IMPACTS of Economics of Globalization of Gross Domestic Contribution of the Maritime Transport Sector in Nigeria

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ABSTRACT

This study evaluated the impact of economic globalization on the maritime sector's contribution to Nigeria's Gross Domestic Product (GDP). The primary objective was to determine how economic globalization influenced the maritime transport sector's GDP contribution between 2005 and 2019. The research employed a quantitative methodology utilizing time series secondary data. Data on the maritime transport sector's GDP contribution spanning 15 years (2005-2019) was obtained from the Central Bank of Nigeria Statistical Reports. The KOF economic globalization indices, comprising trade globalization de facto, trade globalization de jure, financial globalization de facto, and financial globalization de jure for Nigeria, were sourced from the International Monetary Fund (IMF) database for the same period. Analysis was conducted using log-linear multiple regression methodology. The findings revealed a significant relationship between economic globalization and the maritime transport sector's contribution to Nigeria's GDP during the study period. The relationship between economic globalization (measured by the KOF economic globalization indices) and maritime transport GDP can be expressed by the following equation: ***InGDPmaritime = 5.016 - 1.21InKOFTRGlDf + 0.503InKOFTRGlDj + 1.623InKOFFGlDj + 0.672InKOFFGlDf***. where: InKOFTRGlDf represents trade globalization de facto; InKOFTRGlDj represents trade globalization de jure; InKOFFGlDj represents financial globalization de jure; InKOFFGlDf represents financial globalization de facto; Policy implications were analyzed, and recommendations were formulated based on the study's findings.

Keywords: Economic-globalizations, Effects, Maritime-transport, Gross-Domestic-Product, Logistics, Seaport

1. Introduction

Aylin & Yucel [1] define globalization as the increasing interdependence of world economies, cultures, and populations, facilitated by cross-border exchanges in goods, services, technology, investment, human capital, and information. Over time, nations have established economic relationships and partnerships that facilitate international trade between organizations and individuals across different countries [1]. From an economic perspective, globalization encompasses multiple dimensions: international exchange of goods, services, data, technology, and capital; expansion of global marketing activities; elimination of cross-border trade barriers; and the subsequent emergence of global markets [1, 2, 3]. The evolution of transportation technologies—including steam locomotives, steamships, jet engines, and container vessels—coupled with advancements in telecommunications infrastructure such as the telegraph, Internet, mobile phones, and smartphones, have been instrumental in driving globalization. These technological developments have fostered greater interdependence in economic and cultural activities worldwide [4, 5, 6].

Historically, globalization emerged from centuries of European colonization and trade activities, commonly referred to as the 'first wave' of globalization. This initial phase was driven by technological innovations—including steamships, railroads, and the telegraph—along with increasing economic cooperation among nations. However, this period of globalization declined following World War I, subsequent postwar protectionism, the Great Depression, and World War II [7]. Maritime logistics encompasses all aspects of logistics and supply chain management related to maritime transportation and seaport operations. Its primary objectives include optimizing efficiency, cost-effectiveness, timing, safety, security, service quality, and customer satisfaction in maritime transport operations. This field addresses the comprehensive needs of shippers and freight forwarders in the maritime delivery process. Seaports serve as critical nodes within maritime transport systems and play an essential role in transport, logistics, and supply networks facilitating international trade. As fundamental components of maritime logistics systems, seaports require efficient implementation of logistical functions to overcome operational challenges and bottlenecks in import and export trade flows. The effectiveness of port operations planning and administration—a crucial aspect of maritime logistics—significantly influences several key factors: port operational costs; freight rates (ocean transport costs); delivery timeframes; maritime transport's contribution to gross domestic product; and operational efficiency. safety and security risk management in international seaborne trade [8, 9, 10].

The effectiveness of maritime logistics management can be evaluated through multiple performance indicators, including port costs (dues and charges); volume and tonnage of shipping imports and exports; value of maritime trade facilitated; freight rates (ocean transport costs); maritime transport's contribution to gross domestic product (GDP); and port revenue generation. The implementation of efficient logistics functions in maritime transport should not only enhance the sector's GDP contribution but also lead to increased volume and tonnage of shipping trade through ports over time [1, 11]. Trade globalization significantly influences maritime commerce and port operations in Nigeria. Understanding these impacts on shipping trade patterns through Nigerian seaports is crucial for improving maritime operations and trade efficiency. The effects of globalization on maritime sector performance can be assessed through various metrics, including revenue generation, trade volume, ship traffic, and GDP contribution. This analysis provides an empirical foundation for evaluating whether increased global maritime trade through Nigerian ports has enhanced the country's maritime sector performance. This assessment is particularly relevant as nations need to understand globalization's influence on their economies and development variables before fully embracing trade liberalization policies and globalization strategies [12, 13]. Within this context, the present study aims to evaluate the extent to which globalization affects the maritime transport sector's contribution to Nigeria's GDP.

To quantify the impacts of economic globalization, [14] describes the KOF Globalization Index (KOFGI), developed by the Swiss Economic Institute (SEI), as a comprehensive measure encompassing economic, social, and political dimensions of globalization within an economy. According to the KOF Globalization Index, these three dimensions have shown consistent growth since the 1970s, with a notable acceleration following the conclusion of the Cold War [14]. The study employs four key proxies from the KOF Globalization Index (KOFGI) as explanatory variables to examine the influence of economic globalization on the maritime transport sector's GDP contribution: Trade globalization, de facto (KOFTrGIdf); Trade globalization, de jure (KOFTrGIdj); Financial globalization, de facto (KOFFiGIdf); Financial globalization, de jure (KOFFiGIdj).

2. Literature Review

Adesina [15] conducted a study to measure the impacts of global integration on economic growth and income inequality. The research had two primary objectives: 1. To develop a novel composite index of globalization using data from 158 economies spanning 2006-2014. 2. To empirically evaluate globalization's effects on economic growth and income inequality using this new index. The study utilized secondary data comprising 25 indicators representing key socioeconomic components of global integration from each country. Principal component analysis was employed to weight each component and construct an aggregate measure. Distinctively, this study differentiated between intraregional and extraregional integration contributions in developing the globalization index, unlike previous composite indexes. Key findings of the study revealed: 1. Globalization promotes economic growth while potentially exacerbating income inequality; 2. High-income countries derive the greatest benefits from globalization, experiencing: 3. Stronger positive effects on economic growth compared to low-income groups; 4. Less pronounced widening of income inequality [15, 14, 9]. Between the two drivers of global economic integration: Intraregional integration demonstrates significantly greater importance; Extraregional integration primarily contributes to the increased income inequality associated with globalization [15, 10, 13].

Chinn and Ito [16] investigated the adverse impacts of globalization on Nigeria, with particular emphasis on its effects on science, technology, and environmental sectors. While acknowledging globalization's opportunities, their research highlighted the unique challenges it presents to developing nations like Nigeria. Methodology of the study employed an exploratory approach, utilizing primary data collected through surveys. The key findings were the research revealed that although globalization yields both positive and negative outcomes globally, including Nigeria, its adverse effects are particularly significant. The study emphasized the critical need to preserve Nigeria's: Cultural heritage; Scientific advancement; Technological development; Environmental integrity; and Recommendations. Rather than allowing globalization to undermine local technological development, the study advocates that Nigeria should: 1. Strategically leverage globalization processes to develop indigenous technology for export; 2. Maintain environmental sustainability; 3. Implement protective measures for local innovations [16, 8, 4].

Yevgeniy, Tim, Philip, James, and Marc [14] conducted a study titled 'The Impact of Economic, Political and Social Globalization on Overweight and Obesity in 56 Low and Middle Income Countries.' The research aimed to provide robust quantitative evidence supporting the hypothesis that globalization significantly contributes to increasing rates of overweight and obesity in developing nations. The methodology implemented comprehensive econometric analyses using: Primary data collected through surveys; Multiple datasets with new proxies for various globalization dimensions; A sample of approximately 887,000 women; Age range: 15-49 years; Geographic scope: 56 countries; Time period: 1991-2009. And the key findings were 1. Globalization demonstrated a substantial and statistically significant association with increased individual propensity for overweight conditions among women; 2. Political and social dimensions of globalization showed stronger influence compared to economic factors [14]. The recommendations of this study were emphasized the necessity for developing improved governance frameworks specifically designed to promote health-oriented globalization processes [14]. Significance of this research provides empirical evidence linking globalization to public health outcomes in developing nations, particularly concerning weight-related health issues.

Czaika, de Haas, and Villares-Varela [17] investigated the socioeconomic impacts of globalization in Nigeria, with particular emphasis on comparing its effects across public and private sectors. The research was designed with dual objectives: to assess the socioeconomic impacts of globalization in Nigeria and to analyze the comparative differences between public and private sector impacts. The study employed a comprehensive survey research design utilizing primary data collection through closed-ended questionnaires. The researchers implemented random sampling across various economic sectors, ultimately gathering data from 233 staff members representing both Nigerian private and public sectors. For data analysis, the researchers employed both descriptive statistics, including means and standard deviations, and inferential statistics through independent sample t-tests to evaluate sectoral differences in globalization impact. The research revealed several significant findings regarding the impact of globalization on socioeconomic development in Nigeria. The study identified three primary areas where globalization demonstrated substantial influence: skill development, job commitment, and positive work attitude. Furthermore, the analysis revealed significant differences in globalization's impact between private and public sectors, with the private sector exhibiting notably stronger effects from globalization processes [17]. The researchers concluded that globalization's influence was substantially more pronounced in Nigeria's private sector operations compared to the public sector [17]. This finding suggests important implications for understanding the differential effects of globalization across various institutional contexts within developing economies. The study's results provide valuable insights into how globalization's impacts may vary significantly depending on the organizational structure and operational context of different economic sectors. The research contributes to the broader understanding of globalization's role in shaping organizational development and economic transformation in developing nations, particularly highlighting the disparity in its effects between public and private institutions. These findings may have important implications for policy development and institutional reform strategies in Nigeria and similar developing economies [17].

3. Methodology

3.1 Method of Data Analysis: Log-Linear Multiple Regression

The influence of economic globalization on maritime transport sector's contribution to GDP was analyzed using a log-linear multiple regression model. The study employed the KOF Economic Globalization Index as the primary measure of globalization. According to the International Monetary Fund (IMF), the KOF Economic Globalization Index comprises four distinct components:

KOF trade globabilization de facto (KOFTrGldf),
KOF trade globabilization de jure (KOFFiGIdj),
KOF financial globalization de factor (KOFFiGIdf),
KOF financial globalization de jure (KOFFiGIdj).

The effects of the each of the four identified indices of economic globalization above on maritime transport GDP ($GDP_{maritime}$) were estimated.

3.2 Model Specification

$$GDP_{maritime} = \beta_0 + \beta_1 KOFFiGIdf + \beta_2 KOFFiGIdj + \beta_3 KOFTrGIdf + \beta_4 KOFTrGIdj + \mathcal{E} \quad (1)$$

The effects of economic globalization variables on the maritime transport sector's GDP contribution were estimated using Ordinary Least Squares (OLS) regression. To standardize the units of measurement across all variables, the data were transformed using natural logarithms (ln). This transformation facilitated the application of log-linear multiple regression analysis. The models were subsequently reformulated in log-linear regression format:

$$InGDP_{maritime} = \beta_0 + \beta_1 KOFFiGIdf + \beta_2 KOFFiGIdj + \beta_3 KOFTrGIdf + \beta_4 KOFTrGIdj + \mathcal{E} \quad (2)$$

Using the methods discussed above, the study analyzed the data obtained

4. Results and Discussion

The estimation results presented in Table 1 demonstrate the relationship between economic globalization and sectoral output. The correlation coefficient (R) between the maritime transport sub-sector's Gross Domestic Product (GDP) contribution and economic globalization in Nigeria is 0.964. This indicates a strong positive correlation (96.4%) between Nigeria's maritime transport sub-sector GDP and economic globalization, as measured by the KOF Economic Globalization Index components: trade globalization de facto, trade globalization de jure, financial globalization de facto, and financial globalization de jure.

Table 1. The influence of globalization on the Gross Domestic Product (GDP) of the maritime sub-sector in Nigeria

Variable	Regression coefficient	t	Sig.	F-score	Sig.	R	R^2
(Constant)	5.016	1.848	.094	32.920	.000[b]	.964[a]	.929
InKOFTRGDF	-1.212	-4.560	.001				
InKOFTRGDJ	.503	1.013	.335				
InKOFFGDJ	1.623	9.557	.000				
InKOFFGDF	.672	1.837	.096				

a. Dependent Variable: InGDmaritime

Source: Authors' calculation

The functional relationship expressing the influence of economic globalization on maritime transport GDP can be represented by an equation incorporating the four KOF Economic Globalization Index components: trade globalization de facto, trade globalization de jure, financial globalization de facto, and financial globalization de jure as:

$$InGDP_{maritime} = 5.016 - 1.21 InKOFTRGlDf + 0.503 InKOFTRGlDj + 1.623 InKOFFGlDj +$$

0.672InKOFFGlDf + e

The analysis reveals that a one-unit annual increase in the KOF trade globalization de facto index, which encompasses trade in goods and services, corresponds to a 1.21-unit decrease in the maritime transport sub-sector's GDP contribution. Conversely, a one-unit increase in the KOF trade globalization de jure index is associated with a 0.503-unit increase in maritime transport sub-sector output, as measured by sectoral GDP.

Furthermore, a one-unit annual increase in the KOF financial globalization de jure index corresponds to a 1.62-unit increase in the maritime transport sub-sector's GDP contribution. Similarly, a one-unit increase in the KOF financial globalization de facto index, which includes metrics such as foreign direct investment inflows to Nigeria, is associated with a 0.67-unit increase in the sub-sector's GDP contribution.

The coefficient of determination (R^2) of 0.926 indicates that economic globalization explains approximately 92.6% of the variation in the maritime transport sub-sector's contribution to the Gross Domestic Product (GDP).

Table 2. The average value of GDP Maritime sector in Nigeria between 2005 and 2019

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
GDPMARITIME	15	37474.95	69799.94	862672.99	57511.53	11620.44
Valid N (listwise)	15					

Source: Authors' calculation

Over the study period, the maritime transport sector's average annual Gross Domestic Product (GDP) contribution was 145,402.0 billion naira, with a standard deviation of 78,624.37 billion naira. The port logistics sub-sector contributed an average of 57,511.53 billion naira annually, with a standard deviation of 11,620.44 billion naira.

Table 3. Test of Significance of the influence of globalization on the Gross Domestic Product (GDP) of the maritime Transport sub-sector in Nigeria

Hypotheses	F-cal.	F-critical	p-value/sig.	Decision
Test variable	32.920	3.68	.000[b]	Significant
Variable	t-cal.	t-critical	p-value/sig.	Decision
InKOFTRGlDf	-4.560	1.75	.001	significant
InKOFTRGlDj	1.013	1.75	.335	Not significant
InKOFFGlDj	9.557	1.75	.000	significant
InKOFFGlDf	1.837	1.75	.096	Not significant

Source: Authors calculation. Reject *null hypotheses if F-cal > f-critical; Reject null hypotheses if F-cal.< F-critical*

The significance test results presented in Table 3 indicate an F-statistic of 32.920 (F-critical = 3.68, $p < 0.001$). As the F-statistic exceeds the critical value (32.920 > 3.68), the findings demonstrate a statistically significant effect of economic globalization on the maritime transport sector's contribution to Nigeria's Gross Domestic Product (GDP).

Individual t-tests were conducted to examine the specific effects of the KOF globalization indices over the 15-year study period. The analysis revealed that the trade globalization indexes de jure ($t = 1.013$, t-critical = 1.75, $p = 0.331$) did not significantly influence maritime transport GDP, as the calculated t-value was less than the critical value ($1.013 < 1.75$).

However, significant effects were observed for the following indices, each exceeding the critical value of 1.75:

KOF financial globalization index de facto ($t = 4.560$),

KOF trade globalization index de facto ($t = 9.557$),

KOF financial globalization indexes de jure ($t = 1.837$).

These results indicate that these three components of economic globalization significantly influenced the maritime transport sub-sector's contribution to Nigeria's GDP.

5. Conclusion

This study demonstrates that economic globalization significantly influences the maritime transport sector's contribution to Nigeria's Gross Domestic Product (GDP). The analysis reveals differentiated impacts across various dimensions of globalization, as measured by the KOF Globalization Index components. The empirical evidence indicates that financial globalization de facto ($t = 4.560$, $p < 0.001$), trade globalization de facto ($t = 9.557$, $p < 0.001$), and financial globalization de jure ($t = 1.837$, $p < 0.05$) each exhibited statistically significant effects on the maritime transport sector's GDP contribution.

In contrast, the trade globalization de jure index did not demonstrate a significant influence on maritime transport GDP ($t = 1.013$, t-critical = 1.75, $p = 0.331$). This finding suggests that formal trade policies and regulations may have less immediate impact on maritime sector performance compared to actual trade flows and financial integration. The robustness of these findings is supported by the overall model's explanatory power, with an R^2 value of 0.926, indicating that economic globalization components account for 92.6% of the variation in the maritime transport sector's GDP contribution.

These empirical results underscore the maritime sector's strong relationship with global economic integration and have important implications for policymakers and stakeholders in Nigeria's maritime sector. The evidence suggests that actual economic flows and financial integration have more substantial effects on maritime sector performance than formal trade policies alone. Future research directions could benefit from examining longer time series, including additional control variables, investigating causality mechanisms, and analyzing sector-specific policy interventions to enhance understanding of these relationships further.

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