

Campus São Mateus
UNIVERSIDADE FEDERAL DO ESPÍRITO SANTO**BLUE ECONOMY IN BRAZIL: A HYBRID ANALYSIS OF TRENDS, CHALLENGES AND OPPORTUNITIES***Economia azul no Brasil: uma análise híbrida sobre tendências, desafios e oportunidades**Economía azul en Brasil: un análisis híbrido de tendencias, desafíos y oportunidades***Vinicius Wittig Vianna^{1*}, Rafael Zelesco Barreto², & Carlos Wellington Leite de Almeida³**^{1 2 3 4} Escola de Guerra Naval, Programa de Pós-graduação em Estudos Marítimos^{1*} viniciuswv@gmail.com ² rafael.zelesco@marinha.mil.br ³ carloscwla@gmail.com**ARTICLE INFO.****Received:** 04.01.2026**Approved:** 20.06.2026**Available:** 14.09.2026**KEYWORDS:** Blue Economy; Blue Amazon; Brazil.**PALAVRAS-CHAVE:** Economia do Mar; Amazônia Azul; Brasil.**PALABRAS CLAVE:** Economía Azul; Amazonía Azul; Brasil.***Corresponding Author:** Vianna, V. W.**ABSTRACT**

In recent years, the concept of the Blue Economy has gained strategic relevance, especially in relation to national sovereignty, but it has also been the subject of important economic, environmental, and social discussions in international forums. Considering the existence of national efforts through events, projects, or academic publications, the feasibility of implementing a hybrid method capable of analyzing the results of such work was identified, aiming to provide the reader with a general overview of the literature. To this end, a search was conducted in the Scopus database to identify works within the theme. From the defined keywords, 29 articles were found, which were screened and analyzed using the PRISMA method. Subsequently, the data from the remaining 27 articles were loaded into bibliometric analysis software, which made it possible to highlight metrics of annual publication growth, most relevant terms, co-occurrence of topics, and a thematic map. Based on this investigation and literature review, the work highlights the main ongoing projects, the current challenges, and the opportunities explored in an incipient way in the Brazilian context.

RESUMO

Nos últimos anos, o conceito de Economia Azul adquiriu relevância estratégica, sobretudo relacionada à soberania nacional, mas também tem sido objeto de importantes discussões econômicas, ambientais e sociais em fóruns internacionais. Considerando a existência de esforços nacionais por meio de eventos, projetos ou publicações acadêmicas, identificou-se a viabilidade de implementação

de um método híbrido capaz de analisar os resultados de tais trabalhos, visando fornecer ao leitor um panorama geral da literatura. Para tal, uma busca na base de dados Scopus foi realizada para identificar os trabalhos inseridos na temática. A partir das palavras-chave definidas, foram encontrados 29 artigos, os quais foram triados e analisados utilizando o método PRISMA. Em seguida, os dados dos 27 artigos restantes foram carregados em um software de análise bibliométrica, que possibilitou evidenciar métricas de avanço anual de publicações, termos mais relevantes, coocorrência de tópicos e mapa temático. A partir desta investigação e de revisão da literatura, o trabalho evidencia os principais projetos em curso, os desafios presentes e as oportunidades exploradas de forma incipiente no contexto brasileiro.

RESUMEN

En los últimos años, el concepto de Economía Azul ha cobrado relevancia estratégica, especialmente en relación con la soberanía nacional, pero también ha sido objeto de importantes debates económicos, ambientales y sociales en foros internacionales. Considerando la existencia de esfuerzos nacionales a través de eventos, proyectos o publicaciones académicas, se identificó la viabilidad de implementar un método híbrido capaz de analizar los resultados de dicho trabajo, con el objetivo de proporcionar al lector una visión general de la literatura. Para ello, se realizó una búsqueda en la base de datos Scopus para identificar trabajos relacionados con el tema. A partir de las palabras clave definidas, se encontraron 29 artículos, que se filtraron y analizaron mediante el método PRISMA. Posteriormente, los datos de los 27 artículos restantes se incorporaron a un software de análisis bibliométrico, lo que permitió identificar métricas de crecimiento anual de publicaciones, términos más relevantes, coocurrencia de temas y un mapa temático. Con base en esta investigación y revisión bibliográfica, el trabajo destaca los principales proyectos en curso, los desafíos actuales y las oportunidades exploradas de forma incipiente en el contexto brasileño.

INTRODUCTION

The term "Blue Economy" (BE) has been consolidated, in the last two decades, as a concept that aggregates economic, social, and environmental agendas associated with the use of the ocean. Although there are variations in its scope, some closer to the "ocean economy" and others based on principles of sustainability, the definitions of international organizations converge in recognizing the centrality of the sustainable use of marine and coastal resources for the generation of value, income, and employment and, at the same time, for the health of the ecological system (Keen et al., 2018).

From a corporate point of view, the work of Bădîrcea et al. (2021) highlights that the maritime environment has become a new economic, social, and innovation conjuncture, in which production methods aligned with climate and biodiversity conservation goals have also become organizational objectives, reinforcing that the sea has ceased to be interpreted solely as a means of providing food, energy, or transportation. In industrial terms, the report *The Ocean Economy to 2050* (OECD, 2025) also reinforces the importance of a multidisciplinary analysis due to the tripod of sustainability and indicates that both the already consolidated and emerging ocean industries still have great potential for organizational growth.

For example, in the context of maritime transport, which represents a fundamental aspect for global supply chains, as well as in the development of countries, the International Maritime Organization (IMO) has approved a strategy with the objective of reducing emissions of harmful gases into the atmosphere. In addition to including targets, this plan will also provide incentives in the use of low-carbon fuels and technologies, causing a change in investment patterns and applied standards (Serra & Fancello, 2020).

In the Brazilian context, the work of Soares et al. (2022) argues that the analysis of BE has even more unique characteristics, starting with the introduction of the term "Blue Amazon", used to represent its entire maritime extension, including the territorial sea, the exclusive economic zone, and the extended continental shelf, evidencing the strategic role that the sea plays for the country. At the same time, the government has been implementing policies aimed at strengthening maritime spaces, including Marine Spatial Planning (MSP), which aims to reconcile different uses of the sea, guide investments and balance environmental conservation with economic development, also ensuring that the commitments made at the international level are achieved, such as SDG No. 14 (Life under Water) and the Decade of Ocean Science for Sustainable Development (Planejamento Espacial Marinho - PEM, 2025).

Other examples are the National Plan to Combat Waste at Sea (MMA, 2019), accompanied by agendas aimed at the energy transition, such as offshore wind energy projects, which are the subject of technical analyses prepared by the Ministry of Mines and Energy and the Ministry of the Environment, in partnership with the Energy Research Company and the World Bank (MME & EPE, 2020; World Bank, 2024).

Given this scenario, understanding the trends, challenges, and opportunities of BE in Brazil becomes relevant to correctly assess the institutional and technological capacity to respond to international regulatory pressures, such as the decarbonization of maritime transport, mitigation of socio-environmental liabilities such as pollution, coastal erosion and overfishing, and identification of new value fronts, such as marine biotechnology, offshore renewable energies, and ecosystem services. Thus, by investigating the evidence available in the literature, this study seeks to propose a discussion of potential trends, risks, and opportunities, contributing to the formulation of public policies, investment decisions, and strategic planning processes.

THEORETICAL FRAMEWORK

According to Keen et al. (2018), the recognition of the ocean as a central element for sustainable development has strengthened the notion of Ocean Economy, also called Blue Economy, while Santos et al. (2022) base the concept on a strategic perspective that

encompasses different dimensions related to the marine environment, with an emphasis on the responsible use of ocean resources to promote economic growth, social welfare, and expanding job opportunities.

BE, therefore, goes beyond the exploitation of maritime resources, encompassing a model of integrated and sustainable management of ocean spaces, a concept structured in the conception of three-dimensional governance, based on the economic, environmental, and institutional pillars, which serves as a basis for coastal countries interested in diversifying their productive matrices (Ginga, 2020). Such complexity creates an environment in which the investigation of the literature, through data-driven analytical methods, will allow exploring how the topic is developing.

Brazil has one of the largest ocean economies in the world, with significant contributions from sectors such as oil and gas (O&G), tourism, and fishing. Nevertheless, the literature presents strong evidence that the transition from a traditional ocean economy to a sustainable blue economy is still incipient. From an economic perspective, the Brazilian BE has a high concentration in the coastal capitals, especially Rio de Janeiro, responsible for more than 80% of the sectoral value added and for about a quarter of the related formal jobs. In this context, tourism, hospitality and O&G are the predominant activities. Tourism and the services associated with it reveal the greatest potential for sustainable development (Câmara et al., 2021; Freitas et al., 2022; Santos et al., 2024).

However, Freitas et al. (2022) argues that, despite its relevance, the country's BE still remains strongly anchored in traditional sectors, lacking greater integration with high-tech and high-value-added industries. On the other hand, Franz et al. (2021) and Gouvea and Gutierrez (2023) argue that the Blue Amazon, with a vast maritime extension under Brazilian jurisdiction, represents a strategic frontier that is still little explored, capable of fostering sustainable growth through initiatives aimed at renewable energies, such as green hydrogen, as well as opportunities in marine biotechnology and the valorization of ecosystem services.

From the perspective of challenges in governance and the environment, Gerhardinger et al. (2020) and Siverwood-Cope and Ling (2021) clarify that the construction of a sustainable BE faces significant difficulties resulting from a national strategy that is still incipient, which resulted in fragmented and poorly articulated public policies. Also in this scenario, Siverwood-Cope and Ling (2021) observe that the tax incentives and subsidies granted between 2011 and 2018 only reinforced traditional practices, especially in agriculture and fishing, without promoting a consistent alignment with the principles of sustainability or with the guidelines established by the Sustainable Development Goals (SDGs).

Adding to such arguments the fact that the recent implementation of the MSP has not yet achieved an increase in effectiveness in governance actions among the various actors involved, it becomes suggestive to conclude that these factors still challenge the management of the sea focused on sustainability (Gerhardinger et al., 2020; Franz et al., 2021).

Studies in the literature evidence that the Brazilian BE is relevant and diverse but remains dominated by traditional and less sustainable sectors. Despite the significant potential for sustainable growth, especially in tourism and renewable energy, progress is still limited by policy fragmentation, operationalization of strategic vision, and insufficient alignment with

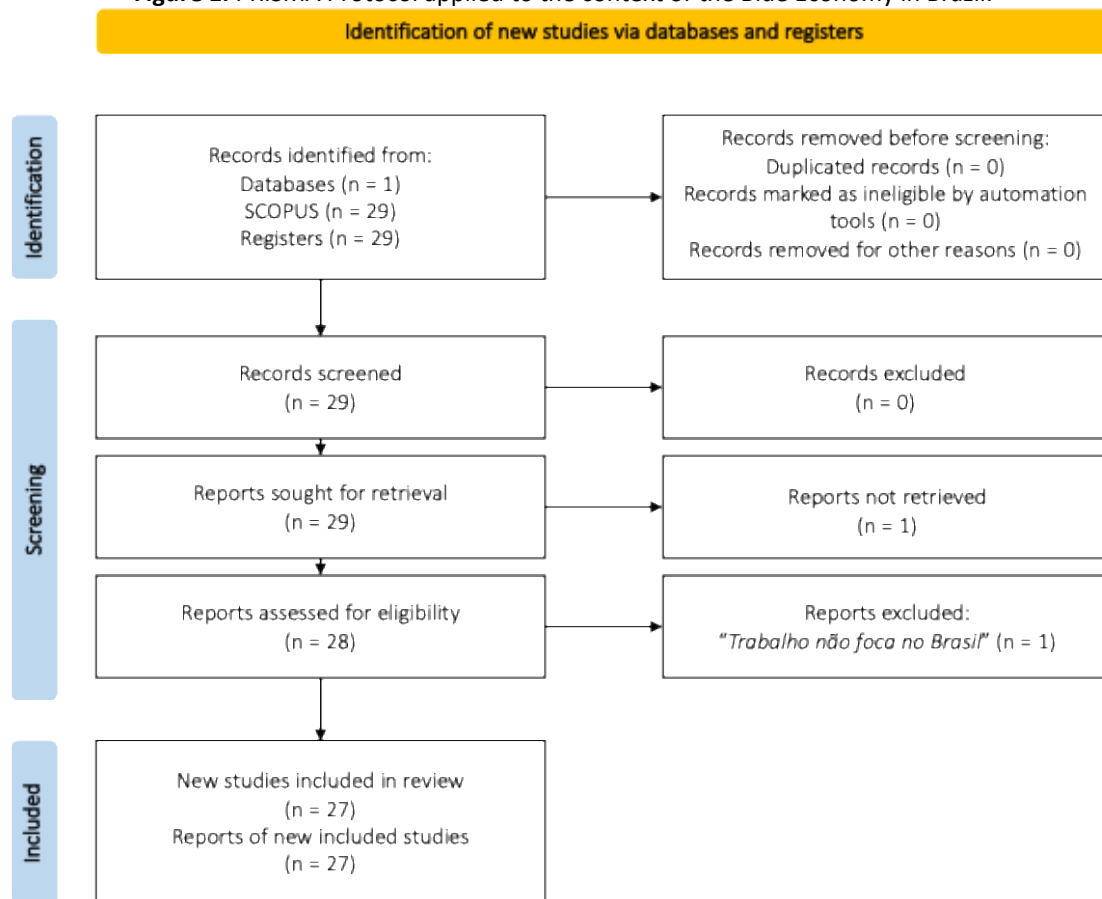
sustainability goals. In this context, a comprehensive analysis of the literature becomes relevant to investigate the main efforts, challenges, and opportunities in the Brazilian BE.

METHODOLOGY

This work was planned from a hybrid approach (bibliometric and literature review) to enable an exploratory-descriptive analysis. To this end, data were collected from the Scopus database, implementing the following search expression: (“blue economy” OR “ocean economy” OR “marine economy” OR “maritime economy”) AND (“Brazil”). It should be noted that Scopus was chosen as the reference database due to its scientific rigor, international relevance, and vast availability of literature.

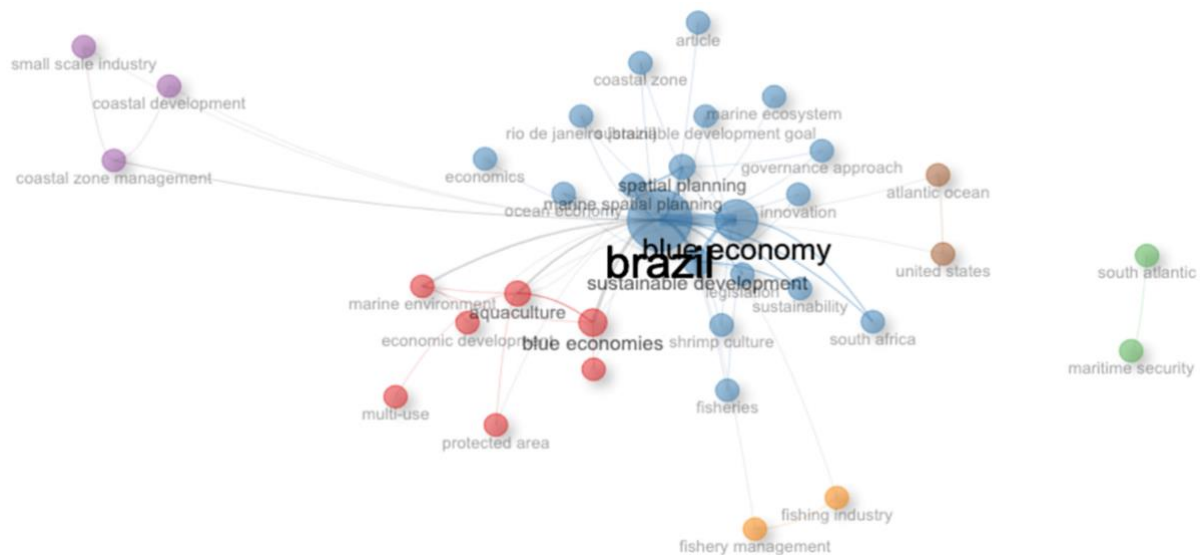
Initially, 29 articles were identified, which were submitted to an adherence analysis (screening) through the application of the protocol Preferred Reporting Items for Systematic Reviews and Meta-Analyses - PRISMA (Liberati et al., 2009), which resulted in the elimination of two papers: the first because there was no access via the CAPES Journal Portal, and the second because it did not contemplate a focus on Brazil (Figure 1).

Figure 1. PRISMA Protocol applied to the context of the Blue Economy in Brazil.



Source: Authors (2026).

Then, the metadata of the 27 selected articles was uploaded and processed through the Bibliometrix program (Aria & Cuccurullo, 2017), allowing the extraction of information regarding the temporal evolution of publications, main journals, authors, institutions, co-authorship networks, and the occurrence of keywords. Finally, from the literature review obtained, the present work aims to discuss the main guiding elements identified, with the objective of evidencing the current efforts, challenges and opportunities supported by the bibliometric data obtained.

Figure 4. Network of co-occurrences of the relevant terms

Source: Authors (2026).

However, it is possible to notice that some topics were concentrated in sets, indicating that they have greater affinity with each other. For example, in the purple set, it can be seen that coastal development is usually linked to small-scale management and industry methods; in red, the blue economy correlates with aquaculture, the marine environment, economic development, protected areas and multipurpose, while in yellow, the correlation between fisheries management and the fishing industry is evidenced; in the brown set, the United States and the Atlantic Ocean itself appear as strategic elements for Brazil. Finally, in a disconnected way (in green), the terms South Atlantic and maritime security show an isolated correlation.

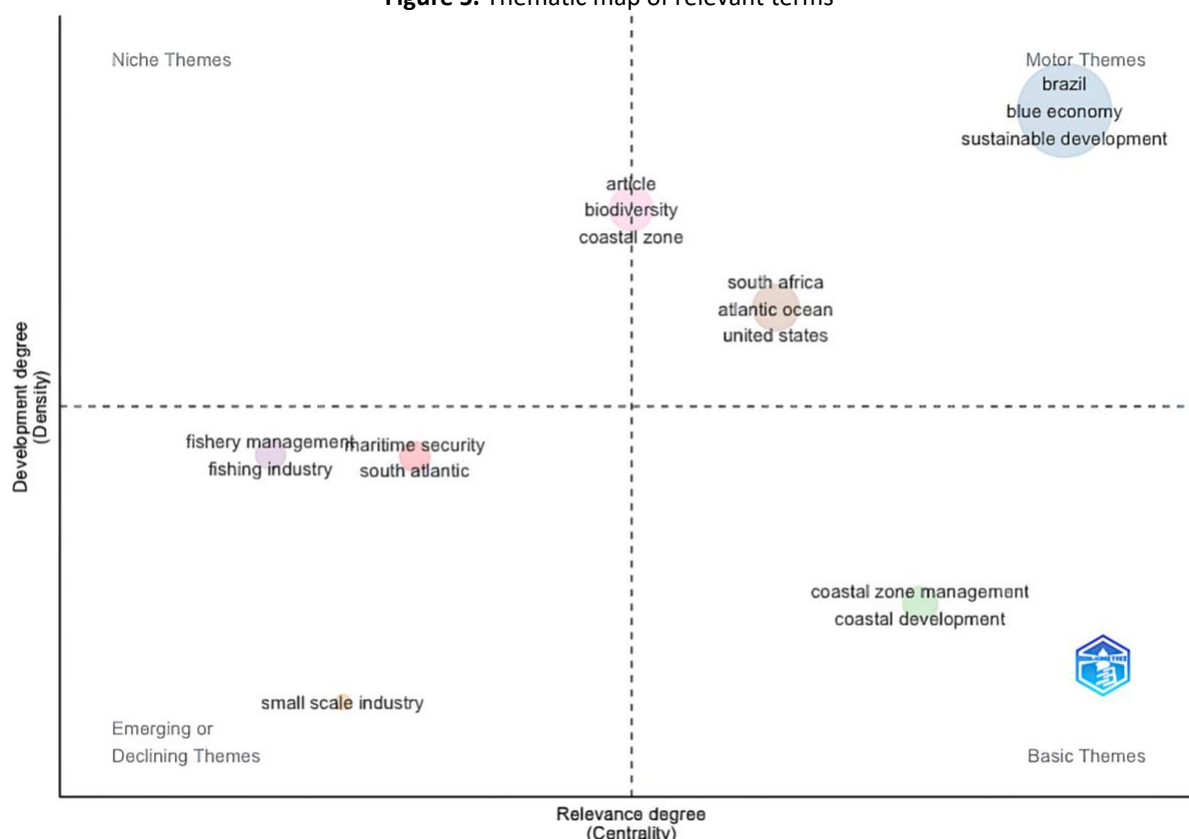
At the same time, in order to investigate how the research theme is positioned and what are the possible trends, a thematic map was implemented that structures the topics in two axes, centrality and density, categorizing the topics into four quadrants, or themes: niche; emerging or declining; basic; and engines. According to Cobo et al. (2011), centrality refers to the degree of relevance of a topic, while density refers to its degree of development. As for the quadrants, as evidenced in Figure 5, the niche themes are those that are well developed, but with little importance; emerging or declining themes, as suggested, refer to new topics or those in decline; the basic themes are of great importance but are still little developed; while the motor themes are those that guide the established field of research.

As can be seen, the map indicates that the field of BE research in Brazil is structured by consolidated and highly relevant motor themes, centered on the grouping that unites “Brazil”, “blue economy” and “sustainable development”, indicating that the literature is mature with regard to the integration between economic development and environmental sustainability. A secondary grouping involving “south Africa” and “Atlantic Ocean” is also observed, indicating that international cooperation and the geopolitics of the South Atlantic represent well-established elements in the academic production of the area. Additionally, a third cluster composed of “biodiversity” and “coastal zone” was positioned with high density, but in an intermediate region between niche and motor themes, indicating potential to become more relevant.

On the other hand, the themes classified as basic, such as “coastal zone management” and “coastal development”, prove to be fundamental for the field, although they still need greater theoretical density. It is also possible to highlight that, while this grouping demonstrates that development and management of coastal zones, by itself, still lacks development, when related to biodiversity (already discussed in the previous grouping), it is positioned with greater development but less relevance.

Simultaneously, the topics “fishery management”, “fishing industry”, “maritime security”, “South Atlantic” and “small scale industry” were positioned in the quadrant of emerging or declining themes, suggesting that, despite their importance for maritime sovereignty and management, they are still at an early stage of scientific maturation or are approached in an incipient way, representing research gaps that can be exploited for the future development of Brazilian BE (Figure 5).

Figure 5. Thematic map of relevant terms



Source: Authors (2026).

LITERATURE REVIEW

Developing the discussion in order to obtain a more specific overview of the advances in terms of BE in Brazil, in general terms, the literature shows that the works range from the management of oceanic economic activities to issues of governance, social justice and technological innovation. In this multidimensional context, mapping the main contributions allows the identification of trends, challenges, and opportunities related to its consolidation in the Brazilian context, expanding and grounding the analysis, based on scientific evidence.

The study by Duarte (2016) discusses that the maritime dimension of Brazilian policy is related to the development of the Blue Amazon, aiming to reconcile the policy of defense and national security with the maritime areas, exploration of energy resources, and geopolitical projection in the South Atlantic. However, another study by Duarte and Kenkel (2019) investigated,

through a comparative study with other countries in the southern hemisphere, that a state and security bias is still noticeable, limiting the integration of collaborative approaches to ocean governance and revealing, for example in South Africa, participatory and multilateral maritime management strategies capable of articulating security, development and inclusion of local actors.

Moving on to the field of public policies, the studies by Gerhardinger et al. (2020) and Guerreiro et al. (2021) discussed that the MSP represents an important instrument to define the sustainable use of the oceans, but that its full implementation still faces challenges related to institutional fragmentation and the still incipient development of operational mechanisms. The main argument, according to the work of Franz et al. (2021), is that its effectiveness does not depend only on technical factors but on the integration of different levels of government, which requires the strengthening of scientific infrastructure, such as coastal observation and modeling systems, which would enable the monitoring of environmental and socioeconomic parameters in real time.

Analyzing the context on a continental scale, the study by Santos (2025) on the progress of the MSP in Latin America shows that Brazil is in an intermediate position, that is, with ongoing initiatives but still without robust institutional coordination, while, at the regional level, Santos et al. (2024) argued that the state of Rio de Janeiro stands out for having a detailed mapping of its coastal economic activities, reinforcing the relevance of subnational policies aligned with national BE strategies. The study by Siverwood-Cope and Ling (2021) presents evidence that the lack of standardization in public spending linked to the sea, especially in relation to subsidies and tax incentives, compromises the coherence of ocean sustainability policies.

In the field of measuring the economy of the sea, a recent milestone was the application of input-output matrices by Carvalho & Inácio de Moraes (2021) to track economic chains associated with marine activities, making it possible to estimate that about 19% of Brazilian GDP derives from coastal and oceanic activities, with greater weight for tourism, transport, and energy. Subsequently, the study by Haddad and Araújo (2025) proposed to institutionalize the Ocean Satellite Account to enable the management of sectoral and regional statistics in a system that supports and coordinates economic and environmental policies. The work of Câmara et al. (2024) evidenced that coastal capitals have the greatest potential for transition to sustainability, with Rio de Janeiro standing out in accounting for 83.3% of the sectoral value added and 26.9% of formal jobs in the period analyzed.

From a comparative and macroeconomic perspective, Han et al. (2025) analyzed 17 economies in transition, including Brazil, and showed that inclusive growth, green technological innovation, renewable energy consumption, and aquaculture are associated with the reduction of the ecological footprint, while total fishing, the aggregate between agriculture, forestry, and fisheries, and resource depletion increase environmental pressures, reinforcing policy orientation towards renewables, sustainable fisheries management, and green finance as pillars of an inclusive BE.

In the context of production chains, Silva et al. (2024) analyzed shrimp aquaculture from the perspective of frugal innovation and showed that low-cost technical and organizational solutions can mitigate environmental impacts and increase process efficiency. Later, Bastos-

Filho et al. (2025) investigated the sustainable exploitation of the fluorescent pigment *R-phycoerythrin* from algae cultivated on the coast of Ceará, which demonstrated the biotechnological potential of native marine species for pharmaceutical and industrial applications.

Another front of investigation identified in the literature refers to the concept of multiuse of ocean space, initially explored in the study by Weiss et al. (2023), which develops an analysis within the scope of the Exclusive Economic Zone (EEZ) to identify possible areas of convergence between emerging and traditional uses of the sea, such as the simultaneous application of wind (and wave) energy with aquaculture activities. In the same vein, Medeiros et al. (2024) presented spatial compatibility models equally applied in the EEZ, indicating that the combination of wind and wave energy has high synergy, while activities such as mining and intensive aquaculture tend to generate conflicts.

Later, Diederichsen et al. (2025) also conducted similar experiments in coastal communities in southern Brazil, showing that it is possible to generate economic and social benefits through the integration between artisanal fishing, tourism, and environmental conservation, as long as there is the support of a horizontal governance model, as well as community participation.

Within the scope of natural resource-based solutions, Queiroz et al. (2024) used shell residues from aquaculture in the construction of coastal structures, revealing their effectiveness in increasing biodiversity and containing invasive species. Next, Sadoughipour et al. (2025) explored the energy use of marine currents, suggesting perspectives for diversification of the matrix and identifying that projections for the north coast remain limited by the insufficiency of consistent data.

Advancing the review from a social perspective, there is a great emphasis on socio-environmental vulnerabilities and conflicts, such as the study by Câmara et al. (2021) on the oil spill that hit the Northeast in 2019-2020, demonstrating the socioeconomic fragility of coastal communities dependent on tourism and fishing. Similarly, Dos Santos et al. (2023) found, on urban beaches in Salvador, low levels of environmental awareness among users and concluded that it is important to disseminate and defend education policies that promote social co-responsibility.

In the literature related to historical inequalities in access to and use of marine assets, studies focused on blue justice show that coastal development initiatives and mariculture policies have driven the privatization of public waters and the exclusion of traditional fishermen. To address this situation, they recommend participatory instruments such as community mapping and the integration of local ecological knowledge into planning (Reis-Filho et al., 2024; Silva & Pierri, 2024).

In addition, Fassina et al. (2025) showed the growing incorporation of gender issues, emphasizing fisherwomen as agents of resilience in the face of climate change and productive transformations; however, they point out that limited female participation in decision-making processes and policies in the sector is still noticeable, demanding more robust affirmative actions.

In the ecological context, Nemzoue et al. (2024) investigated the continental shelf of Ceará and identified correlations between geological features and benthic biological diversity, offering subsidies for environmental zoning and impact monitoring. In the historical literature on the modernization of fishing in the extreme south of the country, Moura and Diegues (2024) demonstrated that state policies and models of industrial exploitation, implemented between the 1940s and 1990s, generated social exclusions and environmental degradation, anticipating dilemmas that are now reflected in discussions about BE. Such works complement and reinforce the diagnosis of Neto et al. (2021), who described the Brazilian fishing sector as a “sleeping giant”, hampered by institutional discontinuity and the absence of consistent data, showing that the sustainability of BE depends on solid ecological foundations and historical understanding of socio-environmental transformations.

Finally, to strategically compare the studies found in the literature, Brazilian summarizes the authors, the thematic focus of the studies, the method or approach used, as well as the main conclusions obtained through such studies (Table 1).

Table 1. Comparative matrix of the articles found

Author/Year	Thematic focus	Method/Approach	Key findings
Bastos-Filho et al. (2025)	Potential of <i>R-Phycoerythrin</i> in BE	Experimental (laboratory)	Bioeconomic potential
Câmara et al. (2021)	Socioeconomic vulnerability to the oil spill 2019-2020	Spatial analysis and indicators	Need for territorial management and economic support
Câmara et al. (2024)	Potential for “blue” by sector/territory (SDGs)	Socioeconomic indicators	Tourism stands out compared to O&G
Carvalho e Inácio de Moraes (2021)	Size of the coastal/marine economy in Brazil	Economic modeling	Relevant contribution to GDP
Silva et al. (2024)	Frugal innovation in shrimp farming	Qualitative case study	Gains linked to SDGs
Diederichsen et al. (2025)	Multipurpose approach and local BE	Participatory case study	Need for governance and infrastructure improvement
Santos et al. (2023)	Marine litter and perception (Salvador)	Field research	Integrated management required
Duarte (2016)	BE and maritime security in the South Atlantic	Policy essay	More active Brazilian posture
Duarte; Kenkel (2019)	Maritime Security Governance (Brazil/South Africa)	Conceptual comparison	Regional governance gaps
Fassina et al. (2025)	Blue justice, gender and climate adaptation	Qualitative	Importance of ecological knowledge and gender equality
Franz et al. (2021)	Coastal observation/modelling and BE	Technical summary	Scientific and socioeconomic improvement through integrated networks
Gerhardinger et al. (2020)	Transition to BE	Proposal/revision	Importance of national vision and collaborative processes
Guerreiro et al. (2021)	MSP Governance (Tropical Atlantic vs. EU)	Institutional comparison	Effective MSP demands a robust legal and institutional basis
Haddad; Araújo (2025)	Regional structure of the ocean economy	Regional economic modeling	Need for a heterogeneous and interdependent BE
Han et al. (2025)	BE, inclusion and sustainability (17 economies)	Panel econometrics	Inclusion supports sustainability
Medeiros et al. (2024)	Spatial compatibility of uses (South EEZ)	Multicriteria decision methods with experts	Wind and wave are more compatible
Moura; Diegues (2024)	Modernization of fisheries (Southern Brazil)	Historical analysis	Modernization impacted artisanal fishing
Nemzoue et al. (2024)	Benthic and geodiversity (Ceará)	Ecological survey	Geodiversity as a management basis
Neto et al. (2021)	Diagnosis of Brazilian fishing	Institutional diagnosis	Need for governance and data reform
Queiroz et al. (2024)	Eco-coastal engineering (reuse of shells)	Experimental applied	It is a practical solution for biodiversity
Reis-Filho et al. (2024)	Blue justice and coastal development	Participatory mapping	Conflicts with large enterprises persist
Sadoughipour et al. (2025)	Energy from ocean swells	Observational assessment	Definition of promising locations through regional variability and limitations analysis
Santos (2025)	MSP and BE Integration (LATAM)	Regional review	Integration is still incipient

Santos et al. (2024)	Ocean economy in Rio de Janeiro	Sector analysis (official data)	O&G and tourism lead
Silva; Pierri (2024)	Mariculture and ocean grabbing	Document analysis/interviews	Arrangements still favor privatization and inequalities
Siverwood-Cope; Ling (2021)	Exemptions, subsidies and BE	Review of public spending	High and loosely aligned incentives
Weiss et al. (2023)	Multipurpose zones in the EEZ of Brazil	Spatial analysis	Attention to conservation units in the MSP

Source: Authors (2026).

CONCLUSION

Considering the proposed hybrid investigation, consisting of a bibliometric analysis followed by a literature review, it was possible to successfully identify the main trends, challenges, and opportunities in the field of Blue Economy at the national level.

In the case of trends, the operationalization of Marine Spatial Planning was identified as a pillar of Brazilian ocean policies, although its effectiveness depends on greater sectoral integration and greater scientific infrastructure (Franz et al., 2021; Santos, 2025). In addition, the improvement of economic metrics and the sea satellite account was widely investigated as a guiding factor for regional policies and impact monitoring (Carvalho & Inácio de Moraes, 2021; Haddad & Araújo, 2025). It is also attributed as a possible trend the implementation of multi-use approaches and spatial compatibility in the management of emerging activities, such as ocean energy and aquaculture (Weiss et al., 2023; Medeiros et al., 2024), as well as the strengthening of the blue justice and inclusive bioeconomy agendas, in which frugal innovation and traditional knowledge have complementary roles (da Silva et al., 2024; Reis-Filho et al., 2024).

Regarding the challenges, it is possible to highlight institutional fragmentation, the incoherence of tax incentives, conflicts of use in coastal areas, persistent gender inequality, and the lack of reliable data on biodiversity and energy resources (Siverwood-Cope & Ling, 2021; Silva & Pierri, 2024; Sadoughipour et al., 2025). Finally, as for the opportunities, according to the analysis implemented, they are included in the creation of pilot zones of multiple uses, in the reconfiguration of economic incentives due to sustainability, in the densification of participatory governance, and in the integration of local technological solutions to maritime productive chains (Franz et al., 2021; Weiss et al., 2023; Bastos-Filho et al., 2025).

Based on the trends, challenges, and opportunities identified, it is possible to conclude that, despite the country's natural resources, technical knowledge, and sociocultural diversity for the development of a robust Blue Economy strategy, its full viability still requires efforts for greater institutional coherence and political effectiveness, making the articulation between science, marine spatial planning, and environmental and cultural diversity relevant, inclusive innovation and social justice through the balance between economic use and conservation of the Blue Amazon.

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