure over the years.

The mean values of financial institutions measured by contract-intensive money (cim), lending rate, and financial

Table 1.
Definitions and Sources of Data and Variable Measurement

Signs	Description	Unit Measurement	Data Source
iy	Industrial output growth measures the total rate of output produced in the industrial sector to GDP.	Naira (billion)	CBN (2020)
k	Capital measured by gross fixed capital formation measures by the total capital of private investors in the economy.	Naira (billion)	CBN (2020)
lab	Labor force is the number of people who are within the age bracket of working class in an economy.	Absolute value	WDI (2020)
vac	Voice and accountability capture the extent to which a country's citizens can select and challenge its government, thus limiting executive power.	Index (−2.5 to 2.5)	WGI (2020)
psav	Political stability and absence of violence states that the lower the probability of political instability and/or politically motivated violence, the more a country's citizens are incentivized to invest in their own prosperous future.	Index (−2.5 to 2.5)	WGI (2020)
gef	Government effectiveness captures the quality of public services and the degree of its independence from political pressures.	Index (−2.5 to 2.5)	WGI (2020)
rqv	Regulatory quality is the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.	Index (−2.5 to 2.5)	WGI (2020)
rlw	Rule of law captures particularly the quality of contract enforcement, property rights, the police, and the courts, i.e., the enforcement of the rules of society.	Index (−2.5 to 2.5)	WGI (2020)
ccn	Control of corruption shows that the stronger the control of corruption, the more economic success is a function of effort and competence, rather than connections and bribery.	Index (−2.5 to 2.5)	WGI (2020)
cim	Contract-intensive money measures the total money supply less currency outside the banking system as a ratio of broad money.	Rate (%)	CBN (2020)
lr	Lending rate is the rate at which commercial bank give loan to people seeking financial assistant.	Rate (%)	CBN (2020)
fd	Financial deepening measures by domestic credit to private sector to GDP shows the total level of domestic credit/loans provided by banks to the private sector to the size of the economy.	Rate (%)	CBN (2020)
fdi	The foreign direct investment measure the total investment capital of foreign investors in the country.	Naira (billion)	CBN (2020)
ti	Trade index measures the total volume in market values of total trade to the economic size of the country.	Rate (%)	CBN (2020)

Note: CBN = Central Bank of Nigeria; WDI = World Development Indicators; WGI = World Governance Indicators.

deepening proxied by credit to the private sector to GDP (*fd*) were 82.32%, 19.68%, and 13.46%, respectively, with maximum values of 92.57%, 31.68%, and 21.11%. The minimum values for contract-intensive money (*cim*), lending rate, and financial deepening proxied by credit to the private sector to GDP are 65.28%, 14.43%, and 6.09%, respectively (fd). This means that domestic credit to the private sector was disbursed at a two-digit average of 13.76%. The descriptive statistics of two selected political institutions, voice and accountability (*vac*) and political stability and absence of violence (*psav*), as well as their summary values, were also considered. Voice and accountability (*vac*) and political stability and absence of violence (*psav*) had average values of −0.709 and −1.717, respectively. It confirms the deterioration of Nigeria's political system over time. During the examined periods, the average values of the two key factor determinants of industrial output growth were 23.75% and 45,993,900 for capital investment (*k*) and labor force (*l*), respectively. Their maximum values were 43.02% and 62,166,800, respectively, while their minimum values were 13.97% and 33,924,300. The mean values of foreign direct investment to GDP (*fdi*) and the trade intensity proxy by total trade as a ratio of GDP (*ti*) for the control variables are 1.80% and 38.17%, respectively. Foreign direct investment (fdi) and trade intensity proxy by total trade as a ratio of GDP have minimum values of 0.55% and 19.76%, respectively, while the maximum values are 3.24% and 55.29%.

Table 3 presents the partial correlation of the institutional quality indicators, capital, labor force, foreign direct investment, trade intensity, and industrial output growth in Nigeria using a quarterly dataset within the period of 1996–2019. The correlation coefficients indicating the level of association of the three institutional quality indicators with industrial output growth were low, with none exceeding 0.9. In the meantime, they each have a different sign. The results show that all indicators of economic institutions have a negative relationship with industrial output, with the exception of government effectiveness, which has a positive coefficient. Similarly, two financial indicator variables (contract-intensive money and financial deepening) have negative correlation coefficients with industrial

Table 2.
Descriptive Statistics

Signs	Variable Measurements	Mean	S.D.	Maximum	Minimum	Skewness	Kurtosis	Jarque–Bera	*p*
iy	Industry (including construction), value added (% of GDP)	26.490	4.670	37.847	17.021	0.497	3.268	4.066	.131
Economic institution variables									
gef	Government effectiveness	-1.022	0.088	-0.878	-1.256	-0.829	3.016	10.533	.005
rqv	Regulatory quality	-0.899	0.182	-0.631	-1.454	-1.003	3.694	17.265	.000
rlw	Rule of law	-1.166	0.155	-0.837	-1.431	-0.061	2.176	2.662	.264
ccn	Control of corruption	-1.168	0.128	-0.859	-1.450	-0.108	2.761	0.397	.820
Financial institution indicators									
cim	Contract-intensive money (%)	82.318	9.366	92.570	65.276	-0.442	1.596	10.542	.005
lr	Lending rate (%)	19.682	3.792	31.680	14.427	1.252	4.165	29.247	.000
fd	Credit to private sector to GDP (%)	13.464	5.630	21.111	6.089	0.105	1.166	13.068	.001
Political institution indices									
vac	Voice and accountability	-0.709	0.278	-0.304	-1.635	-1.105	5.006	34.145	.000
psav	Political stability and absence of violence	-1.717	0.414	-0.469	-2.262	1.253	3.866	26.938	.000
Key factor inputs									
k	Gross fixed capital formation (% of GDP)	23.750	8.881	41.018	13.970	0.537	1.918	8.918	.012
l	Labor force, total (in thousands)	45993.9	7935.6	62166.8	33924.3	0.274	1.912	5.690	.058
Control variables									
fdi	Foreign direct investment, net inflows (% of GDP)	1.801	0.707	3.243	0.550	0.267	2.248	3.257	.196
ti	Trade (% of GDP)	38.172	9.306	55.289	19.759	-0.130	2.243	2.459	.292

Note: Number of observations is 92.

output, whereas the lending rate has a positive value. Voice and accountability were found to have a negative level of association with industrial output growth, whereas political stability and the absence of violence had a positive correlation coefficient. Capital investment has a positive correlation coefficient with key factors of industrial output growth, whereas the labor force has a negative correlation coefficient. However, the two control variables (foreign direct investment and trade intensity) were discovered to have a positive relationship with Nigerian industrial output growth. The table also reported the level of association among factors influencing industrial output growth. In summary, the correlation values indicate the absence of perfect multicollinearity among the predictive variables, as positive and negative relationships of varying magnitudes and signs were reported among the variables of interest.

Pre-estimation Tests (Stationarity and Cointegration Tests)

Unit Root Test

This section describes the traditional methods for computing the unit root test of stationarity. The conventional methods used in this study were augmented Dickey–Fuller (ADF), Phillips–Perron, and Kwiatkowski–Phillips–Schmidt–Shin (KPSS) to test the stationarity level at levels and first differences. Table 4 shows the results of the conventional unit root test methods. Except for regulatory quality and control of corruption, which were found stationary at levels using KPSS and foreign direct investment using the ADF at 5% significance level, all three conventional unit root tests result in about the same conclusion about the stationary level of the variables understudy.

In summary, the unit root test results for the following variables: industrial output growth (*iy*), investment (*k*), labor force (*l*), rule of law (*rlw*), government effectiveness (*gef*), control of corruption (*ccn*), regulatory quality (*rqv*), lending rate (*lr*), contract-intensive money (*cim*), financial deepening (*fd*), political stability and absence of violence (*psav*), voice and accountability (*vac*), foreign direct investment (*fdi*), and trade intensity (*ti*). They were further tested at the 5% significance level for the first differences that were found to be significant. This means that after differentiating the series at one, they

Table 3.
Correlation Matrix

	gef	*rqv*	*rlw*	*ccn*	*cim*	*lr*	*fd*	*vac*	*psav*	*k*	*l*	*fdi*	*ti*
Industrial Growth (*iy*)	0.337	−0.050	−0.449	−0.333	−0.756	0.320	−0.662	−0.685	0.624	0.704	−0.733	0.488	0.596
Government Effectiveness (*gef*)	1	−0.273	−0.162	−0.180	−0.302	0.144	−0.431	−0.022	0.176	0.199	−0.211	0.045	0.011
Regulatory Quality (*rqv*)		1	0.566	0.594	0.434	−0.599	0.554	0.077	−0.329	−0.407	0.392	0.027	−0.024
Rule of Law (*rlw*)			1	0.706	0.652	−0.670	0.675	0.549	−0.464	−0.586	0.743	−0.482	−0.456
Control of Corruption (*ccn*)				1	0.514	−0.698	0.537	0.111	−0.270	−0.398	0.450	0.082	−0.289
Contract-Intensive Money (*cim*)					1	−0.752	0.706	0.580	−0.771	−0.766	0.827	−0.471	−0.448
Lending Rate (*lr*)						1	−0.694	−0.220	0.578	0.716	−0.689	0.239	0.268
Financial Deepening (*fd*)							1	0.486	−0.691	−0.771	0.877	−0.467	−0.450
Voice and Account (*vac*)								1	−0.578	−0.586	0.688	−0.756	−0.380
Political Stability and Absence of Violence (*psav*)									1	0.797	−0.742	0.399	0.261
Investment (*k*)										1	−0.715	0.498	0.428
Labor Force (*l*)											1	−0.644	−0.596
Foreign Direct Invest (*fdi*)												1	0.521
Trade Intensity (*ti*)													1

eventually converge to their true mean or long-run equilibrium, indicating that the time series of the series were stationary at the first difference and integrated at order one.

More than that, the tau-statistic results for the intercept and trend model were found to be statistically significant at the 5% McKinnon critical point for the first difference of the variables. As a result, the null hypothesis "no stationarity at first difference" was rejected, and the first differences of those time series show stationarity, implying that they are integrated of order one (see Table 4). Notably, the Schwarz's Bayesian Information Criterion (SIC) was used to choose automatically and ideally the lag length for assessing the stationarity level of the variables under study, while a few were fixed.

Cointegration Test

The Johansen cointegration test was employed to examine the long-term relationship between industrial sector growth and economic, financial, and political institutions. The vector autoregressive (VAR) lag order selection criteria test and the lag exclusion Wald tests were used to determine the optimal lag length that should be used in estimating the three Johansen cointegration models. For the Johansen cointegration model, SIC of the VAR model system showed that a lag length of 1 is the best, most appropriate, and most significant lag. These findings are presented in the appendix. Tables 5, 6, and 7 display the results of the Johansen cointegration analysis. The test is used because it is appropriate for variables that are stationary at the first difference.

The cointegrating equation reported for the series in Table 5, in the following order: industrial output growth (*iy*), rule of law (*rlw*), government effectiveness (*gef*), control of corruption (*ccn*), regulatory quality (*rqv*), labor force (*l*), investment (*k*), foreign direct investment (*fdi*), and trade intensity (*ti*), showed that the alternative hypothesis "$r=5$" of trace and maximum eigen statistics were not rejected at the MacKinnon–Haug–Michelis 5% significance level. This indicates that the series evaluated in the specified order satisfy six cointegrating vector equations. Intuitively, there exists a long-run relationship between economic institutions and industrial output growth in Nigeria.

Table 6 depicts the Johansen cointegration test result for the links between financial institutions and industrial output growth. At the MacKinnon–Haug–Michelis 5% significance level, the trace and maximum eigen statistics indicate that the incorporated series are cointegrated at the fourth hypothesized cointegration equations order, i.e., $r=4$ for the linear deterministic trend model with intercept. For trace statistics and maximum eigen values, this means that the alternative hypothesis "$r=4$" was not rejected. This implies that among the considered time series, there are five cointegrating vector equations in the order stated. The economic implication is that financial institutions and industrial output growth in Nigeria have a long-run relationship.

Table 7 displays the cointegration results of political institutions and industrial output growth in Nigeria. The table shows

Table 4.
Unit Root Tests

	Level			First Difference			
Variables	ADF	PP	KPSS	ADF	PP	KPSS	*I*(*d*)
Industrial output growth (*iy*)	-2.1618	-2.9547	0.1525	-6.8590***	-6.0614***	0.0490***	*I*(1)
Government effectiveness (*gef*)	-3.2550*	-2.2603	0.1822	-5.3743***	-4.4835***	0.0304***	*I*(1)
Regulatory quality (*rqv*)	-2.6110	-2.3684	0.0469***	-4.5424***	-4.2106***	–	*I*(1)
Rule of law (*rlw*)	-3.1291	-2.2790	0.1211	-8.9773***	-4.0107**	0.0446***	*I*(1)
Control of corruption (*ccn*)	-2.5825	-2.0225	-0.0875**	-8.6052***	-3.9904**	–	*I*(1)
Contract-intensive money (*cim*)	-0.6515	-0.8702	0.4606	-3.5061**	-4.2629***	0.0700***	*I*(1)
Lending rate (*lr*)	-1.9250	-2.7756	0.1280	-4.4891***	-4.3230***	0.0884***	*I*(1)
Financial deepening (*fd*)	-2.1495	-1.7557	0.1293	-3.5641**	-3.5219**	0.0873***	*I*(1)
Voice and accountability (*vac*)	-2.6152	-2.6360	0.1337	-4.0561**	-4.6721***	0.0952***	*I*(1)
Pol. stability and absence of violence (*psav*)	-1.8139	-1.7860	0.2532	-4.7258***	-4.1057***	0.0364***	*I*(1)
Investment (*k*)	-0.2402	-1.3161	0.2170	-5.2152***	-3.8493**	0.0840***	*I*(1)
Labor force (*l*)	1.8952	2.4413	0.3207	-9.9557***	-8.4730***	0.0451***	*I*(1)
Foreign direct investment (*fdi*)	-5.5168***	-1.8669	0.01596	–	-4.5066***	0.0909***	*I*(1)
Trade intensity (*ti*)	-2.1674	-2.9202	0.1549	-6.0357***	-4.1275***	0.0321***	*I*(1)

Note: The Schwarz Information Criterion (SIC) is used to determine the optimal trend, intercept, and lag lengths at which to calculate the values.
ADF = Augmented Dickey–Fuller; KPSS = Kwiatkowski–Phillips–Schmidt–Shin; PP = Phillips–Perron.
***Significance level at 1%. **Significance level at 5%. *Significance level at 10%.

Table 5.
Johansen Cointegration Test of Economic Institutions and Industrial Output Growth

Lag Intervals in First Differences): 1–1 — Series: *iy*, *k*, *l*, *gef*, *rqv*, *rlw*, *ccn*, *fdi*, *ti*

Trend Assumption: Linear Deterministic Trend

Hypothesized Number of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Hypothesized Number of CE(s)	Maximum Eigen Statistic	0.05 Critical Value
r = 0*	0.887982	613.3181	228.2979	*r* = 0*	197.0183	62.75215
r ≤ 1*	0.728656	416.2998	187.4701	*r* ≤ 1*	117.3932	56.70519
r ≤ 2*	0.623905	298.9066	150.5585	*r* ≤ 2*	88.01224	50.59985
r ≤ 3*	0.531361	210.8943	117.7082	*r* ≤ 3*	68.21302	44.49720
r ≤ 4*	0.472698	142.6813	88.80380	*r* ≤ 4*	57.59830	38.33101
r ≤ 5*	0.394340	85.08301	63.87610	*r* ≤ 5*	45.12931	32.11832
r ≤ 6	0.172969	39.95370	42.91525	*r* ≤ 6	17.09213	25.82321
r ≤ 7	0.161756	22.86157	25.87211	*r* ≤ 7	15.88010	19.38704
r ≤ 8	0.074639	6.981462	12.51798	*r* ≤ 8	6.981462	12.51798

Note: *ccn* = Control of corruption; *fdi* = Foreign direct investment; *gef* = Government effectiveness; *iy* = Industrial growth; *k* = Investment; *l* = Labor force; *rlw* = Rule of law; *rqv* = Regulatory quality; *ti* = Trade intensity.
*Denotes rejection of the hypothesis at the 0.05 level.

the cointegrating equations for the models at the 5% significance level for MacKinnon–Haug–Michelis. In accordance with the trace and maximum eigen value tests, the incorporated variables are cointegrated at the fifth cointegration equation for the linear deterministic trend model with intercept. For trace statistics and maximum eigen values, this means that

Table 6.
Johansen Cointegration Test of Financial Institutions and Industrial Output Growth

Lag intervals in First Differences: 1–1				Series: *iy*, *k*, *l*, *cim*, *lr*, *fd*, *fdi*, *ti*		
Trend Assumption: Linear Deterministic Trend						
Hypothesized Number of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Hypothesized Number of CE(s)	Maximum Eigen Statistic	0.05 Critical Value
r = 0*	0.772106	481.9938	187.4701	*r* = 0*	133.0986	56.70519
r ≤ 1*	0.731817	348.8952	150.5585	*r* ≤ 1*	118.4476	50.59985
r ≤ 2*	0.620516	230.4476	117.7082	*r* ≤ 2*	87.20480	44.49720
r ≤ 3*	0.499497	143.2428	88.80380	*r* ≤ 3*	62.29276	38.33101
r ≤ 4*	0.367743	80.95004	63.87610	*r* ≤ 4*	41.26129	32.11832
r ≤ 5	0.218787	39.68874	42.91525	*r* ≤ 5	22.22165	25.82321
r ≤ 6	0.133800	17.46709	25.87211	*r* ≤ 6	12.92759	19.38704
r ≤ 7	0.049188	4.539502	12.51798	*r* ≤ 7	4.539502	12.51798

Note: *cim* = Contract-intensive money; *fd* = Financial deepening; *fdi* = Foreign direct investment; *iy* = Industrial growth; *k* = Investment; *l* = Labor force; *lr* = Lending rate; *ti* = Trade intensity.
*Denotes rejection of the hypothesis at the 0.05 level.

the alternative hypothesis "*r* = 5" was not rejected. This implies that there are six cointegrating vector equations among the series understudied. It suggests that there is a long-run relationship between political institutions and industrial output growth in Nigeria.

Estimation Results of Economic Institutions and Industrial Sector Growth

In this section, we use the estimated VEC model to look at both the short- and long-run effects of economic institutions on industrial output growth in Nigeria. The estimated regression results of industrial output growth on economic institutions (rule of law, government effectiveness, control of corruption, and regulatory quality), key factor inputs (capital and labor), and control variables (FDI and trade intensity) are presented in Table 8. The lag length was fixed at one for all variables within the model to provide a sufficient degree of freedom using an automatic selection of the SIC. The estimated error correction term (ECT) coefficient is negative and significant at the 5% level of significance. The negative ECT value (–0.3786) indicated a speed of adjustment of 37.86% from the short-run disequilibrium to the long-run equilibrium.

Table 8 displays the estimated short-run coefficients of economic institutions and industrial output growth. The short-run parameter estimates show that trade intensity (*ti*), regulatory

Table 7.
Johansen Cointegration Test of Political Institutions and Industrial Output Growth

Lag Intervals in First Differences: 1–1				**Series: *iy*, *k*, *l*, *vac*, *psav*, *fdi*, *ti***		
Trend Assumption: Linear Deterministic Trend						
Hypothesized Number of CE(s)	**Eigenvalue**	**Trace Statistic**	**0.05 Critical Value**	**Hypothesized Number of CE(s)**	**Maximum Eigen Statistic**	**0.05 Critical Value**
r = 0*	0.689799	401.0176	150.5585	*r* = 0*	105.3480	50.59985
r ≤ 1*	0.641884	295.6696	117.7082	*r* ≤ 1*	92.42078	44.49720
r ≤ 2*	0.616858	203.2489	88.80380	r ≤ 2*	86.34137	38.33101
r ≤ 3*	0.429969	116.9075	63.87610	*r* ≤ 3*	50.58586	32.11832
r ≤ 4*	0.347991	66.32164	42.91525	*r* ≤ 4*	38.49275	25.82321
r ≤ 5*	0.225879	27.82889	25.87211	*r* ≤ 5*	23.04247	19.38704
r ≤ 6	0.051793	4.786421	12.51798	*r* ≤ 6	4.786421	12.51798

Note: *fdi* = Foreign direct investment; *iy* = Industrial output growth; *k* = Investment; *l* = Labor force; *psav* = Political stability and absence of violence; *ti* = Trade intensity; *vac* = Voice and accountability.
*Denotes rejection of the hypothesis at the 0.05 level.

quality (*rqv*), government effectiveness (*gef*), rule of law (*rlw*), and capital (*k*) all have positive effects on industrial output growth. Only the measures of capital and trade intensity achieved statistical significance at 5% and 10%, respectively. However, the parameters for labor force, corruption control, and FDI were all negative, with only labor force being statistically significant at the 5% level. This suggests that the labor force has a short-term impact on industrial output growth.

In the table, the long-run estimates showed that industrial sector growth was positively and significantly affected by capital investment, labor force, control of corruption, and trade intensity. Their signs were in tandem with the a priori expectations. Also, on a magnitude basis, a 1% increase in capital investment, labor force, control of corruption, and trade intensity led to a rise in industrial output growth by 3.64%, 2.31%, 1.68%, and 0.73%, respectively. The table also reported that regulatory quality, government effectiveness, rule of law, and FDI indirectly affect industrial output growth, which all do not conform to theoretical expectations. Statistically, rule of law, government effectiveness, regulatory quality, and FDI all had a negative impact on industrial output growth by 0.21%, 0.23%, 0.84%, and 4.36%, respectively, for every 1% rise. In terms of their partial significance, they had significant effects on industrial output growth except for the rule of law during the periods understudied.

The high value of the adjusted R^2 indicates that the regressors adequately explain about 44.59% of the total variability in industrial output growth. It simply showed that differences in economic institutions, major factor inputs, trade intensity, and FDI accounted for 44.59% of the variation in industrial output growth. The F-statistics value of 8.1607 at the 5% level of significance demonstrates that the model is properly defined and statistically significant. According to the Durbin–Watson statistic (1.893), serial autocorrelation is not present in the model.

Table 8.
Vector Error Correction Model Estimates of Economic Institutions and Industrial Sector Growth

Short-run estimates				
Variable	Coefficient	S.E.	*t*-Statistic	*p*
Δ(*iy*(−1))	0.729025	0.16709	4.36319	.0000
Δ(*k*)	0.604691	0.15890	3.80559	.0016
Δ(*l*)	−2.538364	1.37348	−1.84813	.0650
Δ(*gef*)	0.857543	3.55930	0.24093	.8097
Δ(*rqv*)	1.119652	3.44712	0.32481	.7454
Δ(*rlw*)	1.095343	4.35964	0.25125	.8017
Δ(*ccn*)	−1.131061	4.97786	−0.22722	.8203
Δ(*fdi*)	−0.096865	0.78302	−0.12371	.9016
Δ(*ti*)	0.008497	0.04861	1.74801	.0861
ect(−1)	−0.378611	0.06065	−6.24236	.0000
Long-run estimates				
k	3.637154	0.38328	9.48949	.0000
l	2.309663	0.26503	8.71465	.0000
gef	−0.230270	0.10238	−2.24905	.0254
rqv	−0.840477	0.069845	−12.0333	.0000
rlw	−0.204755	0.13908	−1.47216	.1470
ccn	1.679503	0.13263	12.6628	.0000
fdi	−4.360877	0.23975	−18.1892	.0000
ti	0.730116	0.13848	5.27219	.0000
Constant	42.55229	8.81587	4.82678	.0000
R-squared	0.5081	F-stat	8.1607 (0.0000)	
Adj. *R*-squared	0.4459	D-Watson	1.8930	

Note: Dependent variable: Industrial output growth (*iy*); sample: 1996: Q1–2019: Q4; included observations: 90.

Estimation Results of Financial Institutions and Industrial Sector Growth

This part tests the null hypothesis that financial institutions have no significant effect on the rate of expansion of Nigeria's industrial production. Using the VECM estimator, it calculates the short- and long-run parameters of financial institutions and industrial output growth in Nigeria. Table 9 displays the estimated regression findings of industrial output growth on financial institutions (proxy by lending rate, contract-intensive money, and financial deepening), key factor inputs (capital and labor), and control variables (FDI and trade intensity). To guarantee a suitable degree of freedom based on the automatic selection of the SIC, the lag length on all variables was set to 1. The ECT showed the distortion correction rate and indicated that the industrial output adjustment rate was 21.2%. This rate was statistically significant at the 5% level of confidence. Also, the negative ECT value (–0.212) indicates a speed of adjustment of 21.2% as the model restores long-run equilibrium from a short-run disequilibrium.

The parameters of the short-run results revealed that the first lag of industrial output to GDP has a positive and significant effect on the current level of industrial growth in Nigeria. Likewise, the coefficients of the labor force have the same sign and significance. It implies that the labor force influences industrial output growth in the short run. The short-run parameter of trade intensity was also positive, but it was found to be statistically significant at 10%. Meanwhile, the parameter estimates of financial deepening and capital investment were positive but statistically insignificant at 5% and 10%. However, industrial output growth reacts negatively and significantly to changes in lending rates in the short run. It implies that a low lending rate enhances industrial sector growth in the short-run. Also, the contract-intensive money and foreign direct investment coefficients were both negative but statistically insignificant at 5%. This means that they do not have a short-term effect on industrial output growth.

As well, Table 9 reports the long-run estimates of the financial institutions-industrial sector growth nexus in Nigeria. It shows that investment, lending rates, contract-intensive money, financial deepening, and foreign direct investment have positive impacts on industrial sector growth.

Table 9.
Vector Error Correction Model Estimates of Financial Institutions and Industrial Sector Growth

Variable	Coefficient	S.E.	*t*-Statistic	*p*
Short-run estimates				
Δ*(iy(–1))*	0.737161	0.14893	4.94976	.0000
Δ*(k)*	0.056856	0.15724	0.36159	.7178
Δ*(l)*	2.442963	1.26295	1.93434	.0535
Δ*(cim)*	–0.068555	0.22549	–0.30402	.7612
Δ*(lr))*	–0.290111	0.12197	–2.37871	.0187
Δ*(fd)*	0.152438	0.20488	0.74403	.4571
Δ*(fdi)*	–0.072269	0.53170	–0.13592	.8919
Δ*(ti)*	0.087941	0.05110	1.72096	.0878
ect(-1)	–0.211911	0.01877	–11.2910	.0000
Long-run estimates				
k	0.492189	0.09903	4.96999	.0000
l	–0.834856	1.21838	–0.68522	.4917
cim	0.962255	0.18420	5.22407	.0000
lr	1.636729	0.09133	17.9204	.0000
fd	0.120694	0.11307	1.06740	.2896
fdi	2.023585	0.44775	4.51943	.0000
ti	–0.241671	0.02961	–8.16312	.0000
Constant	12.96059	0.83491	15.5333	.0000
R-squared	0.5078	F-stat	9.1694 (0.0000)	
Adj. *R*-squared	0.4524	D-Watson	1.8682	

Note: Dependent variable: Industrial output growth (*iy*); sample: 1996: Q1–2019: Q4; included observations: 90.

The series' coefficients follow the theoretical expectations except for the lending rate. Thus, a 1% change in investment, lending rate, contract-intensive money, financial deepening, and foreign direct investment led to a rise in Nigerian industrial sector growth of 0.49%, 1.64%, 0.96%, 0.12%, and 2.02%, respectively. Furthermore, the table showed that industrial output growth was indirectly affected by labor force and trade intensity, with 0.84% and 0.24%, respectively, due to a 1% change in the two indicators. Regarding the partial significance test, all variables significantly impacted industrial sector growth at 5% except labor force and financial deepening.

According to the adjusted-R^2 statistics, the coefficient of determination is moderately high at 45.24%. This meant that the model regressors accounted for around 45.24% of the total variance in the growth of industrial output. It simply showed that differences in financial institutions, key factor inputs, and control variables accounted for 45.24% of the changes in industrial output growth. The F-statistic value of 9.1694, which is significant at the 5% level, shows that the model is well specified and statistically significant. The Durbin–Watson statistic (1.8682) demonstrates that serial autocorrelation is not present in the model.

Estimation Results of Political Institutions and Industrial Output Growth

In this section, this study tests the null hypothesis that political institutions have no significant impact on industrial sector growth in Nigeria. The short- and long-run estimates of the links between political institutions and industrial output growth were estimated using the VECM estimator. The estimated VECM results of industrial sector growth on political institutions (political stability and absence of violence and voice and accountability), key factor inputs (capital and labor), and control variables (FDI and trade intensity) are presented in Table 10. To guarantee a suitable number of variables for the model, the lag length was fixed to one automatically using the SIC. The ECT, a measure of the rate or extent of adjustment, is displayed in the short-run estimation results. It measures how quickly industrial sector growth responds to shifts in political institutions and other control variables. At the conventional level of significance, the ECT coefficient is found to be negative. The negative ECT value (−0.1957) indicated a speed of adjustment of 19.57% from the short-run disequilibrium to the long-run equilibrium.

At the 5% level of significance, the lag-one coefficient of changes in industrial production has a positive and significant

Table 10.
Vector Error Correction Model Estimates of Political Institutions and Industrial Output Growth

Short-run coefficients				
Variable	**Coefficient**	**S.E.**	***t*-Statistic**	**Prob.**
Δ(iy(−1))	0.737823	0.12624	5.84469	.0000
Δ(k)	0.081860	0.15267	0.53620	.5920
Δ(l)	−2.463318	1.17822	−2.09071	.0370
Δ(vac)	0.619092	2.51701	0.24596	.8058
Δ(psav)	−0.501696	1.68859	−0.29711	.7665
Δ(fdi)	−0.119130	0.05764	−2.06688	.0363
Δ(ti)	0.103381	0.05107	2.02438	.0396
ect(-1)	−0.195651	0.02661	−7.35667	.0000
Long-run coefficients				
k	7.482841	0.76673	9.75936	.0000
l	1.152008	0.51808	2.22359	.0252
vac	−0.081531	0.09154	−0.89062	.4029
psav	0.551138	0.10467	5.26503	.0000
fdi	5.706797	3.32335	1.71718	.0883
ti	−1.664031	0.18944	−8.78416	.0000
Constant	−19.58918	0.76102	−25.7406	.0000
R-squared	0.5154	F-stat	10.769 (0.0000)	
Adj. *R*-squared	0.4676	D-Watson	1.8970	

Note: Dependent variable: Industrial output growth (*iy*); sample: 1996: Q1–2019: Q4; included observations: 90.

effect on the short-run current growth of changes in industrial output. This means that the rate of growth of Nigeria's industrial output is determined by the rate at which it changed during the first period. For the short-run parameter estimates, investment, voice and accountability, and trade intensity were found to be positive. It indicates that they influence changes in industrial output growth in the short run. Only trade intensity was found to be statistically significant at the 5% level. However, the parameter estimates of labor force and foreign direct investment were negative and statistically significant at 5%. It implies that the labor force and foreign direct investment influence changes in industrial output growth. Likewise, the coefficient of political stability and absence of violence was negative but not significant statistically at 5%.

Table 10 also reports the long-run relationship between political institutions and industrial sector growth in Nigeria between 1996: Q1 and 2019: Q4. The table reveals that investment, labor force, political stability and absence of violence, and foreign direct investment have a positive impact on industrial sector growth in Nigeria, which conforms to a priori expectation. In magnitude, it showed that a 1% increase in investment, labor force, political stability and absence of violence, and foreign direct investment improved industrial output growth by 7.48%, 1.15%, 0.55%, and 5.71%, respectively. However, the coefficients of voice and accountability, and trade intensity are negative, implying that they negatively influence industrial output growth in Nigeria. Only the parameters of voice and accountability had statistical significance at the 5% level. In magnitude terms, industrial output growth decreased by 0.08% and 1.66% due to 1% changes in voice and accountability, and trade intensity, respectively, during the reviewed periods.

The moderate-ly adjusted R^2 (0.5154) values indicate that changes in the explanatory variables account for around 51.54% of the total variation in industrial output growth. It simply showed that differences in political institutions, major factor inputs, and control variables accounted for 51.54% of the variation in changes in industrial output growth. Overall, the F-statistic (10.769) shows that the model is adequately defined and significant at the 5% level of significance. The absence of serial autocorrelation in the model is demonstrated by a Durbin–Watson statistic of 1.8970.

Discussion

From the analysis of the results, economic institutions had a significant impact on industrial output growth in the long run compared to the short run. Specifically, the outcome showed that rule of law and government effectiveness negatively influence industrial output growth in Nigeria. This is different from what Grigorian and Martinez (2000) found when they looked at 27 developing countries in Asia and Latin America. They found that good institutions, like rule of law, effective enforcement, a well-developed legal and regulatory framework, and low administrative barriers, help industrial output growth by attracting more investment and making better use of resources. The findings also corroborate the study conducted by Udah, Ubi, and Efiom (2016), which found that government effectiveness significantly impacted economic performance.

Also, the increasing rate of corruption causes low output growth in the Nigerian industrial sector. It thus negates the findings of Olayungbo and Adediran (2017) that corruption promotes economic growth in the short run but not in the long run in Nigeria. However, this is similar to the result of Mauro (1995), who found an inverse relationship between corruption and economic growth. Similarly, it corroborates the findings of Sachs and Warner (1995) that corruption slows the growth process of a country. One of the reasons identified by studies like Isham, Woolcock, and Busby (2005), which is the natural resource abundance of the majority of the countries, also applies to the Nigerian economy. In the study of Brunnschweiler and Bulte (2008), they found that resource-dependent countries are associated with poor institutional quality. Ross (2001) specifically found that among the natural resources that impede the democratization process in developing countries is oil wealth, and Nigeria was among the affected economies. Sala-i-Martin and Subramanian's (2013) results specifically back up the idea that Nigeria's poor long-term economic performance has been caused by waste and corruption from oil, not Dutch disease. Also, Ubi and Udah (2014) found that corruption, which undermines the quality of institutions and political and economic activities, has negative implications for economic performance in Nigeria. In the same way, Ahmadov, Mammadov, and Aslanli (2013) discovered a negative link between resource-related indicators and institutions in the resource-rich Caspian Basin countries (Azerbaijan, Kazakhstan, Russia, and Turkmenistan), except for Russia. In Russia, oil rents had a positive effect on the quality of institutions, while total natural resources had a slightly negative effect. However, regulatory quality has an insignificant impact on industrial output growth. It does not support the findings of Grigorian and Martinez (2000) that regulatory frameworks drive growth.

Furthermore, the study provides empirical results for the impacts of financial institutions on industrial output growth in Nigeria. A glance at the results clearly shows that a low lending interest rate drives industrial output growth in the short run, whereas in the long run, a high lending rate has an increasing impact on industrial output growth in Nigeria. The outcome is consistent with research by Afaha and Ologundudu (2014), which discovered that the interest rate has a negative relationship with manufacturing sector growth but did not specify whether it is in the short term or long term. This negates the result of Sokunle and Chase (2016), who reported for 26 sub-Saharan African countries that interest rates had no significant impact on manufacturing sector growth. They attributed the findings to high corruption practices and political instabilities in many African countries. Contract-intensive money was found to positively and significantly drive industrial output growth in the long run, but not in the short run. This is in line with the result of Ubi and Udah (2014), who found that contractive intensive money as a measure of financial institutions influenced economic growth significantly. However, the ratio of domestic credit to the private sector to GDP, which shows

how deep the financial system is getting, had an insignificant but positive effect on both short- and long-term industrial output growths. This supports the findings of Odior (2013) that credit facilities to the manufacturing sector have a high tendency to influence manufacturing productivity positively in Nigeria. It negates the study conducted by Ukoha (2000) and Aiyedogbon and Anyanwu (2015), which found that credit to the manufacturing sector exerts a negative impact on industrial development in Nigeria.

In addition, the study shows that political institutions only drive industrial output in the long run and not in the short run, which is mainly through political stability and the absence of violence. This is similar to the findings of Barro (1999) and Knack and Keefer (1995) that political stability in terms of the number of coups, political assassination, and property rights are important drivers of a country's long-term economic growth. Thus, voice and accountability have an insignificant influence on industrial output growth. For the other variables, the findings revealed that, on average, capital and labor force mainly had a significant influence on industrial output growth in the long run and not in the short run. The study of Otalu and Anderu (2015) for Nigeria supported our findings that capital and labor drive industrial sector growth. This is also similar to the findings of Mohsen, Chua, and Che Sab (2015) in Syria that capital positively influences industrial output. The result of financial openness measured by foreign direct investment to GDP negatively influenced industrial output in the short run, but it positively drove the output of the industrial sector in the long run. It means that the majority of the foreign funds are channeled into areas where the funds and their proceeds can easily be repatriated from the country, thus having a negative impact on the industrial output growth in the country. It corroborates the results of Odior (2013) and Aiyedogbon and Anyanwu (2015) that foreign direct investment has high chances of enhancing manufacturing productivity, but this study only supports it in the long run. However, trade intensity is found to drive industrial output growth mainly in the short run and not in the long run. This implies that the majority of trade is in the form of consumer commodities and not capital goods, which adversely affects the Nigerian industrial sector.

Conclusion

This study provides an empirical insight on the role of institutional quality in industrial sector growth in Nigeria for a period of 1996: Q1–2019: Q4. The problem of weak institutions has been one of the major challenges impeding Nigerian output growth, including the industrial sector. In light of this, the issue at hand is not only to maintain the quality of institutions while also pursuing other economic goals, but also to make sure that the right policies are put in place to keep these qualities over the next few years so that they can help improve the Nigerian industrial sector. The empirical findings show that the positive influence of economic institutions on industrial sector growth is insignificant, while the negative influence in the long run is significant. Among the indicators of economic institutions enhancing industrial output growth are government effectiveness and the rule of law. For financial institutions, a low interest rate only enhances industrial output growth in the short run, but in the long run, it makes investment in the sector more costly. Likewise, contract-intensive money had an insignificant impact in the short run, while in the long run it had a significant impact on industrial sector growth. Meanwhile, the impact of financial deepening on the output growth of the industrial sector was not significant in both periods. In the case of political institutions, the two indicators do not have a significant impact in the short run, but in the long run, political stability and the absence of violence positively influence industrial output growth. Financial institutions, economic institutions, and political institutions are the three categories of institutional quality that this study considers to have the greatest impact on industrial output growth.

The policy implications of the findings and recommendations are as follows: First, the result reported that poor economic institutions affected the process of industrial sector growth in Nigeria, primarily the ineffectiveness of government and the quality of regulations. It suggests the need for the government to improve the quality of public services and their ability to formulate and implement sound policies and regulations as they are adherent to the growth process of the Nigerian industrial sector. Second, the economic institutions show the importance of monitoring and controlling the activities of public office holders to prevent corruption and fund mismanagement, as these have the tendency to improve the industrial sector of the Nigerian economy in the long run. Meanwhile, the study revealed the need to improve the enforcement of contract quality, property rights, and societal rules because they retard the growth process of the industries in Nigeria. Finally, in the case of financial institutions, the government, through the Central Bank of Nigeria, should ensure that domestic credits and other financial facilities are made available easily to prospective investors at a cheaper and more affordable rate in order to boost local production and ensure the sustainability of the Nigerian industries. This also boils down to the fact that these credits should be made available at a lower rate in order to ease the cost of doing business in Nigerian industries. There is also a need for the apex bank to ensure improvement in contract-intensive money to drive growth in both the short run and long run.

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Appendix

Results of Lag Length Selection Criterion

Economic Institutions and Industrial Sector Growth

VAR Lag Order Selection Criteria

Endogenous variables: *IY*, *K*, *L*, *GEF*, *RQV*, *RLW*, *CCN*, *FDI*, *TI*

Exogenous variables:

Sample: 1996: Q1–2019: Q4

Included observations: 91

Lag	LogL	LR	FPE	AIC	SC	HQ
1	874.0403	NA	2.19×10^{-19}*	-17.42946*	-15.19452*	-16.52780*

*Indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan–Quinn information criterion

Financial Institutions and Industrial Sector Growth

VAR Lag Order Selection Criteria

Endogenous variables: *IY*, *K*, *L*, *CIM*, *LR*, *FD*, *FDI*, *TI*

Exogenous variables:

Sample: 1996: Q1–2019: Q4

Included observations: 91

Lag	LogL	LR	FPE	AIC	SC	HQ
1	-174.3658	NA	2.61×10^{-08}*	5.238810*	7.004689*	5.951232*

*Indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan–Quinn information criterion

VAR Lag Order Selection Criteria

Endogenous variables: *IY*, *K*, *L*, *VAC*, *PSAV*, *FDI*, *TI*

Exogenous variables: C

Sample: 1996: Q1 2019: Q4

Included observations: 91

Lag	LogL	LR	FPE	AIC	SC	HQ
0	−697.3939	NA	0.012476	15.48118	15.67433	15.55910
1	378.4149	1962.464*	1.98×10^{-12}*	−7.086042*	−5.540897*	−6.462672*

*Indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan–Quinn information criterion