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Blue Economy and Sustainable Development: A Comparative Analysis of International Models and Türkiye's Governance Capacity

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Abstract. The blue economy is a holistic development approach that seeks to balance economic growth, environmental protection, and social welfare through the sustainable use of marine and ocean resources. This study examines the relationship between the blue economy approach and the Sustainable Development Goals and evaluates Türkiye's potential in this field through comparative country cases. The research adopts a qualitative design based on document analysis and comparative case study methods. In this context, reports of international organizations, policy documents, and academic studies were analyzed, and the experiences of Portugal, Indonesia, and the Maldives were compared in terms of blue economy strategies, institutional structures, priority sectors, and governance capacities. The findings suggest that the blue economy should not be considered merely as a growth model aimed at expanding marine-based economic activities. Rather, it represents a comprehensive development paradigm that requires ecosystem-based planning, multi-level governance, sustainable resource management, and long-term policy coordination. The comparative analysis further indicates that successful blue economy practices are supported by strong institutional capacity, cross-sectoral integration, and environmental sustainability principles. For Türkiye, sectors such as maritime transport, ports, aquaculture, coastal tourism, renewable marine energy, and marine biotechnology present significant opportunities. However, institutional fragmentation, data limitations, pressures on coastal ecosystems, and the absence of a comprehensive national strategy remain key challenges. By addressing the blue economy within an integrated governance and sustainability framework, this study contributes to the literature on sustainable maritime development.

Keywords: Blue economy, sustainable development, SDG 14, blue growth, marine resources, Türkiye

1 Introduction

Globalization, climate change, environmental degradation, the overexploitation of natural resources, and increasing population pressure have made it necessary to reconsider prevailing approaches to development. In recent years, there has been a growing recognition that economic growth should not be evaluated solely in terms of increases in production and income levels; rather, it should also be considered within the broader framework of environmental sustainability, social inclusiveness, and intergenerational equity. In this context, the concept of sustainable development has emerged as a fundamental paradigm that emphasizes the integration of economic progress with environmental protection and social well-being. Seas, oceans, and coastal areas have consequently become some of the most critical components of this new development paradigm.

Seas and oceans, which cover a large proportion of the Earth's surface, are of vital importance in terms of food supply, trade, transportation, energy production, tourism, employment, and biodiversity. However, challenges such as overfishing, marine pollution, habitat loss, ocean acidification caused by climate change, and the degradation of coastal ecosystems increasingly threaten the sustainability of marine resources. Therefore, economic activities based on marine and ocean resources must be restructured not only with a focus on growth

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but also in accordance with the principles of environmental protection and social benefit. At this point, the concept of the blue economy has gained increasing prominence.

In its broadest sense, the blue economy refers to an approach that seeks to promote economic growth, generate employment, and enhance social welfare through the sustainable use of marine and ocean resources, while simultaneously ensuring the protection of marine ecosystems. This approach encompasses a wide range of sectors, including fisheries, aquaculture, maritime transport, port activities, coastal tourism, offshore renewable energy, marine biotechnology, and seabed resources. By emphasizing the need to balance economic development with environmental conservation, the blue economy represents a strategic field that embodies the marine and coastal dimension of sustainable development.

The adoption of the Sustainable Development Goals (SDGs) by the United Nations has further reinforced the significance of the blue economy within the global policy framework. Notably, SDG 14, "Life Below Water," establishes a normative and institutional foundation for the blue economy by emphasizing the conservation and sustainable utilization of oceans, seas, and marine resources. Moreover, other objectives such as poverty alleviation, zero hunger, access to clean energy, and the promotion of decent work and economic growth are indirectly associated with the blue economy. This underscores the notion that the blue economy should not be regarded solely as an environmental approach but rather as a comprehensive development strategy.

Across the world, the blue economy has been operationalized through various policy initiatives and practices. Countries such as Portugal, Indonesia, and the Maldives have developed marine-based development policies aligned with their specific geographical and economic conditions. Within this framework, notable practices have emerged in areas such as sustainable tourism, renewable energy, coastal protection, fisheries management, and marine protected areas. These experiences demonstrate that the blue economy is not merely a theoretical concept but also a practical development model supported by concrete policy instruments.

Türkiye also possesses significant potential in terms of the blue economy due to its strategic geographical location, being surrounded by seas on three sides, its extensive coastline, its position along major maritime trade routes, and its rich marine resources. The coasts stretching along the Mediterranean, Aegean, Marmara, and Black Seas offer considerable opportunities in sectors such as maritime transport, port management, aquaculture, marine tourism, energy, and biotechnology. However, the effective utilization of this potential depends not only on increasing economic returns but also on protecting marine ecosystems, establishing sustainable governance mechanisms, and developing comprehensive strategies aligned with national development policies.

This study aims to examine the blue economy approach within the context of sustainable development from conceptual, sectoral, and policy perspectives. The main objective of the study is to explore the relationship between the blue economy and the Sustainable Development Goals and to evaluate Türkiye's potential in this field through international examples. In this regard, the study analyzes the impacts of the sustainable use of marine and ocean resources on economic growth, environmental protection, and social welfare.

Within this framework, the blue economy policies implemented in countries such as Portugal, Indonesia, and the Maldives are examined, and their experiences are evaluated from a comparative perspective in relation to Türkiye. In doing so, the study seeks to highlight the contribution of the blue economy to sustainable development goals and to identify strategic opportunities for Türkiye in this field.

Accordingly, the main research question of the study is formulated as follows:

> *"How is the blue economy approach related to the Sustainable Development Goals, and through which policy and sectoral strategies can Türkiye more effectively utilize its potential in this field?"*

While this study discusses the blue economy broadly as a comprehensive model, Türkiye's capacity assessment is specifically limited to certain priority sectors. Instead of offering an all-encompassing overview of every possible marine activity, the focus is on five key sectors: maritime transport and ports, aquaculture, marine tourism, renewable marine energy, and marine biotechnology. These sectors were chosen because of their significant current economic influence and their vital role in Türkiye's future sustainable development plans.

Despite the increasing volume of scholarly work concerning the blue economy, the existing research primarily concentrates on global trends or regional case studies within the European Union [1], [2]. Such studies frequently neglect the unique country-specific dynamics present in emerging economies such as Türkiye. Notably, there exists a scarcity of empirical and conceptual analyses that thoroughly examine the structural challenges, policy frameworks, and economic potential associated with Türkiye's blue economy.

Türkiye has substantial maritime resources due to its strategic location, long coastline, and diverse marine ecosystems. However, the integration of blue economy principles into national development strategies remains fragmented and is not thoroughly explored in academic research. This results in a significant gap in understanding how Türkiye can sustainably and effectively utilize its marine resources.

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Therefore, this study aims to address this gap by providing a focused analysis of Türkiye's blue economy, identifying key structural constraints, assessing current policy approaches, and offering policy-oriented recommendations. In doing so, the study contributes to the literature by bridging the gap between the global blue economy discourse and country-specific implementation in Türkiye.

Unlike the existing literature, which mainly examines the blue economy either from a purely conceptual perspective or through single-sector analyses, this study adopts a comprehensive and multidimensional approach that links the blue economy framework with the Sustainable Development Goals. While prior studies often focus on specific regions or advanced economies, this research offers a country-specific analysis focused on Türkiye, an emerging economy with unique geographical and structural features.

Consequently, this study makes three primary contributions to the existing body of knowledge on the blue economy and sustainable development. First, it enriches the literature on emerging economies by illustrating how a transcontinental maritime nation with high growth potential but fragmented institutional structures (Türkiye) can transition to a sustainable blue economy model. Second, it moves beyond single-sector analyses by providing a holistic framework that systematically links distinct blue economy sectors with specific Sustainable Development Goals (SDGs). Third, through a comparative analysis of diverse international models ranging from advanced European frameworks (Portugal) to archipelagic developing nations (Indonesia) and small island states (Maldives), the study offers a transferable governance perspective for other emerging maritime nations facing similar structural challenges.

Furthermore, this study stands out from previous research by integrating conceptual analysis with comparative policy evaluation. By assessing international best practices alongside Türkiye's current framework, the study provides a more thorough understanding of how blue economy strategies can be tailored to fit national contexts. In this way, the study moves beyond mere descriptions and adds to the literature by offering specific, policy-driven recommendations based on both global experience and local dynamics.

2 Conceptual Framework and Literature Review

This study is based on sustainable development theory, which forms the main conceptual foundation for analyzing the blue economy. Sustainable development highlights the need to balance economic growth, environmental protection, and social well-being, ensuring current needs are met without hindering future generations from meeting their own needs. In this framework, the blue economy is seen as a strategic approach that encourages the sustainable use of marine and coastal resources while supporting long-term economic growth and social welfare. The perspective of sustainable development enables the study to assess blue economy practices not only by their economic performance but also in terms of environmental sustainability and social inclusion. By using this theoretical approach, the study provides a clear and integrated analysis of how blue economy activities relate to the Sustainable Development Goals.

The concept of the blue economy has attracted increasing attention in recent years in the academic literature as a multidimensional development approach that seeks to ensure economic growth, environmental protection, and social welfare simultaneously through the sustainable use of marine and ocean resources. Nevertheless, there is still no full consensus in the literature regarding the theoretical framework and scope of the concept. While Pauli (2009) [3] defines the blue economy as a model of economic transformation based on innovation, local production, and environmental efficiency, Smith-Godfrey (2016) [4] approaches the ocean economy through a value-chain perspective and offers a broader conceptual framework encompassing the entirety of marine-based economic activities. Similarly, Govan (2020) [5] and Lee, Noh, and Khim (2020) [6] emphasize that the conceptual boundaries of the blue economy remain ambiguous because the concept draws on different disciplines such as environmental sciences, development economics, marine policy, and sustainability studies. Despite this ambiguity, the common position in the literature is that the concept is fundamentally rooted in the understanding of sustainable development set out in the Brundtland Report of the World Commission on Environment and Development. Within this framework, the blue economy is regarded as a normative development approach that seeks to improve economic growth, quality of life, and social welfare while ensuring the protection of ocean and coastal ecosystems [7].

When the sectoral scope of the concept is examined, it becomes clear that the blue economy covers a very broad range of economic activities. The World Bank (2017) classifies blue economy sectors into activities based on living and renewable ocean resources and those based on non-living or non-renewable resources. In this context, not only sectors based on living resources, such as fisheries and aquaculture, but also extractive activities such as seabed mining and offshore oil and gas extraction are considered part of the blue economy. In addition, taking into account the interaction between coastal and marine areas, the literature highlights major blue economy sectors such as fisheries and aquaculture, maritime transport and port activities, coastal tourism and recreation, offshore renewable energy, marine biotechnology, marine technologies, and environmental

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services [8]. This sectoral diversity demonstrates that the blue economy cannot be reduced to a single field of economic activity; rather, it represents a multi-sectoral and multi-actor economic and governance structure.

A review of the blue economy literature reveals three main areas of debate. The first debate concerns whether the blue economy is primarily a growth-oriented development strategy or a governance approach centered on environmental sustainability. Researchers such as Ninawe (2017) [9], Mistri and Mistry (2023) [10], and Luna (2024) [11] argue that the blue economy offers a development model capable of simultaneously ensuring economic growth and environmental protection. By contrast, more critical perspectives show that the expansion of marine-based economic activities does not always produce sustainable outcomes and may, in some cases, increase pressure on marine ecosystems. This debate has made the question of how the blue economy can balance economic expansion with ecological limits a central issue in the literature.

The second major area of debate concerns whether the blue economy constitutes an inclusive and equitable development model. Bax et al. (2022) [12] argue that, for a sustainable blue economy to emerge, it is necessary to develop collaborative governance mechanisms, increase stakeholder participation, and take ecosystem services into account. In contrast, Childs and Hicks (2019) [13] contend that, particularly in the African context, blue economy discourse is in some cases associated with security policies, the centralized control of marine spaces, and an increased state role in resource management. This suggests that the blue economy should be assessed not only through the discourse of sustainability but also in terms of power relations, governance structures, and resource distribution.

The third prominent debate in the literature concerns the tension between sectoral diversification and ecological limits. The concentration of different activities such as maritime transport, coastal tourism, energy production, and aquaculture within the same marine areas makes marine spatial planning and institutional coordination a critical policy field. In this context, Whisnant and Vandeweerd (2019) [14] emphasize that unless an ecosystem-based approach is developed across blue economy sectors, spatial and institutional conflicts may arise among economic activities. Therefore, the blue economy is regarded as a policy domain that should be evaluated not only in terms of economic growth objectives but also together with ecosystem-based governance and marine spatial planning tools.

Regional and empirical studies make these debates more concrete. In the case of Pakistan, Gill and Iqbal (2021) [15] argue that the blue economy offers important opportunities for sustainable development, but that this potential cannot be fully realized due to limitations in institutional capacity and environmental pressures. Similarly, Aprizal, Wiranatakusuma, and Razak (2025) [16] show that themes such as innovation, marine spatial planning, and sustainable governance have become increasingly prominent in the blue economy literature. In recent years, quantitative studies have also begun to occupy a growing place in this body of research. Using panel data analysis, Ahammed et al. (2024) [17] demonstrate that the maritime and aquaculture sectors create a positive leverage effect on macroeconomic growth and employment. On the other hand, Bădîrcea et al. (2021) [18] in their econometric analysis of European Union countries, reveal that the uncontrolled expansion of blue economy activities may increase carbon emissions and create risks for environmental sustainability. These findings indicate that although the blue economy offers economic opportunities, it also requires a strong governance and regulatory framework.

An examination of the Turkishliterature shows that the concept of the blue economy has increasingly become the subject of academic studies in recent years. Studies such as those by Akdoğan (2019) [19], Öktem et al. (2021) [20], and Sevimli (2024) [21] draw attention to the potential of the blue economy in the Turkish context in terms of sustainable development. However, it is also evident that most existing studies focus on conceptual debates, the blue growth approach, or specific sectors, while studies that address Türkiye's blue economy potential holistically within the framework of governance capacity, the Sustainable Development Goals, and international comparative cases remain limited.

When the existing international and national literature is evaluated together, it becomes clear that the concept of the blue economy has generally been addressed either through the discourse of economic growth based on sectoral opportunities or through the perspective of environmental sustainability. By contrast, studies that examine the blue economy holistically in relation to the Sustainable Development Goals, ecosystem-based governance, international country experiences, and Türkiye's sectoral and institutional capacity remain quite limited. This study addresses that gap in the literature by evaluating the blue economy not merely as the sum of sectoral activities, but as a multidimensional development paradigm shaped by environmental limits, governance capacity, and policy coordination. In this respect, the study aims to contribute to the literature by analyzing Türkiye's blue economy potential from a comparative perspective in light of international examples.

2.1 The Relationship Between the Blue Economy and the Green Economy

The relationship between the blue economy and the green economy provides a complementary framework that illustrates how the principles of sustainable development can be applied across different ecosystems. Both

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approaches aim to ensure that economic growth occurs within environmental limits, emphasizing increased resource efficiency, reduced environmental degradation, and the preservation of natural capital. However, the ecosystems on which these approaches focus differ. The green economy primarily concentrates on land-based production systems, energy use, industrial activities, and the reduction of carbon emissions. In contrast, the blue economy focuses on the sustainable management of marine and ocean ecosystems, the conservation of marine resources, and the development of ocean-based economic activities. In this sense, the blue economy is often regarded as an extension of the green economy adapted to marine and coastal environments. Nevertheless, the relationship between the two concepts extends beyond a simple spatial distinction. While the green economy largely emphasizes carbon reduction, energy transition, and environmentally friendly production processes, the blue economy represents a more complex governance domain that requires balancing economic activities with the protection of marine ecosystems. In particular, sectors such as fisheries, aquaculture, marine tourism, maritime transport, and offshore renewable energy frequently operate within the same marine spaces, making the blue economy a multi-actor and multi-sector policy field [22].

For this reason, the blue economy should not be understood merely as the application of environmental protection principles to marine environments. Rather, it should be approached as a comprehensive development framework incorporating ecosystem-based management, marine spatial planning, and sustainable resource governance. While the green economy aims to enhance human well-being while reducing environmental risks, the blue economy extends these objectives specifically to marine and ocean ecosystems [19]. Consequently, the relationship between the blue and green economies should be understood not as competitive but as complementary. Achieving long-term sustainable development ultimately depends on the development of integrated environmental governance approaches that address both terrestrial and marine ecosystems.

To establish an operational framework, this study defines the blue economy through three main dimensions: economic growth, environmental sustainability, and social welfare. These dimensions are analyzed using a mix of qualitative and policy-focused indicators, rather than relying solely on a quantitative index. From an economic point of view, the blue economy is evaluated based on sectoral contributions such as maritime transport, fisheries, aquaculture, tourism, and marine industries, emphasizing their roles in economic growth and job creation. Concerning environmental sustainability, the study looks at indicators like marine ecosystem protection, resource efficiency, and policy alignment with SDG 14 targets. When considering social welfare, the focus is on employment opportunities, income generation in coastal areas, and the inclusiveness of marine-based development strategies. Instead of creating a composite index, this study uses a qualitative and comparative analysis to examine how these dimensions are reflected in both international practices and Türkiye's current policy framework. This approach allows for a deeper understanding of the blue economy as a multidimensional development model.

2.2 Linking the Blue Economy with SDGs

To strengthen the analytical connection between the blue economy and the Sustainable Development Goals, this study explicitly links key blue economy sectors with specific SDG targets and indicators. Specifically, fisheries and aquaculture relate to SDG 14.4 (sustainable fish stocks) and SDG 2.3 (food security and agricultural productivity), while maritime transport and port activities are associated with SDG 9.1 (sustainable infrastructure) and SDG 8.1 (economic growth). Coastal and marine tourism are examined in relation to SDG 8.9 (sustainable tourism), and offshore renewable energy is connected to SDG 7.2 (renewable energy share) and SDG 13.2 (climate action policies). In addition, the environmental sustainability aspects of the blue economy are analyzed through SDG 14 indicators such as marine pollution reduction (14.1) and ecosystem protection (14.2), while social factors are linked to SDG 8 (decent work) and SDG 10 (reduced inequalities). This sector–SDG mapping enables a more systematic and analytical assessment of how blue economy activities contribute to sustainable development goals. By establishing these clear linkages, the study goes beyond a descriptive overview of SDGs and offers a structured framework for analyzing the complex interactions between marine-based economic activities and global sustainability targets. This approach aligns with the multidimensional and integrative nature of the blue economy highlighted in recent studies [1], [2].

2.3 Research Design and Methodology

This study adopts a qualitative and comparative research design to analyze the blue economy from conceptual, sectoral, and policy perspectives. Specifically, it employs a comparative case study approach focusing on selected country cases—Portugal, Indonesia, and the Maldives—to examine different models of blue economy development across diverse geographical and institutional contexts.

The analysis is based on qualitative policy analysis, utilizing secondary data sources such as official policy documents, national development strategies, reports from international organizations, and relevant academic

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literature. These sources are systematically analyzed to evaluate key dimensions, including strategic priorities, institutional structures, and sectoral developments within each country.

The comparative framework enables the identification of best practices, policy variations, and transferable lessons that can inform Türkiye's blue economy development. This approach provides a structured and context-sensitive analysis of how blue economy strategies are designed and implemented across different national settings. This methodological approach is particularly suitable for capturing the multidimensional and policy-oriented nature of the blue economy, where economic, environmental, and social factors are closely interconnected, and for enabling a coherent comparative evaluation across different national contexts.

3 Results and Discussion

3.1 Sustainable Development Goals (SDGs) and the Blue Economy

The United Nations Conference on Sustainable Development held in Rio de Janeiro in 2012 aimed to establish universal goals in response to urgent environmental, political, and economic challenges facing the world. During the conference, it was emphasized that sustainability should be a priority for all countries, whether developed or developing, and regardless of whether they operate under market-based or centrally planned economic systems when setting economic and social development goals. Sustainable development does not simply mean economic growth; rather, it highlights the quality of growth and the relationship between humans and nature. In this context, it is essential to develop strategies that consider how development impacts local environments and communities. The main focus of a sustainable development strategy is integrating economic and ecological considerations into decision-making processes. These two elements are closely connected to real-world dynamics and require changes in attitudes, objectives, and institutional practices at all levels [20].

Figure 1. United Nations Sustainable Development Goals
Source: [23].

Table 1. United Nations Sustainable Development Goal 14 (Life Below Water) and Its Targets

Target Code	Description
SDG 14	Conserve and sustainably use the oceans, seas, and marine resources for sustainable development.
14.1	By 2025, prevent and significantly reduce marine pollution of all kinds, particularly from land-based activities, including marine debris and nutrient pollution.
14.2	Sustainably manage and protect marine and coastal ecosystems; strengthen their resilience and support ecosystem restoration to achieve healthy and productive oceans.
14.3	Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels.
14.4	Effectively regulate harvesting, end overfishing, illegal, unreported and unregulated fishing, and destructive fishing practices; implement science-based management plans to restore fish stocks to sustainable levels.
14.5	By 2020, conserve at least 10 percent of coastal and marine areas in accordance with

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	national and international law and based on the best available scientific information.
14.6	Prohibit certain forms of fisheries subsidies that contribute to overcapacity and overfishing; eliminate subsidies that contribute to illegal, unreported, and unregulated fishing; and refrain from introducing new such subsidies.
14.7	By 2030, increase the economic benefits to Small Island Developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture, and tourism.
14.a	Increase scientific knowledge, develop research capacity, and transfer marine technology to improve ocean health and enhance the contribution of marine biodiversity to development.
14.b	Provide access for small-scale artisanal fishers to marine resources and markets.
14.c	Enhance the implementation of international law, particularly the United Nations Convention on the Law of the Sea, for the conservation and sustainable use of oceans and their resources.

Source: [24].

The Sustainable Development Goals (SDGs) aim to promote more sustainable practices across social, environmental, and economic domains at a global scale while simultaneously protecting the planet, fostering peace, and improving human well-being. In the context of the blue economy, these goals encourage the creation of multi-use opportunities in sectors such as aquaculture, offshore renewable energy, tourism, recreation, and maritime transport, as well as the development of innovative production techniques [25].

Although the relationship between SDG 14 and the blue economy is often discussed mainly in terms of conserving marine resources, this connection actually rests on a broader development logic. The blue economy not only encourages the protection of marine environments but also creates transformative impacts in areas such as food security, employment, energy transition, the well-being of coastal communities, and climate adaptation. Therefore, SDG 14 should not be seen as the only reference point for the blue economy; instead, it should be viewed as a central element interconnected with other Sustainable Development Goals [26]. In other words, the relationship between the blue economy and the SDGs is not one-way but multilayered: protecting marine ecosystems supports the sustainability of economic activities, while establishing sustainable economic structures helps reduce pressure on marine resources. This interdependence shows that the blue economy is not only an environmental framework but also a wider sphere of social and economic governance.

The Sustainable Development Goals have emerged as a development framework aimed at meeting the needs of the present while ensuring that future generations inherit a livable world. Introduced within the United Nations system, these goals bring countries together under a shared global objective. In doing so, they aim not only to improve the living conditions of people today but also to ensure better living standards for future generations.

3.1.1 Sustainable Development Goals in Türkiye

Due to its geographical location, Türkiye is a peninsula country, a characteristic that provides significant access to marine resources. This geographical advantage has facilitated the development of economic activities such as trade, transportation, and tourism, while simultaneously creating the need to manage the potential environmental impacts associated with these activities. In this context, the Sustainable Development Goals (SDGs) established by the United Nations hold particular importance for Türkiye. Within the framework of SDG 14, Türkiye's commitments are addressed through six specific targets: 14.1, 14.2, 14.4, 14.5, 14.6, and 14.b. Under Targets 14.1 and 14.2, the Ministry of Environment, Urbanization and Climate Change (MoEUCC) and the Union of Chambers and Commodity Exchanges of Türkiye (TOBB) play active roles in implementing initiatives aimed at preventing marine pollution and protecting environmental structures. Target 14.4 focuses on the conservation of fish stocks and the adoption of measures to prevent overfishing, emphasizing the implementation of science-based management practices to ensure the sustainability of fisheries. Target 14.5 addresses the regulation and protection of coastal areas, aiming to maintain the ecological balance of these regions, ensure the sustainability of coastal ecosystems, and minimize negative human-induced impacts. Target 14.6 emphasizes the elimination of subsidies that support illegal fishing practices and the introduction of subsidies that promote sustainable fisheries. Finally, Target 14.b focuses on supporting small-scale fisheries and improving their access to marine resources and markets [21].

3.2 Blue Economy Practices Around the World

The cases of Portugal, Indonesia, and the Maldives provide suitable examples for comparative analysis in terms of illustrating how the blue economy takes shape in different national contexts. Although these three

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countries differ in terms of geographical scale, economic structure, and institutional capacity, they can be evaluated within a common framework due to their efforts to integrate marine-based development with sustainability principles. In the comparative analysis, four key dimensions stand out: the nature of strategic priorities, institutional structures, priority sectors, and the tensions between sustainability and governance. Such a comparison demonstrates that the blue economy is not merely a collection of successful practices; rather, each country develops its own model in accordance with its ecological limits, institutional capacity, and development priorities.

The selection of Portugal, Indonesia, and the Maldives as comparative cases is based on their distinct yet complementary characteristics in developing the blue economy. These countries represent diverse geographical, economic, and policy contexts, enabling a more comprehensive comparative analysis. Portugal is chosen as an example of a European Union country that has developed a structured, policy-driven approach to the blue economy, supported by strong institutional frameworks and integration with EU maritime strategies. Indonesia, a large archipelagic developing nation, offers insights into how blue economy principles can be applied in resource-rich but institutionally complex settings. The Maldives, on the other hand, exemplifies a small island developing state (SIDS) where the blue economy is vital for economic survival, especially through tourism and fisheries. These cases are not meant to be directly comparable in a strict economic sense; instead, they are selected to illustrate different models of blue economy development. This comparative approach allows the study to identify best practices, policy differences, and strategic lessons that can guide Türkiye's blue economy development within its unique geographic and institutional context. This intentional case selection enhances the analysis by enabling the identification of transferable policy insights and context-specific development strategies.

3.2.1 Portugal

Portugal is considered a leading country in the field of the blue economy, having demonstrated its national commitment through the 2013-2020 Ocean Strategy. This strategy aims to promote both the sustainable use and conservation of ocean resources. It focuses on four main areas: knowledge and innovation, competitiveness, environmental sustainability, and governance. One of the most successful examples of Portugal's blue economy initiatives is the Centre for Renewable Energy in the Ocean (MARE), established in 2010 to support research, development, and innovation in offshore renewable energy. MARE has pioneered projects such as the installation of a wave energy facility off the coast of Aguçadoura and the development of floating wind turbines. Such initiatives not only contribute to reducing carbon emissions but also create new employment and economic opportunities in coastal regions. Applications in the Madeira region further illustrate how the blue economy can promote economic growth while protecting marine ecosystems. Through Marine Protected Areas, Madeira has sought to preserve coastal biodiversity while developing sustainable tourism activities such as diving and whale watching. These activities contribute to the conservation of marine life while generating economic benefits for local communities. In addition, prohibiting fishing in protected areas supports both tourism development and environmental conservation efforts. Madeira is also reducing its dependence on fossil fuels through investments in renewable energy and conducting marine research to support sustainable policies. These initiatives demonstrate that the blue economy can enhance prosperity while simultaneously protecting marine ecosystems. Portugal's commitment to the blue economy thus establishes a balance between economic growth and environmental sustainability by promoting the conservation and sustainable use of marine resources. Both MARE and Madeira stand out as inspiring models for other countries through their successful sectoral transformation projects, providing a roadmap for future developments [27].

3.2.2 Indonesia

Indonesia, a leading country in the field of the blue economy, implements comprehensive policies that integrate economic growth with environmental protection in order to develop its maritime and fisheries sectors. This approach supports regional development while encouraging clean production and innovative investments. Indonesia's blue economy strategy includes expanding marine fisheries, transportation, tourism, energy, and materials production; improving coordination between national maritime and terrestrial policies; strengthening trade and infrastructure connectivity through pilot regions in the blue economy; and enhancing technological capacity and human resources [28].

The country focuses on maintaining a balance among the social, economic, and environmental dimensions of sustainable development and operationalizes this balance through three measurable objectives: (i) increasing the contribution of ocean- and marine-related sectors to gross domestic product (GDP) to 15 percent,

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(ii) raising employment in these sectors to 12 percent of total employment, and (iii) designating 30 percent of marine areas as Marine Protected Areas by 2045 [29].

In 2018, Indonesia launched the Integrated and Sustainable Tourism Development Program, which invests in planning, business support, community empowerment, environmental and cultural resource management, and tourism-related infrastructure and skills development. By adopting a comprehensive strategy, the country aims to promote sustainability and create economic opportunities for local communities through ecotourism, community-based tourism, and nature-based tourism [30].

3.2.3 Maldives

In order to protect its coastline and support the growing blue economy, the Maldives Ministry of Environment, with support from the World Bank, has implemented Coastal Protection Projects. These initiatives focus on the conservation of coral reefs and coastal wetlands, which are critical for marine biodiversity and erosion control [31].

Since 2013, the Coastal Protection Unit has implemented protection and sustainability projects across fifteen islands, thereby safeguarding key sectors such as tourism and fisheries, which together account for approximately 80 percent of the Maldivian economy. In addition, public authorities are promoting modern fisheries practices and exploring the potential of mariculture in order to diversify the sector [32].

The Maldives has also taken significant steps to reduce carbon emissions and increase the use of green energy, including plans to construct one of the world's largest floating solar power plants. The country prioritizes environmentally friendly practices, such as banning single-use plastics, and promotes "blue tourism" in tourist areas. Furthermore, measures such as encouraging companies to conduct environmental, social, and governance (ESG) reporting and organizing activities to raise sustainability awareness among tourism workers are being implemented. National initiatives also include efforts to increase income opportunities for local communities through sustainable procurement and fair-trade initiatives [33].

3.2.4 Comparative Evaluation and Implications for Türkiye

When the examples of Portugal, Indonesia, and the Maldives are evaluated together, it becomes evident that the blue economy develops under different strategic priorities and governance models depending on national contexts. Portugal has adopted a more institutionalized and strategy-oriented blue economy approach; Indonesia has integrated the blue economy more strongly with national development, trade, and employment policies; and the Maldives has developed a more defensive yet economically vital blue economy model shaped by tourism, coastal protection, and climate vulnerability.

This comparison demonstrates that a successful blue economy policy cannot be limited solely to increased sectoral investment. Rather, it requires the simultaneous operation of multi-level governance mechanisms, a balance between conservation and utilization, the participation of local communities in decision-making processes, and long-term strategic planning. At the same time, the sustainability of marine-based economic activities depends on strengthening ecosystem-based management approaches and ensuring coordination across sectors.

For Türkiye, one of the most important lessons from these experiences is that the blue economy should not be evaluated merely in terms of sectoral potential. Although Türkiye's geographical advantages and marine-based economic activities present significant opportunities, the sustainable realization of this potential depends on strengthening institutional coordination, developing data-driven policy frameworks, and promoting ecosystem-oriented planning approaches. Within this framework, Türkiye's current situation and sectoral capacity in the field of the blue economy are examined in greater detail in the following section.

3.4 The Blue Economy in Türkiye

Türkiye's potential in the blue economy cannot be explained solely by the fact that it is surrounded by seas on three sides or that it possesses an extensive coastline. What is more important is the extent to which this geographical advantage generates economic value across different sectors, how the environmental costs of such value creation are managed, and to what degree the existing institutional framework can guide these sectors in an integrated manner. Therefore, the blue economy in Türkiye should be evaluated not merely as a collection of opportunities but through the lenses of capacity, performance, risks, and policy coherence. Within this framework, maritime transport and ports, aquaculture, coastal tourism, renewable marine energy, and marine biotechnology emerge as the most prominent sectors. However, the transformation of this potential into sustainable gains depends on addressing sectoral growth alongside environmental protection and governance capacity.

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According to the World Wide Fund for Nature (WWF) 2021 Report, the Mediterranean generates approximately USD 450 billion annually from marine-related activities, making it one of the most economically important seas in the world. In this context, regional economic activities such as fisheries and tourism support around 505,000 jobs either directly or indirectly through their reliance on healthy marine ecosystems. About 16 percent of the Mediterranean population works in the tourism sector. Additionally, 55 percent of fisheries in the region are small-scale operations, highlighting the importance of biodiversity and sustainable resource management in the sector [20]. When supported by strategic investments and blue economy initiatives like projects focused on employment generation and sectoral diversification, Türkiye's coastline has a dynamic sectoral structure with significant development potential. Preliminary analyses suggest that different coastal regions of Türkiye have varying capacities in terms of sectoral diversity and economic scale. Along the Mediterranean, Black Sea, Aegean, and Marmara coasts, sectors within the scope of the blue economy have the potential to develop into high value-added "blue sectors" as economic activities increasingly adopt sustainable practices.

3.4.1 Sectors with Long-Term Contributions to the Economy

The blue economy provides critical inputs for sectors such as maritime industries, fisheries, marine tourism, and biotechnology. As the fundamental resource for life, water plays a crucial role in ensuring the sustainable functioning of social, economic, and environmental systems. The overextraction of water resources beyond the natural replenishment rate of the hydrological cycle may lead to water scarcity; therefore, the protection and sustainable management of water resources are essential [34].

Ecotourism represents a tourism model that is compatible with nature and based on sustainability principles. As an alternative to mass tourism, it encourages individual or small-group travel while aiming to protect natural and cultural heritage and support the well-being of local communities. In Türkiye, the potential for ecotourism is supported by diverse natural assets such as national parks and protected areas [35].

Marine tourism is a vibrant industry that plays a vital role in the national economy, representing about 20 percent of total tourism income. This sector has great potential for creating jobs and earning foreign exchange, especially through innovative activities like underwater tourism. Additionally, marine-based renewable energy sources such as wind and wave power significantly contribute to sector growth while also tackling environmental issues [36].

One of the most significant policy gaps in Türkiye concerns the absence of a comprehensive national strategy that integrates different blue economy sectors under common objectives and sustainability principles. Currently, policies related to maritime activities, fisheries, tourism, environmental protection, energy, and regional development are implemented within separate institutional domains. This fragmented structure leads to coordination challenges and fragmented decision-making processes regarding the use of marine spaces. However, the blue economy, by its nature, involves a high level of interaction among sectors and therefore cannot be effectively managed through isolated sectoral policies alone. The absence of a national blue economy strategy complicates the alignment of Türkiye's geographical and economic advantages with long-term sustainable development goals. Consequently, the primary need is the establishment of a comprehensive policy framework that integrates sectoral potential with holistic governance mechanisms, data infrastructure, and marine spatial planning tools [37].

3.4.2 Türkiye's Blue Economy Strategy

In 2012, the European Union introduced the concept of Blue Growth in response to factors such as climate change, the fragility of ecosystems, limited natural resources, increasing urbanization, and population concentration in coastal areas. This strategy aims to promote sustainable economic growth in marine environments. It encompasses policies and measures related to fisheries, energy production, and the conservation of marine biodiversity in order to ensure the effective and sustainable use of marine resources. The Blue Growth agenda published by the European Commission in 2012 identifies sustainable growth opportunities in marine, maritime, and coastal sectors and seeks to maximize the benefits derived from these areas. Within this framework, blue growth is applied across the following sectors [38]:

a. Blue Energy
   Renewable energy production from wind, waves, tides, and ocean currents.
b. Aquaculture
   Sustainable fisheries management and the production of marine food resources.
c. Marinas, coastal and marine tourism
   Sustainable coastal tourism, marina operations, and marine-based recreational activities.
d. Marine mineral resources (seabed mining)

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The sustainable extraction of minerals and other resources from the seabed.

e. Blue biotechnology
The development of pharmaceuticals, food products, and industrial materials derived from marine organisms.

The main challenge in Türkiye's blue economy is not the absence of sectoral activities but rather the fragmented, disconnected, and often short-term policy frameworks through which these activities are governed. Maritime transport and port activities are strategically important for foreign trade and logistics; however, green port practices and low-emission maritime policies aimed at reducing environmental impacts still require a stronger institutional framework. Aquaculture represents a significant sector for Türkiye in terms of exports and food security, yet issues such as stock management, ecosystem pressure, and coastal carrying capacity pose critical sustainability risks. Coastal tourism offers high revenue potential, but increasing construction pressures in coastal zones, seasonal fluctuations, and ecosystem degradation require careful planning and regulation. Renewable marine energy and marine biotechnology remain at relatively early stages, with Türkiye's potential in these fields largely representing a future-oriented capacity. Therefore, the main policy challenge for the blue economy in Türkiye lies not in adding new sectors but in transforming existing sectors within an ecosystem-based and coordinated strategic framework [39], [40].

Table 2. Analytical Assessment of Blue Economy Sectors in Türkiye

Sector	Current Situation	Opportunities	Risks	Policy Needs
Maritime transport and ports	Türkiye is located on major maritime trade routes and port capacity continues to increase	Potential to become a regional logistics hub	Marine pollution, infrastructure limitations	Green port practices and sustainable maritime transport policies
Aquaculture	Türkiye is one of the leading aquaculture producers in Europe	Export growth and food security	Overfishing and ecosystem pressure	Science-based fisheries management and sustainable aquaculture
Marine tourism	Significant contribution to tourism revenues	Blue Flag beaches and yacht tourism	Degradation of coastal ecosystems	Sustainable coastal tourism planning
Renewable marine energy	Significant potential but limited utilization	Investments in wind and wave energy	High investment costs	Energy incentives and technology investments
Marine biotechnology	Emerging sector	Pharmaceutical, food, and biotechnology industries	Limited R&D capacity	University–industry collaboration and research investments

Source: [20], [20], [41], [42].

Table 2 provides an analytical evaluation of the main sectors within Türkiye's blue economy in terms of their current status, opportunities, risks, and policy needs. The assessment indicates that Türkiye possesses significant potential in the blue economy due to its extensive coastline and its geographical position surrounded by seas on three sides. In particular, sectors such as maritime transport, aquaculture, and marine tourism make important contributions to both economic growth and employment. However, various environmental and economic risks—such as overfishing, degradation of coastal ecosystems, marine pollution, and high investment costs—remain significant challenges. Therefore, the development of blue economy activities within a sustainable framework requires the implementation of policy instruments such as science-based fisheries management, sustainable coastal planning, incentives for renewable energy investments, and strengthened research and development capacity. These findings highlight that the blue economy in Türkiye represents not only economic opportunities but also a domain requiring comprehensive governance and sustainable resource management.

4 Conclusion

The blue economy is a comprehensive development approach that aims to balance economic growth, environmental protection, and social well-being through the sustainable use of marine and ocean resources. The evaluations conducted in this study show that the blue economy is not just a growth model indicating the ability

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of marine-based sectors to generate economic value; instead, it is also a strategic policy area for protecting natural resources, advancing ecosystem-based management, and achieving sustainable development goals.

The literature review reveals that the blue economy encompasses a multidimensional structure covering numerous sectors, including fisheries, aquaculture, maritime transport, coastal tourism, renewable energy, and marine biotechnology. However, the blue economy should not be assessed solely in terms of economic opportunities. The overexploitation of marine ecosystems, marine pollution, habitat loss, the effects of climate change, and governance deficiencies constitute major challenges that directly affect the sustainability of marine-based economic activities. For this reason, the success of the blue economy depends on addressing economic growth objectives together with environmental protection, ecological limits, and the principles of social inclusiveness.

The Sustainable Development Goals discussed in this study, particularly SDG 14 (Life Below Water), clearly demonstrate the importance of the blue economy within the global development agenda. The conservation and sustainable use of oceans, seas, and marine resources are critical not only for environmental sustainability but also for food security, employment, poverty reduction, and economic development. In this respect, the blue economy should be regarded as a complementary policy domain that supports the Sustainable Development Goals and concretizes their marine and coastal dimensions.

The cases of Portugal, Indonesia, and the Maldives illustrate how the blue economy can be translated into concrete policies and practices in different national contexts. In these countries, various models have been developed through sustainable tourism, coastal protection, marine protected areas, renewable energy investments, and community-based development policies, all of which aim to generate economic value from marine resources while simultaneously ensuring their conservation. The comparative assessment demonstrates that strong institutional capacity, long-term strategic planning, multi-actor governance mechanisms, and principles of environmental sustainability play decisive roles in the success of the blue economy.

From the perspective of Türkiye, the country's extensive coastline along the Mediterranean, Aegean, Marmara, and Black Seas, its strategic geopolitical location, and its rich marine resources point to a substantial blue economy potential. Sectors such as maritime transport, port activities, coastal tourism, aquaculture, renewable energy, and marine biotechnology are among those that could both contribute to Türkiye's economic growth and be developed in alignment with sustainable development goals. Nevertheless, the main challenge in Türkiye's blue economy lies in the fact that these sectors are often governed through fragmented and disconnected policy frameworks. This situation results in a lack of coordination in the use of marine areas and prevents sustainability goals from being addressed in a sufficiently integrated manner.

4.1 Strategic Framework and Policy Recommendations

For Türkiye to realize its blue economy potential in line with sustainable development goals, a holistic and long-term policy approach is required. The expected strategic frameworks and policy outcomes of this study are outlined as follows:

a. National Blue Economy Strategy Document: The preparation of a comprehensive national blue economy strategy document should be considered a priority. Such a strategy should establish an integrated policy framework that brings together sectors such as maritime affairs, fisheries, tourism, energy, and biotechnology under shared sustainability objectives.
b. Marine Spatial Planning (MSP): The development of marine spatial planning practices would contribute to a more balanced and sustainable use of resources by taking into account the impacts of different economic activities on marine ecosystems.
c. Community Support and Infrastructure Development: Supporting small-scale fisheries also emerges as an important policy area, both for safeguarding the economic well-being of coastal communities and for strengthening sustainable fisheries policies. Likewise, strengthening coastal protection policies, improving the scientific data infrastructure on marine ecosystems, and enhancing the institutional capacity that supports sustainable resource management are all critical in this process.
d. Blue Finance Mechanisms: Furthermore, the development of blue finance mechanisms is of great importance for increasing investment in the blue economy. Green and blue finance instruments can facilitate the implementation of sustainable marine economy projects and thereby contribute to the simultaneous achievement of environmental and economic objectives.

In conclusion, the blue economy refers not only to the expansion of marine-based economic activities but also to a multidimensional approach that requires environmental sustainability, social inclusiveness, and a long-term development perspective to be addressed together. Although Türkiye's natural and strategic advantages provide significant opportunities in this field, the transformation of these opportunities into lasting and sustainable gains will only be possible through planned, integrated, and ecosystem-based policies.

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