Maritime Entrepreneurship and Economic Development in Nigeria

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Abstract
This research empirically examined the effect of maritime entrepreneurship on economic development in Nigeria from 1990 to 2022. The study proxy maritime entrepreneurship by maritime import, marine export, maritime transportation and maritime tourism as well as measured economic development by Human Development Index. In order to achieve the objectives of the study, annual time series data used were sourced from CBN Statistical Bulletin, WDI of the World Bank as well as UNCTAD reports. The data obtained were tested for stationarity using Augmented Dickey-Fuller (ADF) approach. ARDL bounds cointegration test was used to establish cointegration or long run relationship among the variables. Lastly, the study employed Autoregressive Distributed Lag Model (ARDL) to investigate the long-run and the short-run parameters among the variables. The major results emanating from this study showed that maritime import, marine export and maritime transportation have positive and significant effect on Human Development Index in Nigeria. Also, maritime tourism has a positive and significant effect on Human Development Index in Nigeria in short run while its effect on Human Development Index in Nigeria in the long run is positive but insignificant. Based on the findings, the study concluded that maritime entrepreneurship plays a significant role in promoting economic development in Nigeria. The study recommended that Nigerian government should prioritize the modernization and expansion of port facilities in order to improve the efficiency of maritime imports and exports. This should include upgrading equipment, increasing cargo handling capacity, and introducing automation in customs clearance processes to reduce delays.

1.0 INTRODUCTION

The maritime industry is popularly referred to as commerce in the sea which involves all efforts for the shipment of goods (cargo) and people by sea and water ways. The efforts in the maritime industry are concentrated in port operations which are a necessary tool to enable maritime trade between trade partners. The industry includes all enterprises engaged in the business of designing,

constructing, manufacturing, maintaining vessels and so on. In other words, the maritime industry is all-encompassing as it embraces all the economic ventures derived from the waters. It includes services associated with coastal shipping, tramp service, short sea shipping, port operations, ship management and agencies, dockyard and dock facilities, freight forwarding, customs clearing, import and export trade, banking, and cargo inspection. Globally, maritime transport is one of the oldest forms of transport in Nigeria. It has been in existence since the time of our forefathers. It dates back as early as the history of Nigeria itself. It started out with the use of canoe and paddle boats as a means of transporting people and goods and has since then gone through several evolutionary stages. It was the main form of trans-continental transportation; it was this form of transport that was used in the famous trans-Atlantic slave trade, where slaves were exchanged for goods such as jewellery, clothing materials and the likes. Nigeria's maritime heritage has been an important economic engine for Nigeria throughout most of its history. This is due to the fact that Nigeria is endowed with different water bodies such as the Atlantic Ocean, lagoons and other various rivers (Usman & Bello, 2018).

Hence, opportunities in the maritime industry are numerous and as such need to be harnessed for effective utilization. Maritime entrepreneurship is inevitable in maximizing these opportunities in the maritime industry. Maritime entrepreneurship involves the creation, management, and growth of business ventures within the maritime sector. This encompasses a wide range of activities including shipping, port operations, shipbuilding and repair, marine services, fishing, aquaculture, and maritime tourism. Entrepreneurs in this field are instrumental in identifying and exploiting opportunities within the maritime industry, driving innovation, and improving efficiencies (Usman & Bello, 2018). According to Nwankwo and Amadi (2021), maritime entrepreneurship is one of the critical success factors in the growth and development of any emerging economy accessible by sea. Its importance cannot be overemphasized in its contribution to the Gross Domestic Product (GDP), employment opportunities in the country and overall economic development. Maritime entrepreneurship, offers numerous benefits that extend beyond economic growth. The advantages of maritime entrepreneurship are multifaceted, encompassing economic, technological, environmental, and social dimensions. These benefits not only enhance the competitive edge of individual businesses but also contribute to broader societal and environmental goals. Maritime entrepreneurship plays a pivotal role in job creation and economic development. The maritime industry is labor-intensive, requiring a wide range of skills and expertise across various segments such as shipping, port management, logistics, and marine services. The establishment of new maritime enterprises leads to the creation of direct and indirect employment opportunities, thereby stimulating local and regional economies. Employment in the maritime sector boosts household incomes, reduces poverty, and contributes to economic stability. Moreover, the growth of maritime businesses generates additional revenue through taxes and fees, contributing to public finances and enabling further investment in infrastructure and public services (Cullinane & Song, 2022). In addition, maritime entrepreneurship significantly enhances trade and global connectivity. By developing efficient and innovative shipping solutions, maritime entrepreneurs facilitate the smooth flow of goods across international borders. This, in turn, reduces transportation costs, shortens delivery times, and improves supply chain reliability. Enhanced global connectivity

fosters international trade, enabling businesses to access new markets and consumers to benefit from a diverse range of products at competitive prices. The growth of maritime entrepreneurship thus acts as a catalyst for global economic integration and development (Stopford, 2019).

Statement of the Problem

Nigeria is naturally endowed with large body of inland waterways spreading over 10,000 kilometers which actually linked about 28 states out of the 36 states and the second lengthiest waterways in Africa (National Inland Waterways Authority 2021). Over 3,000 kilometers of the 10,000 kilometers of inland waterways in Nigeria are navigable seasonally (National Inland Waterways Authority 2021), especially during the wet season when the water volume and tide is high to maintain the boat buoyance for easy navigation. This figure represents only 30% utilization of the waterways in Nigeria and 70% unutilized due to undeveloped inland waterways as a means of transportation. Nigeria indeed is blessed with dense network of rivers, streams, creeks and coastal lagoons which can provide huge potentials for development of efficient inland water transport. The maritime industry is however vital to the economies of all coastal countries since it attracts workers from virtually everywhere except landlocked countries. As expected, Nigeria follows suit. Nigeria, as Africa's largest economy and a maritime nation with extensive coastline along the Gulf of Guinea, relies heavily on ocean as a critical enabler of international trade, economic development, and prosperity. However, despite the strategic importance of ocean, maritime industry in Nigeria has over the years faced a lot of challenges that impeded it progress and denied Nigeria the opportunities from reaping its full benefits. In other words, Nigeria's maritime has failed to contribute to the country's economic expansion, while the sector as a whole has underperformed and failed to live up to its potential. Specifically, Nigeria's maritime infrastructure faces numerous challenges, including inadequate port facilities, congestion, inefficiencies in cargo handling, and poor hinterland connectivity. These infrastructure deficiencies hamper the smooth flow of goods, increase transaction costs, and undermine the competitiveness of Nigerian ports in global trade. In addition, the ocean space and marine environment in Nigeria is threatened by anthropogenic activities as well as the increasing level of trade, surging population and search for alternative energy sources. These activities further affect a country's economic prospects. The level of stress facing the ocean as a result of climate change, overexploitation, pollution and declining biodiversity hinders the potentials and benefits offered by the ocean and prevents the achievement of a blue economy. Furthermore, security challenge has hampered the success of maritime entrepreneurship in Nigeria. Piracy, armed robbery at sea, and general insecurity in Nigerian waters pose significant risks to maritime operations. These security challenges increase insurance premiums, discourage foreign investment, and disrupt maritime activities which in turn negatively affect economic growth and development in Nigeria. Drawing from the identified problem, this study therefore seeks to empirically determine the effect of maritime entrepreneurship on economic development in Nigeria.

Aim and Objectives of the Study

The aim of this study is to examine the effect of maritime entrepreneurship on economic development in Nigeria. The specific objectives of the study are to:

i. examine the effect of maritime import on Human Development Index in Nigeria;

ii. determine the effect of marine export on Human Development Index in Nigeria;
iii. ascertain the effect of maritime transportation on Human Development Index in Nigeria; and
iv. analyse the effect of maritime tourism on Human Development Index in Nigeria.

LITERATURE REVIEW

Theoretical Framework

The theories adopted in this study are discussed in this section as follow

Porter's Diamond Theory of National Advantage

Porter's Diamond Theory of National Advantage was propounded by Michael E. Porter, a professor at Harvard Business School. He introduced the theory in his book "The Competitive Advantage of Nations," published in 1990. This work built on his earlier research in competitive strategy and industry analysis, particularly his 1980 book "Competitive Strategy" and the 1985 book "Competitive Advantage." The Diamond Model is a key component of his broader theories on how firms and nations achieve and sustain competitive advantage. Michael Porter's Diamond Theory explains how certain industries within a country can gain competitive advantage internationally. The theory is based on four key determinants: factor conditions, demand conditions, related and supporting industries, and firm strategy, structure, and rivalry. The Porter Diamond Theory of National Advantage, or the Porter Diamond Model, is a model that describes the competitive advantage that nations or groups possess based on factors available to them. The theory explains how governments can act to improve a country's position in a globally competitive economic environment.

Assumptions of Porter's Diamond Theory of National Advantage

The primary assumptions underlying Porter's Diamond Theory of National Advantage include:

i. The quality and availability of a nation's factors of production (such as labor, natural resources, capital, and infrastructure) are critical for competitive advantage.
ii. The nature and size of domestic demand for an industry's products and services are important for competitive advantage.
iii. The presence of competitive and innovative related and supporting industries boosts the competitiveness of firms.
iv. The context in which firms are created, organized, and managed, as well as the nature of domestic rivalry, influence competitive advantage.

Drawbacks of Porter's Diamond Theory of National Advantage

Porter's Diamond Theory of National Advantage has been influential in understanding the factors that contribute to a nation's competitive advantage in specific industries. However, several drawbacks and criticisms have been identified:

i. The theory places significant emphasis on the domestic environment, potentially underestimating the influence of international factors. In a globalized economy, international markets, competition, and supply chains play crucial roles in determining competitive advantage.
ii. Porter's Diamond Model can be seen as somewhat static, not fully accounting for the dynamic and rapidly changing nature of global industries. It may not adequately address

how competitive advantages evolve over time or how nations can adapt to shifting global conditions.

iii. The theory assumes that firms compete on a relatively level playing field within their domestic markets. However, disparities in economic development, infrastructure, and regulatory environments can create unequal conditions that the model does not adequately address.

iv. Porter's model underestimates the impact of cultural and social factors on competitive advantage. National culture, social norms, and historical context can significantly influence business practices, innovation, and competitiveness.

Application to Porter's Diamond Theory of National Advantage to the Study

Nigeria's geographical advantage with extensive coastlines and navigable waterways provides favorable conditions for maritime entrepreneurship. A growing domestic and international demand for shipping services, fishery products, and oil and gas resources drives entrepreneurial activity in the maritime sector. Also, the development of supporting industries such as logistics, shipbuilding, and port management strengthens the maritime sector. Moreover, competitive pressures encourage maritime firms to innovate and improve their services, contributing to overall sector growth. Hence, strong maritime entrepreneurship leads to a competitive maritime industry, attracting foreign investment and boosting trade. Also, development of maritime clusters (e.g., port cities) stimulates regional economic development and creates synergies among related industries.

Review of Empirical Literature

Trisha (2023) looked at the role and contribution of entrepreneurship industry to foster social and economic development through small, micro, and medium-sized businesses in South Africa. The conceptual research looked at the influence of small, micro, and medium-sized businesses (SMMEs) on South African development. A desktop literature review research design was adopted to collect data on the role of entrepreneurship in South Africa, policies and practices of big business and government that exacerbate social issues in communities and impede socioeconomic development, as well as the specific roles that SMMEs play in achieving socioeconomic development goals. Findings from research indicate that, among other development outcomes, SMMEs are at the vanguard of creating jobs and fostering social and political justice in the nation.

Agbai, Eugene and Muhammed (2023) assessed the impact of international maritime security threats on economic development in coastal areas of Delta and Rivers States. The sample size of the study was 385 respondents drawn from a population of 9,925 people comprising of staff from Ministry of Foreign Affairs, Nigeria Customs Service, Nigeria Police Force and Nigeria Maritime Administration and Safety Agency in delta and Rivers States. The population of the study equally includes staff drawn from Togolese, Benin republic and Senegalese embassies Abuja as well as operators of shipping businesses, fishing groups and oil servicing firms in Warri, Port Harcourt, Oporoza and Bonny. Primary data were collected from close-ended and open-ended questionnaire and in-depth interview. Findings showed that international maritime security threats in Nigeria maritime domain increases poverty and unemployment levels in coastal areas of Delta and Rivers States as well as transnational cooperation as well as collaboration are among the effective

measures in combating negative impacts of international maritime security threats in Nigeria coastal waters on coastal areas in delta and Rivers States.

Ogoun (2022) assessed and enumerate maritime transport as a tool of economic growth in Nigeria. The study applied and adopted the qualitative method of research, particularly the desk-review approach. Through the desk-review approach applied and adopted, the study found amongst other things that maritime transport contributes positively to the GDP of Nigeria, which is a major determinant of the rate of economic growth in a nation. The study also found that maritime transport facilitates other sectors of the economy as a major component in the value chains; thereby enabling such other sectors to make contributions to the economy which implies that it is also serving as a tool of the economic growth of Nigeria.

Adekunle and Ibrahim (2022) investigated the role of innovation in maritime entrepreneurship and its contribution to economic growth in Nigeria. The study employed a mixed-methods approach, combining quantitative surveys with qualitative case studies. Data were collected from a sample of maritime entrepreneurs and industry stakeholders through structured questionnaires and in-depth interviews. The quantitative data were analyzed using regression analysis to determine the relationship between innovation and economic indicators such as business growth, employment, and GDP contribution. The qualitative data provided contextual insights into how innovation is implemented and its effects on the maritime sector. The findings indicated that innovation plays a crucial role in enhancing the performance and competitiveness of maritime enterprises in Nigeria.

Yıldız (2022) examined the relations between gross domestic product (GDP) and maritime exports, maritime imports, and the construction sector in Turkey. The data of the study for the last years were obtained from the Turkish Statistical Institute (TSI). The stationarity levels of the data were analyzed with unit root statistics tests. Since all series are stationary at the I (1) level, the Granger causality method is preferred. As a result, GDP is the Granger cause of maritime exports, maritime imports, and the construction industry but no correlation could be established between maritime imports with other data. Also, the construction industry is the Granger cause of maritime exports.

Matekenya and Ncwadi (2022) explored the impact of maritime transport financing on trade in South Africa. Using the Autoregressive Distribution lag model, we examine the impact of maritime transport financing on total trade in South Africa during the period 1994 to 2019. The results confirm a long and short-run positive relationship between maritime transport financing and total trade. The findings suggest an overall, substantial investment in maritime transport has the potential to promote trade flows in South Africa.

Bashiru, Muse and Lawal-Fagbo (2021) examined maritime logistics factors on Nigeria Gross Domestic Product (GDP) with the view of evaluating the relationship as well as influence of the logistics factors (Vessel Movement (VM), and Cargo Throughput) in term of costs on Nigeria Gross Domestic Product. The study employed expo-facto research design with data obtained from Nigeria Port Authority (NPA), Central Bank of Nigeria (CBN) Statistical Bulletin and Records from Concessionaires of some of the ports. The results showed that Nigeria GDP has positive but

weak association with Bulk Cargo and Cargo Throughput costs but inversely connected with Container Vessel and Roro Vessel costs. Though, the influence of the logistics factors except cargo throughput on Nigeria GDP is negatively insignificant. Nevertheless, they contributed 29.1% to the improvement of Nigeria GDP.

Nicholas (2021) carried out a qualitative single case study to explore the barriers to technology acceptance among Nigerian maritime industry stakeholders. A single case study with an embedded unit design was used to address the literature gap, and qualitative data from 12 semi-structured interviews, reflective field notes, and archival data were collected to provide answers to the central research question. This study was framed by Yang's concept of maritime shipping digitization and Wiafe et al.'s concept of technology acceptance in the maritime industry in developing countries. Thematic analysis of data from the interviews revealed 16 themes encased in the following five coding categories: (a) technology adoption standards as compared to global industry standards, (b) barriers to technology adoption and maritime digitization, (c) technology acceptance factors influencing maritime industry stakeholders, (d) resources needed for new technology adoption to meet global industry standards, and (e) how Nigeria's maritime sector can drive national sustainable development.

Naidoo and Andrews (2021) carried out a study to provide an in-depth analysis of maritime transport and port development in South Africa. Employing a mixed-methods approach, the study integrates quantitative analysis of economic and trade data with qualitative insights from industry stakeholders. The findings revealed that port development and maritime transport efficiency are strongly correlated with economic growth in South Africa. Ports such as Durban, Cape Town, and Richards Bay serve as vital nodes in the global trade network, handling a substantial portion of the country's imports and exports.

Chasomeris (2018) examined the role of maritime transport in South Africa's economic growth. The research findings indicated that maritime transport has a substantial multiplier effect on the economy, stimulating growth in related sectors such as manufacturing, logistics, and services. The study highlights the role of maritime transport in job creation, noting that the sector directly and indirectly supports a significant number of jobs across various skill levels. The study concluded with policy recommendations aimed at strengthening the maritime transport sector's contribution to economic growth.

Johnson and Eze (2020) examined the contribution of maritime entrepreneurship to the economic development of the Niger Delta region in Nigeria. Using a quantitative approach, data were collected through structured questionnaires administered to a sample of maritime entrepreneurs operating in the Niger Delta. The analysis employed descriptive statistics to provide an overview of the current state of maritime entrepreneurship in the region, and regression analysis to investigate the relationship between maritime entrepreneurial activities and key economic indicators such as employment, income levels, and GDP growth. The findings revealed that maritime entrepreneurship plays a critical role in job creation and income generation within the

Niger Delta. Specifically, the study found a positive and significant correlation between maritime entrepreneurial activities and regional GDP growth.

Evaluation of Literature Reviewed

A good number of empirical studies on the effect of maritime sector on economic growth/development sector have been reviewed in this chapter. Based on the researchers' knowledge, content, time/data and methodology gaps have been identified which this study aims to bridge. In terms of content, very few of the previous studies exactly linked maritime entrepreneurship to economic development in Nigeria. With respect to time/data, none of the studies previously carried out made use of annual time series data that covered 2022. With respect to methodology, most of the studies did not carry out pre-estimation tests and post-estimation tests in their data analyses. In an attempt to bridge these gaps therefore, this study empirically examined the effect of maritime entrepreneurship on economic development in Nigeria by using annual time series data that ranged from 1990 to 2022 while pre-estimation tests, estimation tests and post-estimation tests were econometrically carried out in this study in order to arrive at more dependable results for effective and efficient policy implementation.

3.0 METHODOLOGY

The research design to be adopted in this study is ex-post facto research design. Ex post facto research is one which is based on a fact or event that has already happened and at the same time employs the investigation and basic logic of enquiry like the experimental method. Also, annual time series data which ranged from 1990 to 2022 were used in this study. These data were sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin, World Development Indicators (WDI) of the World Bank as well as United Nations Conference of Trade and Development (UNCTAD).

Model Specification

Empirically, multiple regression model was adopted in this study and were used to establish the effect of the independent variables (maritime import, marine export, maritime transportation and maritime tourism) on the dependent variable (Human Development Index). This model was built on the model of Nwankwo and Amadi (2021) in their work on economic impact of maritime entrepreneurship on coastal communities in Nigeria. However, this model is slightly modified in order to capture all the variables of this study. The modified model is systematically specified as follows:

Functional Model

Expressing model in functional form gives the equation below:

$$HDI = f(MIM, MEX, MTS, MTR) \quad (1)$$

Mathematical Model

Expressing equation (1) in mathematical form gives the equation below:

$$HDI_t = \beta_0 + \beta_1 MIM_t + \beta_2 MEX_t + \beta_3 MTS_t + \beta_4 MTR_t \quad (2)$$

Econometric Model

Expressing equation (2) in econometric form gives the equation below:

$$HDI_t = \beta_0 + \beta_1 MIM_t + \beta_2 MEX_t + \beta_3 MTS_t + \beta_3 MTR_t + \mu t \quad (3)$$

Where: HDI = Human Development Index, MIM = Maritime import, MEX = Marine export, MTS = Maritime transportation, MTR = Maritime tourism, $_t$ = Time frame, β_0 = Intercept, β_1 - β_4 = Coefficient of maritime import, μt = Disturbance or error term

Variables Description and A Priori Expectation

Dependent Variable

Economic development is the dependent variable in this study and it is measured by Human Development Index.

Human Development Index: The Human Development Index (HDI) is a composite statistic developed by the United Nations Development Programme (UNDP) to measure a country's overall achievement in its social and economic dimensions. The HDI considers three main criteria: Life Expectancy which reflecting the average lifespan of individuals, which serves as an indicator of health and longevity; Education which is measured by the mean years of schooling for adults aged 25 years or more and expected years of schooling for children of school entering age; as well as income per Capita that is, gross national income (GNI) per capita adjusted for purchasing power parity (PPP), indicating the standard of living.

Independent Variable

Maritime entrepreneurship is the independent variable in this study and it will be proxied by maritime import, marine export, maritime transportation and maritime tourism:

Maritime Import: Maritime import refers to the transportation of goods into a country via sea routes. This involves the receipt of goods shipped from foreign ports and delivered to domestic ports. Based on economic theory, the study expects maritime import to have a positive effect on Human Development Index. This is mathematically represented as: $\beta_1 > 0$.

Maritime Export: Maritime export refers to the transportation of goods out of a country via sea routes. This involves the shipment of domestically produced goods to foreign markets. Maritime export is a critical driver of economic growth, providing revenue, creating jobs, and enhancing the trade balance of a country. Based on economic theory, the study expects maritime export to have a positive effect on Human Development Index. This is mathematically represented as: $\beta_2 > 0$.

Maritime Tourism: Maritime tourism involves travel and leisure activities conducted on or around coastal and marine environments. This includes a variety of activities such as cruising, yachting, sailing, diving, and visiting coastal resorts and attractions. Based on economic theory, the study expects maritime tourism to have a positive effect on Human Development Index. This is mathematically represented as: $\beta_3 > 0$.

Marine Transportation: Marine transportation refers to the movement of goods and passengers over water bodies, including oceans, seas, rivers, and lakes. It encompasses a wide range of activities such as shipping, ferry services, and inland water transport. Based on economic theory, the study expects maritime transportation to have a positive effect on Human Development Index. This is mathematically represented as: $\beta_4 > 0$.

Data Analysis Techniques

The method of data analysis used in this study is Autoregressive Distributed Lag (ARDL) method. This approach, which is quantitative technique, includes table and the test for the hypotheses formulated by using regression analysis at 5% level of significance. The model was estimated accordingly while the observed relationships between the variables was explained in details.

Analysis was carried out through the use of econometric views (EViews) statistical software 12. EViews is a statistical package used mainly for time-series oriented econometric analysis.

4.0 DATA ANALYSIS AND DISCUSSION OF FINDINGS

Descriptive Statistical Analysis

Table 1 presents the descriptive statistics of the data for this study as follows:

Table 1: Descriptive Statistics

	HDI	MIM	MEX	MTS	MTR
Mean	0.490939	4193.760	1836.764	219.7721	118.8070
Median	0.477000	2140.920	426.0000	137.4500	92.20000
Maximum	0.581000	15894.80	9661.900	731.3600	389.1300
Minimum	0.445000	35.40000	10.40000	10.67000	4.840000
Std. Dev.	0.036253	4658.118	2405.562	213.6197	102.1584
Skewness	0.694386	1.231559	1.614774	0.843916	1.180025
Kurtosis	2.300879	3.511804	5.285854	2.556229	3.582390
Jarque-Bera	3.324002	8.702234	21.52577	4.187854	8.124891
Probability	0.189759	0.012892	0.000021	0.123202	0.017207
Sum	16.20100	138394.1	60613.20	7252.480	3920.630
Sum Sq. Dev.	0.042056	6.94E+08	1.85E+08	1460268.	333962.6
Observations	**33**	**33**	**33**	**33**	**33**

Source: Researcher's Computation, 2025.

Note: HDI = Human Development Index; MIM = Maritime Import, MEX = Marine Export, MTS = Maritime Transportation MTR = Maritime Tourism

Table 1 shows that there are thirty-three (33) observations for all the variables over a period of thirty-seven years from 1990 to 2022 with one explained variable, which is Human Development Index and four explanatory variables, which are maritime import, marine export, maritime transportation and maritime tourism. From Table 1, the average Human Development Index is 0.491. The maximum value for Human Development Index is 0.581 while the minimum value of Human Development Index is 0.445. The standard deviation of Human Development Index which indicates the spread of the variable around its mean is 0.036. In addition, the average maritime import is 4193.76. The maximum value for maritime import is 15894.8 while the minimum value of maritime import is 35.4. The standard deviation of maritime import which indicates the spread of the variable around its mean is 4658.12. In furtherance, mean marine export is 1836.76. The maximum value for marine export is 9661.9 while the minimum value of marine export is 10.4. The standard deviation of marine export which indicates the spread of the variable around its mean is 2405.562. Moreover, mean maritime transportation is 219.77. The maximum value for maritime transportation is 731.36 while the minimum value of maritime transportation is 10.67. The standard deviation of maritime transportation which indicates the spread of the variable around its mean is 213.62. Lastly, the average maritime tourism is 118.81. The maximum value for maritime tourism is 389.13 while the minimum value of maritime tourism is 4.84. The standard deviation of maritime tourism which indicates the spread of the variable around its mean is 102.16.

Trend Analysis

The second analytical procedure for this study is trend analysis. This is aimed at analyzing the past trends in the variables of the study:

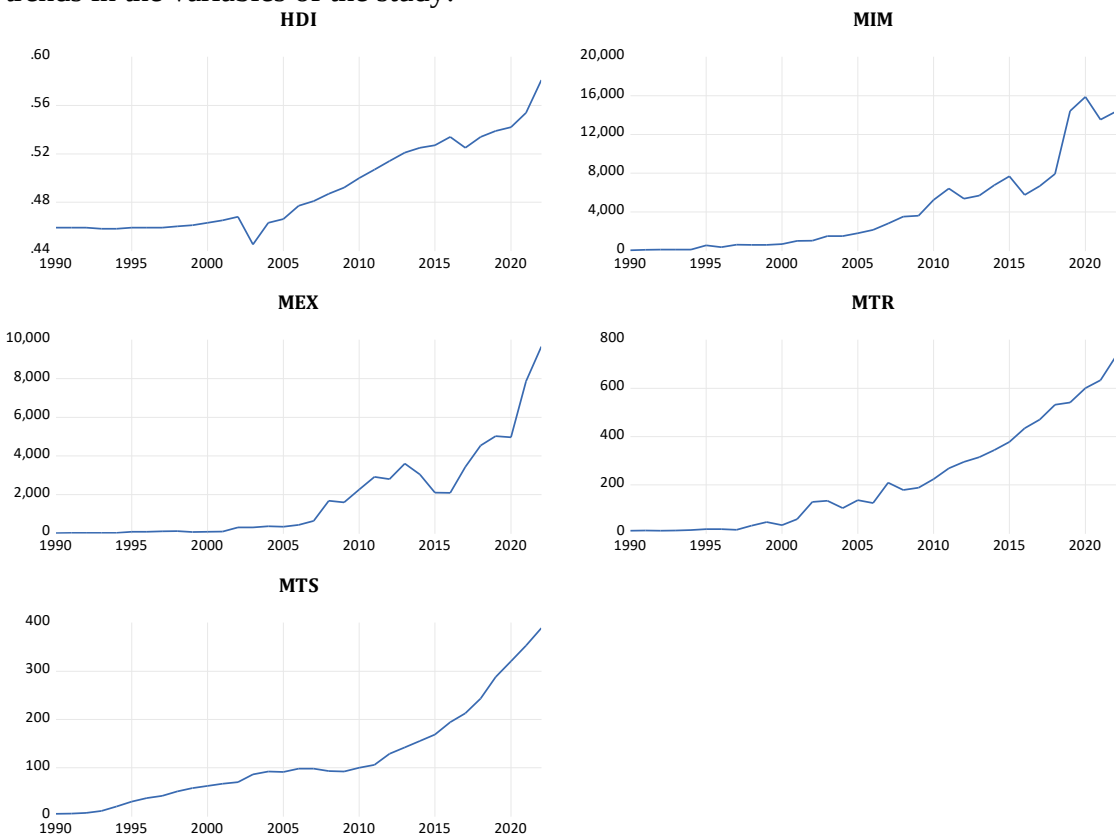

Figure 1: Trend Analysis Human Development Index, Maritime Import, Marine Export, Maritime Transportation and Maritime tourism

The trend analysis as presented in Figure 1 revealed that Human Development Index, maritime import, marine export, maritime transportation and maritime tourism revealed that the graphs representing Human Development Index, maritime import, marine export, maritime transportation and maritime tourism demonstrated similar patterns in movements which are mostly upward trend over the study period (1990 – 2022).

Pre-Estimation Tests

Unit Root Test

The first stage of econometric analysis is to test for the stationarity properties of the variables. Augmented Dickey-Fuller (ADF) type of unit root test was conducted in this study to help avoid "spurious" or "nonsense" regression results. The results of Augmented Dickey-Fuller (ADF) unit root tests are presented in Table 2:

Table 2: Augmented Dickey-Fuller (ADF) Test Results

	ADF at Levels			ADF at First Difference			
Variables	**ADF Statistic**	**5% Critical Value**	**Decision**	**ADF Statistic**	**5% Critical Value**	**Decision**	**Order of Integration**
HDI	1.905764	-2.957110	Not Stationary	-5.047939	-2.960411	Stationary	I(1)
LOG(MIM)	-2.337706	-2.957110	Not Stationary	-7.872305	-2.960411	Stationary	I(1)
LOG(MEX)	-1.055824	-2.957110	Not Stationary	-6.066060	-2.960411	Stationary	I(1)
LOG(MTS)	-3.706662	-2.957110	Stationary	-	-	-	I(0)
LOG(MTR)	-1.373768	2.963972	Not Stationary	-6.592170	-2.963972	Stationary	I(1)

Source: Researcher's Computation, 2025.
Note: (i) * implies stationarity at 5% level of significance; (ii) Decisions are based on absolute values.

The results of the Augmented Dickey Fuller (ADF) unit root test at levels reported in Table 2 showed that only maritime transportation was stationary at the 5 percent level of significance. This is because in absolute terms, the Augmented Dickey Fuller (ADF) test statistic for maritime transportation is less than its associated critical value. Thus, the null hypothesis of unit root of maritime transportation was rejected at level. In other words, maritime transportation was stationary at order zero [i.e., I(0)]. On the other hand, Human Development Index, maritime import, marine export and maritime tourism were stationary at order one [i.e., I(1)]. This implies that they attained stability by first differencing. It also shows that the null hypothesis of presence of unit root was rejected after first differencing for Human Development Index, maritime import, marine export and maritime tourism. Based on the Augmented Dickey Fuller (ADF) unit root test therefore, while one of the time series was stationary at level i.e. integrated of order zero, others only became stationary after first differencing i.e. integrated of order one. It can therefore be inferred that a mixed order of integration is evident among the time series in the model.

ARDL Bound Cointegration Test

Bound testing technique was used to test for cointegration because of a mixture of variables of order I(0) and I(1). However, the result of the ARDL Bounds Cointegration Test for this study is reported in Table 3:

Table 3: ARDL Bounds Cointegration Test Result

Selected Model: ARDL (4, 1, 0, 1, 4)		
Test Statistic	**Value**	**K**
F-statistic	5.595595*	4
Critical Value Bounds		

Significance	**Lower Bound [**I(0)]	**Upper Bound [**I(1)]
5%	2.56	3.49

Source: Researcher's Computation, 2025.
Note: * implies that F-statistic is greater than upper bound 5% critical value and long run exists between the variables in the model.

The result of ARDL Bounds Test presented in Table 3 showed that the F-statistic (5.595595) is greater than the lower bound (2.56) and upper bound (3.49) at 5% level of significance. Hence, there is sufficient statistical evidence to reject the null hypothesis of no co-integration at 5% level of significance and conclude that there exists a long run relationship or cointegration between the variables. Specifically, it can therefore be concluded based on the ARDL bounds cointegration test that there is a long-run relationship among Human Development Index, maritime import, marine export, maritime transportation and maritime tourism. The confirmation of long run dynamics among the variables gives credence for the estimation of the extent of the relationship by proceeding to estimate the ARDL short-run model, ARDL long-run form and ARDL error correction for Human Development Index model.

Autoregressive Distributed Lag (ARDL) Estimation
ARDL Long-Run Dynamics
In this section, the study estimates the long run effect of maritime import, marine export, maritime transportation and maritime tourism on Human Development Index in Nigeria. The long run estimations are conducted using the Autoregressive Distributed Lag (ARDL) technique. In the selected long run ARDL (4, 1, 0, 1, 4) model, the maximum lag length was set out by using Akaike Info Criterion (AIC). However, the normalized short run coefficient estimates are reported in Table 4:

Table 4: Autoregressive Distributive Lag (ARDL) Long Run Dynamics Result

Dependent Variable: **HDI**
Selected Model: **ARDL** (**4, 1, 0, 1, 4**)

Independent Variables (Regressors)	**Coefficient (Parameter estimates)**	**Std. Error**	**t-Statistic**	**Prob**
LOG(MIM)	0.036512	0.012686	2.878052	0.0237
LOG(MEX)	0.021535	0.007157	3.008880	0.0197
LOG(MTS)	0.059344	0.010268	5.779272	0.0007
LOG(MTR)	0.170445	0.262789	0.648600	0.5373
C	-2.107558	4.391457	-0.479922	0.6459

Source: Researcher's Computation, 2025.
Note: ** and * implies statistical significance of the coefficient at 1% and 5% respectively.

From the ARDL long run estimate result in Table 4, maritime import has a positive coefficient value of 0.036512. This implies that maritime import has a positive effect on Human Development Index. Hence, a unit increase in maritime import will lead to 0.036512 unit increase in Human

Development Index while a unit decrease in maritime import will lead to 0.036512 unit decrease in Human Development Index. Also, the p-value (i.e., 0.0237) of the coefficient of maritime import which is less than 0.05 indicates that maritime import has a significant effect on Human Development Index. It can therefore be concluded that maritime import has a positive and significant effect on Human Development Index in Nigeria in the long run. Also, from the ARDL long run estimate result in Table 4, marine export has a positive coefficient value of 0.021535. This implies that marine export has a positive effect on Human Development Index. Hence, a unit increase in marine export will lead to 0.021535 unit increase in Human Development Index while a unit decrease in marine export will lead to 0.021535 unit decrease in Human Development Index. Also, the p-value (i.e., 0.0197) of the coefficient of marine export which is less than 0.05 indicates that marine export has a significant effect on Human Development Index. It can therefore be concluded that marine export has a positive and significant effect on Human Development Index in Nigeria in the long run. In addition, from the ARDL long run estimate result in Table 4, maritime transportation has a positive coefficient value of 0.059344. This implies that maritime transportation has a positive effect on Human Development Index. Hence, a unit increase in maritime transportation will lead to 0.059344 unit increase in Human Development Index while a unit decrease in maritime transportation will lead to 0.059344 unit decrease in Human Development Index. Also, the p-value (i.e., 0.0007) of the coefficient of maritime transportation which is less than 0.05 indicates that maritime transportation has a significant effect on Human Development Index. It can therefore be concluded that maritime transportation has a positive and significant effect on Human Development Index in Nigeria in the long run. Lastly, from the ARDL long run estimate result in Table 4, maritime tourism has a positive coefficient value of 0.170445. This implies that maritime tourism has a positive effect on Human Development Index. Hence, a unit increase in maritime tourism will lead to 0.170445 unit increase in Human Development Index while a unit decrease in maritime tourism will lead to 0.170445 unit decrease in Human Development Index. Also, the p-value (i.e., 0.5373) of the coefficient of maritime tourism which is greater than 0.05 indicates that maritime tourism has a non-significant effect on Human Development Index. It can therefore be concluded that maritime tourism has a positive and non-significant effect on Human Development Index in Nigeria in the long run.

ARDL Short Run Dynamics

Having performed the long run estimation of the Human Development Index model, it therefore becomes necessary and important to determine the correction of short run disequilibrium to long run equilibrium. To achieve this, the Error Correction Mechanism (ECM) was conducted and the results are reported in Table 5.

Table 5: Autoregressive Distributive Lag (ARDL) Error Correction Result

	Dependent Variable: HDI Selected Model: ARDL (1, 4, 4, 4, 4)			
Independent Variables (Regressors)	**Coefficient (Parameter Estimates)**	**Std. Error**	**t-Statistic**	**Prob**
DLOG(MIM)	0.097419	0.018815	5.177593	0.0013
DLOG(MIM(-1))	-0.142254	0.025413	-5.597757	0.0008
DLOG(MEX)	0.068178	0.011890	5.734152	0.0007
DLOG(MEX(-1))	-0.012407	0.007864	-1.577564	0.1587
DLOG(MTS)	0.091106	0.022721	4.009827	0.0051
DLOG(MTS(-1))	0.040510	0.023422	1.729572	0.1273
DLOG(MTS(-2))	0.044374	0.025106	1.767452	0.1205
DLOG(MTS(-3))	-0.032538	0.021508	-1.512839	0.1741
DLOG(MTR)	0.036808	0.008964	4.106238	0.0045
DLOG(MTR(-1))	-0.036061	0.006910	-5.218826	0.0012
DLOG(MTR(-2))	-0.040806	0.008043	-5.073579	0.0014
CointEq(-1)*	-0.180078	0.029611	-6.081386	0.0005
	Adjusted R^2 = 0.542693; Durbin-Watson stat = 2.297546			

Source: Researcher's Computation, 2025.

Note: ** and * implies statistical significance of the coefficient at 1% and 5% respectively.

The short run estimations are conducted using the Autoregressive Distributed Lag (ARDL) technique. Thus, the results of the ARDL Error Correction are reported in Table 5. The result shows that maritime import has a positive coefficient value of 0.097419. This implies that maritime import has a positive effect on Human Development Index. Hence, a unit increase in maritime import will lead to 0.097419 unit increase in Human Development Index while a unit decrease in maritime import will lead to 0.097419 unit decrease in Human Development Index. Also, the p-value (i.e., 0.0013) of the coefficient of maritime import which is less than 0.05 indicates that maritime import has a significant effect on Human Development Index. It can therefore be concluded that maritime import has a positive and significant effect on Human Development Index in Nigeria in the short run. Also, the result shows that maritime export has a positive coefficient value of 0.068178. This implies that maritime export has a positive effect on Human Development Index. Hence, a unit increase in maritime transportation will lead to 0.068178 unit increase in Human Development Index while a unit decrease in maritime export will lead to 0.068178 unit decrease in Human Development Index. Also, the p-value (i.e., 0.0007) of the coefficient of maritime export which is less than 0.05 indicates that maritime export has a significant effect on Human Development Index. It can therefore be concluded that maritime export has a positive and significant effect on Human Development Index in Nigeria in the short run. Also, the result shows that maritime transportation has a positive coefficient value of 0.091106. This implies that maritime transportation has a positive effect on Human Development Index. Hence, a unit increase in maritime transportation will lead to 0.091106 unit increase in Human Development Index while

a unit decrease in maritime transportation will lead to 0.091106 unit decrease in Human Development Index. Also, the p-value (i.e., 0.0051) of the coefficient of maritime transportation which is less than 0.05 indicates that maritime transportation has a significant effect on Human Development Index. It can therefore be concluded that maritime transportation has a positive and significant effect on Human Development Index in Nigeria in the short run.

In addition, the result shows that at initial level, maritime tourism has a positive coefficient value of 0.036808. This implies that maritime tourism at the first lag has a positive effect on Human Development Index. Hence, a unit increase in maritime tourism will lead to 0.036808 unit increase in Human Development Index while a unit decrease in maritime tourism will lead to 0.036808 unit decrease in Human Development Index. Also, the p-value (i.e., 0.0045) of the coefficient of maritime tourism which is less than 0.05 indicates that maritime tourism has a significant effect on Human Development Index. It can therefore be concluded that maritime tourism has a Positive but significant effect on Human Development Index in Nigeria in the short run. However, the error correction term indicates the speed adjustment to restore equilibrium in the dynamic model. The error correction mechanism coefficient shows how quickly variables converge to equilibrium and it should have a statistically significant coefficient with a negative sign. Thus, the error correction coefficient estimated at CointEq(-1) is highly significant (0.0005) and negative (-0.180078) as expected. This implies a very high speed of adjustment to equilibrium. The highly significant error correction term further confirms the existence of a stable long-run relationship among all the research variables with their various significant lags. Specifically, the coefficient of CointEq(-1) which is -0.180078 indicates that deviation from the long-term growth rate in Human Development Index is corrected by 18% in the following year. In furtherance, the adjusted R-Square of 0.542693 indicates that about fifty-four (54) percent of the total variation in Human Development Index is explained by systematic changes in maritime import, marine export, maritime transportation and maritime tourism while the remaining forty-six (46) percent of the variation is explained by other factors not included in the model. Lastly, the Durbin-Watson stat statistics of 1.828 shows that the model is free from the problem of autocorrelation.

In summary, it can be observed that both the short run and long run results yielded the same sign for the variables which signifies consistency in the effects of the independent/explanatory variables (maritime import, marine export, maritime transportation and maritime tourism) on the dependent/explained variable (Human Development Index in Nigeria) in the short run and long run.

Post-Estimation Tests

In order to ensure the reliability of the model and further ascertain that the estimated model is adequate for adoption and policy formulation, both residual and stability post-estimation tests were conducted on the Human Development Index model as follows.

Table 6: Post-Estimation Test Result

Test	F-Statistic	P-value	Null Hypothesis	Decision
Normality Test	1.042103	0.605459	**H_0:** Normally distributed	Do not reject H_0
Breusch-Godfrey Serial Correlation LM Test	2.725279	0.0634	**H_0:** Not serially correlated	
Breusch-Pagan-Godfrey Heteroskedasticity Test	0.348952	0.9711	**H_0:** Homoscedasticity	Do not reject H_0
Ramsey RESET test	8.799523	0.0603	**H_0:** The model is correctly specified	Do not reject H_0

Source: Researcher's Computation, 2025.

Normality test was carried out to verify if the error term is normally distributed. The null hypothesis states that the residuals are normal distributed at 5 % level of significance. To test this hypothesis, Jarque-Bera statistics was used. The result in Table 6 above shows that Jarque-Bera statistic is 1.042103 and the probability is 0.605459. However, since the probability value (0.605459) of Jarque-Bera statistic is greater than 5%, we do not reject the null hypothesis and conclude that the residuals are normally distributed at 5 % level of significance. Also, the results in Table 6 above shows that F-statistic is 2.725279 and the probability value is 0.0634. However, since the probability value (0.0634) of the F-statistic is greater than 5 percent, we do not reject the null hypothesis and conclude that the residuals are not serially correlated. That is, the estimated model is not suffering from serial autocorrelation problem. In addition, the result in Table 6 above shows that F-statistic is 0.348952 and the probability value is 0.9711. However, since the probability value (0.9711) of the F-statistic is greater than 5 percent, we do not reject the null hypothesis and conclude that the variance of the residuals is homoscedastic over the period covered in this study. This implies that the estimated model is free from the problem of heteroskedasticity. Lastly, the results in Table 6 above show that F-statistic is 8.799523 and the probability value is 0.0603. However, since the probability value (0.0603) of the F-statistic is greater than 5 percent, we do not reject the null hypothesis and conclude that the model is correctly specified. This suggests that the variables included in the model are adequate and sufficient.

Stability Test

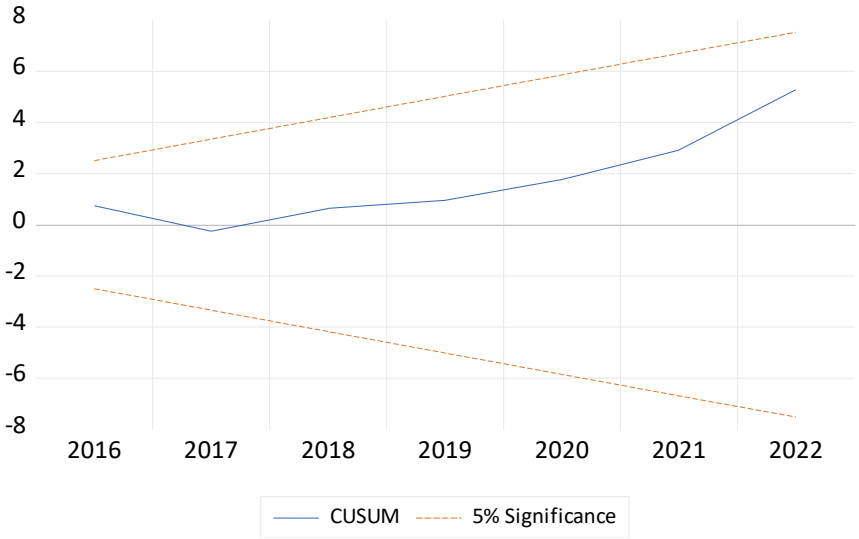

Figure 2: Stability CUSUM Test

The cumulative sum of recursive residuals (CUSUM) test result as shown in Figure 2 above portray the plots of CUSUM test statistics as resting neatly within the boundaries at 5%significant level. The CUSUM plot did not across the 5 percent critical line. Hence, this confirms the stability and absence of any instability of the long-run coefficient of maritime entrepreneurship variables in the Human Development Index model over the sample period.

Discussion of Findings

Evidences that emerged from the study showed that maritime import has a positive and significant effect on Human Development Index in Nigeria in both short run and long run. This implies that increase in maritime import will lead to significant increase in Human Development Index in Nigeria in the short run and long run. This finding is in agreement with the finding of Ogoun (2022) who found that maritime import as a proxy of maritime transport plays a significant effect on economic development on nation (Nigeria). Also, the results of the study showed that marine export has a positive and insignificant effect on Human Development Index in Nigeria in both short run and long run. This implies that increase in marine export will lead to insignificant increase in Human Development Index in Nigeria in the short run and long run. This finding is in agreement with the finding of Johnson and Eze (2020) who found that the marine export caused economic development. In addition, Yıldız (2022) found that marine export significantly affects economic growth in Ghana. In addition, evidences that emerged from the results of the study showed that maritime transportation has a positive and significant effect on Human Development Index in Nigeria in both short run and long run. This implies that increase in maritime transportation will lead to significant increase in Human Development Index in Nigeria in the short run and long run. This result is supported by the result of Chasomeris (2018) which stated that maritime transportation exerts positive impact on South Africa's economic growth. Lastly, the

results of this study showed that maritime tourism has a positive and significant effect on Human Development Index in Nigeria in both short run and long run. This implies that increase in maritime tourism will lead to significant increase in Human Development Index in Nigeria in the short run and long run. This result is in tandem with the result of Johnson and Eze (2020) which stated that there is a significant relationship between the maritime tourism and poverty reduction.

5.0 CONCLUSION AND RECOMMENDATIONS

Conclusion

This study determined the effect of maritime entrepreneurship on economic development in Nigeria. Theoretically, the study found that maritime transportation plays a critical role in the economic development of coastal nations like Nigeria, which relies heavily on its maritime sector for international trade, resource transportation, and overall economic sustainability. As a country rich in natural resources, Nigeria depends on maritime transportation for exporting oil, gas, agricultural products, and other goods, making this sector vital to its economic development. Empirically, the study showed that maritime import, marine export, maritime transportation and maritime tourism have joint significant effect on Human Development Index in Nigeria. Based on the findings, the study concludes that maritime entrepreneurship plays a significant role in promoting economic development in Nigeria.

Recommendations

Based on the above findings and conclusions, the following are recommendation are made:

1. Nigerian government should prioritize the modernization and expansion of port facilities in order to improve the efficiency of maritime imports and exports. This should include upgrading equipment, increasing cargo handling capacity, and introducing automation in customs clearance processes to reduce delays.
2. Government should invest in maritime security measures such as surveillance technology, increased naval patrols and international collaboration to combat piracy and other security risks in Nigerian waters.
3. Government should develop Nigeria's maritime tourism potential by investing in coastal infrastructure such as resorts, marinas, and recreational facilities. Also, Nigeria government should promote coastal attractions through international tourism campaigns to attract more tourists.
4. Government should encourage public-private partnerships (PPP) for the development of maritime transportation infrastructure, including the construction of new ports, inland waterways, and coastal transport networks.

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