



Unlocking the Potential of the Sustainable Blue Economy: Opportunities and Threats in a Changing Global Landscape

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Abstract. This research explores the opportunities and challenges in developing a sustainable blue economy, which has great potential to drive economic growth, social welfare, and environmental conservation. The method used was a Systematic Literature Review (SLR) based on the PRISMA framework, by analyzing 154 Scopus-indexed articles using five main keywords. The results show that the main opportunities are policy support, increased investment, the creation of new economic sectors, and the development of environmentally friendly technologies. However, significant challenges include legal uncertainty, marine pollution, limited human resources, and global market fluctuations. The novelty of this research lies in the comprehensive approach that integrates various dimensions of the blue economy. With the increasing urgency of marine resource management, this study offers strategic guidance to capitalize on opportunities and overcome obstacles, while also serving as a foundation for future blue economy research and policy.

Keywords: Opportunities; Threats; Sustainable blue economy

1. INTRODUCTION

The sustainable blue economy is one of the key concepts in global development that focuses on utilizing marine resources to drive economic growth while ensuring the sustainability of marine ecosystems [1], [2]. The concept covers a wide range of sectors, such as fisheries, ecotourism, ocean-based renewable energy, and maritime transportation, which have great potential to contribute to the achievement of the Sustainable Development Goals (SDGs), particularly the goals related to poverty alleviation, social equality, and environmental conservation [3]. In the changing global context of climate change, population growth, and marine ecosystem degradation, it is important to understand how the opportunities of the blue economy can be maximized while addressing the challenges

that hinder its implementation [4]. While the blue economy is considered a potential solution to economic, social, and environmental pressures, its implementation still faces some significant obstacles. Challenges such as non-integrated management, lack of political and financial support, non-compliance with laws, as well as environmental threats due to climate change and marine pollution, are barriers that slow down the implementation of a sustainable blue economy [2], [5]. In addition, there are gaps in the participation of coastal communities which are often the most affected, yet less empowered in decision-making [6], [7].

Most of the existing literature focuses on sectoral aspects or specific case studies without providing a holistic picture of the opportunities and threats of the blue economy in a changing global landscape [8], [9], [10]. Therefore, a comprehensive analysis is needed to thoroughly understand the dynamics of blue economy opportunities and challenges, which can help policymakers, academics, and practitioners in formulating more effective management strategies. This research offers a unique and up-to-date approach by integrating the opportunities and challenges of the blue economy in one comprehensive analytical framework. This study uses a systematic literature review (SLR) approach based on the PRISMA framework [11], to map findings from articles indexed in Scopus. With these methods, this research can provide new insights into how a sustainable blue economy can be developed in a complex global context, covering political, economic, social, environmental, as well as technological and innovation aspects. The novelty of the research also lies in exploring the interaction between opportunities and threats in the blue economy, as well as strategic recommendations to maximize the potential of the blue economy while addressing the challenges. This provides a foundation for further research and more effective policy development. This research is crucial due to the vital role of marine resources in human life, providing 70% of oxygen, supporting 3 billion people, and having a trillion-dollar economic potential[12]. It promotes the blue economy as an equitable, sustainable solution to global challenges, serving as a reference for policymakers and industry players.

2. METHOD

2.1. Population and Sample

The population in this study includes all articles related to Blue Economy and Blue Entrepreneurship that are related to sustainability and are available in the Scopus database. The total number of articles collected was 154. To obtain relevant samples, this study applied a purposive sampling method. The sample was selected based on the relevance of the articles to the research topic using 5 specific keywords, namely: 1) Blue Entrepreneur; 2) Blue Entrepreneurship; 3) Blue Entrepreneurial; 4) Blue Economy AND Sustainable; 5) Blue Economy AND Sustainability. In the sample screening process, several inclusion and exclusion criteria were applied to ensure the quality and relevance of the articles used. The

criteria were as follows: 1) Duplicate Articles; 2) Journal Sources; 3) Auto-mark as ineligible; 4) Article Language; 5) Irrelevant Fields.

2.2. Data Collecting

Data collection in this study was carried out using Publish or Perish 8 software. This tool is used to extract relevant articles indexed in the Scopus database, based on predetermined keywords. By using Publish or Perish, researchers can identify and collect articles with high citations and strong relevance to Blue Economy, Blue Entrepreneurship, and Sustainability. This tool allows researchers to obtain comprehensive data on published articles, including information on the number of citations, year of publication, journal published, and more. This process ensures that the data used in this research comes from reliable and relevant sources.

2.3. Data Analysis

This research uses a content analysis approach to review literature related to “Blue Economy” and “Blue Entrepreneurship” focusing on sustainability. Through content analysis, this research aims to identify opportunities and threats in the development of a sustainable blue economy. This research uses a Systematic Literature Review (SLR) as the methodological design. The SLR process is carried out following the guidelines recommended by Snyder[NO_PRINTED_FORM] [13] and includes structured steps in screening, assessing, and analyzing relevant literature. This design allows researchers to gather comprehensive and objective evidence on the topic under study.

This study also followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines suggested by Page et al[NO_PRINTED_FORM] [11]. The reliability and validity of this research are maintained through the use of reliable software and a rigorous article selection process per PRISMA guidelines. All steps in data collection and analysis were carried out with full transparency, and the results obtained will be critically reviewed to ensure that the conclusions drawn are based on valid and reliable data.

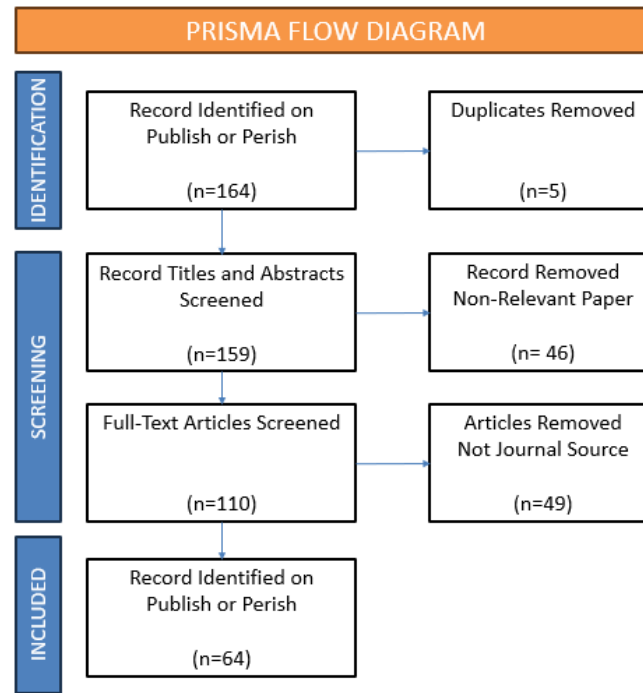


Fig. 1. The journal collection process is illustrated according to the PRISMA flow diagram

3. Result and Discussion

3.1. Content Analysis

a. Opportunities for a Sustainable Blue Economy

1) Political and Legal

A sustainable blue economy requires strong national and international political and policy support [14], [15]. Governments play a crucial role in creating policies supporting marine and fisheries, as well as other natural resources. Incentives for investment and environmental sustainability regulations are essential[16], [17]. Strong national sovereignty and international agreements strengthen countries' position in managing their blue economies sustainably [17].

2) Social and Cultural

Public awareness of ocean sustainability and sustainable marine resource management can create social support and encourage participation in sustainability practices[14], [18]. Promoting equality and social welfare, the blue economy can open up more equitable economic opportunities for coastal and fisheries communities,

contributing to poverty alleviation in coastal areas through ecotourism revenue sharing and marine resource management[18], [19], [20], [21].

3) Economics

The blue economy offers significant economic growth and investment opportunities, including sustainable fisheries, eco-ports, and ocean-based industries[14], [18], [22]. These sectors create new jobs, improve national economic resilience, and support local food security[23], [24]. The sustainable blue economy also uses marine resources for domestic consumption and seafood production, increasing the availability of nutritious food for a growing global population[20], [25].

4) Environmental

Marine resource management offers significant opportunities for capacity building, conservation programs, and ecotourism[26]. These efforts can mitigate overexploitation and ensure the sustainability of marine ecosystems. Ecotourism can create income and raise community awareness about nature preservation[15]. Reducing greenhouse gas emissions through marine resource management can contribute to global climate change targets. Preserving marine resources for renewable energy use also presents new opportunities[27].

5) Technology and Innovation

Technology and innovation are crucial for a sustainable blue economy, including environmentally friendly technologies for marine waste management and real-time monitoring of seawater quality[4], [28], [29]. Renewable energy, such as wave power and tidal energy, can also contribute to a sustainable green economy. Encouraging eco-friendly technologies in sectors like fisheries, marine transportation, and ecotourism can reduce environmental impact and ensure long-term sustainability[20], [21], [24], [30]. Collaboration between governments, private sector, communities, and international institutions is essential for successful implementation.

b. Challenges of a Sustainable Blue Economy

1) Political and Legal

Developing a sustainable blue economy faces challenges due to low law compliance and illegal activities[14], [18]. Inconsistent enforcement of marine resource management regulations, such as unreported and unregulated fishing, hinders efforts to maintain marine ecosystem sustainability[25], [31]. Differences in policies and regulations between countries and regions also hinder international coordination[19], [24], [30]. Legal uncertainties, political instability, and maritime security issues like piracy and border conflicts further complicate the implementation of sustainable blue economy policies[4], [26], [31], [32].

2) Economics

In the economic sector, the most prominent challenge is the lack of financial support for the sustainable development of the blue economy [14], [30], [33]. Many

countries, especially developing countries, have difficulty in allocating sufficient budget to the marine sector, which is often considered less of a priority than other sectors [26], [34], [35], [36]. Competition among countries in marine resource management causes tensions and reduces the effectiveness of international collaboration [21], [37], [38], [39], [40]. The limitations of existing infrastructure, both in the form of inadequate port facilities, as well as the lack of other supporting facilities, limit the country's ability to manage and utilize marine resources optimally [24]. High costs associated with green technologies and sustainable management of marine resources, as well as international market fluctuations affecting ocean-based commodity prices, further exacerbate the challenge of maintaining a stable and sustainable blue economy [27], [41].

3) Social and Cultural

Stakeholders involved in blue economy management governments, the private sector, coastal communities, and environmental organizations have different priorities, leading to tensions and difficulties in reaching a mutual agreement [4], [44], [52]. Increasingly marginalized coastal communities are also a major challenge [23], [39]. Many coastal communities have lost access to natural resources that are the source of their livelihoods due to regulations that are less favorable to social sustainability [15], [22], [42], [43].

4) Environmental Threats

Climate change, marine pollution, and natural disasters pose significant challenges to the development of a sustainable blue economy [25], [27], [28]. Sea level rise, tropical storms, and ocean temperature changes affect marine ecosystems and fisheries resources [31], [41]. Industrial waste and plastics pollute marine ecosystems, while the gap between conservation and economic development and the scarcity of natural resources add to the difficulty [21], [44].

5) Technology and Innovations

The marine sector faces challenges in technology and innovation due to limited environmentally friendly technologies, outdated, and damaging technologies [15], [26]. Lack of consistent methodologies, quality data, and poor governance in marine resource management hinder the development of sustainable strategies for blue economy management [21], [45]. Poor local, national, and international governance further exacerbates the situation [46].

Table 1. Opportunities and Challenges of a Sustainable Blue Economy

No	Opportunities	Items	References
1	Politics and Law	National and international support and policies	[14], [15]
		Strong national sovereignty	[47]
2	Social and Cultural	Increased public awareness of environmental conservation	[14], [18]

No	Opportunities	Items	References
3	Economics	Equality and social welfare	[18], [19], [20], [21], [30], [41], [46], [47]
		Poverty reduction	[18], [41]
		The potential for economic growth and investment in the marine sector	[14], [18], [19], [20], [29], [30], [33], [37], [38], [47], [48]
		New jobs, new economic sectors	[15], [18], [20], [21], [23], [26], [28], [29], [33], [37], [39], [41], [46], [47], [48]
4	Environmental	Financial benefits	[37]
		Supporting local food safety	[20], [41]
		Improved marine resource management capacity	
		Ecotourism	[15], [26], [40]
5	Technology and Innovation	Reduction of greenhouse gas emissions	[41]
		Preservation of marine resources for the next generation	[20], [30], [48], [49]
		Renewable energy	[26], [40], [50]
		Promoting environmentally friendly technology and innovation	[4], [20], [21], [23], [25], [28], [29], [30], [36], [47], [51]
Challenges			
1	Politics and Law	Low level of compliance with laws and regulations related to marine resource management	[14], [18], [27]
		Illegal activities	[14], [25], [26], [31]
		Policy and regulatory differences	[19], [24], [30], [52]
		Legal and institutional uncertainty	[4], [15], [19], [21], [26], [31], [32], [47]
2	Social and Cultural	Political upheaval and lack of political support for blue economy initiatives	[20]
		Maritime security and crime	
		Differences in stakeholder interests	[4], [23], [29], [35], [37], [52]
		Coastal communities are increasingly marginalized, unable to compete with large companies	[23], [37], [39]
3	Economics	Lack of community participation	
		Limited human resources	[14], [15], [18], [20], [22], [42], [43]
		Lack of financial support	[14], [26], [30], [33], [34], [35], [36]
		Competition between countries in marine resource management	[21], [36], [37], [38], [39], [40], [47]
		Limited infrastructure	[18], [24], [53]

No	Opportunities	Items	References
4	Environmental	Limited access to resources and capital	[14], [19], [26]
		High costs	[27]
		International market fluctuations	
		Climate change	[4], [14], [20], [25], [28], [31], [37]
		Marine pollution, industrial waste	[14], [25], [31], [37], [41], [48]
		Gap between conversion and economic development	[18], [21], [44]
		Scarcity of natural resources	[29]
		Environmental damage, ecosystem degradation	[25], [27], [28], [39], [48]
		Natural disasters	
		Limited technology and innovation	[15], [26]
5	Technology and Innovation	Lack of a consistent and integrated methodology for assessing the environmental impacts of ocean economic activities.	[21], [24], [30], [32], [45]
		Limited data and information	[32], [35]
		Governance	[46]

4. Conclusion

The development of a sustainable blue economy holds significant potential for global social, economic, and environmental well-being, particularly for countries reliant on marine resources. Key opportunities include strong political and legal support, economic growth through investment in the marine sector, promoting social equality in coastal communities, and the development of environmentally friendly technologies. However, challenges such as non-compliance with laws, political and security issues, competition, climate change, lack of financial support, limited infrastructure, and divergent stakeholder interests hinder its implementation. To capitalize on these opportunities, a blue economy management strategy should involve collaboration between public, private, and community sectors, with clear policies, adequate financial support, and environmentally friendly infrastructure. Increased public awareness and active participation in natural resource management will strengthen the social basis for a more inclusive blue economy. Future research should focus on in-depth empirical research, enhancing the study of environmentally friendly technologies, understanding coastal communities' participation, cross-country studies on blue economy policies, and economic modeling and cost-benefit analysis.

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