

**THE ECONOMY OF THE SEA IN REGIONAL DEVELOPMENT: DISCUSSION OF  
INTERNATIONAL MODELS AND THE BLUE AMAZON**

***A ECONOMIA DO MAR NO DESENVOLVIMENTO REGIONAL: DISCUSSÃO DE  
MODELOS INTERNACIONAIS E A AMAZÔNIA AZUL***

***LA ECONOMÍA DEL MAR EN EL DESARROLLO REGIONAL: DEBATE SOBRE LOS  
MODELOS INTERNACIONALES Y LA AMAZONIA AZUL***



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**ABSTRACT:** This article presents examples of countries mentioned in the specialized literature that have created plans to harness the sea as an economic instrument to promote regional development. Initially, the maritime economy is discussed, describing its components and the concepts that define it from governmental and international multilateral organizations' perspectives. Subsequently, case studies of independent governments and joint strategies are presented, which, based on the maritime economy, have created clusters of regional development. The final section highlights how the Brazilian government harnesses marine resources and how the Blue Amazon has the potential to contribute to economic growth, following the presented models.

**KEYWORDS:** International Economic Relations. Economy of the Sea. Regional Development. Cluster. Blue Amazon.

**RESUMO:** *O presente artigo apresenta exemplos de países mencionados na literatura especializada que criaram planos de aproveitamento do mar como um instrumento econômico para promover o desenvolvimento regional. Inicialmente, é discutida a economia marítima, descrevendo seus componentes e os conceitos que a definem, tanto do ponto de vista governamental quanto de organismos multilaterais internacionais e outros. Em seguida, são apresentados estudos de caso de governos independentes e estratégias conjuntas que, a partir da economia do mar, criaram clusters de desenvolvimento regional. A seção final destaca como o governo brasileiro aproveita os recursos marítimos e como a Amazônia Azul possui potencial para contribuir para o desenvolvimento econômico, seguindo os modelos apresentados.*

**PALAVRAS-CHAVE:** *Relações Econômicas Internacionais. Economia do Mar. Desenvolvimento Regional. Cluster. Amazônia Azul.*

**RESUMEN:** *El presente artículo enumera ejemplos de países, disponibles en la literatura especializada, cuyos gobiernos han creado planes para aprovechar el mar como instrumento económico para promover el desarrollo regional. Inicialmente, se hace la discusión de la economía marítima, a través de la descripción de lo que la compone, seguida de los conceptos que la definen, desde el punto de vista gubernamental, de organismos multilaterales internacionales y otros. A partir de ahí, se presentan estudios de casos, de gobiernos independientes y estrategias conjuntas que, desde la economía del mar, han creado clusters de desarrollo regional. La sección final muestra cómo el gobierno brasileño ha aprovechado los recursos del mar y cómo la Amazonía Azul tiene potencial para contribuir al desarrollo económico, según los modelos presentados.*

**PALABRAS CLAVE:** *Relaciones Económicas Internacionales. Economía del Mar. Desarrollo Regional. Cluster. Amazonia Azul.*

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## Introduction

In 2004, the term "Blue Amazon" was coined by comparing the properties of this area with those of the Amazonian territory located within Brazil's land borders. In 2010, the Brazilian Navy officially adopted and registered the concept to designate a new maritime domain rich in natural resources and of great strategic importance to the country. This space refers to the portion of the Brazilian naval territory encompassing the Exclusive Economic Zone (EEZ) and the Continental Shelf (CS) of Brazil.

While the Navy is responsible for most of the exploration in this area, ministries, universities, research and innovation centers, and other branches of the armed forces are also interested in collaborating on this subject. This cooperation aims to enhance the protection of Brazil's jurisdictional waters and the resources they contain against foreign interventions.

To promote a broader debate beyond security and defense efforts, this study presents the concept of the blue economy based on the most common examples found in specialized literature. The text also mentions the blue economy as ocean economy, oceanic economy, and other related terms. Subsequently, examples of countries whose governments have established or are developing policies for utilizing marine resources as part of their regional development plans are provided. Finally, an overview of the Blue Amazon and the areas where the blue economy has proven to be most attractive from a socioeconomic progress perspective.

## Economic Exploitation Models of the Sea Worldwide

The oceans represent a source of wealth and are increasingly seen as a viable response to significant global challenges such as food security and climate change. However, they are frequently exploited and polluted, incompatible with the new economic movement seeking sustainability. The ocean economy encompasses industrial activities based in this environment, such as cargo and passenger transportation, fishing, wind energy, and marine biotechnology, to name a few. Additionally, the ocean economy provides natural resources and ecosystem services, the direct or indirect benefits humans derive from nature through ecosystems. Examples of this are fish and seafood, which are sources of food, as well as navigation routes. This approach can be defined as a complement to the current development paradigm, seeking greener and more inclusive economic paths. It is a vision that aims to expand the economic boundaries of coastal countries beyond their land territories.

In each country, it is possible to find a specific definition of the term "ocean economy." In the United States, the blue economy is the direct or indirect input of goods and services from the ocean into the country. Australia focuses on economic activities that occur in the oceans, generating goods and services that directly contribute to the national economy. In China, the sea economy is described as the result of all activities associated with developing, utilizing, and protecting the marine environment. Standard terms can be observed in the analyzed definitions. Therefore, this economy can be summarized as all economic activities that occur directly or indirectly in the ocean, utilizing its resources and providing goods and services in return (PARK; KILDOW, 2014). Table 1 presents a survey of concepts elaborated by governments, considered most relevant in specialized literature.

**Table 1** - Survey of concepts of coastal, oceanic, or marine economy

Country	Concept
<b>Estados Unidos</b>	Coastal Economy: All economic activities developed along the coast. Ocean Economy: Economic action that arises, in whole or in part, from the seas or the Great Lakes.
<b>Reino Unido</b>	Activities involving work in and with the ocean.
<b>França</b>	Economic activities that are directly and indirectly related to the sea.
<b>Irlanda</b>	Activities that directly or indirectly use the ocean as a means of production or any activity that produces a production tool or utilizes a product from a specific ocean-related activity in its production process.
<b>Portugal</b>	Production and consumption of goods and services related to economic activities that directly or indirectly use the sea.
<b>Austrália</b>	The industrial sector has a relationship with the marine environment, i.e., 1) if they use marine resources; 2) if they offer services that depend on the ocean; 3) if they derive economic advantages from the marine environment.
<b>China</b>	Ocean Industries: Engage in the production or provision of services for the development, utilization, and protection of the ocean. Industries related to the Ocean: Refer to companies that supply and consume products/services of sea industries.
<b>Canadá</b>	They are industries located in maritime zones and adjacent coastal communities dependent on activities in those areas for their income.
<b>Nova Zelândia</b>	The economic activity occurs in or utilizes the marine environment, produces goods and services necessary for these activities, or directly contributes to the national economy.
<b>Japão</b>	The industry is exclusively responsible for the ocean's development, use, and conservation.
<b>Coreia do Sul</b>	Economic activity that occurs in the sea and uses derived resources as inputs.

Source: Adapted from Carvalho (2018) and Park & Kildow (2014)

Not only have countries been striving to identify this new economy, but this topic has also been a recurring issue in international forums. During the United Nations Conference on Sustainable Development, Rio+20, held in 2012, participating nations unanimously called for

greater emphasis on the "blue economy" theme in the context of sustainable development and, more specifically, within the concept of the United Nations' green economy. This blue economy approach recognizes and emphasizes the need for effective planning and management of coastal and water resources functions, safety, and preservation, as ocean governance mechanisms develop in international law.

In addition to the intergovernmental perspective, there are also definitions adopted by international actors, such as international organizations, economic blocs, and public opinion, including globally-reaching media. These definitions are presented in Table 2.

**Table 2** - Survey of blue economy concepts coined by non-state actors of interest to the study

Type of Actor	Name	Concept
Non-Governmental Organization Forum	Commonwealth of Nations	"Maximizes the economic value of the marine environment sustainably, preserving and protecting the resources and ecosystems of the sea" (2016, online).
Intergovernmental Economic Organization	Organization for Economic Cooperation and Development (OCDE)	"The sum of economic activities of ocean-based industries, and the assets, goods, and services of marine ecosystems" (2017, p. 22)
Program defining the global environmental agenda	United Nations Environment Programme (Pnuma)	Describes it based on a vision of "improved well-being and social equity while significantly reducing environmental risks and ecological scarcity" (2015, p. 8).
International Financial Institution	World Bank	"The sustainable use of ocean resources for economic growth, improved living conditions, employment, and preservation of the health of marine and coastal ecosystems" (2017, online, tradução nossa).
Privately-owned publication with global reach	The Economist	"A sustainable ocean economy arises when economic activity is balanced with the long-term capacity of ocean ecosystems to support such activity and remain resilient and healthy" (2015, p. 7, our translation)

Source: Elaborated by the author

From the exposition of the concepts, they are based on common key themes in all the mentioned definitions. These themes include sustainable and inclusive growth and development, the reduction of the risk of overexploitation and improper use of ocean resources, the improvement of well-being for coastal communities in terms of economic opportunities and social protection, and the strengthening of governmental capacity in the face of natural disasters and the impacts of climate change.

The scope of the ocean economy varies depending on the country and actor involved. Some industrial sectors may be included in one country but not in another. Although ocean activities may vary, it is possible to outline an overview of the most common activities in established or developing economies, as presented in Table 3.

**Table 3 - Activities with the highest recurrence in established and developing ocean-based industries**

Status	Established	In Development
Activity Type	Fish capture Seafood processing Shipping and logistics Ports Shipbuilding and repairs Offshore oil and gas (shallow waters) Marine manufacturing and shipbuilding Maritime and coastal tourism Maritime business services Marine Research, development, and Education Dredging	Marine aquaculture Deepwater and ultra-deepwater oil and gas Offshore wind energy Ocean renewable energy Marine and maritime mining Maritime security and surveillance Marine biotechnology High-tech marine products and services

Source: Adapted from OCDE (2017, p. 23).

Countries like Brazil have manufacturing that falls into both mentioned categories. This is due to the rapid evolution of industries, which leads to a different classification from that presented in the framework. An example of this is port and maritime activities, which are becoming increasingly automated, and coastal aquaculture, which is gaining prominence, especially on an industrial scale. However, in the Brazilian case, there are no specific statistical data to account for and evaluate the economic contribution of marine resources. In other words, "there is no distinction between marine and non-marine industries in the national accounts, so the ocean economy or GDP [Gross Domestic Product] of the Sea is not estimated" (CARVALHO, 2018, p. 23, our translation).

Despite this, the ocean economy is becoming increasingly crucial for Brazil's development. This is evidenced by the adoption of this agenda by institutions such as the Ministry of Regional Development (MDR), where the Department of Articulation and Management is responsible for "supporting the economic development aspect of the Maritime Frontier or Blue Amazon" (BRASIL, 2019).

Therefore, this study discusses significant economic alternatives already being used in other countries that could serve as models for future exploration of the Brazilian maritime frontier.

## Methodology

The initially proposed structure explores the definition and advantages of maritime clusters as drivers of regional development. Clusters allow for the geographical concentration of companies with similar objectives, which group together due to the presence of suppliers and customers. The proximity between them results in reduced transportation costs and more frequent interaction. However, delimiting the region of a cluster can be challenging, as companies within the cluster often have connections beyond their area of operation. This study becomes relevant, especially in the maritime context, in the face of the digitization of life, which has transformed how people relate to each other and conduct business.

The approach adopted throughout the text emphasizes a triple helix model, which involves the interaction among three group actors in the clusters to achieve success, as evidenced by the case studies gathered. These groups are institutions (universities, research institutes), companies (specifically oriented towards maritime transportation), and central, regional, and local governments responsible for facilitating agglomeration processes.

This foundation is utilized in the following section to address the Blue Amazon and existing initiatives to harness its economic potential, considering the impact on local communities and regional development. Finally, recommendations are presented based on examples from other countries that could serve as references for fostering public policies in the field of the ocean economy.

## Regional development from the maritime frontier: clusters

The broad definition of the ocean economy benefits sectors that directly or indirectly utilize its resources. An example is the formation of maritime clusters, which can be understood as "a geographically proximate group of interconnected companies and associated institutions in a particular field, with economic affinity, similarities, and complementarities" (PORTER, 2008, p. 78, our translation). Maritime clusters can be explained from three perspectives: first, as an industrial complex composed of relationships between related industries through networks of goods and services; second, as a clustering of associated companies that are linked through knowledge, skills, and demands; and third, as a network based on strengthening community ties. In this sense, clusters are defined by the geographical concentration of maritime industries within a regional community, supporting industrial development (DOLOREUX, 2017).

In summary, companies concentrate mainly on these maritime agglomerations to leverage the benefits of clustering in maritime clusters, which become centers of significant economic growth over time.

Economic activities related to cargo and passenger transportation, such as port operations, maritime transport, and inland transportation, can be considered traditional economic sectors within naval clusters. Additionally, other sectors are linked to conventional transportation activities, such as maritime services, naval equipment, and works, which are more specifically geared toward the maritime industrial chain. Finally, there are industries related to the marine sector, such as fishing and aquaculture, recreational and tourism, and submarine and cable telecommunications. In general, expanding maritime clusters promotes the provision of cutting-edge, high-value-added services. This includes naval transportation transactions, maritime legal services, consulting services, and maritime education, which are associated with the integrated flow of business information, capital, and intelligence. These services go beyond integrated logistics services in transportation chains (SHI *et al.*, 2020).

Maritime clusters have a significant impact on regional industry development. When a naval bunch is successful, it contributes to increased social, economic, and innovation benefits throughout the surrounding region.

An example of this is South Korea, which has promoted regional development by creating maritime clusters due to the extent of its territorial waters compared to its land area. This has resulted in a high degree of relevance of the naval industry in the national economy since the first half of the 1990s. To further drive the growth of this sector, the government at that time established the Ministry of Maritime Affairs and Fisheries of Korea (Momaf). Momaf was responsible for implementing the so-called "Blue Revolution," which aimed to strengthen the vitality of territorial waters, develop the maritime industry, and promote the sustainable development of marine resources. The results of these initiatives had direct and indirect effects on productive activities in various sectors not necessarily linked to the marine environment. Among the industries that benefited the most were construction, services and retail, finance and insurance, real estate, education, and healthcare services (KWAK; YOO; CHANG, 2005).

Canada provides another example demonstrating the benefits of harnessing maritime economic potential through clusters. This occurred when the national economy, which has a base in forest resources, mining, and marine industries, faced a crisis in the mid-1980s. As a result, the coastal region began to receive attention from politicians and managers as an alternative to overcome the problem. The strategy of clusters has been an integral part of the



country's regional economy since the 1990s. During this time, the term "Quebec Coastal Region" was coined, referring to a constructed geographical area encompassing three administrative regions: Bas-Saint-Laurent, Gaspésie-îles-de-la-Madeleine and Côte-Nord. This expression emerged during the period of spatial policy formulation and is used to identify this specific region. However, clusters were expanded after the federal and municipal governments identified economically depressed areas within the country that needed diversification and growth. In 2002, the Canadian government began investing in regional clusters as part of an innovation strategy through the Department of Fisheries, Oceans, and the Canadian Coast Guard (DOLOREUX; SHEARMUR; FIGUEIREDO, 2016).

It was not until 2015 that the provincial government of Quebec provided institutional support for this strategy through the creation of the "Maritime Strategy" program, which encompasses the country's maritime industry development plans until 2030. The areas covered include infrastructure, logistics, ports, transportation, tourism, aquaculture, fishing, workforce qualification, research, international expansion, and support for the shipbuilding industry (QUÉBEC, 2015). The Canadian coastal maritime clusters can be divided into four components: corporations that form the core of the marine sector (aquaculture, fishing, shipbuilding, etc.); higher education institutions and public and private research institutes; and support and complementary organizations, service providers, and business networks. These elements aim to stimulate economic activity related to aquaculture and similar sectors. However, contrary to expectations, this initiative negatively impacted the economy and particular sectors. Among the achieved results is the growth of technical and support services for maritime transportation, the increase in local business establishments, especially those related to the seasonal tourism industry, and the expansion of technical schools (DOLOREUX; SHEARMUR; FIGUEIREDO, 2016).

In the Caribbean, regional governments have established common strategies to promote changes in the regional economy, following the principles of the blue economy. Table 4 presents the guiding principles of these strategies.

**Table 4 - Principles of the Blue Economy and strategic actions for the Caribbean**

Principles of the Blue Economy	Actions
<b>Regional policy of economic sharing</b>	While the definition of Exclusive Economic Zones (EEZs) can help determine the geographical area to which a nation has exclusive access and represents the limit of its rights over ocean resources, an effective regional policy for economic sharing is a fundamental factor for the success of the blue economy. In the Caribbean context, some nations share the same space, and therefore, it is necessary to have appropriate competitive strategies among regional economies to facilitate negotiations with investors and avoid conflicts between different governments and regions.
<b>Ocean governance</b>	Ocean governance refers to the mechanisms, laws, processes, agreements, treaties, and institutions through which the ocean and its resources are managed to maintain or increase productivity and diversity. This should include international, regional, national, and local levels.
<b>Support for the creation of a business-friendly environment and infrastructure</b>	The success of the blue economy also depends on creating a business-friendly environment where emerging industries can grow. In the case of Caribbean countries, establishing a Regional Ocean Management Agency has been proposed to guide the governance process of this space.
<b>Advocacy and participatory development</b>	Citizen participation is valued in this process, involving contributions from actors such as the government, private sector, and other citizens. The involvement of these sectors can contribute significantly to attracting more investments in the blue economy, benefiting coastal populations and vulnerable groups that are impacted by activities in this domain.
<b>Regional knowledge Hub</b>	Continuous improvement through research, development, and innovation is necessary for this economy to thrive. The model emphasizes establishing a regional knowledge hub whose outputs can be used in national and regional dialogues, thus contributing to greater sharing of experiences and increased mobility, skills, and knowledge transfer among countries. This capacity diffusion can strengthen the region's human capital resource base.

Source: Patil *et al.* (2016)

As observed, in the Caribbean, a common strategy is being outlined that aims primarily at the joint development of countries in the region by creating regional capacities and sharing experiences.

In the context of the European bloc, the blue economy encompasses, in general, activities related to the oceans, seas, and coasts. The European concept of the blue economy emphasizes the management of conservation and sustainability based on the idea that the health and productivity of oceanic ecosystems are fundamental for sustainable ocean-based activities. This concept encompasses the same desired outcomes as the "green economy" and includes interconnected sectors and economic activities related to the oceans, seas, and coasts, including the outermost regions of the European Union (EU) and landlocked countries. The concept adopted by the bloc is similar to that of the OECD and the World Bank (COMISSÃO

EUROPEIA, 2018). Activities such as aquaculture, fish processing industry, fishing, ports, storage and water projects, shipbuilding and repairs, coastal tourism, oil and gas extraction, maritime transport, desalination, ocean energy, bioeconomy, biotechnology, and others are developed within the EU. According to the understanding of the countries' governments that make up the economic bloc, it is only through the identification of maritime activities that it becomes possible to strengthen and promote local financial practices (KATILA, 2018).

In recent years, significant growth has been observed in areas related to the maritime economy within the European bloc, particularly in coastal tourism, maritime transport, and aquaculture, which are also the largest employers. In addition, the European Commission (EC) has identified industries that can contribute to the so-called "blue growth" or sustainable growth in the future. These sectors include aquaculture, coastal tourism, marine biotechnology, ocean energy, and deep-sea mining (COMISSÃO EUROPEIA, 2010). Although there is no unified policy on using marine resources and, more specifically, the blue economy, there are already case studies on the subject. A relevant example is the Gulf of Bothnia (GoB), located in Finland's northernmost arm of the Baltic Sea. The GoB is a region dominated by activities related to the blue economy, such as shipbuilding, transportation, fishing, and offshore activities. These activities are mainly carried out in coastal municipalities with a significant number of employees and great economic importance for neighboring rural areas.

Employment issue continues to be a challenge for the region's growth. The number of jobs related to the maritime economy is still low and represents only 4% of the total in the GoB, with the maritime transport sector being the largest employer (KATILA *et al.*, 2017). This includes activities such as vessel construction and repair and water projects. Therefore, in the presented case, indirect effects were more significant than direct effects in the context of the blue economy. Traditional activities still play an essential role in the region, while development is moving in a direction more aligned with sustainability and innovation. The areas with the most significant potential for regional development strategies include coastal tourism as a priority, followed by biomass and energy (KATILA *et al.*, 2018). As observed in Finland, coastal tourism significantly contributes to the blue economy in most countries within the European bloc. In recent years, the United Kingdom has benefited considerably from the blue economy, while Slovenia, Slovakia, and Luxembourg have shown limited economic returns in this sector (COMISSÃO EUROPEIA, 2018).

From the cases presented, both in the Caribbean and the EU, it becomes evident that the relevance of the blue economy varies according to the observed country. Now, we will analyze

the Brazilian case, as the maritime economy is intrinsically linked to the concept of the Blue Amazon, which has distinct characteristics from other coastal and marine regions in Brazil.

### **Blue Amazon and the Development of the maritime economy**

The beginning of the 21st century marked a new regional scenario for Brazil, as it opened up to the maritime space, particularly the South Atlantic. Although Brazil's economic development has primarily focused on its interior, the shift towards the sea was not random. Discoveries of deep-sea oil reserves, their exploration, and the strong performance of foreign trade led to nearly all national exports being carried out through maritime routes (COSTA, 2012), as shown in Table 1.

**Table 1 - Total value of Brazilian exports through maritime routes by the economic bloc, January to July 2022**

<b>Economic Block</b>	<b>FOB Value (US\$)</b>
Asia (Exclusive Middle East)	70.448.344.909
Europe	28.966.671.206
European Union (EU)	23.479.198.566
North America	20.274.822.623
Association of Southeast Asian Nations (ASEAN)	11.664.728.675
South America	9.238.113.246
Middle East	7.217.328.436
Africa	6.460.840.358
Andean Community of Nations (CAN)	3.602.618.118
Southern Common Market (Mercosur)	3.278.204.994
Central America and the Caribbean	2.585.640.373
Oceania	615.991.024
<b>Total</b>	<b>187.832.502.528</b>

\* FOB value represents all risks and costs that the buyer of the goods assumes once they are placed on board the ship.

Source: Brasil (2022)

In addition to exports, the maritime frontier is becoming increasingly crucial for Brazil's economy and development. This importance stems from the resources present in its Territorial Sea (TS), Exclusive Economic Zone (EEZ), and Continental Shelf (CS). Specific rules govern these maritime spaces and have different boundaries than those observed on land. The Brazilian Territorial Sea corresponds to the ocean strip extending from the baseline to a distance of 12 nautical miles (approximately 22 kilometers). It consists of coastal waters and is considered part of the sovereign territory of the State.

On the other hand, the Exclusive Economic Zone (EEZ) corresponds to an area located beyond the Territorial Sea and adjacent to it, in which the rights and jurisdiction of the coastal State, as well as the rights and freedoms of other States, are governed by the relevant provisions of the United Nations Convention on the Law of the Sea (UNCLOS) (CNUDM) (BRASIL, 1995, art. 55; ONU, 1994). In Brazil, the EEZ represents a zone located beyond the territorial waters, in which each coastal country is responsible for environmental protection and prioritizes using its resources. Although vessels have freedom of navigation in the national EEZ, all living and non-living water, soil, and subsoil resources belong to Brazil. Finally, the Continental Shelf (CS) corresponds to the seabed and subsoil of the submarine areas that extend beyond a country's Territorial Sea, up to the outer limit of the continental margin or up to a distance of 200 nautical miles from the baseline used to measure the width of the Territorial Sea (BRASIL, 1995, Art. 76). In other words, the CS encompasses the bed and subsoil of the submarine areas that extend beyond a State's Territorial Sea, along the natural prolongation of its land territory, respecting the established minimum and maximum limits.

The Brazilian Continental Shelf exceeds the mentioned limit, and its natural resources are strategic for the country. In May 2004, the Brazilian State submitted a proposal to extend the Continental Shelf to the United Nations Commission on the Limits of the Continental Shelf (CLCS). After analysis, the CLCS issued recommendations to the government in April 2007, which did not fully meet the initial demand, resulting in restrictions on approximately 19% of the claimed area. In July 2008, the Interministerial Commission for Marine Resources (CIRM) developed a new proposal to revise the requested extension (BRASIL, 2010). It is essential to present these concepts because the area covered by the extension of the national Territorial Sea (12 nautical miles), Exclusive Economic Zone (188 nautical miles), and the extension of the Continental Shelf corresponds to the current coverage zone of the Blue Amazon (ANDRADE *et al.*, 2019; BRASIL, 2004).

The use of the term "Amazônia" refers to the fact that "with the expansion of our Continental Shelf, including the maritime areas of the Archipelagos of Fernando de Noronha and São Pedro and São Paulo, as well as the Oceanic Islands of Trindade and Martim Vaz" (MARINHA, 2019, online, our translation), the area available for the exploration of its economic, scientific, and biological riches is similar to the existing surface of the Amazon Rainforest. In Brazil, a country with one of the most significant coastal extensions in the world, the recognition of the benefits that the maritime economy can bring is still very recent. The Blue Amazon (Amazônia Azul) presents significant economic potential, especially in a new

emerging economy. Regarding employment, in the maritime economy, the accommodation and food sector was the largest employer, followed by the manufacturing industries in the country (CARVALHO, 2018).

Furthermore, in the southern coastal region of Brazil, there is a concentration of the highest number of employees in the maritime economy, emphasizing the states of Rio de Janeiro and Bahia. On the other hand, Pará and Piauí have the lowest numbers of jobs, indicating lower participation in the regional maritime sector. Positions are mainly in the accommodation and food areas, such as restaurants and food and beverage services, followed by hotel chains. Interestingly, the Defense sector is also responsible for a significant portion of jobs in the analyzed states.

It is possible to suggest, similar to the experience of the GoB in Finland, the adoption of a model for the Blue Amazon (Amazônia Azul) that focuses its objectives on creating quality jobs with the existing workforce in the region in sectors such as shipbuilding and repair, coastal tourism, fishing, and aquaculture, which are some of the main segments of the maritime economy.

Although the majority of the maritime economy and resources of the Blue Amazon are in the southern part of the country, it is important to highlight that most Brazilian coastal municipalities are located in the Northeast, Southeast, South, and North. This is particularly relevant for the planning of public policies in the region. Similar to other countries, the orientation of regional development policy to economically exploit the resources of the Blue Amazon emerges through the formation of clusters. Oil is the central resource to be explored in the Brazilian continental shelf, whose economic potential is analyzed and utilized more intensely. In 2010, the Brazilian government expanded the maritime boundary of the pre-salt region by 200 nautical miles through Interministerial Resolution n.º 3/2010. The incorporated area corresponds to a territory the size of the state of Ceará or four times the size of the state of São Paulo and includes five particular regions of the continental shelf: Amazon Cone, Brazilian Northern Chain, Vitória and Trindade Chain, São Paulo Plateau, and Southern Continental Margin.

In 2019, the Brazilian government initiated a study to offer exploratory blocks beyond the 200 nautical miles limit of the Continental Shelf. "The economic potential goes beyond oil extraction. There are also prospects for the exploration of minerals such as cobalt and manganese, which led the Navy to call the area the 'Blue Amazon'" (PAMPLONA, 2019,

online, our translation). In addition to these minerals, other resources will be explored in the Pre-Salt area, as summarized in Table 5.

**Table 5** – Location and economic potential of Pre-Salt resources

	<b>Economic Potential</b>	<b>Localization</b>
<b>Resources</b>	Oil and hydrocarbons	Campos and Santos basins
	Natural gas	Santos Basin and the coast of Espírito Santo
	Gas hydrates	Pelotas Basin
	Granulated Phosphorites	Coasts of Pará and Maranhão states in the north, and Southeast and South regions
	Heavy minerals (ilmenite, zircon, rutile, and monazite)	Marginal plateaus of Ceará and Pernambuco
	Cobalt-rich ferromanganese crusts	Paraíba do Sul Delta Marginal Plateau of Pernambuco

Source: Elaborated from Figueirôa (2014).

Petrobras, the Brazilian state-owned oil company, plays a fundamental role in the activities of the oil sector in the Blue Amazon area. In addition, in 2013, the Brazilian government established *Amazônia Azul Tecnologias de Defesa S.A.*, whose mission is to promote actions related to submarine construction, development of oil exploration technologies, and utilization of marine resources. Other companies are also conducting surveys and studies to exploit this new area under Brazilian jurisdiction economically. In Rio Grande do Sul, companies plan initiatives in technology, processes, and products related to the sea, focusing on logistics, shipbuilding, offshore activities, and coastal and port infrastructure. The technological parks of universities and research centers have driven this process.

It is relevant to mention the European model in this segment. Initially, the focus of the European Union was on the extractive industry, but with a more exploratory approach, resulting in the development of extractive industries. Later, countries adopted a more innovation-oriented approach in bioeconomy and biotechnology as part of their standard strategy to promote the blue economy and regional development.

The southern region of Rio Grande do Sul is experiencing rapid growth in investments in the port and industrial sectors, following practices already adopted by developed economies. An example is South Korea, which created maritime clusters to drive the country's marine economy by bringing together companies with similar interests around a common goal. Thus, one of the opportunities in the region is the organization of the shipbuilding industry into three regional clusters: Southeast Maritime Pole (Naval and Offshore Industries of Rio de Janeiro), South Maritime Pole (Naval and Offshore Industries of Rio Grande), and Northeast Maritime

Pole (Naval and Offshore Industries of Suape) (CARVALHO; DOMINGUES; CARVALHO, 2012).

A similar scenario can be observed in Santa Catarina, where the main focus of maritime development lies in shipbuilding, following the South Korean model. The state's shipbuilding industry stands out for establishing specialized shipyards in producing modules and vessels for the oil and gas sector, adopting an innovation-oriented approach similar to the European model. In this regard, it is possible to consolidate a cluster of sustainability, knowledge transfer, and technological innovation in the shipbuilding industry of Santa Catarina. However, several measures are necessary, such as investments in sectoral funds for the maritime and shipbuilding sectors, actions by the Federal Government to foster partnerships with universities, and incentives for studies and projects aimed at enhancing institutional collaborations (CARVALHO; DOMINGUES; CARVALHO, 2012).

Indeed, the Itajaí and Navegantes region emerges as an embryonic and emerging cluster in the shipbuilding industry. This region is home to numerous companies with strong ties to the national naval and nautical industry, and it is recognized as Brazil's largest fishing port (PINTO, 2016). The local fishing fleet comprises over 700 vessels owned by approximately 250 shipowners, capturing around 200,000 tons of fish annually. The shipbuilding industry significantly produces ships used for platform support services, tugboats, and fishing vessels, both in wood and steel. However, to further strengthen this cluster, governmental support is needed to enhance connectivity with the international market, improve physical infrastructure, develop human capital, and provide greater security for investors (PINTO, 2016).

The possibility of adapting the Canadian model is observed, in which maritime clusters are seen as a viable economic alternative to diversify the regional economy. This model emphasizes the concentration of port clusters that are already geographically interconnected.

The Suape Industrial Port Complex stands out in the Northeast region, created by the Government of Pernambuco in the 1970s. The original design of this complex was influenced by the integration model between the port and the industrial complex, similar to what had already been implemented in Marseille-Fos, France, and Kashima, Japan. The enterprises established in Suape are the Atlântico Sul Shipyard, the Abreu e Lima Refinery, and the Suape Petrochemical Complex. Additionally, the port of Suape is one of the largest in the country and contributes to the consolidation of productive chains in petrochemicals, shipbuilding, the steel industry and alimentation (CARNEIRO *et al.*, 2011). In 2009, creating a "naval cluster" in the northern part of Suape's port area was proposed and approved in 2010. Currently, the complex



operates as an extension of the State Secretariat of Economic Development of Pernambuco (SDEC), receiving investments from the state and federal governments. However, for the initiative to progress, it is necessary to create a network capable of expanding social capital and improving the competitiveness of the formed cluster. This network would include the association of port professionals, naval component manufacturers in Brazil and abroad, and local professionals and companies, among others.

The development of a standard policy is suggested, through the creation of regional capacities and shared experiences, following the example of Caribbean countries. This is due to the region's development characteristics, which concentrate on a vast network of actors that could benefit from forming clusters in a more traditional sense, involving institutions, companies, and central, regional, and local governments.

Thus, it is possible to perceive the tremendous economic potential to be explored in the South Atlantic and the Blue Amazon, where the formation of clusters is just one of several possibilities for harnessing the resources of this area.

## **Final Considerations**

Although there is still no consensus definition of the blue economy, the concept is widely similar when examining the reports adopted by various governments worldwide and international, regional, and economic bloc organizations. In general terms, there is a recurrence in the use of expressions such as "maritime-dependent economic activities," "production and provision of services from coastal areas," or "industries located in maritime areas" to describe the economy based on the exploitation of marine resources. The main difference between the exposed meanings lies in how each government utilizes or plans to explore this area.

It has been demonstrated that clusters emerge as one of the main alternatives for regional development in developed and developing countries. Specific institutions and programs are created to leverage existing companies, workforce, and infrastructure, especially during diversification needs or economic crises.

Some countries already have well-developed maritime industries, while others are still developing a strategic plan for their creation. In the case of Brazil, and more specifically, the Blue Amazon region, a similar panorama is taking shape. Forming regional development clusters has proven to be the most promising approach. Compared to other initiatives, this model can bring together companies, government, and technological and research centers towards a

common goal. For each case analyzed, suggestions were made based on existing models in other countries. For example, for areas with a higher workforce concentration, adopting a model similar to Finland's is suggested. Regarding deep-sea exploration areas, European approaches are more pertinent. For port and industrial areas, especially in the country's South, the South Korean model with multiple geographically concentrated companies sharing interests and interconnected with global value chains is more suitable. The Canadian model was also considered in one of the analyzed cases. In the Northeast region, the model adopted by Caribbean countries stands out, which seeks to share experiences for regional development through traditional maritime clusters.

Finally, broadening the debate in academic and governmental circles about the importance of forming maritime clusters as a viable alternative for regional development in the country, especially in the Blue Amazon region, is crucial.

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