The effect of blue economy elements on economics growth in Tanzania

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Abstract

The purpose of this study was to analyze the effect of blue economy elements on the economic growth in Tanzania. Time-series data (1993 – 2023) sourced from the Bank of Tanzania were used in this study. Three main key sectors considered were: fisheries production revenue, coastal and marine tourism revenue, and maritime transport revenue. The research is grounded on three theoretical frameworks: The Natural Resource-Based View, the Technology-Organization-Environment framework, and the Theory of Action. Data analysis was conducted using the Autoregressive Distributed Lag (ARDL) model to assess both short - and long-run dynamics. The pre-estimation and post-estimation diagnostic tests, including unit root, co-integration, and normality tests, were utilized to ensure the robustness of the model. The findings suggested that all three variables: fisheries production revenue, coastal and marine tourism revenue, and maritime transport revenue were statistically significant with positive effect on Tanzania's economic growth. These findings underscore the critical importance of the blue economy in driving Tanzania's GDP growth. The study recommends an implementation of policy interventions to enhance governance frameworks, to promote technological advancements, investment in infrastructure development, -adoption of sustainable resource management approach to achieve economic diversification, job creation, and environmental sustainability for long-term national economic growth.

Key Words: Blue economy, maritime resource management, job creation, environmental sustainability, economic growth, Tanzania

JEL Code: Q22, Q25, Q56, O4

1. Introduction

The Blue Economy refers to the sustainable use of ocean and inland water resources for economic growth, improved livelihoods, and jobs while preserving the health of marine ecosystems (World Bank, 2017). Globally, the Blue Economy has become increasingly important as nations recognize the significant potential of oceans and inland water bodies in driving economic growth. Coastal and marine resources contribute to the livelihoods of more than three billion people, and the ocean economy is estimated to be worth over US$ 3 trillion annually, encompassing industries such as fisheries, maritime transport and marine tourism (OECD, 2016). The Blue Economy is a concept that emphasizes the sustainable management of coastal and marine environments. It integrates a range of industries, including fisheries, tourism, transportation, and energy, under a framework that seeks to balance economic growth with

environmental preservation. According to UNECA (2016), the Blue Economy provides a comprehensive framework for policies and investments that aim to preserve and responsibly utilize ocean, lake, and river resources to foster economic growth. This approach addresses the immediate economic benefits and ensures the long-term sustainability of these vital ecosystems.

The term Blue Economy became widely recognized during the 2012 United Nations Conference on Sustainable Development in Rio de Janeiro, also known as Rio+20. This conference marked a turning point in how nations viewed their marine and aquatic resources. Prior to this, the focus was often on the exploitation of these resources for economic gain, with little consideration for sustainability **(Cisneros *et al.*, 2021).**

Voyer *et al.*, (2018) argue that the Blue Economy is not just an economic strategy but also a framework for achieving broader environmental and social goals, making it an essential component of sustainable development. The Blue Economy is crucial for both developed and developing nations. For instance, the European Union's Blue Economy generates nearly €750 billion annually, driven by sectors like offshore wind energy, marine biotechnology, and sustainable fisheries (European Commission, 2021). In China, the Blue Economy contributed around US$ 1.3 trillion to GDP in 2019, fueled by the development of aquaculture, port logistics, and maritime trade (Wang & Zhang, 2019). Similarly, in Small Island Developing States (SIDS) like Mauritius and Seychelles, the Blue Economy accounts for a substantial share of GDP due to thriving coastal tourism and fisheries (UNCTAD, 2020). Maritime industries are major drivers of the economies of many coastal developing countries and Small Island Developing States. An estimated US$ 2.5 trillion was the overall export value of ocean-based sectors prior to the COVID-19 epidemic, and by 2050, maritime freight transit volumes were expected to treble. Ninety percent of world trade is facilitated by oceans, and 60–70 percent of this trade is by volume in developing nations (OECD, 2020).

Tourism accounts for approximately 10 percent of global GDP, highlighting its significance within the Blue Economy. Coastal and marine tourism is essential in the economies of numerous small islands developing states, often acting as the primary source of employment and income. The WTTC (2022) indicates that over 80 percent of the 300 million workers in the tourism sector reside in developing countries, highlighting the industry's importance for economic growth. Small-scale fisheries provide numerous job and livelihood opportunities in developing coastal and island nations. FAO (2022), reports that small-scale fisheries alone contribute 40 percent of global fish production and engage over 90 percent of fishers and fish workers. Approximately half a billion individuals rely on these fisheries for their sustenance and income, with the majority located in Asia (80 percent), followed by Africa, Latin America, and the Caribbean. Coastal and marine resources are vital for the livelihoods, housing, and leisure of nearly three billion people worldwide. The Blue Economy, as a strategic policy instrument, aims to address the various challenges these resources face while managing marine and coastal ecosystems sustainably and protecting them from harmful practices (Hassanali, 2020).

1.2 The Problem Statement

Tanzania, with its extensive coastline and rich maritime resources, has significant potential to harness the blue economy sectors such as fisheries, coastal and marine tourism, and maritime transport for economic growth (UNECA, 2023). However, despite this potential, the contribution of these sectors to Tanzania's economic growth remains low and inadequately quantified. Several studies underscore this potential. For instance, Nyamrunda (2020), highlighted that the fisheries sector, which contributes about 3.1 percent to Tanzania's GDP, is underperforming due to overfishing, inadequate infrastructure, and limited value addition. Similarly, Mwaipopo (2018), pointed out that coastal tourism, although recognized as a growth area, remains underdeveloped due to constraints like insufficient investment, poor marketing strategies, and environmental degradation. According to Kamwela (2019), the maritime transport sector, which is vital for international trade, is hindered by poor governance, outdated infrastructure, inefficiencies, and regulatory challenges. Despite these insights, there is a lack of comprehensive empirical research quantifying the contributions of these sectors to Tanzania's economic growth. Existing studies often focus on individual sectors without providing a holistic view of the blue economy's role in the national economy. Therefore, there is a critical need for empirical research to quantify the contributions of these blue economy sectors to Tanzania's GDP. This research aims to fill this gap by analyzing the impact of fisheries, coastal tourism,

and maritime transport on Tanzania's economic growth. The study will provide evidence-based insights to guide policy and investment decisions, thereby maximizing the sustainable development of these sectors.

1.3 Objectives

To analyze the effect of blue economy sectors on the growth of Tanzania economy.

1.3.2 Specific Objectives

i. To find out the effect of total fisheries production revenue on Tanzania's economic growth.
ii. To assess the impact of coastal and marine tourism revenue on Tanzania's economic growth.
iii. To determine the effect of maritime transport revenue on Tanzania's economic growth.

1.3.3 Research Hypotheses

i. H0: Total fisheries production revenue has no effect on Tanzania's economic growth.
ii. H0: Coastal and marine tourism revenue has no effect on Tanzania's economic growth.
iii. H0: Maritime transport revenue has no effect on Tanzania's economic growth.

1.4. The Blue Economy in Tanzania

Tanzania has long engaged in activities that align with the Blue Economy, particularly in sectors such as fisheries, tourism, and maritime transport. Recognizing the potential of the Blue Economy to drive economic growth, the Tanzanian government, along with various development partners, has prioritized this agenda. The government has committed to unlocking the full potential of the Blue Economy as a means to accelerate economic development, which requires a comprehensive socio-economic and ecological assessment of the country's blue resources (UNECA, 2023). In 2020, the Blue Economy was valued at approximately US$ 7.74 billion, contributing 11.9 percent to Tanzania's GDP. Retail trade emerged as the leading Blue Economy sector, contributing about 39.13 percent, followed by coastal tourism at 7.95 percent, maritime transport at 3.55 percent, and fisheries and aquaculture at 3.55 percent. These contributions reflect the sectoral gross value added (GVA) that can be attributed to the Blue Economy (UNECA, 2023).

Despite the fisheries sector being a cornerstone of Tanzania's Blue Economy, its contribution to the Gross Value Added (GVA) is relatively low. This is due to several factors, including the impacts of climate change on water systems, the dominance of small-scale fisheries, inadequate infrastructure, and significant post-harvest losses. Additionally, gender dynamics play a role, with men predominantly involved in fishing while women engage mainly in fish processing and commercialization (UNECA, 2023). Tanzania's fisheries sector involves approximately 202,053 individuals directly, while over 4.5 million people indirectly depend on fisheries-related activities. The coastal tourism sub-sectors, which include accommodation, food services, and various forms of transport, are significant contributors to the GVA generated by the Blue Economy. These sub-sectors also support the employment of around 2 million people through linkages with other economic activities. The country's blue economy is extremely beneficial in terms of ecosystem services. In 2020, ecosystem services were estimated to be worth US$ 104.24 billion. Freshwater systems, particularly the large permanent lakes, contribute significantly to this value, accounting for 74.87 percent of the total ecosystem service value. Coral reefs, which are crucial for marine biodiversity, also play a vital role. Tanzania's unique position as both an ocean-facing and freshwater-rich nation underscores the diverse potential of its Blue Economy (UNECA, 2023)

2. Literature Review

The purpose of this section is to present relevant, timely research on the topic, and synthesize it into a cohesive summary of existing knowledge in the field. This then prepares the researcher for making his own argument on that topic. Literature reviews helps to gain familiarity with the current knowledge in the chosen field, as well as the boundaries and limitations of that field. It also helps to gain an understanding of the theory(ies) driving the field, allowing to place the research question into context.

The Natural Resources-Based View (NRBV) and Technology-Organization-Environment (TOE) frameworks offer vital theoretical foundations for understanding the relationship between the Blue Economy and economic growth in Tanzania. Developed by Hart (1995), the Natural Resource Based View posits that organizations that effectively manage and utilize natural resources can achieve sustainable

competitive advantages. This theory emphasizes that firms integrating sustainability into their core operations tend to outperform those that neglect environmental considerations. In the context of the Blue Economy, the NRBV suggests that leveraging Tanzania's coastal and marine resources sustainably can lead to economic benefits such as reduced pollution, biodiversity conservation, and enhanced economic growth. The NRBV aligns with this study's focus on promoting sustainable resource management as a key driver of economic growth in Tanzania.

The Technology-Organization-Environment (TOE) framework, proposed by Tornatzky and Fleisher (1990), provides a holistic perspective on the factors influencing economic growth. It suggests that technological advancements, organizational structures, and environmental conditions collectively determine the success of economic initiatives. Hence, in the context of the Blue Economy, the TOE framework highlights the importance of adopting appropriate technologies, developing robust organizational capacities, and creating an enabling environment to drive sustainable economic growth. The framework is particularly relevant to this study, as it
helps to identify the critical factors that influence the effectiveness of Blue Economy strategies in Tanzania.

By integrating the NRBV (Hart, 1995)**,** and TOE (Tornatzky and Fleisher, 1990) frameworks, the study develops a comprehensive model that explains how sustainable management of natural resources, supported by technological innovation and organizational development, can drive economic growth in Tanzania. The combination of these theories provides a robust foundation for analyzing the Blue Economy's role in promoting long-term economic sustainability, addressing gaps in previous studies that have primarily focused on conceptual reviews rather than empirical analysis.

Mpenda and Mbowe (2015), examined the economic importance of the fisheries sector in Tanzania, providing a detailed analysis of its contribution to GDP, employment, and foreign exchange earnings. The study utilized time series data from 1985 to 2014, covering various economic indicators related to fisheries production. The research used the VECM approach to assess the short-term and long-term relationships between total fish production and economic growth. The findings indicated that an increase in total fish production is closely associated with economic growth, as it boosts both domestic consumption and exports. The challenges such as illegal fishing, inadequate infrastructure, and climate change, which threaten the sustainability of the sector were also discussed. Policy interventions to enhance fishery management, improve infrastructure, and promote sustainable practices that maximize the sector's economic potential were also suggested.

Ulega *et al.,* (2022), conducted an empirical study to evaluate the role of fishing production in Tanzania using data from 1995 to 2020. The study utilized the ARDL model to examine both short-term and long-term effects of fishing production on the country's GDP. The findings revealed that fishing production had a significant positive impact on economic growth. With improved fishing practices and technological advancements can positively contribute to the sector's performance. The study argued that Tanzania has abundant marine resources, if managed effectively, have the potential to drive sustained economic growth. They study called for policies that support sustainable fishing practices and the adoption of modern technologies to increase productivity. It recommended that continued investment in the fishing industry is important, to maximize its contribution to the country's economic development.

Abila (2003), investigated the contribution of fisheries to economic development in Kenya, focusing on the Lake Victoria region. The study used panel data from 1990 to 2002 to analyze the role of fisheries in supporting rural livelihoods and contributing to national GDP. The analysis employed the ECM to determine the short-term and long-term impacts of fisheries on economic growth. The study found that the fisheries sector significantly contributes to Kenya's GDP and foreign exchange earnings, especially through exports of Nile perch. The challenges facing the sector, including overfishing, environmental degradation, and market access issues were also highlighted. The research concluded that sustainable management of fisheries resources is essential for maintaining economic contribution and ensuring long-term benefits for the local economy. The study recommended that sustainable management of fisheries resources is essential in order to ensuring long-term benefits for the local economy.

Smith (2016), used time series data from 1985 to 2015 to investigate key maritime sectors such as tourism, fisheries, and shipping. The study examined the economic potential of the Blue Economy in the Caribbean region, with a focus on its contribution to sustainable economic growth. The research found that the Blue Economy was a vital component of Caribbean economies, offering opportunities for economic diversification, resilience building, and poverty reduction. The need for improved governance and policy

frameworks was emphasized to manage marine resources sustainably, protect biodiversity, and enhance the economic contributions of the Blue Economy. The findings suggested that a well-managed Blue Economy coul**d** lead to long-term economic stability and growth for Caribbean nations.

A comprehensive study was conducted by Silver *et al.* (2015), on the concept of the Blue Economy and its potential to drive economic growth, particularly in coastal and island nations. The study defined the Blue Economy as the sustainable use of ocean resources for economic growth, improved livelihoods, and jobs while preserving the health of ocean ecosystems. To empirically analyze the impact of the Blue Economy on economic growth, the research used time series data spanning from 1990 to 2014, focusing on a range of countries with significant coastal economies. The data included economic indicators such as GDP contribution from fisheries, maritime transport, and tourism. The study employed Autoregressive Distributed Lag (ARDL) model to assess the short-term and long-term relationships between Blue Economy sectors and economic growth. The findings found that the Blue Economy offers significant opportunities for economic growth by diversifying income sources, particularly in developing countries. However, the study also highlighted the need for strong governance and effective regulation to ensure sustainable growth.

Wang and Zhang (2019), examined the relationship between China's Blue Economy and economic growth by analyzing time series data from 1990 to 2018. Using the VECM, the study found that the Blue Economy, particularly sectors like marine transportation, fisheries, and coastal tourism, has a positive and significant impact on China's GDP growth, especially in coastal regions. The study highlighted that the development of marine policies and the sustainable exploitation of marine resources are crucial for promoting equitable and long-term economic growth. Additionally, the study pointed out regional disparities in the Blue Economy's impact, suggesting the need for region-specific strategies to enhance the sector's contribution to economic growth.

3. Methodology

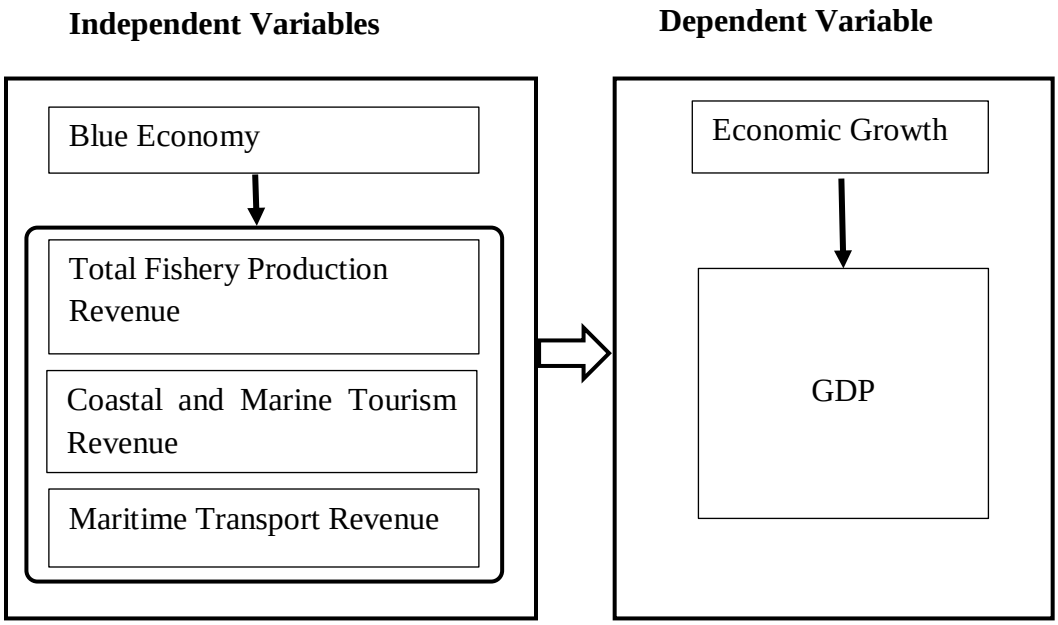
3.1 Research Design

Various researchers consider research design as a framework of procedures and techniques to be used in research process (Jovancic (2021). To help conduct in-depth study of the effect of the blue economy on economic growth in Tanzania, the study used quantitative research design. Kothari (2004), posits that the goal of quantitative research design is to create and use mathematical models, theories and hypotheses to explain the events under investigation. Time-series data used in the study were sourced from the Bank of Tanzania for the period 1993 – 2023. Three main key sectors considered were fisheries production revenue, coastal and marine tourism revenue, and maritime transport revenue. The research is grounded on three theoretical frameworks of the Natural Resource-Based View, the Technology-Organization-Environment framework, and the Theory of Action.

3.2 Conceptual Framework

The conceptualization of variables in academic research is significant because it forms the basis for testing hypotheses and coming up with basic thematic ideas on the findings of the study (Kothari and Gang, 2014). The study's independent variable is the blue economy, through the three strategies: fisheries, transport, and tourism and the dependent variable is Gross Domestic Product (Figure 3.1).

Figure 3.1: Conceptual Framework of the model



Source: Researcher formulation

Figure 3.1 illustrates the interaction between the independent variables and the dependent variable under review. It specifically depicts the impact of the blue economy on Tanzania's economic growth. The study employs Gross Domestic Product to gauge economic growth, as GDP reflects the aggregate market value of all goods and services produced within a country in a given year.

3.3 Empirical Model Specification

The empirical model in this study is based on the Autoregressive Distributed Lag (ARDL) model. The ARDL model by Alharthi and Hanif (2020) was utilized to estimate the relationship between economic growth and the Blue Economy. The ARDL model provides the means for estimating both short-and long-run relationships between the dependent and independent variables. The model by Alharthi and Hanif (2020) was expressed as follows:

$$GDP = \beta_0 + \beta_1 BE + \mu \quad (1)$$

Where, GDP = Gross Domestic Product, β_0 = Intercept, β_1 = Parameter of Blue Economy, BE = Blue Economy (an aggregate measure of Blue Economy sectors), μ = Error term.

To capture the distinct sectors of the Blue Economy in the country, the model has been modified to incorporate sector-specific revenues as independent variables. In considering both short- and long-run dynamics, the ARDL model was specified following equation (2).

$$\Delta GDPt = \alpha 0 + \sum_{i=0}^{p} \alpha 1\, \Delta GDPt - i + \sum_{i=0}^{q1} \alpha 2 \Delta TFPRt - i + \sum_{i=0}^{q2} \alpha 3\, \Delta CMTRt - i + \sum_{i=0}^{q3} \alpha 4 \Delta MTRt - i + \lambda 1 ECMt - i + \mu t \quad (2)$$

Where, Δ = First difference operator, α_1, α_2, α_3, α_4 = Short-run coefficients, λ1 = Coefficient of the Error Correction Model (ECM), capturing the speed of adjustment to long-run equilibrium, ECMt−1 = Error correction term (lagged residuals from the long-run equation), μ_t = Error term.

3.4 The Variable Measurement and Expected Sign

Table 3.1 presents variable measurements and expected signs

Variables	Name	Measurement	Expected Sign	Source of Data
GDP	Gross Domestic Product	In term of percentage	Dependent variable	Bank of Tanzania (BOT)
TFPR	Total Fisheries Production Revenue	Revenue (TZS)	+	Bank of Tanzania (BOT)
CMTR	Coastal and Marine Tourism Revenue	Revenue (TZS)	+	Bank of Tanzania (BOT)
MTR	Maritime Transport Revenue	Revenue (TZS)	+	Bank of Tanzania (BOT)

Source: Authors presentation

4. Results and discussion

4.1 Results

4.1.1 The descriptive statistics

The descriptive statistics table (4.1) provides key statistics for four variables GDP, TFPR, CMTR, and CMTR based on 31 observations. Descriptive test statistics provide an overview of key data characteristics, such as the mean, median, and standard deviation. They summarize the central tendency, spread, and range of the dataset. This helps in understanding data patterns before deeper analysis.

Table 4.1 present the descriptive statistics

Variable	Observation	Mean	Std. Deviation	Min	Max
GDP	31	5.346129	1.725804	1.21	7.67
TFPR	31	9.51e+08	1.01e+09	6.25e+07	3.36e+09
CMTR	31	2.16e+08	2.97e+08	2100300	1.21e+09
MTR	31	3.59e+08	3.54e+08	2.81e+07	1.04e+09

Source: Author's calculations

4.1 provides a summary of the key descriptive statistics of the four variables GDP, TFPR, CMTR, and CMTR based on 31 observations analyzed. From the table 4.1, on observe that the GDP has an average of 5.35 percent with moderate variability (Std. Dev. 1.73), with values ranging from 1.21 to 7.67. TFPR shows a much higher average of 9.51 percent with significant variation (Std. Dev. 1.01), ranging from 6.25 to 3.36. CMTR has an average of 2.16 percent with high variability (Std. Dev. 2.97), with values spanning from 2.1 to 1.21. MTR has an average of 3.59 percent with substantial variability (Std. Dev. 3.54, ranging from 2.81 to 1.04. These statistics give an overview of the distribution and variation within each sector.

4.1.2 Stationarity Test Results

This test aimed at observing whether the time series variables had unit root problem. This is when the time variables change with the change in time (Table 4.2).

Table 4.2: Stationarity Test Results

At level				At first difference			
Variable	Test Statistic	Critical Value	P-value	Test Statistic	Critical Value	P-value	Integration order
GDP	-3.203	-2.986	0.0198	-7.549	-2.989	0.0000	I (1) at 5%
TFPR	3.541	-2.986	1.0000	-3.362	-2.989	0.0123	I (1) at 5%
CMTR	3.233	-2.986	1.0000	-4.256	-2.989	0.0005	I (1) at 5%
MTR	1.554	-2.986	0.9977	-3.463	-2.989	0.0090	I (1) at 5%

Source: Author's calculations, 2024.

The stationarity test results (Table 4.2) using the Dickey-Fuller method show that the three variables, namely: TFPR, CMTR and MTR are not stationary at their levels except GDP, however, all variables become stationary after the first difference. This observation is based on the test statistics at first difference being greater than the critical values at the 5% significance level and the p-values being less than 0.05. Therefore, the variables are integrated of order one, I(1), meaning that they are stationary after first differencing, which is crucial for performing cointegration tests and econometric modeling.

4.2.1 ARDL Test Results

The Autoregressive Distributed Lag (ARDL) test is a method used to explore both short-term and long-term relationships among time series variables, particularly when variables are integrated at different levels (I(0) or I(1)). Pesaran *et al.*, (2001), posits that the ARDL model is widely applied to capture dynamic interactions in time series data using a single-equation framework. The ARDL test was used to investigate whether there are long-run and short-run relationships among the variables. Before running the ARDL model, the VARSOC test was utilized to provide lag-order selection statistics like the final prediction error (FPE), Akaike's information criterion (AIC), Schwarz's Bayesian information criterion (BIC), and Hannan and Quinn information criterion (HQIC). These statistics were calculated for various orders of Vector Autoregressions (VAR) to help determine the optimal lag length. Additionally, the likelihood-ratio test statistics were evaluated for each full VAR model up to the highest lag order. VARSOC was applied as a pre-estimation test to choose the appropriate lag order for the ARDL model or, where applicable, for a Vector Error-Correction (VEC) model.

After executing the VARSOC test to determine the optimal lag length, the bound test was conducted to examine the long-run relationship between the variables. The results from this pre-estimation process, which guided the selection of lag criteria for the time series variables, are presented in Table 5.3.

Table 4.3: VARSOC Test Results

Lag	**LL**	**LR**	**Df**	**P-Value**	**FPE**	**AIC**	**HQIC**	**SBIC**
0	-46.6573				1.99836	3.53017	3.54444	3.57816
1	-42.7009	7.9127*	1	0.005	1.60572*	3.31118*	3.33972*	3.40717*
2	-41.7758	1.8503	1	0.174	1.6157	3.31672	3.35954	3.4607
3	-41.6021	0.3473	1	0.556	1.71988	3.37794	3.43502	3.56991
4	-41.2773	0.6496	1	0.420	1.81194	3.42795	3.49931	3.66792

Source: Author's calculations

4.2.2 Bounds Test Results

The bounds test is a statistical method used in econometrics, particularly in time series analysis, to check for a long-run relationship between variables when using the Autoregressive Distributed Lag (ARDL) model. It helps determine whether the variables are cointegrated, meaning they maintain a stable long-term relationship despite short-term fluctuations. The ARDL Bounds Test is applied when variables are integrated at different orders, such as I(0), I(1), or a combination of both, and is particularly useful in small

sample sizes or when there is uncertainty about whether the variables are stationary at level [I(0)] or at first difference [I(1)] (Table 4.4)

Table 4.4: ARDL Bounds Test Results (Pesaran, Shin, and Smith, 2001)

Test Statistic	Value	10% Critical Values (I_0 - I_1)	5% Critical Values (I_0 - I_1)	2.5% Critical Values (I_0 - I_1)	1% Critical Values (I_0 - I_1)
F-statistic	6.073	2.72 - 3.77	3.23 - 4.35	3.69 - 4.89	4.29 - 5.61
t-statistic	-4.694	-2.57 - -3.46	-2.86 - -3.78	-3.13 - -4.05	-3.43 - -4.37

Source: Author's presentation

Since the F-statistic (6.073) is greater than the upper bound (I_1) critical values at all significance levels, we reject the null hypothesis of no long-run relationship. This indicates the presence of a long-run cointegrating relationship between the variables in the model. After establishing the existence of a long-run relationship, the researcher estimated the long-run and short-run dynamics (Table 4.5).

Table 4.5: ARDL test Results on Long-Run and Short-Run Relationship of the Variables

	D.Lgdp	Coef.	Std. Err.	T	P>|t|	[95% Conf. Interval]
ADJ	lGDP (L1.)	0.6253	0.1758	3.56	0.002	[0.258, 0.992]
LR	LTFPR	0.3549	0.1471	2.41	0.023	[0.049, 0.661]
	LCMTR	0.3621	0.1322	2.74	0.012	[0.091, 0.634]
	LMTR	0.4989	0.2410	2.07	0.048	[0.005, 0.993]
SR	lTFPR Dl.	0.1207	0.2884	0.42	0.280	[-0.481, 0.722]
	lCMTR Dl.	-0.3137	0.2669	-1.18	0.254	[-0.871, 0.243]
	lLMTR Dl.	0.5690	0.4575	1.24	0.228	[-0.385, 1.523]
	Cons	3.1814	1.5679	2.03	0.046	[-0.089, 6.452]

Source: Author's calculations

The ARDL test results (Table 4.5) reveals significant long-run relationships between the blue economy sectors and Tanzania's GDP growth. The total fisheries production revenue, maritime transport revenue, and coastal and marine tourism revenue were statistically significant, with positive effects on economic growth. The following empirical equation was obtained.

GDPt = 3.1814 + 0.3549TFPRt + 0.3621CMTRt + 0.4989MTRt.

The coefficient for the lagged log of GDP was 0.6253, with a significant p-value 0.002. This means that approximately 62.53 percent of the disequilibrium was corrected each period, indicating a stable long-run relationship between the variables.

4.3 Discussion

This study assessed the impact of key blue economy sectors: coastal and marine tourism, total fisheries production, and maritime transport on Tanzania's economic growth. The findings revealed that all three variables: coastal and marine tourism revenue, total fisheries production revenue, and maritime transport revenue had a significant positive impact on economic growth. The results align with existing research that supports the positive influence of coastal and marine tourism on economic growth. For example, Akbulaev and Bayramli (2020) and Fratila et al. (2021) similarly emphasized that coastal tourism significantly contributes to economic development by generating revenue, creating employment opportunities, and fostering infrastructure growth. These studies reflect the findings of this research, which demonstrated a strong correlation between tourism and GDP growth in Tanzania.

In terms of fisheries, this study found that total fisheries production revenue significantly impacted economic growth. Other studies have produced similar results. Eyüboğlu and Akmermer (2024) showed that fisheries production positively affected economic growth in Turkey and highlighted a long-run

relationship between the two variables. In contrast, Elzaki (2024) indicated that marine fishing production did not significantly influence GDP, suggesting that marine exports rather than production had a more substantial economic effect. Furthermore, Ulega et al. (2022) provided evidence of fisheries' positive contributions to Tanzania's economy, consistent with the findings in this study, though the sector's impact may vary based on national contexts.

The coefficient for TFPR is 0.3549 and significant at the 5 percent level (p-value = 0.023). This indicates that a 1 percent increase in total fisheries production revenue leads to an increase in GDP by 0.35 percent when all other factors remain constant. This implying a positive long-run impact of fisheries on economic growth. The coefficient for CMTR is 0.3621, significant at the 5 percent level (p-value = 0.012). This indicate that a 1 percent increase in coastal and marine tourism revenue leads to an increase in GDP by 0.36 percent when other factors remain constant. This highlight the important role of tourism in long-term economic growth. The coefficient for MTR is 0.4989, also significant at the 5 percent level (p-value = 0.048). This suggests that a 1 percent increase in maritime transport revenue leads to an increase in GDP by 0.50 percent when all other factors remain constant. It means maritime transport contributes positively and significantly to long-run economic growth.

The short-run coefficient for TFPR is 0.1207, but it is not statistically significant (p-value = 0.280). This implies that changes in fisheries production revenue do not have a significant immediate effect on GDP in the short run. The coefficient for MTR is 0.5690, but it is not statistically significant (p-value = 0.228). This suggests that changes in maritime transport revenue have no immediate impact on GDP in the short run. The short-run coefficient for CMTR is -0.3137, which is also not statistically significant (p-value = 0.254). This indicates that short-term fluctuations in coastal and marine tourism revenue do not significantly affect GDP.

The constant term is 3.1814, with a p-value of 0.046, indicating significance at the 5 percent level. This suggests that, in the absence of other variables, the log of GDP is positively influenced by this constant factor in the model. The significant impact of maritime transport revenue on economic growth, as revealed in this study, also aligns with other research that underscores its importance. Studies such as Adenigbo et al. (2023) and Fratila et al. (2021) found that maritime transport contributes significantly to economic growth by facilitating international trade and enhancing connectivity. This study reaffirms the importance of the maritime sector in Tanzania's economy, with the potential for further growth through continued improvements in infrastructure and policy development.

This study confirms that coastal and marine tourism, total fisheries production, and maritime transport are all critical drivers of Tanzania's economic growth. The positive impacts of these sectors underscore the need for continued investment and policy enhancements to further strengthen their contributions to the national economy.

5. Conclusion and policy recommendations

5.1 Conclusion

This study examined the impact of Tanzania's blue economy—specifically focusing on coastal and marine tourism, total fisheries production, and maritime transport—on the country's economic growth from 1993 to 2023. The findings demonstrated that all three sectors had a statistically significant positive effect on economic growth, underscoring their importance as key drivers of Tanzania's development. Coastal and marine tourism emerged as a particularly strong contributor, generating substantial revenue, creating jobs, and enhancing infrastructure. Total fisheries production and maritime transport also played vital roles by supporting trade, employment, and resource utilization. The positive contributions of these sectors highlight the potential for Tanzania to leverage its blue economy for sustainable economic growth. However, to fully realize this potential, it is essential to invest in upgrading infrastructure, adopting modern technologies, and improving governance within these sectors. By doing so, Tanzania can maximize the benefits of its blue economy, ensuring long-term economic diversification, job creation, and environmental sustainability. Ultimately, the study reinforces the critical role of the blue economy in shaping Tanzania's future economic trajectory and offers valuable insights for policy development and strategic planning.

5.2 Recommendations

To enhance the contribution of Tanzania's blue economy to economic growth, the government should invest in infrastructure improvements for tourism, fisheries, and maritime transport, while adopting modern technologies to boost efficiency and competitiveness in these sectors. Strengthening governance and regulatory frameworks is essential to ensure sustainable resource management, particularly by addressing illegal fishing and promoting eco-friendly tourism practices. Capacity building and training programs should be implemented to equip individuals with the necessary skills to drive sector efficiency and job creation. Additionally, fostering regional and international cooperation will enhance trade, resource management, and maritime security. Promoting sustainable tourism practices will help preserve Tanzania's natural and cultural assets while maximizing economic returns. These measures, together, will unlock the full potential of the blue economy and drive sustainable economic growth.

References

Abila, R. O. (2003). Fish Trade and Food Security: Are They Reconcilable in Lake Victoria? Report for IUCN, Nairobi, Kenya.

Adenigbo, A. Ojo, O. & Adeyemi, T. (2023). Maritime transport and economic growth: A sectoral analysis. International Journal of Maritime Studies, 28(2), 101-120.

Akbulaev, N. & Bayramli, I. (2020). The relationship between maritime transport development and economic growth in the Caspian Sea region: An empirical analysis using ARDL approach. Journal of Maritime Economics and Logistics, 22(3), 245-267.

Akbulaev, N. & Bayramli, M. (2020). The effect of tourism revenue on economic growth: Evidence from coastal and marine tourism. Tourism and Economic Studies, 12(3), 45-58.

Alharthi, M. & Hanif, I. (2020). Impact of blue economy factors on economic growth in the SAARC countries. Maritime Business Review, 5(3), 253–269.

Cisneros, A. M. Marcia, M. B. Gabriel, R., William, W. L. Cheung, K. M. Crosman, P. C. González, E. & Vicky, W. Y. (2021). Enabling conditions for an equitable and sustainable blue economy. Nature, 591, 396–401.

Elzaki, A. (2024). The impact of marine fishing production on GDP: A comparative study. Journal of Fisheries and Marine Economics, 36(1), 19-34.

European Union. (2018). The 2018 annual economic report on EU blue economy. Brussels: European Union. Retrieved November 15, 2019.

Eyüboğlu, S. & Akmermer, B. (2024). The relationship between fishing production and economic growth in Turkey: A long-term analysis. Turkish Economic Review, 41(4), 102-119.

FAO. (2022). The state of world fisheries and aquaculture: Towards blue transformation. Rome: FAO. Retrieved from https://www.fao.org/3/cc0461en/online/cc0461en.html.

Fratila, D. Marinescu, M. & Popescu, R. (2021). Maritime transport and its effect on economic growth in emerging economies. Journal of Transport Economics, 52(5), 298-312.

Hart, S. L. (1995). A natural-resource-based view of the firm. The Academy of Management Review, 20(4), 986-1014.

Hassanali, K. (2020a). CARICOM and the blue economy - Multiple understandings and their implications for global engagement. Marine Policy, 120, 104137.

Jovancic, N. (2021). Research design types, key elements and characteristics. Leadquizzes.com.

Kamwela, S. (2019). The state of maritime transport in Tanzania: Infrastructure and regulatory challenges. Journal of Transport and Logistics, 10(4), 200-215.

Kothari, C. R. & Garg, G. (2014). Research methodology: Methods and techniques. New Delhi: New Age International Publishers.

Kothari, C. R. (2004). Methodology, methods and technique (2nd ed.). New Delhi: New Age International(P) Ltd Publishers.

Mpenda, Z. & Mbowe, W. (2015). The Role of Fisheries in Economic Development: The Case of Tanzania. Journal of Development and Agricultural Economics, 7(3), 109-116.

Mwaipopo, L. (2018). Coastal tourism in Tanzania: Opportunities and challenges. African Journal of Tourism and Hospitality Management, 12(2), 75-90.

Development. Maritime Policy & Management, 32(3), 297-313.

Nyamrunda, C. (2020). Challenges facing the fisheries sector in Tanzania: The underperformance of a promising industry. Journal of Marine and Coastal Research, 15(3), 145-160.

OECD. (2016). The ocean economy in 2030. Organization for Economic Co-operation and Development. Retrieved from https://www.oecd-ilibrary.org/economics/the-ocean-economy-in-2030

OECD. (2020). Sustainable ocean for all: Harnessing the benefits of sustainable ocean economies for developing countries. The Development Dimension. Paris: OECD.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. Journal of Applied Econometrics, 16(3), 289-326.

Silver, J. J. Gray, N. J. Campbell, L. M. Fairbanks, L. W. & Gruby, R. L. (2015). Blue Economy and Competing Discourses in International Oceans Governance. The Journal of Environment & Development, 24(2), 135-160.

Smith, G. S. (2016). Defining the Blue Economy. Maritime Affairs: Journal of the National Maritime Foundation of India, 12(1), 58-64.

Solow, R. M. (1956). A contribution to the theory of economic growth. The Quarterly Journal of Economics, 70(1), 65-94.

Tornatzky, L. G., & Fleischer, M. (1990). The processes of technological innovation. Lexington Books.

Ulega, T. Msuya, F. E. & Shilimba, M. (2022). The role of fishing production in Tanzania's economic growth: An empirical study. Tanzanian Journal of Economic Development, 14(3), 67-84.

UNCTAD. (2020). The Role of the Blue Economy in Promoting Economic Growth and Sustainable Development in Developing Countries. United Nations Conference on Trade and Development.

UNECA. (2016a). Africa's blue economy: A policy handbook (Introduction). Addis Ababa, Ethiopia: Economic Commission for Africa. Retrieved from https://www.uneca.org.

UNECA. (2020). Blue economy in Africa: A policy handbook.

Voyer, M. Quirk, G., McIlgorm, A., & Azmi, K. (2018). Shades of blue: What do compete interpretations of the blue economy mean for oceans governance? Journal of Environmental Policy & Planning, 20(5), 595-616.

Wang, C. & Zhang, Q. (2019). Blue economy and economic growth in China: An empirical study. Ocean and Coastal Management, 173, 126–134.

Wang, Y. & Wang, X. (2019). The impact of maritime transport on global trade and economy. Journal of Maritime Economics & Logistics, 21(2), 123-145.

World Bank. (2016). The potential of the blue economy: Increasing long-term benefits of the sustainable use of marine resources for small island developing states and coastal least developed countries. Washington, DC: World Bank Group.

World Bank. (2017). The Potential of the Blue Economy: Increasing Long-term Benefits of the Sustainable Use of Marine Resources for Small Island Developing States and Coastal Least Developed Countries.

World Bank. (2021). World Bank activities in the blue economy. Washington, DC: World Bank Group.

WTTC. (2022). Travel and tourism economic impact 2022. London: WTTC. Retrieved from https://wttc.org/Portals/0/Documents/Reports/2022/EIR2022Global%20Trends.

Zakayo, E. & Mbilinyi, R. (2023). Assessment of the potentials of the blue economy resources for poverty reduction in Tanzania. Journal of Maritime Science and Technology