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-RESEARCH ARTICLE-

THE ROLE OF BLUE ECONOMY IN ECONOMIC DIVERSIFICATION: OMANI ECONOMY CASE STUDY FOR THE PERIOD (1990-2022)

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─Abstract─

This article discusses the contribution of blue economic activity to economic diversification in the Omani economy from 1990 to 2022. There are many economic programs that have been criticized for diversifying their sources of production, use, public income and exports to lessen their reliance on one or few agricultural

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commodities and raw materials. Activating the role of blue economic activity is one of these policies that depend on the amount of contribution of blue economic activity to the economy and the extent of its development, which plays an important role in economic diversification in coastal states and small islands. The Autocorrelation Distributed Regression (ARDL) model was used to measure the contribution of blue economic activity to GDP growth. It was concluded based on short-term criteria that the independent variables, the proportion of GDP that comes from fish production, the proportion of GDP that comes from non-oil exports, and the proportion of public revenues that come from agriculture, forestry and fishing, there are significant effect on GDP growth. As for the long-term criteria, they indicate that macroeconomic factors have no effect on GDP growth in the long run.

Keywords: Blue Economy (BE), economic diversification, employment, economic growth, foreign trade

INTRODUCTION

A subfield of contemporary economics, B.E., has grown in significance in response to economic trends and the need for economic diversification. Diversifying the sources of output, usage, public income, and exports is facilitated by B.E. activities. As the B.E. seeks to manage blue resources while taking community development into consideration without damaging ocean systems, it seeks to stabilize the economy and preserve natural potential over the long run, in accordance with the notion of sustainable development. The Sustainable Development Goals, which place a strong focus on marine ecosystems and fisheries, are an important global commitment since oceans make up the majority of the Earth's surface. As a result, the idea of the B.E. has gained more attention as concerns pertaining to the Sustainable Development Goals have gained more attention (Marwa et al., 2024). Countries are searching for ways to use the sea more extensively and creatively (but sustainably) through the B.E. as a result of pressure to diversify economies in response to global competitiveness and the depletion of natural resources (Ferrera, 2024). There is no denying the significance of seas and oceans for sustainable development. Seas and oceans make up more than two-thirds of the Earth's surface, which also offer food and minerals, act as thoroughfares for world seaborne trade, and help eradicate poverty by fostering decent jobs and sustainable lives. For all countries to have access to worldwide markets, ports and international shipping provide essential links in global supply networks (Kim & Seto, 2022). Both land-based industries with obvious connections to marine activities and those that are actively involved in the marine and coastal environments are considered B.E. sectors. The B.E. is a dynamic, multi-sectoral, and ever-changing industry. By enhancing the sustainability of current sectors, establishing new ones, producing jobs, and drawing in investment, the B.E. may boost economic growth. Industries including fisheries, aquaculture, marine tourism, marine energy, and maritime transportation may significantly boost national economies, especially in coastal areas (Dell'Anna, 2021). By producing more products from the exploitation of marine resources and increasing employment

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opportunities developed utilizing local resources and expertise, B.E. sectors have enormous unrealised potential that may greatly aid in the diversification of local economies in coastal nations. An integrated and comprehensive strategy to the B.E. can assist increase the connections across economic sectors in addition to diversifying particular industries (Ahammed et al., 2024). The B.E. promotes systemic change in this way. The B.E.'s GDP contribution varies greatly. The proportion of the B.E. in the GDP of certain major economies has dramatically increased. The contribution of the B.E. may not be as high in other coastal nations (Romano et al., 2023).

Until recently, the B.E. was not considered a development priority due to the long-standing dominance of oil and gas production and exports. However, due to the combined shock of falling oil prices and the COVID-19 epidemic, GCC nations are increasingly diversifying their economies. The majority of these nations see the B.E. as a crucial development dimension that will enable them to take advantage of the region's resources and geopolitical location while also advancing the diversification objective in accordance with their development visions (Novak et al., 2022). To achieve sustainable development, Oman's economy urgently needs to diversify due to the recent downturn in growth. In this context, a long-term growth plan called Oman Vision 2040 was introduced in 2016. In order to diversify the Omani economy and advance sustainable development, this strategy lays out several projects and policies (Ben Hassen, 2022). Since the Tanfeedh program has identified five economic sectors—logistics, fisheries (including aquaculture), tourism, manufacturing, and mining—to propel economic diversification, the sea is significant to Oman as it works towards economic development and realising Vision 2040. The sea is intimately associated with each of these pillars (Mishra et al., 2024). This does not imply disregarding other productive industries, including commerce, building, and agriculture; rather, the goal was to maximise the Sultanate's potential riches by adding value as efficiently as possible. (unit, 2020).The fisheries and aquaculture industries are explicitly recognized as important development pillars in the Sultanate and as a means of diversifying the economy away from the oil and gas industry in Oman Vision 2040 and the Tenth Five-Year Development Plan. Despite these two industries' relatively small GDP contribution, it is anticipated that this proportion would rise considerably in the future (Al Shammakhi et al., 2023). The establishment of world-class, ecologically sustainable, and lucrative fisheries that support the Sultanate's economy is emphasized in Oman Vision 2040. Additionally, it encourages private sector-led fisheries growth in terms of creating jobs and money (Al Shammakhi et al., 2023).

PREVIOUS STUDIES

B.E. Framework

B. E. Concept

In order to account for the costs of environmental imbalance and damage caused by

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the exploitation of ocean resources for human consumption, "B.E." refers to any activity that involves the oceans, including direct and indirect support activities necessary for these economic sectors to function (Alharthi & Hanif, 2020).

The United Nations Development Program defines it as the sustainable use of ocean resources to support economic growth, job creation, and social and economic inclusion. The United Nations Environment Program works to advance sustainable economic, social, and environmental benefits derived from the seas within the worldwide boundaries of oceans and coasts (Romano et al., 2023).

The "B.E.." stands for the responsible use of marine resources for improved lives, environmental sustainability, and economic progress. It covers a wide range of industries, including shipping, tourism, aquaculture, marine biotechnology, and renewable energy (Ahammed et al., 2024).

The B.E. includes a unique marketing strategy for lakes, rivers, and other bodies of water. The goal is to assist sustainable development while advancing economic growth, social inclusiveness, and the preservation or enhancement of livelihoods (Jacob & Umoh, 2022). It explains how companies and operations related to the sea keep ecological and environmental harm apart from social and economic advancement (Commerce, 2021).

B.E. Objectives

According to the East Asian Seas (EAS) Conference, the B.E. aims to: address the security of food, energy, and water; promote ecosystem-based adaptation strategies to the changing global climate; encourage inclusive ownership and development; protect coastlines and oceans; and lessen environmental hazards and resource scarcity (Jacob & Umoh, 2022). According to the sustainable development principle that upholds intergenerational equality, the B.E. idea seeks to stabilise a sustainable economy with long-term sustainability benefits for natural potential (Lee et al., 2020). The goal of the B.E. is to manage blue resources without affecting ocean systems while taking social development into account (Mumtaz, 2022). In order to achieve sustainable development, which strikes a harmony between economic growth and environmental and social sustainability, research on the B.E. aims to investigate the relationships among the three elements. The B.E. aims to offer a thorough framework that promotes the sustainable use of ocean resources for the benefit of current and future generations (Youssef, 2023). To encourage business ventures that eventually enhance the robustness and well-being of lakes, rivers, seas, and oceans. The development and protection of B.E. resources should engage key stakeholders, and relevant knowledge and data should be used to inform policy and decision-making. As a result, social and environmental responsibilities as well as knowledge and comprehension of the worth of the B.E.'s market and non-market goods and services increase. The goals of foreign finance are to create markets for B.E.-related sectors that are characterised by innovation and growth, promote

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comprehensive economic activities that improve the health of B.E. resources, and assist the expansion of small and medium-sized enterprises in the B.E (Jacob & Umoh, 2022).

The B.E. and Other Theoretical Approaches

Creative Economy and BE

The production and exploitation of intellectual property, such as art, design, and innovation, to create economic value is known as the creative economy, whereas the B.E. refers to using ocean resources sustainably to advance economic development and growth. Aspects of the B.E. that can significantly affect sustainable economic growth include marine tourism, fisheries, and marine energy. (Ahammed et al., 2024).

The B.E. and the Circular-Economy

More and more people agree that the circular economy is a workable answer to the problem of sustainable growth. The circular economy aims to increase resource efficiency, decrease waste and emissions, and link economic cycles to keep products and services valuable for as long as possible (Elroi et al., 2023). An economic concept known as the "circular economy" seeks to minimise waste and make effective use of resources in economies (Androniceanu et al., 2021).

The B.E. is an efficient, clean, and low-carbon economy. Sharing, circularity, collaboration, solidarity, resilience, opportunity, and interconnection are also the foundations of this economy. Investments that lower pollution and carbon emissions. Its expansion depends on reducing the loss of biodiversity and ecological advantages, increasing energy efficiency, and using the power of natural capital, such the oceans (Murshed et al., 2021). Economic development and sustainability should be separated, according to the circular economic idea, which obviously also holds true for the B.E.'s sectors. This change is evident in accordance with EU frameworks like the Statement on the Sustainable B.E., which proposes a paradigm shift from "blue growth" to a "sustainable B.E. (Dantas et al., 2021). Economic activities must lessen their effects on the coastal zone and the overall marine ecosystem for this transition to occur. The Green Deal's implementation, the circular economy, pollution reduction, waste prevention, and climate neutrality must all be aided via value chains. In other words, because it encourages resource efficiency and minimises waste, the B.E. is circular (Romano et al., 2023).

Sectors of B.E.

The "B.E." refers to a collection of all industries whose combined economic weight is determined by adding up the "added value" of all the industries taken into account (Khosravi & Izbirak, 2024). This classification covers both land-based industries that are obviously connected to maritime activities (like shipbuilding or port operations)

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and industries that are directly involved in coastal and marine environments (such as fishing or shipping) according to result, the B.E. is a multifaceted, dynamic, and ever-evolving aspect of the economy, with older established industries like fishing and maritime transportation coexisting with more recent ones like marine renewable energy and blue biotechnology. n a larger economic scale, the B.E. may be defined as including not just industries but also ecosystem services and natural resources that the ocean provides (e.g., carbon capture or seafood production) (Bax et al., 2021). The industries that make up the B.E. are not set in stone, and different publications and methodologies may use different names and classifications for these industries. Accordingly, the entire collection of industries that comprise the B.E. is susceptible to change (Martínez-Vázquez et al., 2021). As seen in Table (1), the B.E. sectors are classified differently depending on the classifying entity.

Table 1: B.E. Sectors (Romano et al., 2023**)**

Classified entity	Existing sectors	Emerging sectors
European Commission	Coastal tourism, shipbuilding and repair, port operations, marine renewable energy, and marine living and non-living resources.	desalination, marine minerals, blue bio economy and biotechnology, infrastructure, research and education, maritime defense, security, and surveillance, and ocean energy.
Organization for Development and Economic Cooperation	Ports, shipping, wild fisheries, seafood processing, shipbuilding and repair, offshore oil and gas (shallow water), dredging, marine manufacturing and construction, marine and coastal tourism, marine business services, and marine research, development, and education.	Deep and ultra-deep water oil and gas, marine biotechnology, offshore wind, ocean renewable energy, seabed and marine mining, marine aquaculture, maritime safety and surveillance, and high-tech marine products and services.
United Nations	Fisheries, maritime transportation, ports and related activities, tourism and recreation, coastal development, shipping and shipbuilding, oil and gas, by-product fisheries, and marine product trade and related services.	Desalination; seabed extraction; marine biotechnology and bio prospecting; aquaculture; and renewable energy sources (such as marine renewable energy). Activities that provide indirect assistance include garbage disposal, biodiversity and habitat preservation, coastal protection, and carbon sequestration (blue carbon).
International Bank	Coastal development, oil and gas, shipping and shipbuilding, by-product fisheries, ports and related activities, tourism and recreation, maritime product trade and related services, and maritime transportation.	Desalination; seabed extraction; marine biotechnology and bioprospecting; aquaculture; and renewable energy sources (such as marine renewable energy). Activities that provide indirect assistance include garbage disposal, biodiversity and habitat preservation, coastal protection, and carbon sequestration (blue carbon).

Food production, flood protection, carbon storage, and cultural values are only a few of the non-market advantages that freshwater, coastal, and marine ecosystems (such

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as wetlands, mangroves, coral reefs, and natural river systems) offer. These benefits are also covered by the B.E. (Romano et al., 2023). Ocean energy, aquaculture, marine tourism, blue biotechnology, and seabed resources are the five priority sectors that the European Union has selected (Jacob & Umoh, 2022). The maritime ecosystem is impacted differently by each B.E. industry (Martínez-Vázquez et al., 2021).

Economic Diversification and B.E.

In the past, economic diversification has meant shifting away from reliance on one or a limited number of commodities, such minerals, crude oil, and agricultural products, and towards a greater range of sources of commerce, employment, revenue, and costs. This goal of economic diversification is most closely related to the process of structural transformation, which is characterized by higher productivity, sustainable growth, and wider development. Structural change enables the diversification of sources of production, employment, international trade, income, and spending in a number of area (Owan et al., 2020) . Structural change is one of the primary drivers of social and economic advancement. Both in terms of output and employment, the economic structure of countries that have witnessed major advances in living standards has undergone significant transformation. Economic growth is accelerated and supported as low-productivity subsistence activities, like agriculture, give way to high-productivity commercial industries, including manufacturing and contemporary services (Usman & Landry, 2021). Additionally, when people transition from low-paying, vulnerable employment to higher-paying positions with better working conditions. structural transformation helps create a more equitable development pattern. However, the absence of structural change raises inequality, prolongs poverty, and threatens the fair distribution of growth's benefits (Maria, 2022). The following explains how the B.E. contributes to economic diversification:

The Use

If the B.E. can provide employment with relatively high productivity to replace people in low-productivity industries like fishing and subsistence farming, it can help structural change. It can provide jobs and improve the health of the maritime environment. Fishing and aquaculture can guarantee food security and provide revenue for the government (Ahammed et al., 2024).

Since more skilled personnel will be required to work on creative and technology-based initiatives in many blue industries, digital skills are becoming crucial to supporting industrial growth. These abilities will also be important in luring investment. To do this, future skill gaps must be closed. According to about 30% of

businesses in the maritime renewable energy industry, there is a shortage or lack of the necessary capabilities (Hotaling, 2021).

The EU was concerned with integrating its own aims, especially innovation and job development, with the marine and maritime opportunities discourse. The EU named its approach Blue Growth, which further highlighted this emphasis on financial gains (Bennett et al., 2021).

Economic Growth

The unpredictability of the adverse consequences of an over-reliance on oil has increased the need for the economy to diversify away from it (Lebdioui, 2020) and towards the B.E. Supporters of increased productivity believe that the B.E.'s outcomes have a good probability of advancing the economy to the required degree. Global food chains, livelihoods, and environmental stability all depend on the B.E., which also supports a diverse array of species and ecosystems (Jacob & Umoh, 2022). By creating more output from the utilization of marine resources and increasing the number of career alternatives developed utilizing local resources and expertise, B.E. sectors have a great deal of unrealised potential that may significantly contribute to the diversification of local economies in coastal nations. An integrated and comprehensive strategy to the B.E. can assist with increasing the connections across industries in addition to diversifying specific sectors. The B.E. may hold some of the secrets to quickening the energy transition as water-based renewable energy (such offshore wind, floating solar panels, or tidal energy) may make the move to clean energy easier (Romano et al., 2023). In the upcoming decades, there will be a significant transition to renewable energy sources due to the growing demand for energy and the depletion of natural gas and oil reserves, which are enormous stores of thermal and kinetic energy. An enormous untapped supply of wind, geothermal, kinetic, and other renewable energy sources can be found in the world's seas. The most active human activity in the waters is marine tourism (Breyer et al., 2022). Long-term ties between national economies and the marine and coastal environment may be reinforced by starting along a road towards sustainable ocean development. The transition to a B.E. offers tiny island developing states and least developed coastal nations a chance to handle their unique problems in a sustainable manner. Ocean economies have enormous potential to diversify from more established sectors like fisheries to more recent ones like renewable ocean energy since their economies are so reliant on the biodiversity and natural resources of marine and coastal areas. (unit, 2020). Manufacturing is impacted by the B.E., and in addition to well-established ocean sectors, new and developing businesses—often mentioned as deep-sea mining, aquaculture, marine renewable energy, and marine biotechnology—will expand and diversify the ocean economy. (Islam & Sarker, 2021).

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Foreign Trade

Maritime transport and associated activities are engines of trade facilitation, and trade itself is the motor of inclusive sustainable development and growth. (Ahammed et al., 2024). The oceans provide substantial and wide-ranging commerce potential. They have to do with human settlements, tourism and recreation, mineral extraction, biotechnology, transportation, seafood production, ocean energy, and ocean exploration (Jacob & Umoh, 2022). A safe and secure marine domain is necessary for international oceanborne trade, the creation of jobs and revenue, and the B.E.'s sustainable resource usage (Jacob & Umoh, 2022). In the modern global economy, hundreds of millions of people depend on ships to carry a wide range of commodities and products that the world needs, including food, fuel, and other necessities, both in good times and bad (Romano et al., 2023).

The B.E. and Forward and Backward Linkages

In the modern global economy, hundreds of millions of people depend on ships to carry a wide range of commodities and products that the world needs, including food, fuel, and other necessities, both in good times and bad times. Port operations may have a beneficial influence on fisheries, and marine protected areas may have a positive effect since they successfully safeguard fisheries resources, but they may also diminish the number of fishing grounds that are now available. For instance Coastal tourism and fishing may compete for market share, although tourists may greatly boost demand for fish products, especially from small-scale coastal fleets (Lim et al., 2022).

In the modern global economy, hundreds of millions of people depend on ships to carry a wide range of commodities and products that the world needs, including food, fuel, and other necessities, both in good times and bad times. The B.E. should be seen as an intricate web of relationships and interactions between biodiversity, marine ecosystems, and human economic activity. The advantages, dependencies, and effects of economic activity on the maritime environment are still only partially or not at all measured, though. National statistics frequently fail to evaluate or properly record the entire cost of the environmental consequences and liabilities of economic activities, as well as the full value of the ecosystem services that underpin them. Because of this, statistics about the B.E. are frequently lacking and not generally comparable to those about the rest of the economy (Ren & Ji, 2021).

METHODOLOGY

In the modern global economy, hundreds of millions of people depend on ships to carry a wide range of commodities and products that the world needs, including food, fuel, and other necessities, both in good times and bad times. The significance of the

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B.E. sectors for Omani economic diversification and their immediate and long-term economic effects are the main reasons for the research's importance. The study's objective was achieved by using data from the Statistical Yearbook of the National Centre for Statistics and Information and the Sultanate of Oman's Ministry of National Economy. The study's objective is to measure and investigate the effects of certain B.E. elements on the gross domestic product development of the Omani economy from 1990 to 2022. In the modern global economy, hundreds of millions of people depend on ships to carry a wide range of commodities and products that the world needs, including food, fuel, and other necessities, both in good times and bad times. The following question provides a summary of the researcher's issue: Does the Omani economy's B.E. contribute to economic diversification? And do they have an impact on the gross domestic product's growth over the short and long term?

In the modern global economy, hundreds of millions of people depend on ships to carry a wide range of commodities and products that the world needs, including food, fuel, and other necessities, both in good times and bad times. The study predicates on the idea that, as a contemporary and significant model among other economic disciplines, the B.E. sectors can make a substantial contribution to both economic diversification and GDP growth. This will rely on how much the B.E. sectors contribute to the overall economy and what level of maturity they have attained. In the modern global economy, hundreds of millions of people depend on ships to carry a wide range of commodities and products that the world needs, including food, fuel, and other necessities, both in good times and bad times. By examining the evolution of data for the research variables for a particular time series, the study was based on the inductive analysis approach, which involved extrapolating the economic reality, looking at economic phenomena and how they changed over the course of the research period, and then making inferences about the resulting economic repercussions. To measure the correlation between the B.E. variables in the study, the Autoregressive Distributed Lag (ARDL) model was utilized.

$$GDPR = c + \lambda \mathrm{GDPR}_{t-1} + \beta_1 FPR_{t-1} + \beta_2 \mathrm{FER}_{t-1} + \beta_3 \mathrm{FTR}_{t-1} + \sum_{i=1}^{n} a_1 \mathrm{GDPR}_{t-i} + \sum_{i=0}^{m} a_2 \mathrm{FPR}_{t-i} + \sum_{i=0}^{m} a_3 \mathrm{FER}_{t-i} + \sum_{i=0}^{m} a_4 \mathrm{FTR}_{t-i} + \mu_t$$

Results

Data Analysis

The development of some variables of the B.E. in the Omani economy can be analyzed during the research period using tables (2-4), as follows:

Licenses

In the modern global economy, hundreds of millions of people depend on ships to carry a wide range of commodities and products that the world needs, including food, fuel, and other necessities, both in good times and bad times. Table 2 makes it

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evident that the growth rates of the fishing permits acquired during the study period varied, with the new ones growing at the fastest pace in 2006 (117.7%). With a rate of 87.7%, 2016 saw the largest increase in the number of fishing permits renewed. Therefore, it is clear how important fishing permits are to the Omani economy as one of the B.E.'s activities.

Table 2: B.E. Sectors

Years	Fishing licenses issued				Fishing boat licenses issued			
	New	Growth %rate	renewal	Growth %rate	New	Growth %rate	renewal	Growth %rate
1990	1563		1977		1382		3361	
1991	1417	-9.3	2368	19.8	1436	3.9	3566	6.1
1992	2269	60.1	1890	-20.2	880	-38.7	2668	-25.2
1993	2178	-4	1963	3.9	1406	59.8	2751	3.1
1994	2259	3.7	2686	36.8	878	-37.6	2960	7.6
1995	1361	-39.8	2792	3.9	271	-69.1	3627	22.5
1996	962	-29.3	1816	-35	378	39.5	2652	-26.9
1997	621	-35.4	2001	10.2	165	-56.3	2837	7
1998	830	33.7	2182	9	538	226.1	2466	-13.1
1999	572	-31.1	1940	-11.1	301	-44.1	2705	9.7
2000	1060	85.3	3109	60.3	673	123.6	3112	15
2001	661	-37.6	1944	-37.5	165	-75.5	2052	-34.1
2002	1247	88.7	2128	9.5	200	21.2	1239	-39.6
2003	1166	-6.5	2273	6.8	200	0	1274	2.8
2004	850	-27.1	2518	10.8	111	-44.5	2048	60.8
2005	1060	24.7	1899	-24.6	88	-20.7	972	-52.5
2006	2,308	117.7	3,240	70.6	2,114	2302.3	1,437	47.8
2007	3,313	43.5	4,891	51	1,599	-24.4	3,775	162.7
2008	4,952	49.5	6,786	38.7	878	-45.1	3,413	-9.6
2009	4,252	-14.1	4,603	-32.2	224	-74.5	2,169	-36.4
2010	3,828	-10	4,864	5.7	4,031	1699.6	4,135	90.6
2011	3,768	-1.6	6,349	30.5	328	-91.9	2,971	-28.1
2012	3134	-16.8	6922	9	900	174.4	3218	8.3
2013	1,848	-41	6,418	-7.3	1,287	43	5,515	71.4
2014	1,621	-12.3	6,540	1.9	676	-47.5	3,760	-31.8
2015	1,337	-17.5	4,020	-38.5	309	-54.3	2,655	-29.4
2016	1,320	-1.3	7,545	87.7	181	-41.4	5,471	106.1
2017	1,235	-6.4	3,872	-48.7	285	57.5	2,822	-48.4
2018	1,693	37.1	6,255	61.5	549	92.6	3,746	32.7
2019	1,607	-5.1	7,266	16.2	547	-0.4	8,847	136.2
2020	1,995	24.1	4,678	-35.6	289	-47.2	2,575	-70.9
2021	3,133	57	6,526	39.5	834	188.6	3,238	25.7
2022	2,810	-10.3	7,929	21.5	161	-80.7	6,254	93.1
Timeframes	**%Compound Growth Rate**							
1990-2000		-3.5		4.2		-6.3		-0.7
2001-2011		17.1		11.4		6.4		3.4
2012-2022		-1		1.2		-14.5		6.2
1990-2022		1.8		4.3		-6.3		1.9

In the modern global economy, hundreds of millions of people depend on ships to carry a wide range of commodities and products that the world needs, including food, fuel, and other necessities, both in good times and bad times. For the years 1990–

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2022, the compound growth rate for newly acquired fishing permits was 1.8%. and 4.3% for license renewals.

During the research period, the newly extracted fishing boat permits likewise had fluctuating growth rates; in 2006, they reported the greatest increase rate, at 2302.3 percent. At a rate of 132.7%, the renewal of extracted fishing boat permits had the largest increase in 2007, indicating the growing significance of fishing as a B.E. activity. Between 1990 and 2022, the compound growth rate for newly extracted fishing boat permits was -6.3 percent. In addition, 1.9% of licenses are renewed.

The following formula was used to determine the simple growth rate:

$$r = \frac{P_t - P_{t-1}}{P_{t-1}} * 100$$

The following formula was used to get the compound growth rate:

$$R = \left[\left((PT/P0)\hat{}(1/N)\right) - 1\right] * 100$$

Fish Production

In the modern global economy, hundreds of millions of people depend on ships to carry a wide range of commodities and products that the world needs, including food, fuel, and other necessities, both in good times and bad times. Fisheries were small-scale and regionally focused on their early years, employing low-tech methods (wooden and sea boats) to supply fish for local markets and domestic consumption. Due to its strategic location, extensive coasts, and closeness to international waterways, Oman has a distinct edge over its neighbours and presents an excellent chance for both domestic and foreign companies to engage in commercial fishing. Because of this, Oman's fisheries are one of the industries with the quickest rates of growth and a key component of economic diversification. The government's environmental and investor-friendly policies have made it easier for people to invest in Oman's fishing industry (Al Shammakhi et al., 2023). When following the time series in Table 3, the fisheries sector's production has increased for most of the research years, and almost continuously, as fish production achieved the highest growth during the research period in 1995 at a rate of (68.9%). The compound growth rate for the period 1990-2022 was (8.2%). Thus, fish production may tend towards maturity in the following years.

From Table 3, the percentage of fish production's contribution to the GDP has decreased, as the highest contribution rate was recorded in 2021 at (1.0), which is a low percentage, and this explains the decrease in the contribution of fish production to the diversification of the GDP.

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Fish Exports

It is clear from Table 3 that fish exports have increased almost continuously for most research years, although their value was modest compared to total exports, as they achieved the highest growth during the research period in 2018 at a rate of (267.2%). The compound growth rate for the period 1990-2022 was (6.5%). Thus, although the value of fish exports is still low, they are heading towards more maturity in the following years, as their role in the economy can be greater as one of the indicators of the B.E. with the adoption of stimulating policies and within well-studied plans. Table (4) shows that the percentage of fish exports' contribution to non-oil exports recorded good rates at the beginning of the time series, as it recorded its highest rate in 1990 (25.1%), while it declined in the following years to record (1.9%) in 2022. As for the percentage of fish exports' contribution to total commodity exports, it was low throughout the research years, as it recorded its highest rate in 1993 (1.0%), and this is an indicator that shows the weakness of fish exports' contribution to diversifying exports in the Omani economy. 2-1-4- Revenues from agriculture, forestry and fishing

It is clear from Table 3 that despite the continued increase in revenues from agriculture, forestry and fishing on average during the research period, their value is still low compared to total public revenues, and they achieved their highest growth rate in 1994 at a rate of (80.0%). The compound growth rate for the period 1990-2022 reached (6.2%), and thus revenues from agriculture, forestry and fishing can have a greater role in the future if targeted economic policies are adopted to enhance the structure of public revenues.

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Table 3: Development of some Variables of the B.E. in the Omani Economy at Current Prices for the Period 1990 (million riyals)

Years	GDP at market price	Growth % rate	Fish product	Growth % rate	Fresh fish exports	Growth % rate	frozen fish exports	Growth % rate	Crustaceans and molluscs exports	Growth % rate	Other fish exports	Growth % rate	Total fish exports	Growth % rate	Agriculture, forestry and fishing revenues	Growth % rate
1990	4493		28.1		0		11.7		5.3		0.2		17.3		1.3	
1991	4360.8	-2.9	22.1	-21.4	0	0	10.6	-9.4	1.9	-64.6	0.8	237	13.3	-23.2	0.9	-30.8
1992	4787.8	9.8	26.7	20.8	0.002	0	10	-6.2	2.7	41.7	0.7	-6.7	13.3	0.6	0.9	0
1993	4803.6	0.3	26.9	0.7	0	-100	17.6	76.7	1.9	-27.5	0.3	-63.5	19.8	48.3	1	11.1
1994	4967.3	3.4	30.9	14.9	0.001	0	16.8	-4.6	1.8	-9	0.5	77.9	19	-3.9	1.8	80
1995	5307.2	6.8	52.2	68.9	0.001	42.9	21.3	27.1	1.4	-23.4	0.9	97.5	23.6	24.2	1.7	-5.6
1996	5874.3	10.7	46.4	-11.1	0.044	4260	21.4	0.1	1	-28.3	1.8	93.8	24.2	2.3	1.6	-5.9
1997	6089.5	3.7	52.8	13.8	0.007	-84	22.1	3.6	1.5	51.7	2.2	24	25.8	6.8	2	25
1998	5381.8	-12	50.9	-3.6	1.2	####	16.3	-26.3	0.5	-62.9	1	-54	19.1	-25.9	2	0
1999	5995.7	11.4	52.3	2.8	0.6	-49	11.7	-28.5	1.2	113.6	0.5	-50.2	14	-26.9	3.2	60
2000	7500.6	25.1	48.7	-6.9	7.1	1020	8.9	-23.9	1.5	29.7	1.1	120.1	18.6	33.1	2.5	-21.9
2001	7479.3	-0.3	51	4.7	13	83.5	1.5	-83.3	3.3	119.3	0.9	-17.7	18.7	0.7	2.3	-8
2002	7744.9	3.6	53.1	4.1	18.9	44.8	2.8	89.2	3.2	-3.3	4.6	407.5	29.5	57.3	2.6	13
2003	8318.2	7.4	56.6	6.6	19.5	3.3	4.6	63.7	4.2	30.5	1.4	-70.2	29.7	0.5	3.4	30.8
2004	9521.6	14.5	66.5	17.5	12.4	-36	19.3	319	4.3	2.4	4.3	211.4	40.3	35.7	3.3	-2.9
2005	11951	25.5	75.4	13.4	18.5	49.4	13.9	-27.9	4.4	1.9	0.4	-90.5	37.2	-7.6	3.7	12.1
2006	14309.5	19.7	74	-1.9	16.8	-9.4	14.3	2.4	4.5	3.6	0.4	-0.5	36	-3.4	3.7	0
2007	16181.8	13.1	76.5	3.4	17.6	4.8	8.8	-38.4	4.1	-8.6	3.2	689.6	33.7	-6.3	3.8	2.7
2008	23418.1	44.7	90.3	18	16.8	-4.4	10.3	17.3	2.5	-38.9	1	-69.2	30.6	-9.1	4.2	10.5
2009	18605.3	-21	98.7	9.3	13.6	-19	13.2	28.5	4.8	91.2	0.9	-6.3	32.6	6.4	5.3	26.2
2010	22547.6	21.2	110	11.4	27.7	104	12.1	-8.8	6.6	37.3	1.1	16.6	47.4	45.7	6.3	18.9
2011	26122	15.9	123.4	12.2	20.4	-26	14.1	17	22.4	238.6	0.8	-24.8	57.8	21.8	5.5	-12.7

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2012	29353.3	12.4	141.9	15	15	-27	20.7	46.8	19.4	-13.5	0.6	-21.4	55.8	-3.5	5.6	1.8
2013	30351.9	3.4	164	15.6	19.8	31.5	20.1	-2.8	10.2	-47.6	0.8	18.8	50.8	-8.9	5.6	0
2014	31173.9	2.7	163.1	-0.5	15.5	-22	29.6	46.9	5.3	-47.8	2.2	184.5	52.5	3.3	8.6	53.6
2015	26500.3	-15	167.6	2.8	16.5	6.9	24.3	-17.8	7.5	41.5	0.5	-75.1	48.9	-6.9	6.9	-19.8
2016	25354.5	-4.3	196.3	17.1	16.4	-0.6	33.4	37.2	8.5	12.7	0.6	7.4	58.8	20.4	7.1	2.9
2017	31089.4	22.6	214.5	9.3	16	-2.4	6	-82	5	-40.3	0.7	30.3	27.8	-52.7	7.5	5.6
2018	27140.2	-13	235.2	9.7	24	49.6	47.4	689.6	29.9	493	0.9	22.6	102.2	267.2	7.7	2.7
2019	33859.4	24.8	242.3	3	23.6	-1.8	34.7	-26.7	24.7	-17.5	0.5	-47.2	84.6	-17.3	6.8	-11.7
2020	29187.2	-14	272.3	12.4	15.9	-33	80.3	131.4	17.3	-29.9	0.8	58.2	114.3	35.2	8.2	20.6
2021	33576	15	325.7	19.6	13.1	-18	85.8	6.8	20.9	20.8	1.1	47.8	121	5.8	10.5	28
2022	43042.4	28.2	382.7	17.5	15.1	15.1	95.8	11.7	28.6	36.7	0.6	-46.4	140.1	15.8	9.5	-9.5
Time frames	**%Compound Growth Rate**															
1990-2000		4.8		5.1		0		-2.5		-10.8		15.5		0.7		6.1
2001-2011		12		8.4		4.2		22.7		19		-1		10.8		8.2
2012-2022		3.5		9.4		0		14.9		3.6		-0.4		8.7		4.9
1990-2022		7.1		8.2		0		6.6		5.2		3		6.5		6.2

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It is clear from table 4 that the contribution rate of revenues from agriculture, forestry and fishing to total public revenues is still low throughout the research period, as it recorded its highest rate in 1999 (0.178%), and this is an indicator that shows the weakness of their contribution to diversifying public revenues, i.e. the weakness of the B.E. in diversifying sources of public revenues in the Omani economy.

Table 4: Development of the Relative Importance of some B.E. Variables in the Omani Economy for the Period 1990-2022

Years	Fish production % to GDP	Percentage of total fish exports to non-%oil exports	Percentage of total fish exports to total %commodity exports	Ratio of agriculture, forestry and fishing revenues to %general revenues
1990	0.6	25.1	0.8	0.069
1991	0.5	16.8	0.7	0.057
1992	0.6	13.8	0.6	0.054
1993	0.6	16.2	1	0.058
1994	0.6	13.1	0.9	0.102
1995	1	13	1	0.092
1996	0.8	13.9	0.9	0.08
1997	0.9	12.7	0.9	0.088
1998	0.9	9.6	0.9	0.108
1999	0.9	6.9	0.5	0.178
2000	0.6	7.5	0.4	0.109
2001	0.7	7.1	0.4	0.091
2002	0.7	11.3	0.7	0.086
2003	0.7	9.8	0.7	0.103
2004	0.7	9.6	0.8	0.082
2005	0.6	6.7	0.5	0.082
2006	0.5	4.4	0.4	0.074
2007	0.5	2.6	0.4	0.064
2008	0.4	1.6	0.2	0.055
2009	0.5	1.8	0.3	0.079
2010	0.5	1.9	0.3	0.08
2011	0.5	1.9	0.3	0.052
2012	0.5	1.6	0.3	0.042
2013	0.5	1.3	0.2	0.04
2014	0.5	1.3	0.3	0.061
2015	0.6	1.6	0.4	0.076
2016	0.8	2.5	0.6	0.093
2017	0.7	0.9	0.2	0.088
2018	0.9	2.7	0.6	0.07
2019	0.7	2.6	0.6	0.064
2020	0.9	2.8	0.9	0.096
2021	1	2.1	0.7	0.094
2022	0.9	1.9	0.6	0.066

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Figure 1 Shows the development of some variables of the B.E. in the Omani economy, as the gradual increase is evident during the research period.

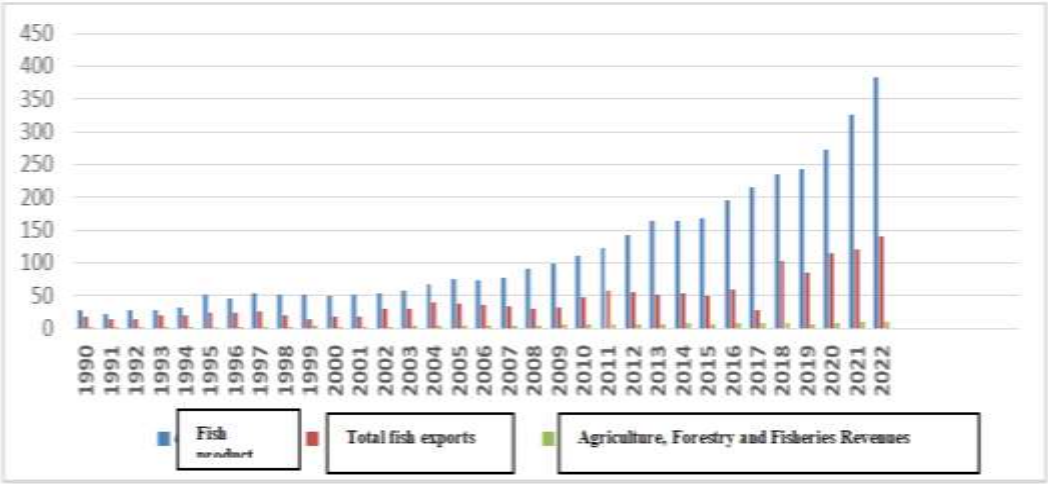

Figure 1: The development of some variables of the B.E. in the Omani economy at current prices for the period 1990-2022 (million Omani riyals)

Figure 2 shows that the percentage of fish exports' contribution to non-oil exports increased from the beginning of the time series until 2004, but it recorded a decline after that until the end of the period. As for the percentage of fish exports to total commodity exports, it recorded a decline throughout the research period. It is also clear that the percentages of fish production's contribution, agricultural revenues, forestry affairs and fishing decreased.

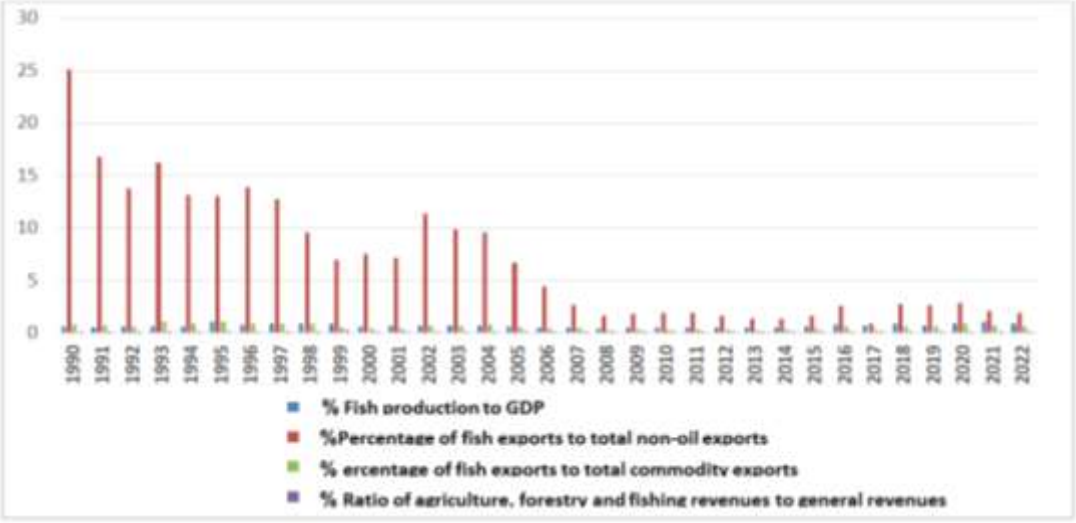

Figure 2: The development of the contribution of some B.E. variables to the Omani economy for the period 1990-2022

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Analysis of the Results of Standard Tests

A collection of economic indicators served as the foundation for the standard component of the study, which may be summarized as follows:

GDPR=F(FPR,FER,FTR)

Where

- The dependent variable is:
- GDPR, or gross domestic product growth rate.
- The independent variables are:
- FPR, the ratio of fish production to gross domestic products.
- FER, The proportion of non-oil exports to fish exports.
- FTR, agricultural ratio, forestry and fishing revenues to public revenues.

- With the growth rate of the gross domestic product as the dependent variable, the effect of a few B.E. indicators on the expansion of the Omani economy's GDP was quantified and examined during the years 1990–2022. As indicators of the B.E., the independent variables are the ratio of fish output to GDP, the ratio of fish exports to non-oil exports, and the ratio of governmental revenues to agriculture, forestry, and fishing revenues.

Before starting to choose the appropriate model to estimate the output function, the degree of stability of the economic indicators used in the analysis must be determined.

Unit Root Test

Table 5 shows that the GDPR variable stabilized at the level, in the case of having only a categorical, categorical and a general trend, and without a categorical and a general trend at a significant level of 1%. The FER variable stabilized at the level, in the case of having only a categorical, at a significant level of 1%, and in the case of having a categorical, a general trend, and without a categorical and a general trend at a significant level of 5%. The FTR variable stabilized in the case of having only a categorical, at a significant level of 10%. As for the FPR variable, it stabilized at the first difference in the case of having only a categorical, categorical, a general trend, and without a categorical and a general trend at a significance level of 1%. 2-2-2- Estimating the output function using the ARDL autoregressive distributed lag model

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Table 5: Augmented Dickey-Fuller test for unit root

UNIT ROOT TEST RESULTS TABLE (ADF) Null Hypothesis: the variable has a unit root					
		At Level			
		GDPR	**FPR**	**FER**	**FTR**
With Constant	t-Statistic	-6.8157	-2.1615	-3.7710	-2.9239
	Prob.	***0.0000***	***0.2235***	***0.0075***	***0.0537***
		***	n0	***	*
With Constant & Trend	t-Statistic	-6.7038	-1.2095	-3.9305	-2.9913
	Prob.	***0.0000***	***0.8909***	***0.0222***	***0.1501***
		***	n0	**	n0
Without Constant & Trend	t-Statistic	-4.9092	-0.1135	-2.5784	-0.8200
	Prob.	***0.0000***	***0.6369***	***0.0119***	***0.3529***
		***	n0	**	n0
		At First Difference			
		d(GDPR)	d(FPR)	d(FER)	d(FTR)
With Constant	t-Statistic	-7.0248	-8.4656	-2.7871	-5.8951
	Prob.	***0.0000***	***0.0000***	***0.0725***	***0.0000***
		***	***	*	***
With Constant & Trend	t-Statistic	-6.8599	-8.3324	-3.9734	-5.8123
	Prob.	***0.0000***	***0.0000***	***0.0218***	***0.0002***
		***	***	**	***
Without Constant & Trend	t-Statistic	-7.1497	-8.4746	-2.4630	-5.9957
	Prob.	***0.0000***	***0.0000***	***0.0157***	***0.0000***
		***	***	**	***
Notes:					
a: (*)Significant at the 10%; (**)Significant at the 5%; (***) Significant at the 1% and (no) Not Significant					
b: Lag Length based on SIC					
c: Probability based on MacKinnon (1996) one-sided p-values.					

Table 6 makes it evident that R-squared = 0.627344, which indicates that 62.73% of the change in the dependent variable can be explained by the independent variables, with the remaining portion coming from the random variable and other factors not in the model. Adjusted R-squared is determined to be 0.513927. The estimated model is judged to be significant at the 1% level based on the F-statistic test.

Figure (3), the optimal slowdown periods are (1,1,1,1), based on the Akaike criterion. The figure contrasts 16 distinct models (Model1 to Model16) according to their Akaike criterion values, where lower values indicate superior model performance. Model9 is the highest performing model, exhibiting the lowest AIC value (~7.7), signifying its optimal suitability for data representation with an effective balance of simplicity and precision. Models with high AIC values, such as Model8, are deemed less efficient. This technique is used to identify the most effective models for predicting or examining temporal data, contingent upon the structure utilized in each model.

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Table 6: ARDL Model for the Output Function

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GDPR(-1)	-0.363306	0.142113	-2.556450	0.0176
FPR	-45.09486	16.43146	-2.744422	0.0116
FPR(-1)	38.51096	17.73662	2.171268	0.0405
FER	-3.162188	1.296981	-2.438114	0.0229
FER(-1)	2.909914	1.235251	2.355726	0.0274
FTR	-294.9020	106.5428	-2.767921	0.0109
FTR(-1)	284.5520	102.1019	2.786942	0.0105
C	17.44371	9.212457	1.893492	0.0709
R-squared	0.627344	Mean dependent var		8.632258
Adjusted R-squared	0.513927	S.D. dependent var		14.59821
S.E. of regression	10.17772	Akaike info criterion		7.695915
Sum squared resid	2382.476	Schwarz criterion		8.065976
Log likelihood	-111.2867	Hannan-Quinn criter.		7.816545
F-statistic	5.531296	Durbin-Watson stat		2.317551
Prob(F-statistic)	0.000791			

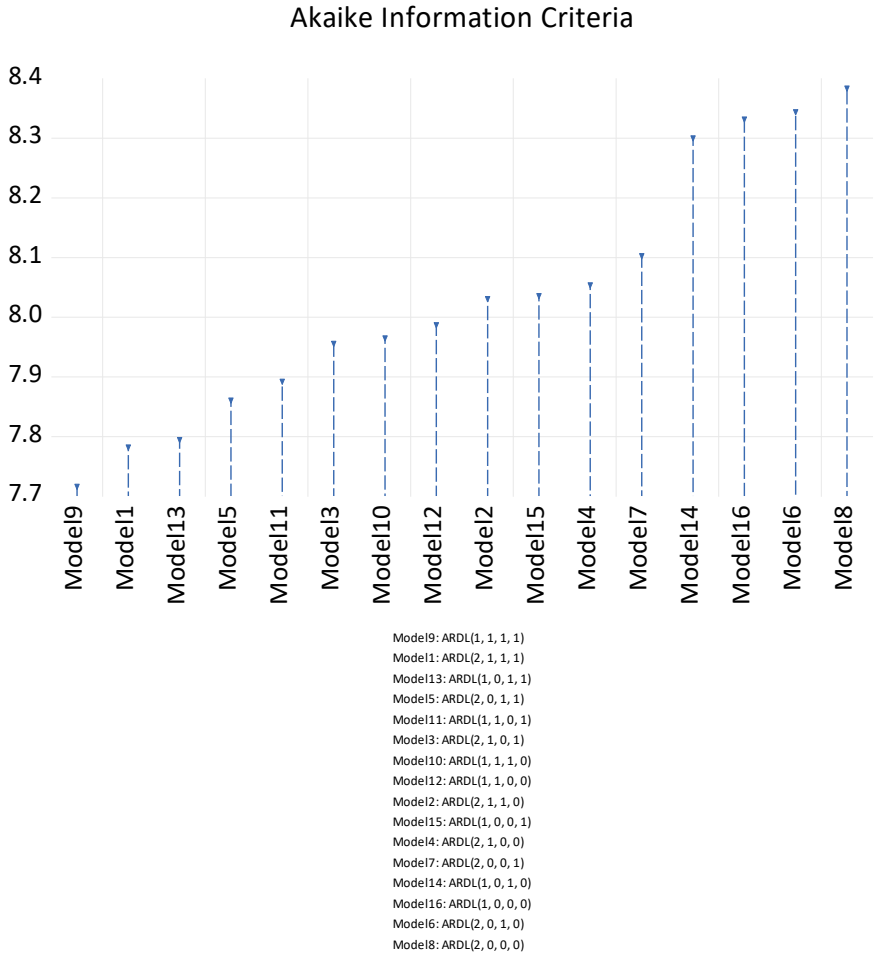

Figure 3: Optimal deceleration periods

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Bounds Test

It is clear from table 7 that the value of F-statistics = 19.52066, which is greater than the critical value of the upper limit at a significance level of 1%. This means that there is a long-term equilibrium relationship between the variables.

Table 7: Bounds Test

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	**Value**	**Signif.**	**I(0)**	**I(1)**
F-statistic	19.52066	10%	2.37	3.2
k	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66

Diagnostic Tests

From table 8 the probability values of F-statistic and Chi-Square are not significant at the 5% level, which means that the estimated model does not suffer from the problem of serial correlation between the residuals or the problem of non-constancy of variance.

Table 8: Diagnostic Tests

Breusch-Godfrey Serial Correlation LM Test:			
Null hypothesis: No serial correlation at up to 2 lags			
F-statistic	1.655683	Prob. F(2,21)	0.2149
Obs*R-squared	4.222400	Prob. Chi-Square(2)	0.1211
Heteroskedasticity Test: Breusch-Pagan-Godfrey **Null hypothesis: Homoskedasticity**			
F-statistic	0.137324	Prob. F(7,23)	0.9941
Obs*R-squared	1.243642	Prob. Chi-Square(7)	0.9899
Scaled explained SS	1.295862	Prob. Chi-Square(7)	0.9885

Histogram-Normality Test

Figure 4 illustrates the normal distribution of random errors (residuals) for the data model spanning 1992-2022, with the histogram depicting the distribution of errors with descriptive statistics. The mean of the errors is around zero (-3.78e-15), indicating a balance of errors around this number, while the median (-0.11) indicates a nearly symmetrical distribution. The standard deviation (8.01) indicates the degree of dispersion around the mean, exhibiting a modest rightward divergence as per the Skewness value (0.30). The kurtosis value of 4.78 indicates a distribution that is more kurtosis than that of a normal distribution. The Jarque -Bera test findings (4.60) with a probability of (0.10) indicate that the null hypothesis of normal distribution cannot be rejected at a 5% significance level, demonstrating the model's adequate quality in capturing the data with statistically acceptable random errors.

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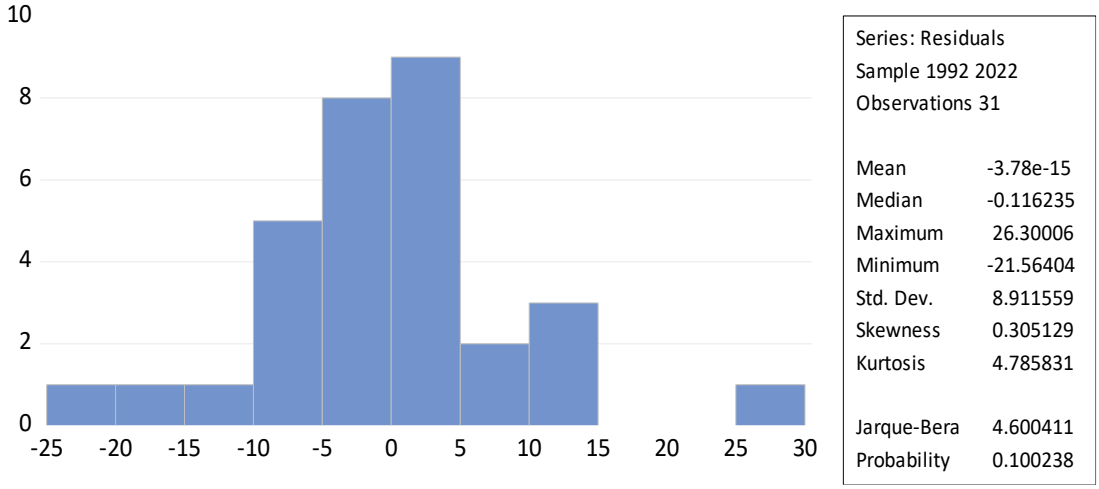

Figure 4: Normal distribution of random errors

Testing The Predictive Performance of the Error Correction Model

Figure 5 illustrates the precision of the GDP projection in relation to the actual values for the period spanning 1992 to 2022. The blue line represents the predicted values, whilst the dotted lines indicate the range including two standard deviations (2 SE). The graphic clearly demonstrates that the actual values mostly fall within the error range, indicating an adequate level of model accuracy. The data provided validates the model's efficacy, as shown by a Root Mean Squared Error (RMSE) of 10.34, indicating the average discrepancy between the predictions and the actual results. The Mean Absolute Error (MAE) is 7.33, indicating commendable overall accuracy. The Bias Proportion is almost nil (0.000036), indicating a lack of bias in the projections. The variation Proportion (0.039236) suggests that the variation in the predictions closely approximates the actual variance. Ultimately, the Theil U2 Coefficient (0.186) indicates that the model has superior performance relative to a basic forecasting model.

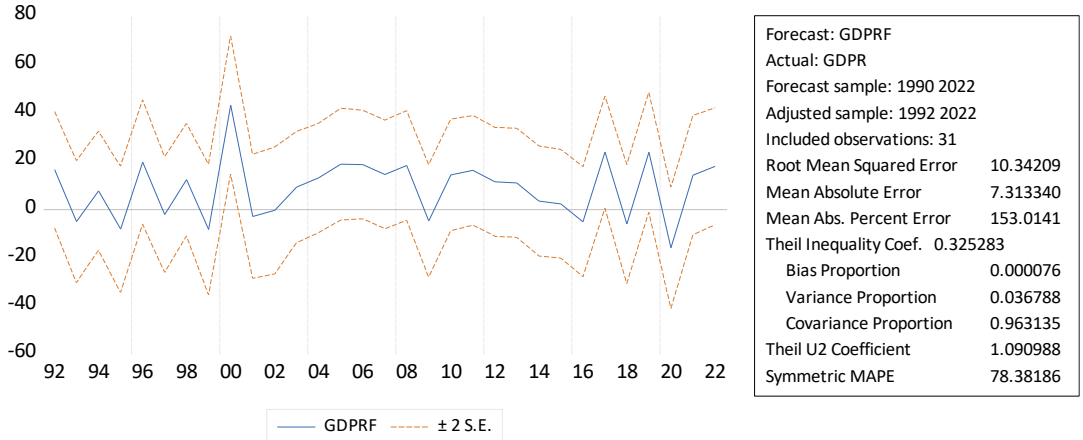

Figure 5: Predictive performance of the error correction model

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Testing the Structural Stability of the Model Parameters Stability Diagnostics

From the figure 6 and based on the CUSUM test shown in part A, the sum of the residuals' accumulation lies between the limits of the critical values, which indicates that the estimated parameters are stable at a significance level of 5%. It is also clear from the CUSUM of Squares test, in part B, that the sum of the residuals' accumulation lies between the limits of the critical values, which means that the variables included in the model are stable at a significance level of 5%.

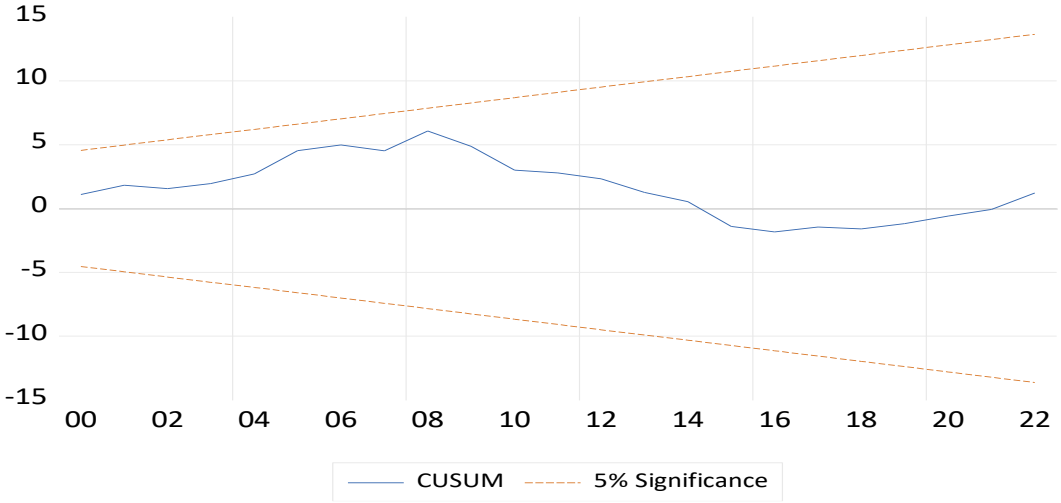

Figure 6: CUSUM Test (Cumulative Sum)

Figure 6 illustrates the Cumulative Sum test for stability of models for the period from 2000 to 2022. The blue line illustrates the cumulative values of the total, whilst the dashed lines denote the limitations of the 5% significance level. The CUSUM line consistently stayed inside the significance bounds for the whole time, indicating the stability of the model parameters and the absence of significant structural changes in the data or the used model. This signifies a favorable assessment of the model's dependability and efficacy in long-term data analysis and prediction.

Figure 7 illustrates the CUSUM of Squares test assessing the stability of model variance from 2000 to 2022. The blue line denotes the cumulative values of the squared errors, whilst the dashed lines indicate the limit of the 5% significance level. The CUSUM of Squares line consistently stays inside the significance limit, indicating stable variance and the absence of significant structural changes or departures in the model. This demonstrates that the model is robust and consistent in data interpretation and prediction, which positively boosts its dependability for future applications.

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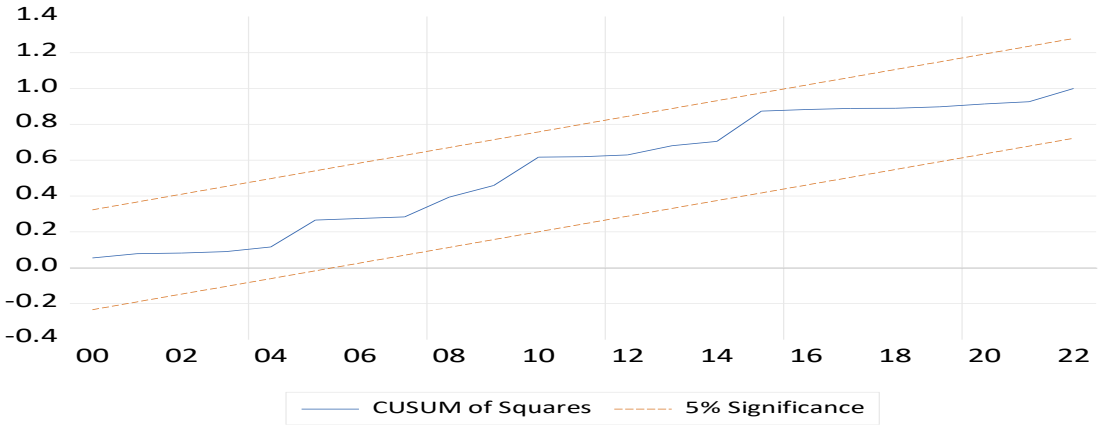

Figure 7**:** CUSUM of Squares test

Estimation of Parameters (Short-term and Error Correction Parameter - Long-Term)

Estimation of Short-term Parameters and Error Correction Parameter

It is clear from table 9 according to the short-term parameters that the variable FPR has a negative significant effect at the 1% level on GDP growth. It is also clear that the variables FER and FTR have a significant effect at the 1% level but negative on GDP growth. This can be justified by the fact that the B.E. activities in the Omani economy are still in the growth phase and have not constituted a significant percentage in the economy, and depend on government support, as they need to exert great efforts to rise to the level of positive impact on the economy and increase economic diversification.

Table 9: Short-term Parameters and Error Correction Model

ECM Regression **Case 2: Restricted Constant and No Trend**				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(FPR)	-45.09486	13.69937	-3.291746	0.0032
D(FER)	-3.162188	1.069823	-2.955805	0.0071
D(FTR)	-294.9020	81.92780	-3.599535	0.0015
CointEq(-1)*	-1.363306	0.127363	-10.70410	0.0000
R-squared	0.847365	Mean dependent var		1.003226
Adjusted R-squared	0.830406	S.D. dependent var		22.81009
S.E. of regression	9.393608	Akaike info criterion		7.437850
Sum squared resid	2382.476	Schwarz criterion		7.622881
Log likelihood	-111.2867	Hannan-Quinn criter.		7.498165
Durbin-Watson stat	2.317551			

It is clear that the error correction parameter CointEq(-1) is negative and significant

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at the 1% level, and is greater than one in absolute value, which means that the speed of adaptation is good to correct imbalances in the short term in order to reach equilibrium in the long term, i.e. it needs 1/1.36=0.735 of a year to correct imbalances.

Long-Term Parameters

It is clear from table 10 that according to the long-term parameters the variables of the B.E. do not have a significant effect on the growth of the GDP in the long term. The sectors of the B.E. in the Omani economy still do not constitute a significant percentage of the economy, which justifies the adoption of a strategy and specific time periods to increase the effectiveness of these sectors, due to their great importance in economic diversification.

Table 10: Long-Term Features

Levels Equation				
Case 2: Restricted Constant and No Trend				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
FPR	-4.829367	11.29887	-0.427420	0.6730
FER	-0.185046	0.292640	-0.632333	0.5334
FTR	-7.591797	77.78842	-0.097595	0.9231
C	12.79516	6.342271	2.017441	0.0555
EC = GDPR - (-4.8294*FPR -0.1850*FER -7.5918*FTR + 12.7952)				

DISCUSSION OF THE RESULTS

According to (Al-Kharusi, 2022), who believes that the B.E. is perhaps a focus point for this diversification, the B.E. is a significant and crucial axis for economic diversification in the Omani economy. The GCC nations have historically benefited from significant marine activity, particularly in the areas of transportation and food and pearl fishing, particularly prior to the growth of oil as a productive, export, and revenue industry, as the latter served as a source of export income, while the former made up a significant portion of their food security. Even if its share of the Omani economy is decreasing, the fishing industry still contributes significantly. This is in line with the findings of (Kwatra et al., 2024), who believe that the fisheries industry contributes significantly to the economy and that the growth of traditional and commercial fishing activities is the reason for the rise in catch quantities and export earnings. The sector's GDP contribution is further increased by the government's emphasis on enhancing fishing infrastructure and encouraging sustainable practices, employment and exports. It supports the assertion made by (Al-Awadhi et al., 2022) that the construction of additional ports and harbors around Oman demonstrates the rapid growth and development of the fishing industry. The emergence of businesses engaged in the fishing, processing, trading, and operation of fish is more proof of

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commercialization. Additionally, the government has been actively working to create new rules for industry that include fishing, marketing, and trade. Additionally, it aligns with the findings of (Al Shammakhi et al., 2023), who recognizes that Oman's fisheries are among the industries with the fastest rate of growth and one of the most significant sources of economic diversification. Oman's strategic location, extensive coastlines, and closeness to international waters give it a distinct advantage over its neighbors, making commercial fishing in Oman a good opportunity for both local and foreign investors. A favorable climate for investors in Oman's fisheries industry has been established by the government's investor-friendly and environmentally friendly initiatives. The study also measures the influence of several B.E. variables, such as the proportion of fish production, exports, and agricultural income, fishery and forestry) on the pace of GDP growth. There is a long-term equilibrium connection between the variables, according to the findings of the conventional tests. It became evident from the short-term characteristics that the B.E. indicators significantly hinder the expansion of the Omani economy's GDP. The long-term characteristics, however, made it evident that the B.E. indicators had no discernible effect on the GDP development of the Omani economy.

CONCLUSIONS

The B.E. activities did not contribute effectively to the diversification of the Omani economy, and this shows that the blue economic activities still need great effort and strategic plans within specific time frames, for their impact to be reflected effectively in the economy. When analyzing the data, it becomes clear that the percentage of fish production in the gross domestic product is low, and this explains the low contribution of fish production (as an indicator of the B.E.) to the diversification of the product. The weak contribution of fish exports (as an indicator of the B.E.) to the diversification of commodity exports in the Omani economy is also clear. The low contribution of agriculture, forestry and fishing revenues to the total public revenues throughout the research period is also clear, and this is an indicator that shows the weakness of their contribution to the diversification of public revenues, i.e. the weakness of the B.E. in diversifying the sources of public revenues in the Omani economy.

The short-term characteristics make it evident from the usual test findings that the variables FPR, FER, and FTR significantly hinder the expansion of the gross domestic product. The Omani economy's B.E. sectors are still in their early stages of growth and make up a small portion of the total GDP. For B.E. activities to reach the point where they have a positive economic impact and boost economic diversity, it takes a lot of work and time for the effects of policies to become apparent. However, given that the B.E. sectors still make up a small portion of the Omani economy, it is evident from the long-term parameters that the B.E. variables have no discernible

effect on the increase of the gross domestic product. Given their significant role in economic diversification, this supports the necessity to implement focused economic measures to boost these sectors' efficacy.

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