

INVESTIGATION OF BLUE ECONOMY AND ITS IMPACT ON GLOBAL MARITIME TRANSPORTATION

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ABSTRACT

According to sustainability, the Strategy to protect the oceans, water surfaces, and water resources that constitute 70% of the world is generally called a Blue Economy (BE). This Strategy maximizes the return from the aquatic environment, which can only be achieved when economic activity is perfectly balanced with the long-term activity of ocean ecosystems. Threats arising during and after studies and activities should be anticipated and actively reduced. This proactive stance is fundamental to the Blue Economy philosophy and allows us to reap its benefits while protecting our oceans. One of the most essential elements of the Blue Economy philosophy is maritime transportation, Ships, and Ports. The maritime industry should remain sustainable and green as it develops. The study investigated the impact of the Blue Economy on maritime transportation and how maritime transportation affects world trade.

Keywords: *Blue Economy, Maritime Transportation, Maritime Economy, Sustainability.*

JEL Codes: *C13, C20, F53, Q 53, Q54, Q56, R 4, R41.*

1. INTRODUCTION

More than 70% of the inhabited earth is covered by water geography. The coastal areas of the water-covered area are known as the geography where more than 80% of the world's population lives. It is known that more than 90% of the endless human needs that economics has researched since its formation are transported through maritime transportation.

In the Blue Economy doctrine, the sustainable use of marine resources for economic growth, improved livelihoods, and employment while maintaining a healthy aquatic ecosystem is accepted as a fundamental principle Voyer et al. (2018). state that it aims to combine development opportunities with environmental management and protection, considering water geography, that is, oceans. Three elements, land, air, and sea attract attention in defining countries. Legal regulations for determining and protecting rights and interests in maritime country concepts have been regulated by the creation and adoption of UNCLOS—the United Nations Convention of Law at Sea. Since its implementation in 1982, mariner nations have been actively and proactively claiming rights over the resources included in the

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Blue economy, a trend that is shaping the future of international law (Kildow and McIlgorm, 2010). As explained in a section of UNCLOS, maritime jurisdiction areas refer to the borders of countries that can be used to exercise their authority, rights, and interests. Maritime trade and shipping, ancient yet ever-evolving, are at the forefront of the commercial world. The maritime industry, a cradle of commercial formations, is constantly shaped by changing and developing technology. Competitiveness, a basis for evaluating all opportunities, from production to transportation, from underground resource exploration to resource processing, is a key factor. At this stage, the determination of ownership and authority over the area to be used becomes not just crucial, but a weighty responsibility and a key decision-making factor (Winder & Le Heron, 2017). Effective use of sea and submarine resources also stimulates the capitalist perspective. It draws attention to the Green Economy and environmental threats (Arsel and Büscher, 2012; Castree, 2010; Corson, MacDonald, and Neimark, 2013).

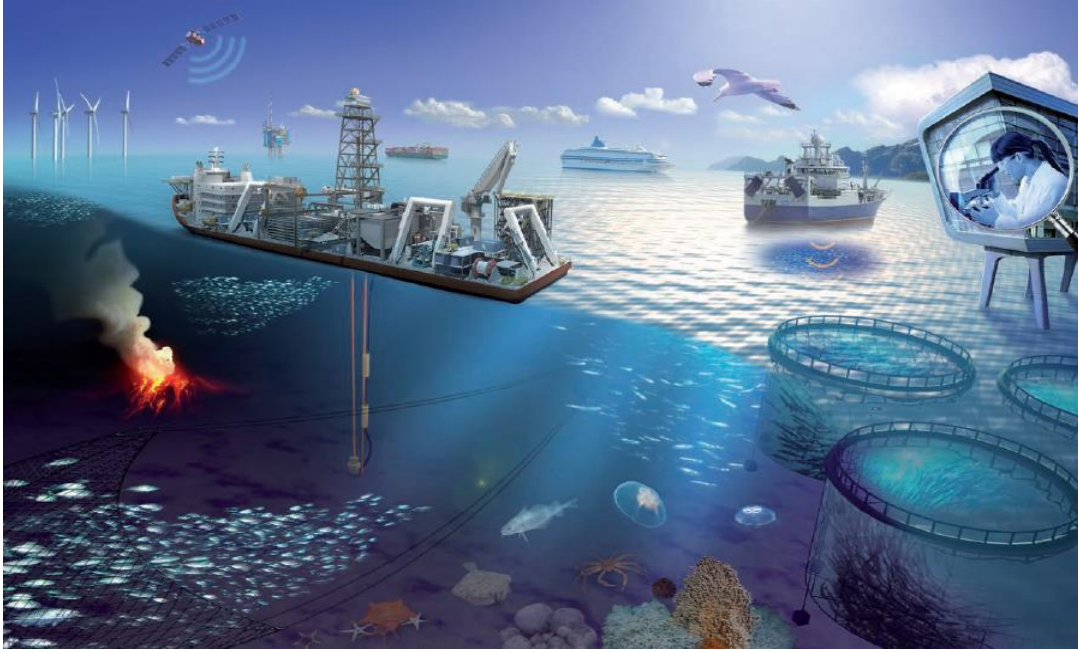
Even though humans did not realize it, they met the blue world and started using it. However, its popularity has increased in the last year since it has been understood that undersea research activities and ownership of energy are progressing towards becoming a global power (Mulazzani and Malorgio, 2017). Given the increasing prominence of the Blue Economy in forums such as the OECD, the United Nations Forum on Sustainable Development, and the Food and Agriculture Organization of the United Nations, the pressing need to resolve some competing claims and apparently inconsistent interpretations of the concept is paramount for a clear and unified understanding (Biermann, 2017; FAO, 2016; OECD, 2016). The Blue Economy (BE) concept was discussed at the 2012 United Nations Sustainable Development Conference in Rio de Janeiro. Although it is also referred to as the ocean economy or marine economy, the most prominent one is the blue economy, defined by international institutions (UNCTAD, 2014).

The main component of finding and using marine resources is the necessity of working together with maritime transportation. This paper aims to explain maritime transport's importance in the Blue Economy.

2. BLUE ECONOMY OVERVIEW

The blue economy has worked for human beings' present and future welfare since the past. The basic principle is to meet all the needs of humans living on earth to sustain their lives. Since each need cannot be met from the same place, transportation is an indispensable need. New activities are reshaping and diversifying the maritime industries, which have long been considered the traditional domain of shipping and fishing, and since the 1960s, offshore oil and gas (OECD, 2016).

Figure 1. Blue Economy overview (OECD, 2016)



Source: OECD,2016, http://www.oecd-ilibrary.org/economics/the-ocean-economyin-2030_9789264251724-en.

The blue economy is not just a local or regional concern, but a global one. The contribution of all industries related to the blue economy to economic production and employment is more significant than that of many other sectors. Preliminary calculations based on the OECD's Ocean Economy Database put the contribution of the ocean economy at US\$1.5 trillion in 2010, or around 2.5% of world gross value added (GVA). This global impact underscores the importance of the blue economy to all of the world. Offshore exploration platforms' important activities in oil and gas exploration account for one-third of the total added value of all industries in the geography of the seas and waters. Marine and coastal tourism, maritime equipment, and ports also impact and contribute. The direct full-time employment of the Blue Economy and its affiliates was approximately 31 million employees in 2010. However, this number has seen a significant increase, reaching over 100 million in 2023, highlighting the substantial growth in the Blue Economy. It is imperative to recognize that the ocean and its associated resources are crucial for addressing the numerous challenges humanity will confront in the near future. With the projected world population of 9 to 10 billion by the middle of this century, the demand for sufficient food, jobs, energy, raw materials, and economic growth will be pressing. This underscores the critical importance of the Blue Economy (Bennet et al.,2019).

The geography of the seas is a vibrant resource for meeting and delivering many needs. The ocean's potential to help meet these needs is enormous, but taking full advantage of it will require significant expansion of many ocean-based economic activities. Unconscious use of oceans has already caused many adverse side effects such as pollution, impact on fauna, decreased biodiversity, and climate change. Therefore, it is crucial to realize the full potential of the ocean and prioritize responsible and sustainable approaches to its economic development, ensuring that ethical considerations are at the

forefront of human actions.

Recent Research shows that different approaches have been taken to identifying the concepts and problems found within the Blue and Ocean Economy and the solutions to overcome them. Further, there needs to be more consistency between theory and practice in providing a sustainable Blue economy. When examined with a focus on expenditures and earnings, the importance of understanding the Blue Economy benefit and tracking employment, earned wages, serving businesses, and their direct or indirect contribution to the output produced from national and international official records is more understood. (Colgan, 2013)

In addition, attention is drawn to the importance of the economic, social and environmental performances of maritime transport through its review within an internationally acceptable legal framework, with the aim of ensuring a more broadly participatory initiative for the implementation of the Blue Economy (Niavis et al., 2017).

When the known contents of the Blue Economy are examined,

- Fishing and Products
- Maritime Transportation, Shipping Networks and Harbors,
- Marine and Coastal Tourism,
- Docking Industry (All kinds of types vessel constructions)
- Marine Sciences (Oceanography, Hydrography, Biology, Biotechnology)
- Offshore Platforms and deep-sea mining
- Ocean source renewable energy
- Safe and security industry
- Desalination
- Underwater Research and Marine Education (IMO standards).

The items mentioned above are obtained from analyzing the maritime industry's surveillance and research conducted through the EU. At this stage, the data that the EU considers the most are obtaining renewable energy with wind, Port activities of ships, Shipyard operations, Maritime transportation, and Marine Tourism.

Figure 2. All Relevant Industries of Blue Economy



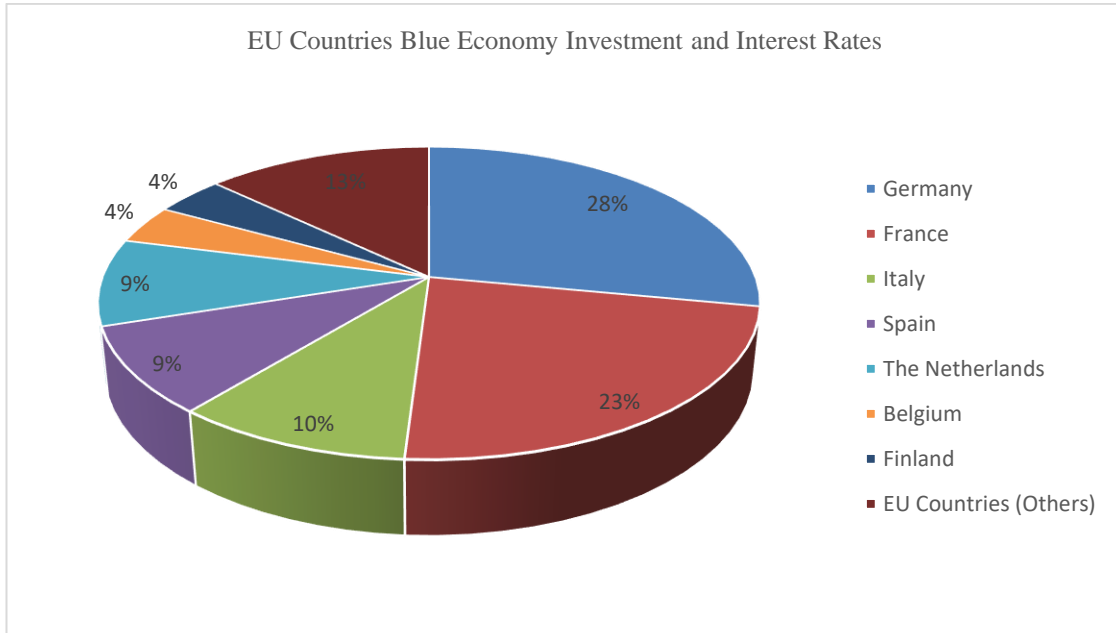
Source: CBEI, 2024, <https://cbei.blog/sectors-of-the-blue-economy/>.

According to Commonwealth research, the value of the Blue Economy worldwide is 1.5 trillion USD per year, making it the seventh largest economy among the world's industries. It is expected to reach 3 trillion USD by 2030, which is the EU's planned period. Considering all Blue Economy resources (in unprocessed Raw form), its total value is estimated to be around 24 trillion USD. In addition, the study determined that more than 80% of the world's commercial transportation will be transported by sea in 2023. It has been understood that fishing and its industry, which can be said to be the main reason for the emergence of UNCLOS, are related to 350 million types of jobs. It is known that 34% of crude oil resources are obtained from offshore platforms. It has been determined that 50% of the world's population uses fish products as a source of nutrition.

Blue Biotechnology General; Blue biotechnology, a field brimming with potential, is the application of science and technology to marine resources. It involves the modification of living or non-living materials to produce information, goods, and services. This field, which encompasses underwater biology, offers a wealth of potential in the form of microalgae, cyanobacteria, seaweed, invertebrates, and marine organism wastes. These resources inspire the development of innovative and high-value products, opening up a world of possibilities in blue biotechnology. Blue Economy and Biotechnology products are rapidly expanding the economy. Cognitive Market Research predicts that blue biotech growth will increase from €2.83 billion in 2022 to a promising €4.92 billion in 2030, at a CAGR of 8.24%. Market Research Future (MRFR) forecasts a market value of €3.9 billion, reaching a substantial €8.9 billion by 2032, at a CAGR of 7.15%. As a result of MRFR's country-by-country research on the EU Blue Economy, the market value in 2021 is 868 Million, and it is expected to reach 1,786 Million Euros in 2032 with a Compound Growth Rate of 6.8%. According to the investment and interest made,

Germany with 28%, France with 23%, Italy with 10%, Spain and the Netherlands with 9%, Belgium and Finland with 4%. The remaining 13% includes Other EU countries.

Figure 3. EU Countries Blue Economy Interest

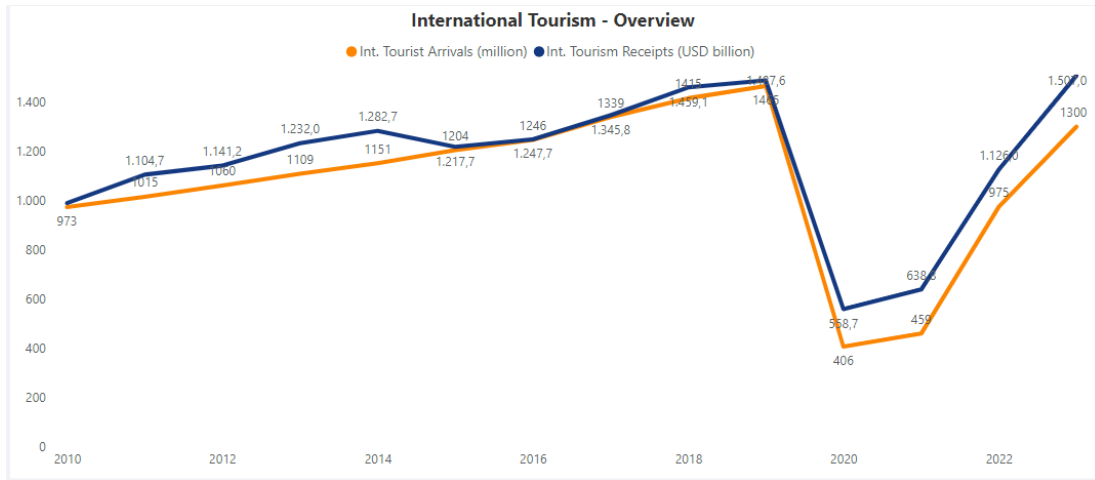


Source: European Commission Reports https://blue-economy-observatory.ec.europa.eu/eu-blue-economy-sectors/blue-biotechnology_en.

Marine and Coastal Tourism General; One of the crucial elements of the Blue Economy is coastal and marine tourism, a sector that significantly influences EU Development. This industry has a profound economic impact, with very few IMO and EU countries not involved. This economic weight is further highlighted by its status as the largest sector of the EU Blue Economy in terms of GVA (Gross Value Added) and employment (EU Blue Economy Observatory,2024; Wang et al. 2024).

Many IMO and EU member countries are interested in maritime tourism. Their Coastlines are within the world's holiday geography and are among the choices of many EU countries, whether they have a coastline or not. The significant economic contribution of marine and coastal tourism, particularly in southern Europe, is a testament to the region's potential and should inspire optimism. As a result of the COVID-19 pandemic, which has recently affected the whole world, people have learned to use more isolated spaces. In this context, marine and coastal tourism helps people have comfortable journeys. In particular, it has a great impact on creating awareness about cruises, boats, and caravans.

Figure 4. 2010-2022 International Tourism Rates



Source: <https://www.unwto.org/tourism-data/global-and-regional-tourism-performance>.

Marine and coastal tourism, rightly described as an effective and familiar way for people to connect with nature, is not just about leisure. It is about responsible and sustainable travel. The existence of protected land and sea areas, and their human-conscious use, are among the issues that should be given the most importance. Clean and healthy oceans and seas, the cornerstone of quality traveler experiences, are a testament to the beauty and diversity of our planet. In this context, sea and coastal tourism is a tool that provides the most essential market-based contribution to the global financing of the economy and will benefit local communities and businesses.

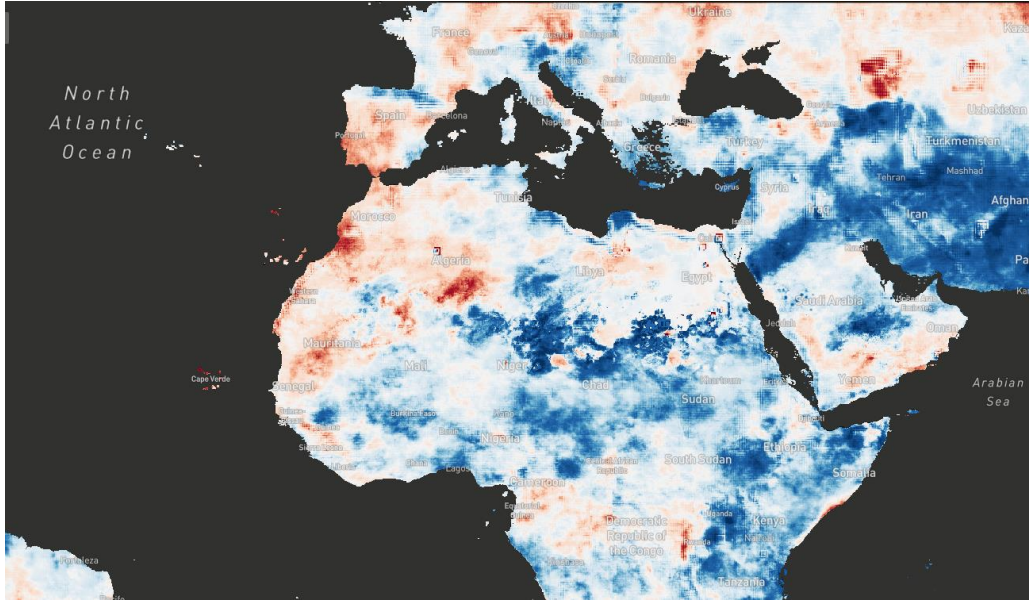
Data for 2022 by the EU Ocean Conference indicate that coastal and marine tourism, which has a high monetary value, especially internationally, constitutes approximately 50% of global tourism, thus covering 5.2% of global GDP with annual earnings of ~4.6 trillion US Dollars. In other words, according to statistical information, 50% of international tourists demand and prefer sea-related tourism. (Eu Ocean Conference, 2022).

Desalination; The environment is affected by the increasing world population, developing technology, unconsciously using natural resources, and national and international bureaucracy that cannot prevent it. Studies indicate that the world is on a trajectory to deplete its domestic water resources unless we adopt a more conscious approach to water usage. The solution to this impending crisis lies in the innovative desalination method, a key component of the Blue Economy. This method, designed for future use, harnesses the power of oceans and seas to provide a sustainable water source.

It's a staggering fact that one-fifth of the world's population, with the majority residing in developing nations, is grappling with water scarcity. The twin challenges of climate change and escalating water demand are not just issues, but crises that are exerting unprecedented strain on our freshwater resources. WRI-World Resources Institute research estimates that water will be scarce, especially in Southern European countries and a large part of the EU, by 2050 and that demand will

increase by 30% due to the changing population rate. Although the European region, which is constantly monitored satelliteally reveals a north-south pattern in terms of water availability, it is estimated that the countries that will be most affected by water scarcity are Spain, Portugal, Greece, and Italy.

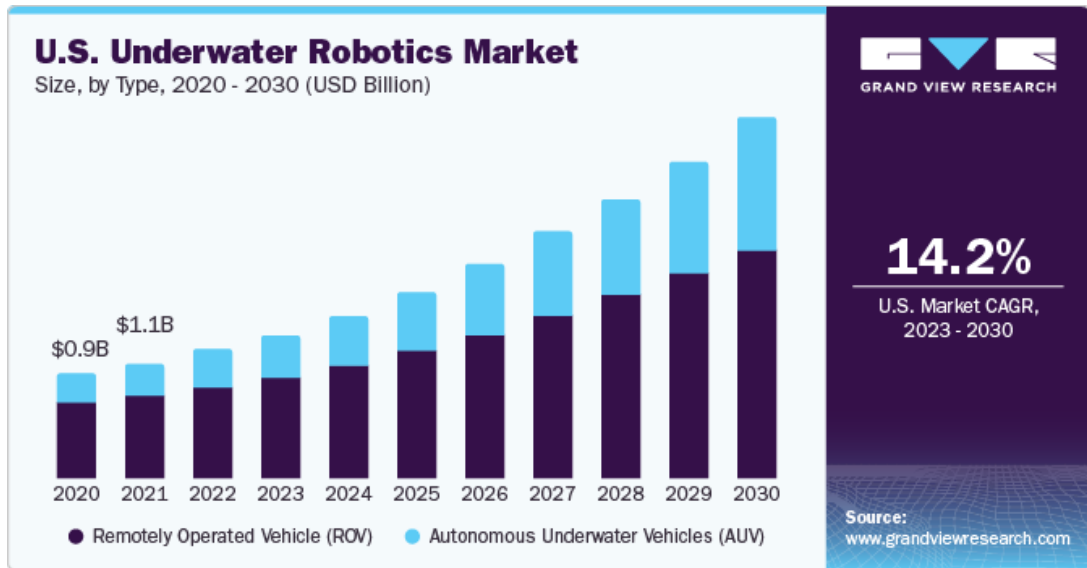
Figure 5. Water Resources watches from Satellite Systems



Source: Source Watch <https://resourcewatch.org/data/explore/cli023-Standard-Precipitation-Index?section=Discover&selectedCollection=&zoom=3&lat=21.0095443012574&lng=12.128906250002828&pitch=0&bearing=0&basemap=dark&labels=light&layers=%255B%257B%2522dataset%252>.

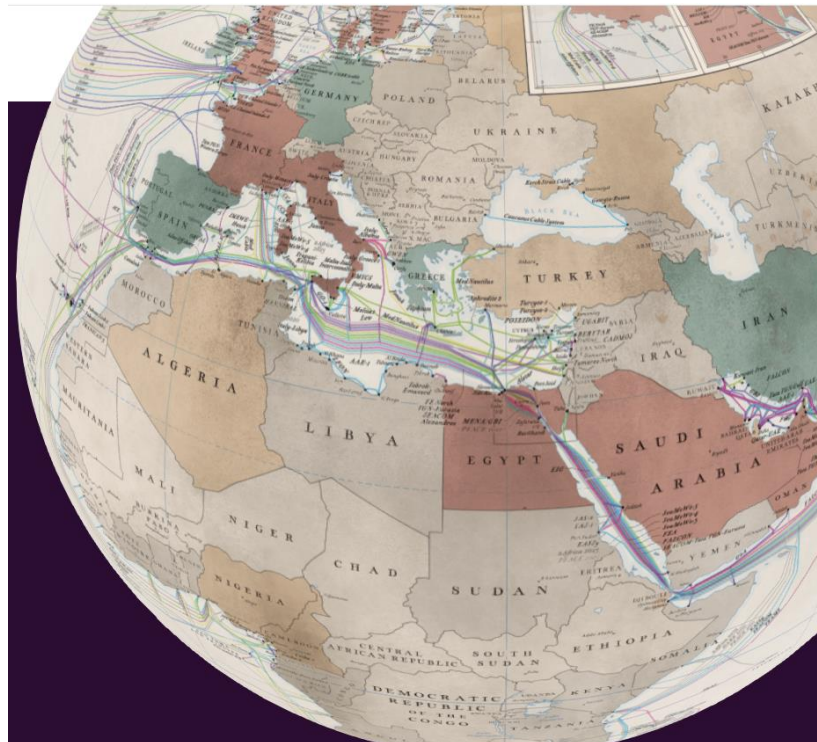
Infrastructure and Robotics; The maritime sector, committed to the principles of the Blue Economy, continues to use and produce underwater and surface technologies, demonstrating its dedication to sustainable practices. The maritime industry has undergone a significant evolution, inspired by the transformative impact of digitalization and technological innovations on underwater unmanned vehicles, which now cater to all industry needs. Marine Technology Advancement in Blue Economy Underwater sensing, ocean sensing and imaging tools, Buoys from navigational aids, and The maritime sector are ripe with opportunities for developing technology. Expanding the spatial coverage of fixed observation platforms, increasing the autonomy of mobile platforms, and exploring new multifunctional complex system integration schemes are just a few of the exciting prospects.

Figure 6. Underwater Robotics Market Rates



Source: <https://www.grandviewresearch.com/industry-analysis/underwater-robotics-market>.

Figure 7. Oceans Cable networking 2020



Source: <https://submarine-cable-map-2020.telegeography.com/>.

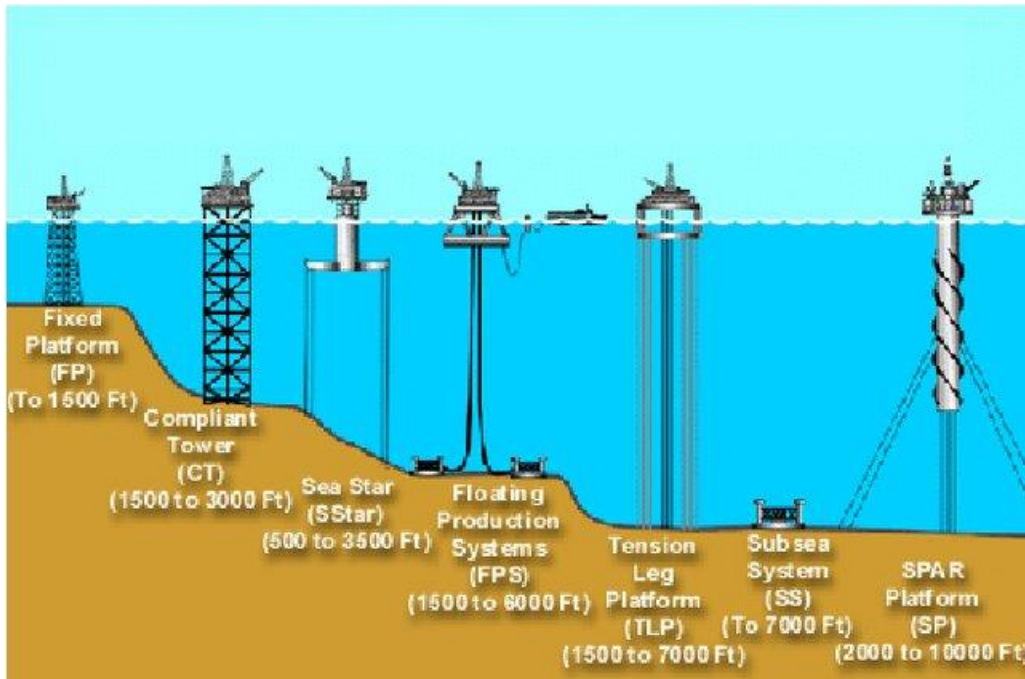
Marine Living Resources; The Marine living resources sector, a significant part of the Blue Economy, operates in two key stages. The first involves the sustainable collection of renewable biological resources, while the second focuses on their transformation into food, feed, bio-based products, and

bioenergy. These products are then distributed throughout the supply chain, adding value to the Blue Economy.

It is a diverse sector consisting of three known sub-sectors related to marine living resources. Fisheries and aquaculture (marine, freshwater, and shellfish) constitute the first subsector. Processing of fish products, processing and preservation of fish, crustaceans, and mollusks, food preparation, production of fats and oils, and other food products constitute the second subsector. The distribution of their products constitutes the third subsector, which is the retail sale of fish, crustaceans, and mollusks in specialized stores and wholesale stores.

Marine Living Resources; This part of the EU Blue economy cares for and addresses all living and non-living sea resources. The developed offshore oil and gas sector has been growing since 2014 as fossil energy sources have been sought. The EU's clean environment approach, ambitious decarbonization targets, and efforts to meet net zero emission targets have caused offshore exploration platforms to lose popularity. The potential for the maritime sector to lead the transition to more sustainable practices, such as researching and using renewable energy sources, and contributing to the development and dissemination of low-carbon technologies, while meeting IMO requirements, is a significant opportunity for a sustainable Blue Economy. There is an increasing focus on marine science and oceanographic scientific research, which can play an essential role in the transition to a Sustainable Blue Economy, hence the extraction of raw materials from its seas and oceans.

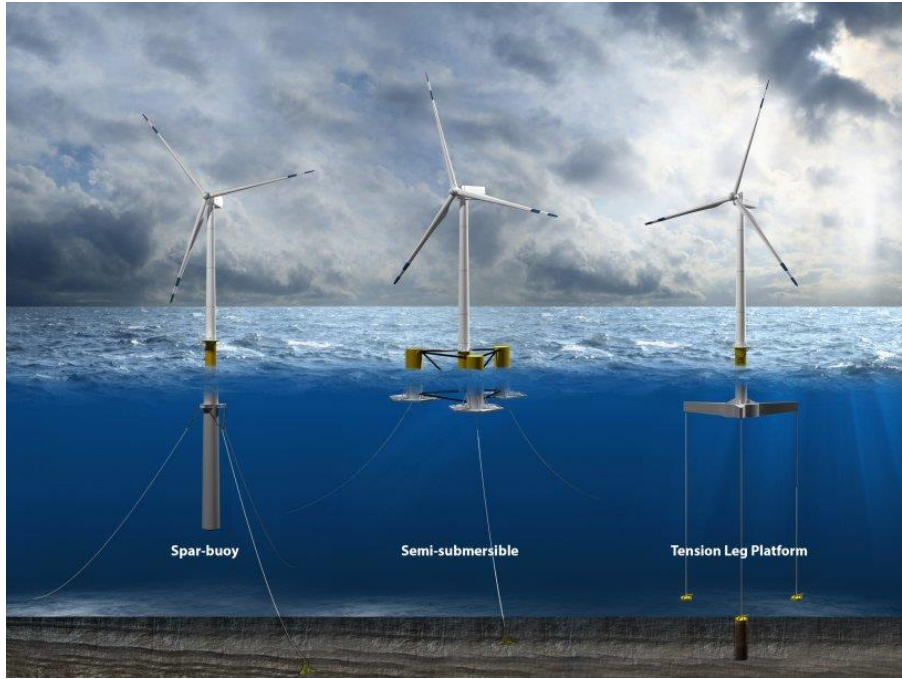
Figure 8. Off-Shore platforms (Sadeghi, 2007)



Source: <https://www.scirp.org/reference/ReferencesPapers?ReferenceID=1552706>.

Marine Renewable Energy, As in all industries, energy scarcity and producing environmentally and renewable sources are essential energy expectations. The exact expectations are at the forefront of the Maritime industry and Blue Economy expectations. The progress of the maritime industry in renewable energy opportunities, green energy, and even obtaining energy from the sea and wind is of significant importance and should engage and interest all stakeholders. As the EU energy sector determines its search according to decarbonization targets, the maritime industry is also progressing in this crucial area. It is understood that offshore technology fixed to the seabed is accepted as one of the projects that can access energy resources from the sea, but there is a trend towards floating offshore technologies. With this importance, the offshore wind industry is developed by increasing employment. In this context, the blue economy and ocean energy are not just promising, but also pivotal sectors in which the EU plays a leading role in technology development. Other important subjects of BE are Sea Defense and defense-related studies, Ports and docks, Shipyards and shipbuilding studies, scientific research and studies, and maritime transportation.

Figure 9. Offshore Wind Energy Tribunes



Source: <https://www.energy.gov/eere/wind/articles/top-10-things-you-didnt-know-about-offshore-wind-energy>

3. MARITIME TRANSPORTATION

Maritime countries and nations, historically significant as indicators of civilization, have often been associated with higher cultural levels. In this context, Shipping and maritime transport play a pivotal role, in driving change and shaping the relationship between the coastal and marine environment.

In the maritime industry, crucial issues such as Spatial Planning, port selection, and transportation lines, as well as the Blue economy and green perspective, are guiding today's studies and research. This

underscores the pivotal role of maritime transportation in shaping a future that is both socioeconomically and environmentally sustainable (Niavis, 2017).

Maritime transport is essential not only for the economy, society, and environment of the region in which it is operated but also to ensure the transportation of international needs and to evaluate the legal and political framework of the industry in which it is developed and regulated for the benefit of humanity and the environment.

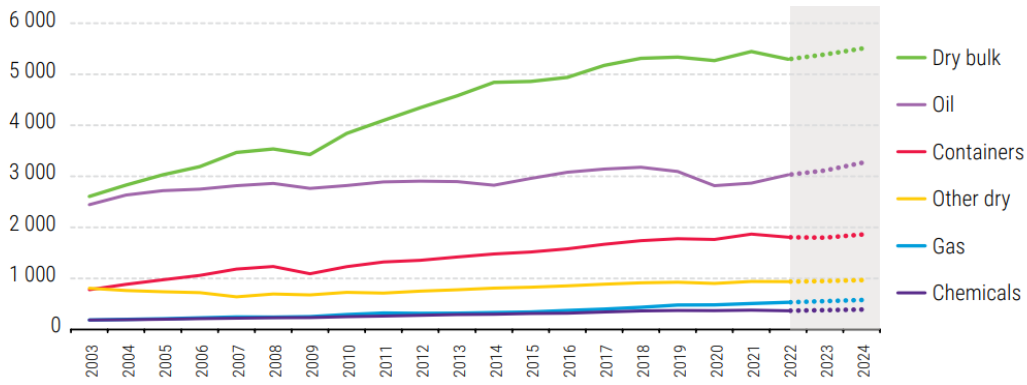
Figure 10. Maritime Transportation Worldwide



Source: Maritime Transportation, how does it work? <https://impact.economist.com/ocean/global-maritime-trends-2050/energy-transition>.

Maritime transportation and the Blue economy are interconnected concepts in the light of these explanations. It expresses the understanding that focuses on oceans and seas, indispensable resources for economic development, environmental protection, and sustainable life that will occur with resources obtained from the sea. Maritime transportation, a cornerstone of the blue economy, facilitates the global movement of commercial cargo. These cargoes, spanning from liquid to solid, are transported by a diverse array of ship types such as tankers, containers, and RO-RO. Each cargo is subject to specific handling activities in ports designed to cater to its unique characteristics. This complex web of operations prompts us to ponder: can we establish a more sustainable relationship with our planet?

Figure 11. International Maritime Trade, 2003–2024 (Million Tons Loaded)



Source: 1 https://unctad.org/system/files/official-document/rmt2023_en.pdf.

The positive or negative behavior of countries in the international arena directly affects the movements in their supply chains. In other words, while reducing risks increases supply and demand and helps expand the goals of diversifying suppliers and markets, growing risks may lead to the opposite effect. The problems experienced by world trade in transportation with COVID-19 in March 2020 and the ongoing tension between Russia and Ukraine as of the end of 2022 have damaged maritime transit and all related understandings.

Figure 12. USA Harbor's during COVID-19 Crises at March 2020



Source: 2 Cruise Ships docked in April at the port at Marina Long Beach due to a no-sail order in Long Beach, in California. Photo: Apu Gomes/AFP via Getty Images.

The positive or negative behavior of countries in the international arena directly affects the movements in their supply chains. In other words, while reducing risks increases supply and demand and helps expand the goals of diversifying suppliers and markets, growing risks may lead to the opposite effect. The problems experienced by world trade in transportation with COVID-19 in March 2020, March 2021 M/V Ever Given/ Evergreen blocked the Suez Canal, and the ongoing tension between Russia and Ukraine as of the end of 2022 have significantly damaged maritime transit and all related understandings, highlighting the urgent need for strategic planning and risk mitigation.

Figure 13. M/V Ever Given / Evergreen Blocked the Suez Canal During Six Days



Source: 3 <https://english.elpais.com/economy-and-business/2023-03-29/the-long-hangover-of-the-ever-given-global-trade-disruption.html#>.

The Evergreen ship accident in the Suez Canal in March 2021 was a cause of concern for the Egyptian state and all cargo and ship owner nationalities and states that wanted to cross the canal. The Denmark-based shipping giant Maersk reported a loss of 43 million USD due to being unable to pass through the Suez Canal by waiting vessels.(Alfadhli et al.2021) This incident, which occurred in a waterway that allowed more than 10% of global maritime trade to pass, led to a situation where more than 370 ships had to wait on the canal's north and south entrance and exit lines, highlighting the financial impact on the shipping industry. Danish shipping giant Maersk claims it owes \$43 million for damages incurred while container ships were forced to wait for days to pass through the Suez Canal. At one point, 372 ships were anchored at either end of the canal, which handled more than 10% of global maritime trade, causing significant operational disruption.

As a result of the Ever-Given ship accident, it was determined that around 400 ships were waiting to arrive on the northern and southern lines. This waiting has resulted in a severe waiting cost for all ships. According to the freight markets 2021, the daily rental fee of large-sized container ships is around 100,000 USD, and the daily rental fee of containers for a 20,000 TEU ship is approximately 100,000 USD. For this reason, the six-day cost can be **1 Billion Euros** or **1.5 billion USD**.

Apart from Hull and Machinery, P&I, third-party insurance can also be provided. At this stage, the world-famous German company Allianz Ever Given commented on the ship. According to these comments, although the Ever-Given ship made the Suez Canal unusable for a certain period, its impact is not so small that it can only be explained by passing through the canal. Global commercial transportation is directly affected. Looking at global trade data, estimated that there could be an average loss of 6 to 10 Billion USD. World trade has had weaknesses and delays in all materials to finished products. Maersk stated through its official channels that commercial market activity and dynamics are expected to cause losses between 20 and 30% shortly after the ship accident. Additionally, Freightos'

research and observations on Baltic Indices in April 2021 showed that shipping costs increased from 1478 USD to around 7485 USD in March 2021, an increase of 500%, a historical record.

4. CONCLUSION

This study explains Blue economy and maritime transportation. Maritime transportation is the oldest and largest mode of logistics transport. However, due to developing and changing technology, technological developments, on the one hand, act for the benefit of humans and, on the other hand, affect the environment. In this context, it became inevitable to start working under the guidance of the EU, a leading authority in environmental sustainability, and the concept of the Blue Economy was created. Although Blue Economy includes many headings as a concept, Maritime Transport has a binding force above all sub-elements. Therefore, uninterrupted and sustainable maritime transportation is required to succeed in the Blue Economy. Since developed countries have thoroughly evaluated these and similar formations and their benefits, ships and their operations will be of interest in the future.

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