Chowdhury, M Rezaul Karim., Saharuddin Abdul Hamid, and Nurul Haqimin Mohd Salleh. "Conceptualization of Region-Specific Comprehensive Ocean Management Regime for Maritime Economic Exploration," *Hasanuddin Law Review* 11 no. 1 (2025): 106-131. DOI: 10.20956/halrev.v11i1.5027

HasanuddinLawReview

Volume 11 Issue 1, April 2025
P-ISSN: 2442-9880, E-ISSN: 2442-9899

Conceptualization of Region-Specific Comprehensive Ocean Management Regime for Maritime Economic Exploration

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Abstract: The history of the global economy is closely tied to the control of international trade routes, with maritime dominance playing a central role—evident in the supremacy of the Phoenicians, Arabs, and later European colonial powers. In the post-Cold War unipolar era, the USA has leveraged globalization through its maritime military hegemony. The Indian Ocean, particularly the Bay of Bengal (BoB), represents a critical hub for global sea trade and economic connectivity, intersecting with the South China Sea. Ensuring regional peace and stability is essential for sustaining international maritime trade and blue economic growth. This research introduces a novel Comprehensive Ocean Management Regime (COMR) tailored to the BOB maritime-littoral region to address these challenges and advance sustainable blue economic objectives. By critically analysing global coastal and ocean governance practices—such as Maritime Protected Areas and Integrated Coastal Zone Management—the study identifies policy, management, and operational challenges and proposes actionable solutions. Recognizing the limitations of aggregated sectoral data and the scarcity of precise quantitative insights, the study adopts a qualitative approach and employs the Delphi method to gather expert consensus through iterative analysis. The COMR framework provides a unique, actionable model that can guide sustainable maritime policy and management in the BOB region, contributing to the broader discourse on sustainable ocean governance.

Keywords: Global International Trade; Indian Ocean; Bay of Bengal; Blue Economic Objectives; COMR

1. Introduction

Oceans and seas cover two third areas of the globe, and about 80% of global trade is carried through water transportation.[1] Marine transportation is a significant, sometimes less conspicuous, component of the global economy.[2] The last 5000 years of the history of civilization prove that those who controlled the Ocean Routes and maritime trades had control over the global wealth of that Era.[3] After ancient Phoenicians and Greeks control

[1] Jouffray, Jean-Baptiste, Robert Blasiak, Albert V. Norström, Henrik Österblom, and Magnus Nyström. "The blue acceleration: the trajectory of human expansion into the ocean." *One Earth* 2, no. 1 (2020): 43-54.
[2] Semenov and Igolkina, "Modern Climate-Related Global Changes in the Ocean and Cryosphere: The 2019 Special Report of the Intergovernmental Panel on Climate Change (IPCC)."
[3] Tanhua, Toste, Siv K. Lauvset, Nico Lange, Are Olsen, Marta Álvarez, Stephen Diggs, Henry C. Bittig et al. "A vision for FAIR ocean data products." *Communications Earth & Environment* 2, no. 1 (2021): 136.

upon the Mediterranean, Arabs took over as Admirals of seas for centuries until European made their colonial expedition.[4]

The transition between the twentieth and twenty-first centuries was characterized by profound structural distinctions in geopolitical balances. Therefore, the environment, science, technology, and other economic sectors are connected to these. In terms of geography, these shifts are causing a rearrangement of power and the emergence of new political players; for their public significance, the so-called developing nations, notably Brazil, Russia, India, and China (BRIC), are an example of this sort of transformation, in which emerging actors replace those who "historically" hold power.[5] In political theory, the premise of territory has been closely linked to that of the State, the existence of which necessitates a geographical area over which to exercise power and a social body vitally rooted in interconnected land, which may result in a valuable maritime space of ambiguous political compound. In contexts of geopolitical doctrine, current geographic location created spatial patterns of political organization for systems of global significance that incorporated enormous territorial regions of a freshly explored world from its advent.[6]

Classical geographers like Carl Ritter and Richthofen did not consider the oceans as part of the oikumenes or inhabited globe because, despite their importance in forming large geostrategic notions, they were mostly viewed as nothing more than an encasement. They lack the physical and political entity that would enable them to be considered the primary subjects of geopolitical assertions.[7] New regions of geographical interest characterized by their preponderance of marine areas have started to be defined as a result of changes in the international power balances (including the collapse of imperialist maritime powers) and the new law of the sea, which happened simultaneously with the decolonization process. Emerging economies have changed the geopolitical chessboard in this way and the balance between political and economic forces.[8] Part of the wider "maritimization" upswing, countries endeavor to add their own maritime spaces, not just for economic reasons, but also in the geopolitical sense.

Geographical characteristics like islands, archipelagos and the continental shelf enable the growth of sovereign rights as states, the territorial entities that serve as the basis for international politics, eventually encroach into the maritime realm via jurisdictional expansion (i.e., territorial seas, contiguous zones, and exclusive economic zones). This event discusses some of the geographical characteristics that the United Nations Convention on the Law of the Sea (UNCLOS) is causing to change States' territorial bases

[4] Stephenson et al., "A Practical Framework for Implementing and Evaluating Integrated Management of Marine Activities."

[5] Stephenson, Robert L., Alistair J. Hobday, Christopher Cvitanovic, Karen A. Alexander, Gavin A. Begg, Rodrigo H. Bustamante, Piers K. Dunstan et al. "A practical framework for implementing and evaluating integrated management of marine activities." Ocean & Coastal Management 177 (2019): 127-138.

[6] Charles, Anthony, Laura Loucks, Fikret Berkes, and Derek Armitage. "Community science: A typology and its implications for governance of social-ecological systems." *Environmental Science & Policy* 106 (2020): 77-86.

[7] Cornu, Elodie Le, John N. Kittinger, J. Zachary Koehn, Elena M. Finkbeiner, and Larry B. Crowder. "Current practice and future prospects for social data in coastal and ocean planning." *Conservation biology* 28, no. 4 (2014): 902-911.

[8] Novaglio, Camilla, Narissa Bax, Fabio Boschetti, Gholam Reza Emad, Stewart Frusher, Liam Fullbrook, Mark Hemer et al. "Deep aspirations: towards a sustainable offshore blue economy." *Reviews in fish biology and fisheries* 32, no. 1 (2022): 209-230.

and hierarchies that were previously based only on developing land. It highlights new regions of geostrategic interest, including new political players and their domains of influence over the ocean. This exercise in maritime geography also intends to examine how power is exerted and certain crucial concepts and background data that refer to the older paradigms of classical geopolitics.[9]

Oceans have gained prominence on the political agenda as the new century has progressed. Two examples of this are the Obama Administration's 2009 initiative and the 2006 introduction of the Integrated Maritime Policy of the European Union.[10] Two notions or views of the world's oceans can be distinguished from one another by the large variety of international actions on this topic of interest that have notably determined the previous 20 years. The old paradigm, centered on competition, innovation, and knowledge, is replacing the old paradigm, which was connected with discoveries, the founding of colonial empires, and the alliance of commerce and naval might.[11] This new vision comprises a shift in strategic focus from conventional operations to new technologies, energy security, and regional (international) leadership based on increasing maritime dominance (spatial and economic). These initiatives have taken several forms, including forming new strategic visions, establishing policies, and adopting new ocean laws that are inclusive in character.

In general, it is beneficial to build the framework for a new way of thinking about how nations depend on the seas to address the difficulties of a new world and how the oceans play a part in that. The most developed countries are developing a new understanding of the oceans that rejects the "navalistic" mentality of the nineteenth century and in which, at least formally, the environment is one of the key pillars (sustainability and ecosystem management; blue growth), and a new hierarchy of priorities emerges: Energy security has taken the place of food security, and leadership now prioritizes innovation, knowledge, and new technologies above naval might and trade alliance development.[12]

The objective of this paper is to propose a region-specific Comprehensive Ocean Management Regime (COMR) model for the Bay of Bengal maritime-littoral region. The aim is to sustainably achieve blue economic objectives by examining and addressing challenges at policy, management, and operational levels related to coastal and ocean initiatives such as Maritime Protected Areas and Integrated Coastal Zone Management. The study also explores the significance of regional peace and stability as prerequisites for the sustainability of international maritime trade and other blue economic functions in the specified area. Additionally, the research employs the Delphi method to obtain expert opinions and establish a consensus in addressing the outlined research objectives. This paper is structured as follows: the next section provides a detailed review of relevant

[9] Sumaila, U. Rashid, Daniel Skerritt, Anna Schuhbauer, Naazia Ebrahim, Yang Li, Hong Sik Kim, Tabitha Grace Mallory, Vicky WL Lam, and Daniel Pauly. "A global dataset on subsidies to the fisheries sector." *Data in brief* 27 (2019): 104706.
[10] Ehler, Charles N. "Two decades of progress in Marine Spatial Planning." *Marine Policy 132* (2021): 104134.
[11] Rudd, Murray A., Mark Dickey-Collas, Johanna Ferretti, Ellen Johannesen, Nicol M. Macdonald, Richard McLaughlin, Margaret Rae, Torsten Thiele, and Jason S. Link. "Ocean ecosystem-based management mandates and implementation in the North Atlantic." *Frontiers in Marine Science* 5 (2018): 485.
[12] Shabtay, Ateret, Erwann Lagabrielle, Virginie Plot, Gaël Potin, and David Guyomard. "Marine spatial planning provides a comprehensive framework for building evidence-based shark risk management policies with sea-users." *Environmental Science & Policy* 111 (2020): 18-26.

literature, followed by the research methodology and data analysis. The findings and proposed COMR framework are presented and discussed in subsequent sections, concluding with policy recommendations and areas for future research.

2. Explanation of Rapports

2.1. Sustainable Development Approach and SDG 14

Sustainable development is a method of developing society that ensures its long-term survival. It necessitates taking into account both immediate and long-term needs, such as promoting social and economic equality or safeguarding the environment and natural resources, all of which may contribute to achieving SDG 14: Protect oceans, seas, and marine resources and ensure their sustainable use for sustainable development. The concept of sustainable development was developed due to the industrial revolution. Western civilizations began acknowledging that their economic and industrial activities considerably influenced the environment and the social order in the second half of the 19th century. Numerous ecological and socioeconomic catastrophes have occurred worldwide, raising awareness of the need for a more sustainable strategy.[13]

2.2. Economic Growth and Development Towards Human Wellbeing

Increases in per capita and overall income are indicators of economic progress. The improvement in living standards overall is what makes the increase in per capita income a stronger indication of economic progress. Economic growth is measured by real national income changes, not only in money or nominal national income. In other words, the growth shouldn't only be a result of higher market prices for already-available goods but also a result of increased production of goods and services. Real Income Growth should be For a Long Time: Real national income growth and per-capita income increases should continue for a considerable time. It is important to distinguish between economic growth and short-term seasonal or transient improvements in income.[14] The basis for revenue growth should be an increase in productive capacity: Income increases can only be sustained if they are the result of a large and durable development in the economy's productive capacity, such as modernization or the application of new technologies in manufacturing, the upgrading of infrastructures, such as the transportation system, or enhanced power production.[15]

A consistent rise in society's material well-being is referred to as economic development. It includes social, cultural, political, and economic advancements that benefit the material world and national income growth. All of these adjustments to institutional and organizational structures, technology, skill, efficiency levels, population size and composition, and resource availability are included. With these upgrades, bigger

[13] Bennett, Nathan J. "In political seas: engaging with political ecology in the ocean and coastal environment." *Coastal Management* 47, no. 1 (2019): 67-87.
[14] Castro-Santos, Laura, A. Rute Bento, Dina Silva, Nadia Salvação, and Carlos Guedes Soares. "Economic feasibility of floating offshore wind farms in the north of Spain." *Journal of Marine Science and Engineering* 8, no. 1 (2020): 58.
[15] Lundquist, Carolyn J., and Elise F. Granek. "Strategies for successful marine conservation: integrating socioeconomic, political, and scientific factors." *Conservation Biology* 19, no. 6 (2005): 1771-1778.

objectives are achieved, such as ensuring more equitable income distribution, increasing employment, and reducing poverty. When basic factors that determine supply and demand undergo a long series of corresponding adjustments, the net national product of a nation will ultimately rise. Economic development is happening at this point.[16]

2.3. Maritime Trade for Net Worth Growth

Maritime transport is the basis of the international economy and responsible for more than 80% of global trade volume. Global supply chains provide a convoluted web of trade movements. The design of this network affects the ecosystems as well as the economic development of the impacted areas. Additionally, research demonstrates that maritime trade flows follow a random path on the underlying sea link network structure, highlighting its crucial role in the development of maritime commerce.[17]

2.4. Blue Economic Functions Agreed at SBEC 2018 Nairobi

In Nairobi, Kenya, from November 26 to November 28, 2018, the Sustainable Blue Economy Conference was conducted. The conference with the theme "The Blue Economy and the 2030 Agenda for Sustainable Development" was attended by seven heads of State and government, 84 ministers, representatives from various levels of government, academics, the scientific and research community, the United Nations, and other intergovernmental organizations, international organizations, business and private sector entities, and more than 18,000 participants from 184 countries.[18]

Throughout the three days of the conference, attendees actively engaged in panel discussions and other conversations that focused on how to conserve aquatic resources, such as oceans, seas, lakes, and rivers, sustainably for improved human welfare, social fairness, and healthy aquatic ecosystems.[19] These following nine major themes dominated the discussions,

a. smart “shipping, ports, transportation and global connectivity;
b. employment, job creation and poverty eradication;
c. cities, tourism, resilient coasts and infrastructure;
d. sustainable energy, mineral resources and innovative industries;
e. managing and sustaining marine life, conservation and sustainable economic activities;
f. ending hunger, securing food supplies and promoting good health and sustainable fisheries;
g. climate action, agriculture waste management and pollution-free oceans;
h. maritime security, safety and regulatory enforcement; and
i. people, culture, communities and societies – the inclusive blue economy.”

[16] Sala, Enric, Juan Mayorga, Christopher Costello, David Kroodsma, Maria LD Palomares, Daniel Pauly, U. Rashid Sumaila, and Dirk Zeller. "The economics of fishing the high seas." *Science advances* 4, no. 6 (2018): eaat2504.
[17] Kosowska-Stamirowska, Zuzanna. "Network effects govern the evolution of maritime trade." *Proceedings of the National Academy of Sciences* 117, no. 23 (2020): 12719-12728.
[18] Klinger, Dane H., Anne Maria Eikeset, Brynhildur Davíðsdóttir, Anna-Marie Winter, and James R. Watson. "The mechanics of blue growth: management of oceanic natural resource use with multiple, interacting sectors." *Marine Policy 87* (2018): 356-362.
[19] Das, Jewel. "Blue economy, blue growth, social equity and small-scale fisheries: a global and national level review." *Studies in Social Science Research* 4, no. 1 (2023): 38-82.

2.5. Marine protected areas (MPAs)

The World Conservation Union (IUCN) defines marine protected areas (MPAs) as portions of intertidal or subtidal ecosystems, together with their surrounding waters, flora, fauna, and other characteristics, that have been set aside and preserved by legislation or other effective measures.[20] Although MPAs are fundamentally spatial, many studies of MPA economics—particularly those with a strong theoretical emphasis—are built using aggregated models that are geographically homogeneous. The need for building spatially diverse models has been acknowledged, and work is being done in this area to provide the necessary insights on issues like the desirable "architecture" of MPAs to maximize economic gains and the economically optimum location of an MPA inside a particular region.[21]

2.6. The Sovereignty of State and it's Maritime Jurisdiction Under UNCLOS

UNCLOS 1982 has a few underlying principles among those are Sovereignty over Resources, Precautionary Action, Common Heritage of mankind, Environmental Conservation, Sustainable Development, International Cooperation etc.[22] Territorial Sea (TS), Contiguous Zone (CZ), Exclusive Economic Zone (EEZ), and Continental Shelf (CS) are among the areas under a state's jurisdiction. While the High Seas, Superjacent Aerospace, Deep Seabed, and The Area are considered the common heritage of humanity, any nation, even those landlocked, has the right to engage in economic exploration there.

Boundary "determinations, fisheries and aquatic resources, regional fishery management, fishery conservation zones, straddling and high seas stocks, mineral resources, continental shelf minerals, deep seabed minerals, marine research and technology, consent regime, technology transfer, and environmental protection, including vessel discharges, ocean dumping, transportation of hazardous wastes, land-based marine pollution, airborne marine pollution, persistent pollutants, and other issues."

Dispute Resolution mechanism includes the International Tribunal of the Law of the Sea (ITLOS), Annex VII Arbitration, Annex VIII Special Arbitration and the International Court of Justice (ICJ). It is worth mentioning that there is no national jurisdiction beyond TS, CZ, EEZ and CS, hence in regional sea areas further regional frameworks would be necessary to harmonize diverse national interests, which could accommodate endeavor towards Blue Economic functions peacefully.

[20]Kriegl, Michael, Xochitl E. Elías Ilosvay, Christian von Dorrien, and Daniel Oesterwind. "Marine protected areas: at the crossroads of nature conservation and fisheries management." *Frontiers in Marine Science* 8 (2021): 676264.
[21] Sumaila, U. Rashid, Daniel Skerritt, Anna Schuhbauer, Naazia Ebrahim, Yang Li, Hong Sik Kim, Tabitha Grace Mallory, Vicky WL Lam, and Daniel Pauly. "A global dataset on subsidies to the fisheries sector." *Data in brief* 27 (2019): 104706.
[22] Chowdhury, M. Rezaul Karim, Saharuddin Abdul Hamid, and Nurul Haqimin Mohd Salleh. "Maritime dispute resolution: understanding adequacy of UNCLOS: a systematic review." *Australian Journal of Maritime & Ocean Affairs* (2024): 1-22.

3. Explanation of Rapports

Advocates have demanded a more comprehensive approach to ocean management, focusing largely on the coastal zone, since the early 1970s. Since the consequences of coastal development on marine ecosystems are obvious and simple to comprehend, it is probable that Integrated Coastal Zone Management (ICZM) emerged initially. However, the idea of integrated management of ocean systems was expanded beyond the coast to the formation of ocean policy and governance in national and international authorities after the United Nations Summit on Environment and Development (UNCED) conference in Rio de Janeiro in 1992. Other focus changes, such as the adoption of the "ecological approach to management," followed this shift in direction.[23]

These advancements recognize natural ocean ecosystems' biological, ecological, and biogeochemical interconnectivity from a natural sciences perspective.[24] From a sociopolitical perspective, this mutation acknowledges that management is ostensibly the governance of human behavior associated with the extraction of human benefits and that there will always be conflicting interests that must be settled, ideally through logical, consensual, and peaceful means while managing ocean resources.

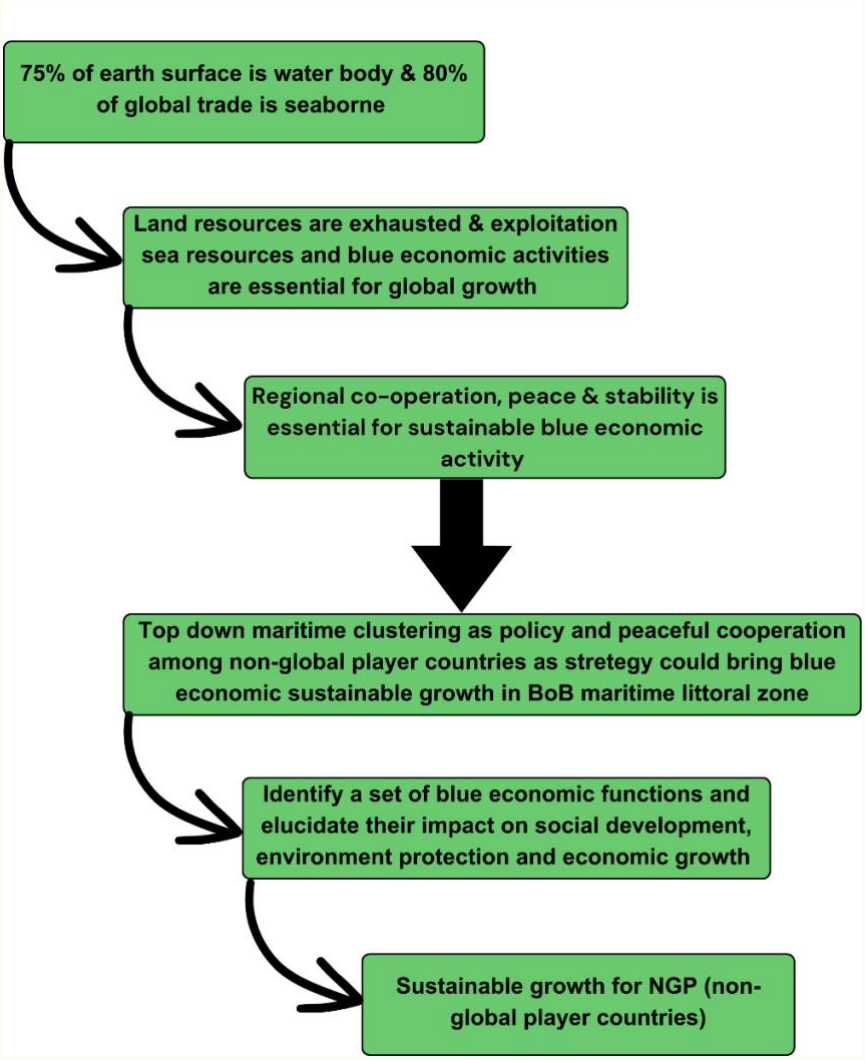
During the first half of the twentieth century, the United States of America's Naval Forces superseded the Strength of the British Royal Navy and took over the control of strategic Ocean Routes[25], then came up with a project called Marshall Aid, which proposed the development of Europe or rebuilding Europe for sustaining USA hegemony in the long run.[26] Encouraged by the success of the European Union, other initiatives took place in East Asia and South East Asia, where China as a major economic player, was growing in the vicinity; another Sub-regional effort like the Nordic Shipping revival also came out as a success story of Regionalism.[27]

Trade seems to increase income by promoting the accumulation of human and physical capital and boosting production for a given level of capital.[28] The marine industry significantly impacts trade volume, trade conditions, and the ability of emerging nations to expand their economies.[29] The maritime sector is currently confronted with several challenges, including recently implemented safety and environmental management standards, a radical information management change, cargo processing and commercial

[23] Arkema, Katie K., Sarah C. Abramson, and Bryan M. Dewsbury. "Marine ecosystem-based management: from characterization to implementation." *Frontiers in Ecology and the Environment* 4, no. 10 (2006): 525-532.
[24] Alexander, K. A., and Marcus Haward. "The human side of marine ecosystem-based management (EBM):'Sectoral interplay'as a challenge to implementing EBM." *Marine Policy* 101 (2019): 33-38.
[25] Tanhua, Toste, Siv K. Lauvset, Nico Lange, Are Olsen, Marta Álvarez, Stephen Diggs, Henry C. Bittig et al. "A vision for FAIR ocean data products." *Communications Earth & Environment* 2, no. 1 (2021): 136.
[26] Stojanovic, Tim, David R. Green, and Graham Lymbery. "Approaches to knowledge sharing and capacity building: The role of local information systems in marine and coastal management." *Ocean & coastal management* 53, no. 12 (2010): 805-815.
[27] Semenov and Igolkina, "Modern Climate-Related Global Changes in the Ocean and Cryosphere: The 2019 Special Report of the Intergovernmental Panel on Climate Change (IPCC)."
[28] Biermann, Frank, Kenneth Abbott, Steinar Andresen, Karin Bäckstrand, Steven Bernstein, Michele M. Betsill, Harriet Bulkeley et al. "Transforming governance and institutions for global sustainability: key insights from the Earth System Governance Project." *Current Opinion in Environmental Sustainability* 4, no. 1 (2012): 51-60.
[29] Cash, David W., William C. Clark, Frank Alcock, Nancy M. Dickson, Noelle Eckley, David H. Guston, Jill Jäger, and Ronald B. Mitchell. "Knowledge systems for sustainable development." *Proceedings of the national academy of sciences* 100, no. 14 (2003): 8086-8091.

procedures, privatization and restructured shipping services, and a sizable potential increase in traffic.[30] Countries who are unable to adapt to these rapidly changing circumstances will find that their ability to support the expansion of their trade sector is compromised.[31]

Figure 1. Summary of the study background.

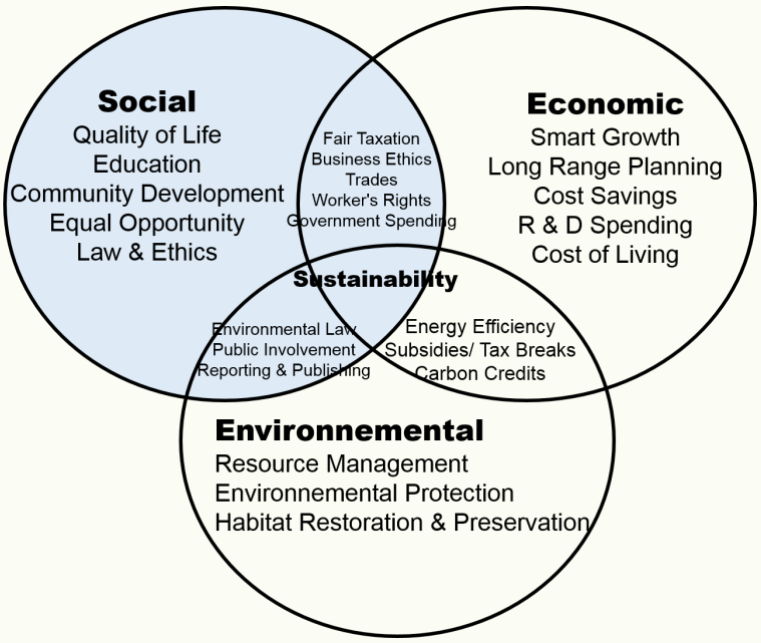


The globalization movement brought new challenges and possibilities to be commercial and political participants, changing not just the rules of the game but also the playing ground itself.[32] As a collective, the Nordic nations continue to play a significant role in

[30] Markusson, Nils, Franklin Ginn, Navraj Singh Ghaleigh, and Vivian Scott. "'In case of emergency press here': framing geoengineering as a response to dangerous climate change." *Wiley Interdisciplinary Reviews: Climate Change* 5, no. 2 (2014): 281-290.
[31] Cash, David W., William C. Clark, Frank Alcock, Nancy M. Dickson, Noelle Eckley, David H. Guston, Jill Jäger, and Ronald B. Mitchell. "Knowledge systems for sustainable development." *Proceedings of the national academy of sciences* 100, no. 14 (2003): 8086-8091.
[32] Biermann, Frank, Kenneth Abbott, Steinar Andresen, Karin Bäckstrand, Steven Bernstein, Michele M. Betsill, Harriet Bulkeley et al. "Transforming governance and institutions for global sustainability: key insights from the Earth System Governance Project." *Current Opinion in Environmental Sustainability* 4, no. 1 (2012): 51-60.

international shipping, elucidating the potential strength of regionalism.[33] It further states to explain the sustainability of Nordic Shipping in the longer term, The 'erosion' of the home factor is one of the key ingredients in this growth; leading Nordic enterprises have been able to stay at the top of their game by becoming 'less Nordic'.[34] This reveals that by complying with only national policy any country would not be able to sustain her growth for long in truly dynamic and international industries like shipping, definitely to become 'more global' one has to be 'less national' to accommodate international rules of the game to at one's advantage, that is known as regionalism for smaller nations.[35] It could also be explained as the Maritime Cluster approach in regional cooperation building for sustainable blue economic growth (Figure 1).[36]

Figure 2. Relationships among social, environmental and economic sustainability.



The escalating emphasis on ensuring sustainable development is a direct response to the inherent conflicts stemming from two global trends: the rapid expansion of human well-being and the swiftly increasing environmental deterioration (Figure 2). The interplay between these two phenomena has given rise to the perplexing and perilous features often referred to as the Anthropocene System. This term encapsulates the contemporary era where human activities significantly impact the Earth's ecosystems and geological

[33] Mathews, Darcy L., and Nancy J. Turner. "Ocean cultures: Northwest Coast ecosystems and indigenous management systems." *In Conservation for the Anthropocene ocean*, pp. 169-206. Academic Press, 2017.
[34] Petterson, Michael G., Hyeon-Ju Kim, and Joel C. Gill. "Conserve and sustainably use the oceans, seas, and marine resources." *Geosciences and the Sustainable Development Goals* (2021): 339-367.
[35] Mullan et al., "National Adaptation Planning: Lessons from OECD Countries"; Petterson, Kim, and Gill, "Conserve and Sustainably Use the Oceans, Seas, and Marine Resources."
[36] Iqbal, Rear Admiral M. Khaled. "Ocean governance for sustainable maritime development in the Bay of Bengal." *Bangladesh Maritime Journal* 4, no. 1 (2023).

processes, underscoring the urgent need for strategies that harmonize societal progress with environmental stewardship.[37]

The pillars of sustainable development form the basis of S.D. since their balance between environmental, economic, and social sustainability is its ultimate objective.[38] To successfully pursue sustainability, six interconnected abilities are required: measuring progress, promoting equality, adapting to shocks and surprises, changing the system, linking knowledge, and creating governance frameworks.

Enhancing strategies for sustainable development involves cultivating six essential capacities,

1. Measuring Sustainability Capacity: Developing the ability to quantify and assess sustainability metrics is vital for understanding the impact of various activities on both the environment and society.
2. Equity Promotion Capacity: Ensuring fairness and inclusivity across social, economic, and environmental dimensions is a fundamental aspect of fostering sustainable development.
3. Adaptation Capacity to Shocks and Surprises: Building resilience and flexibility to adapt to unforeseen challenges and changes in the environment is crucial for the success of sustainable development initiatives.
4. Changing Development Pathways Capacity: Developing the capability to redirect development trajectories towards more sustainable pathways is essential for addressing long-term environmental and societal concerns.
5. Linking Knowledge with Action Capacity: Establishing effective mechanisms to translate knowledge and research findings into practical, actionable strategies is key for informed decision-making in sustainable development.
6. Creating Collaborative Governance Structures Capacity: Fostering governance structures that promote collaboration and engagement among various stakeholders is critical for addressing complex sustainability challenges at local, regional, and global levels.[39]

The United Nations member states adopted the Millennium Development Goals (MDGs) in the year 2000, aiming to guide the global development agenda from 2000 to 2015. The MDGs centered on eight pivotal areas: poverty, education, gender equality, child mortality, maternal health, disease, the environment, and international cooperation. Each goal included 21 specific objectives, with more than 60 indicators designed to monitor progress toward achieving these objectives. The MDGs served as a comprehensive framework to address key challenges and promote sustainable development on a global scale during that period. The United Nations Sustainable Development Goals for 2030, often known as the SDGs or "Global Goals," were signed by

[37] Zalasiewicz, Jan, Colin N. Waters, Erle C. Ellis, Martin J. Head, Davor Vidas, Will Steffen, Julia Adeney Thomas et al. "The Anthropocene: Comparing its meaning in geology (chronostratigraphy) with conceptual approaches arising in other disciplines." (2021): e2020EF001896.
[38] Mensah, Justice. "Sustainable development: Meaning, history, principles, pillars, and implications for human action: Literature review." *Cogent social sciences* 5, no. 1 (2019): 1653531.
[39] Clark and Harley, "Capacity to Measure Sustainable Development"; Clark and Harley, "Sustainability Science: Toward a Synthesis."

193 countries in September 2015 in response to the extreme pressure that social conflict and environmental degradation have placed on civilizations.[40]

Goal 1 of the 2030 Agenda for Sustainable Development aims to eradicate global extreme poverty by 2030, currently defined as living on less than $1.25 per day. This involves enhancing the resilience of the poor and vulnerable, reducing their exposure to and susceptibility to severe weather events and other economic, social, and environmental shocks. Additionally, it entails mobilizing substantial resources from various channels, including improved development cooperation. Agenda 2030, comprising 17 Sustainable Development Goals (SDGs), has been collectively pledged to by all members of the United Nations (U.N.). The success of this agenda will be crucially indicated by humanity's ability to maximize synergies and address existing trade-offs across the SDGs. Achieving this coordination and resolution of trade-offs will be integral to realizing the broader vision of sustainable development by 2030.[41]

4. Regionalism to Maritime Clustering

Clusters encompass a variety of interconnected industries and essential competitors. This can include suppliers of specialized inputs like components, equipment, and services, as well as entities providing specialized infrastructure. Clusters essentially involve a grouping of related and mutually supportive businesses, forming a synergistic network that contributes to the overall competitiveness and efficiency of the constituent industries. The collaborative relationships within clusters often result in shared resources, knowledge exchange, and innovation, fostering a dynamic and interconnected business environment.[42] Clusters frequently extend horizontally to include producers of complementary goods and businesses in sectors linked by a shared technology, skill set, or input. Additionally, clusters may encompass channels and customers within their network. Notably, many clusters also involve governmental and non-governmental organizations that provide specialized training, education, information, research, and technical assistance. This may involve institutions such as universities, standard-setting organizations, think tanks, providers of vocational training, and trade associations.

The inclusion of these diverse entities contributes to the comprehensive and collaborative nature of clusters, fostering an environment that supports innovation, knowledge exchange, and overall industry development.[43] In general, all these could be termed as Bottom-up maritime clusters. Still, forming a Regional Integration Association (RIA) among member states of a sea area could be termed a Top-down maritime cluster,

[40] Diz et al., "Mainstreaming Marine Biodiversity into the SDGs: The Role of Other Effective Area-Based Conservation Measures (SDG 14.5)."
[41] Kroll, Warchold, and Pradhan, "Sustainable Development Goals (SDGs): Are We Successful in Turning Trade-Offs into Synergies?"
[42] Jones, Peter JS, Louise M. Lieberknecht, and Wanfei Qiu. "Marine spatial planning in reality: Introduction to case studies and discussion of findings." *Marine Policy* 71 (2016): 256-264.
[43] Doloreux, David, and Richard Shearmur. "Maritime clusters in diverse regional contexts: The case of Canada." *Marine Policy* 33, no. 3 (2009): 520-527.

which could also be viewed as maritime regionalism unlike much other land-based regionalism.[44]

Clusters represent a diverse network of interconnected industries, encompassing suppliers, service providers, and infrastructure entities that collectively enhance competitiveness and innovation. These collaborative ecosystems often include horizontal linkages to producers of complementary goods and sectors sharing technologies, skills, or inputs. Beyond businesses, clusters integrate government and non-governmental organizations, such as universities, vocational training providers, and trade associations, which contribute to innovation, knowledge sharing, and industry development. In the maritime domain, bottom-up maritime clusters emerge organically through business collaboration, while top-down maritime clusters form through RIAs among states sharing a sea area.[45] These RIAs exemplify maritime regionalism, distinct from land-based models, and are critical for addressing shared challenges like marine pollution, overfishing, and climate change impacts. Establishing such frameworks aligns with global sustainability goals, particularly SDG 14 (Life Below Water), by promoting integrated management, regional cooperation, and sustainable resource utilization.

4.1. Balance of Power and Balancing for Blue Economy

The rising disagreement among realists about how to conceive and operationalize the essential idea of "balancing" analysis indicates a three-tiered distinction between balance of power theory, power balance theories, and balancing theories.[46] Recognizing this distinction not only disproves numerous arguments against broadening the idea of balancing to include "nontraditional" versions, but it also explains why we should not avoid articulating nontraditional balancing in terms of hard and soft balancing. On the other hand, realists are probably better suited to taking a more nuanced and complete perspective to power-political rivalry. The entire discipline would benefit from recognizing "balancing" and "balance of power" as independent subjects of study rather than as the domain of realism theory.[47] Balance of power would add to stability at global, regional, and national political systems. Balancing traditional or non-traditionally could be a methodology to achieve any objective, such as sustainable Blue Economic Growth through peaceful regionalism in a sea area.

4.2. National Interest versus Regional Interest

National interests refer to the claims, objectives, goals, demands, and interests that a country consistently seeks to uphold in its interactions with other nations. The classification of national interest can be approached from various perspectives,

[44] Voyer, Michelle, Genevieve Quirk, Alistair McIlgorm, and Kamal Azmi. "Shades of blue: what do competing interpretations of the Blue Economy mean for oceans governance?." *Journal of environmental policy & planning 20*, no. 5 (2018): 595-616.

[45] Sayed, Kazi Md Abu, MR Karim Chowdhury, and A. H. Saharuddin. "Modern-day MSR and BRI: challenges and opportunities for Bangladesh's maritime infrastructure development." *Australian Journal of Maritime & Ocean Affairs* (2023): 1-13.

[46] Bennett, Nathan J. "In political seas: engaging with political ecology in the ocean and coastal environment." *Coastal Management* 47, no. 1 (2019): 67-87.

[47] Nexon, Daniel H. "The balance of power in the balance." *World Politics* 61, no. 2 (2009): 330-359.

considering the multifaceted nature of a nation's priorities and concerns in the global arena. These interests often encompass economic, security, political, cultural, and environmental dimensions, among others, reflecting the diverse aspects that contribute to a country's overall well-being and strategic position on the international stage. Governments often use at least five widely used strategies to advance and protect their domestic interests abroad. These include the following: I diplomatic discussions (ii) alliances and treaties (iii), (iv) coercive measures (iv), (v) propaganda, and (vi) economic methods.[48] International interests broadly relate to nations' shared goals or the welfare of all people.[49]

They might encompass all nations' interests or just a select few. The latter are what are referred to as global common interests. The communist block's shared interests were the only global interests, according to the Soviet Union in the 1950s. The only shared interests of the western capitalist nations were included in the American understanding of global interests. Instead of pursuing global interests, the U.S. and the Soviet Union promoted worldwide cooperation. International interests on a global scale are becoming more and more significant. It can be seen in the wide range of problems that mankind faces today, which transcend national boundaries, including those related to trade, population control, environmental protection, eliminating hard drugs, preventing crime, combating AIDS, human rights abuses, and immigration issues, as well as economic relations, technological advancement, and population growth. Following the end of the cold war, regionalism has become more important, making regional and global interests crucial for every nation.[50]

Professionals in the field of international relations have proposed a constructivist-institutionalist model for shaping national interests and foreign policy. This model puts forth several general hypotheses regarding the potential, contingent, and uneven impact of institutionalized interstate relations on states' interests and policies. It emphasizes the variable constellations between the logic of institutionalization and construction at the interstate level on one hand, and the influence of domestic factors on the other. According to experts, the three fundamental elements of interstate institutionalization and construction include, regularized intergovernmentalism, mostly emblematic acts and practices, and para-public foundations of interstate relations. By considering these elements, the constructivist-institutionalist model offers insights into how the interplay between institutionalized relations and domestic factors contributes to the formation of national interests and foreign policy at the international level.[51]

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[48] Asaad, Irawan, Carolyn J. Lundquist, Mark V. Erdmann, Ruben Van Hooidonk, and Mark J. Costello. "Designating spatial priorities for marine biodiversity conservation in the Coral Triangle." *Frontiers in Marine Science* 5 (2018): 400.

[49] Bennett, Nathan J. "In political seas: engaging with political ecology in the ocean and coastal environment." *Coastal Management* 47, no. 1 (2019): 67-87.

[50] Katona, Steven, Johanna Polsenberg, Julia Lowndes, Benjamin S. Halpern, Erich Pacheco, Lindsay Mosher, Anna Kilponen et al. "Navigating the seascape of ocean management: waypoints on the voyage toward sustainable use." (2017).

[51] Krotz, "Political Institutionalization, Social Construction, and Physical Reality"; Jessop, "Multi-Level Governance and Multi-Level Metagovernance Changes in the European Union as Integral Moments in the Transformation and Reorientation of Contemporary Statehood."

4.3. Global Player (GP) and NGP Countries Integration in Value Chain

Recently a group of researchers has argued that, due to a lack of balance within the team, the Regional Integration Association (RIA) consisting of Global Player (GP) and Non-global player (NGP) countries together would not function successfully, hence NGP countries required to form their own RIA prior proceeding to engage with any G.P. country for the more balanced outcome of negotiations.[52] Therefore, researchers have proposed KRA positive indexing to evaluate country strength to assist in policy formulation leading to regionalism in the International Relations of NGP countries.[53]

A recent study conducted by the Organization for Economic Co-operation and Development (OECD) assesses the determinants and economic effects of Global Value Chain (GVC) participation in developing countries. The primary objective of this study is to contribute to the ongoing discourse about the scope and desirability of integrating into regional and global value chains. It seeks to shed light on the benefits associated with increased participation in such chains and aims to provide policymakers with valuable insights and recommendations on how to harness these advantages for economic development.[54] The study's findings imply that purchasing and selling activities in value chains may provide economic advantages, emphasizing the need-to-know what factors influence participation and recognize the role governments might play in influencing it.

The key determinants of Global Value Chain (GVC) involvement are often linked to country-specific structural features. However, policies can exert a significant influence on GVC participation. Low import tariffs both domestically and in export markets, along with engagement in regional trading agreements, can facilitate smoother interactions in both backward and forward GVC activities. There is a notable correlation between backward integration and a country's openness to foreign direct investment. Predictors of GVC integration encompass factors such as trade facilitation, logistical efficiency, intellectual property protection, the quality of institutions, and infrastructure. Policymakers in various regions can use country-specific empirical studies as a foundation to analyze their nations' GVC involvement. These studies can serve as a starting point for discussions on policy choices that aim to enhance and optimize GVC participation, fostering economic development and global trade for developing countries.[55]

4.4. Management of RIA, MSP and QMS

According to the EU, "Maritime Spatial Planning aims to organize and regulate all maritime activities while safeguarding marine ecosystems." According to the EU Directive 2014/89/EU, there is a distinction between "maritime" spatial planning and "marine" spatial planning since "maritime" spatial planning often has a stronger economic

[52] Karim, Chowdhury M. Rezaul, Noorul Shaiful Fitri Abdul Rahman, and Saharuddin Abdul Hamid. "Introduction of KPI (KRA Positive Index) For Scrutinizing GP (Global Player) Countries of this ERA." Specialusis Ugdymas 2, no. 43 (2022): 1572-1587.
[53] Chowdhury et al., "Efficiency of KRA Positive Indexing for Global Power Identification."
[54] Sumaila, U. Rashid, Daniel Skerritt, Anna Schuhbauer, Naazia Ebrahim, Yang Li, Hong Sik Kim, Tabitha Grace Mallory, Vicky WL Lam, and Daniel Pauly. "A global dataset on subsidies to the fisheries sector." Data in brief 27 (2019): 104706.
[55] Kowalski, Przemyslaw, Javier Lopez Gonzalez, Alexandros Ragoussis, and Cristian Ugarte. "Participation of developing countries in global value chains: Implications for trade and trade-related policies." (2015).

meaning.[56] Whether motivated by economic, ecological, or social goals, all types of spatial planning in the sea may use the framework and underlying quality management objectives offered.

The Intergovernmental Oceanographic Commission of UNESCO has developed a ten-step approach to delineate the scope and nature of marine spatial planning (MSP), which holds significance as a key element in the ecosystem-based management of maritime regions and resources. The following outlines the ten steps for formulating and implementing a marine spatial plan,

a. Identifying "need and establishing authority
b. Obtaining financial support
c. Organizing the process through pre-planning
d. Organizing stakeholder participation
e. Defining and analyzing existing conditions
f. Defining and analyzing future conditions
g. Preparing and approving the spatial management plan
h. Implementing and enforcing the spatial management plan
i. Monitoring and evaluating performance
j. Adapting the marine spatial management process"[57]

According to ISO 9001 (ISO 9000: 2008), a company is required to manage quality in a methodical and open way. When doing so, it must take into account the requirements of all parties and include quality management techniques into every step of the management process and end products. To enhance performance, organizations are encouraged to adhere to eight quality management principles outlined by standards. These principles are as follows: customer focus, leadership, involvement of people, process approach, system approach to management, continual improvement, factual approach to decision-making, and mutually beneficial supplier relationships. This approach aligns with the quality management system (QMS) specified by the International Council for the Exploration of the Sea, as denoted by MSP QMS.[58]

A unified set of quality policies, goals, and processes is necessary for a QMS. A policy outlining the organization's long-term goals, intelligent quality objectives for continuous improvement, structured processes with steps or tasks that have specified inputs and outputs, and quality management components for related processes—specifically, corrective action, preventive action, management review, internal audit, external audit, and stakeholder feedback—are all important from an applied perspective.

Coordination games and cooperation games are two examples of collective action issues that nations attempt to address to advance regional integration, according to study. Both coordination games, in which players must work together to establish an agreement, and

[56] van den Burg, S. W. K., M. Skirtun, O. Van Der Valk, W. Rossi Cervi, T. Selnes, T. Neumann, J. Steinmann, G. Arora, and P. Roebeling. "Monitoring and evaluation of maritime spatial planning–A review of accumulated practices and guidance for future action." *Marine Policy* 150 (2023): 105529.
[57] Ehler, Charles, Jacek Zaucha, and Kira Gee. "Maritime/marine spatial planning at the interface of research and practice." *Maritime Spatial Planning: past, present, future* (2019): 1-21.
[58] Luburić, Radoica. "Quality management principles and benefits of their implementation in central banks." *Journal of Central Banking Theory and Practice* 4, no. 3 (2015): 91-121.

collaboration games, in which players are enticed to break an agreement in order to receive immediate benefits. Countries unwilling to establish a supranational organization for addressing collective action issues have, over time, developed functional enforcement mechanisms by increasing the centralized nature of regional organizations. The resolution of coordination issues has been pursued within a framework that involves the active participation of nations and environments beyond the immediate region. This approach reflects a strategy where collaboration and coordination extend beyond regional boundaries to ensure effective solutions to collective challenges.[59]

Hence the more a Regional Integration Association (RIA) implements QMS it would resolve more of collaborative problems through institution building, whereas the more RIA moves to engage, interact and negotiate with external entities, that would resolve more of the coordination problems.

5. COMR an answer to the Blue Economic Sustainability Challenges

Understanding that population increase has brought more significant problems to managing land resources to satisfy the needs of civilization, as well as more than 71% of the world's surface is made up of water bodies that have yet to be exploited for its immense blue economic potential.[60] Many nations also have limited or no green economic potential left to be exploited,[61] realizing that the expansion of agriculture in littoral states is further constrained by factors such as salinity, tidal effects, and rising sea levels and that the maritime-littoral region has an alternative opportunity to experience sustainable economic growth by examining blue economic potential.[62] However, the first challenge is how to make the blue economic activities of nations sustainable, as G.P. (Global Player) countries have fought more and cooperated less at sea.[63] To exploit the blue economic potential, many scholars suggest it is required to keep international trade and other financial functions at sea in safe and sound conditions, which cannot be achieved without peace, stability, and regional cooperation.[64]

The second concern is how to preserve peace, stability, and blue-collar economic development through regional collaboration.[65] Any blue economic activity has a measurable positive impact on Social Development (S.D.) and Environment Protection

[59] Hidetaka, Yoshimatsu. "Political leadership, informality, and regional integration in East Asia: The evolution of ASEAN plus three." *European journal of East Asian studies* 4, no. 2 (2005): 205-232.
[60] Leca, Bernard, Thomas B. Lawrence, Roy Suddaby, and Bernard Leca. "Introduction: Theorizing and studying institutional work." *TB Lawrence, R. suddaby & B. Leca (eds.), Institutional Work: Actors and Agency in Institutional Studies of Organizations* (2009): 1-27.
[61] Borchers Arriagada, Nicolas, David MJS Bowman, Andrew J. Palmer, and Fay H. Johnston. "Climate change, wildfires, heatwaves and health impacts in Australia." *Extreme weather events and Human health: International case studies* (2020): 99-116.
[62] Borchers Arriagada, Nicolas, David MJS Bowman, Andrew J. Palmer, and Fay H. Johnston. "Climate change, wildfires, heatwaves and health impacts in Australia." *Extreme weather events and Human health: International case studies* (2020): 99-116.
[63] Petterson, Michael G., Hyeon-Ju Kim, and Joel C. Gill. "Conserve and sustainably use the oceans, seas, and marine resources." *Geosciences and the Sustainable Development Goals* (2021): 339-367.
[64] Hieronymus, Magnus, and Ola Kalén. "Sea-level rise projections for Sweden based on the new IPCC special report: The ocean and cryosphere in a changing climate." *Ambio* 49, no. 10 (2020): 1587-1600.
[65] Haas, Bianca, Mary Mackay, Camilla Novaglio, Liam Fullbrook, Michael Murunga, Carla Sbrocchi, Jan McDonald et al. "The future of ocean governance." *Reviews in Fish Biology and Fisheries* (2021): 1-18.

(E.P.) of a nation.[66] In addition, the oceans are humanity's last and vast source of resources for realizing their cherished dreams of a just and better life for all members of society, a protected environment.[67] Finding the right set of blue economic functions for which the development of a region-specific Comprehensive Ocean Management Regime (COMR) is required would be another challenge. It would be determining how those blue economic functions positively affect sustainability (social, environmental, and economic) dimensions or whether there is a relationship between blue economic functions and sustainable development objectives.[68]

As every ocean or sea or bay or Gulf or Strait beyond the jurisdiction of the national territory, which is termed as The Area in the United Nation's Convention on the Law of the Seas, has its particular features and diversities a single set of Blue Economic Functions could not be applicable in all ocean areas, hence while considering COMR, it requires to identify an appropriate set of blue economic functions for the ocean/sea/gulf/bay maritime littoral region in consideration, prior proposing a COMR model for achieving sustainable growth targets through blue economic functions.

Moreover, the seas still provide abundant resources and can meet the growing needs of the global population.[69] As a consequence, non-powerful countries like Bangladesh have serious issues with their marine resource acquisition and protection policies. Perhaps the most commercially important of these resources are the fisheries resources in the Exclusive Economic Zone (EEZ) and the petroleum and natural gas resources on the continental shelf.[70] 90% of living marine resources are taken out of the water within 200 miles of the EEZ.[71]

The distribution of commercially valuable minerals offshore has been shown via maritime exploration. Nodules of manganese oxide, regarded as the common inheritance of humanity, are discovered in the deepest sections of the oceans in high seas. Outside of polymetallic nodules, other non-living resources include salt, sulfur, gravel, sand, phosphate, and hydrocarbons.[72] More than 60% of the world's total known oil reserves are thought to be hidden under the continental shelf.[73] The Convention will act as a lens through which Ocean Policy will be dispensed into various levels of action and different

[66] Weise, Hanna, Harald Auge, Cornelia Baessler, Ilona Bärlund, Elena M. Bennett, Uta Berger, Friedrich Bohn et al. "Resilience trinity: safeguarding ecosystem functioning and services across three different time horizons and decision contexts." *Oikos* 129, no. 4 (2020): 445-456.

[67] Folke, Carl, Stephen Polasky, Johan Rockström, Victor Galaz, Frances Westley, Michèle Lamont, Marten Scheffer et al. "Our future in the Anthropocene biosphere." *Ambio* 50 (2021): 834-869.

[68] Klinger, Dane H., Anne Maria Eikeset, Brynhildur Davíðsdóttir, Anna-Marie Winter, and James R. Watson. "The mechanics of blue growth: management of oceanic natural resource use with multiple, interacting sectors." *Marine Policy* 87 (2018): 356-362.

[69] Vij, Sumit, Eddy Moors, Bashir Ahmad, Md Arfanuzzaman, Suruchi Bhadwal, Robbert Biesbroek, Giovanna Gioli et al. "Climate adaptation approaches and key policy characteristics: Cases from South Asia." *Environmental Science & Policy* 78 (2017): 58-65.

[70] Asaad, Irawan, Carolyn J. Lundquist, Mark V. Erdmann, Ruben Van Hooidonk, and Mark J. Costello. "Designating spatial priorities for marine biodiversity conservation in the Coral Triangle." *Frontiers in Marine Science* 5 (2018): 400.

[71] Bennett, Nathan J. "In political seas: engaging with political ecology in the ocean and coastal environment." *Coastal Management 47*, no. 1 (2019): 67-87.

[72] Beunen, Raoul, James Patterson, and Kristof Van Assche. "Governing for resilience: the role of institutional work." *Current Opinion in Environmental Sustainability* 28 (2017): 10-16.

[73] Banikoi, Hudu, Achim Schlüter, and Aisa O. Manlosa. "Understanding transformations in the marine coastal realm: The explanatory potential of theories of institutional change." Marine Policy 155 (2023): 105791.

functional and zonal issues in this sea area, though, as most countries in the Bay of Bengal maritime-littoral region, including Bangladesh, continue to use the 1982 UNCLOS-III as the foundation for their ocean policies.[74] Major ocean policy problems such as navigation and aviation, maritime environment protection and preservation, ocean resource acquisition and conservation, marine scientific research, pirate prevention, immigration monitoring and control, navy weapons management, and others must all be linked.[75]

The marine sector of the economy is growing quickly. As a consequence of innovation and technology, both new and existing marine industries are growing.[76] The necessity for a sustainable paradigm in which socioeconomic growth may proceed without causing environmental harm or injustice is generally accepted after an extraordinary rise in ocean-related commercial activities.[77] Today, tensions between regional economic interests and short-term economic benefits or urgent needs and long-term prosperity and a healthy ocean are increasingly apparent, leading to governance snags [78]. Additional factors like global biodiversity loss, pollution, and climate change worsen this situation. Opportunities and obstacles to sustainable ocean and sea development have consequently moved to the top of the international agenda at gatherings like the United Nations (U.N.) Ocean conferences, the World Economic Forum, the Our Ocean conferences, and the High-Level Panel for a Sustainable Ocean Economy.[79] However, this study identifies common traits of an effective Comprehensive Ocean Management Regime (COMR) as well as customized approaches to fit different contexts, such as local expertise, environmental conditions, scaling up of local initiatives, and the requirement for data exchange and capacity building.

Considering the above circumstances, this research proposes developing QMBEIS (Quality Management for Blue Economic Initiative Sustainability) and TDMLCP (Top Down Maritime Littoral Clustering Policy) as management tools and policy options for a region-specific COMR model. However, prior to developing any model of COMR for a given maritime-littoral region, we shall have to answer the following three questions: *First*, how to make management of the mutual blue economic activity of nations sustainable? *Second*, what could be the mechanism for regional cooperation to maintain peace, stability, and sustainable blue economic growth? Last but not least, which appropriate set of blue economic functions would require a COMR development for any maritime-

[74] Chowdhurya, M. Rezaul Karim, Kazi Md Abu Sayeedb AH Saharuddinc, Almas Haider Naqvid, and Sheikh Pasha Habib Uddine. "The Rendezvous of Sreb and Msr at the Bay of Bengal: Bangladesh's Dilemma as Bay's Apex Country."; Blasiak, Robert, Colette CC Wabnitz, Tim Daw, Michael Berger, Abigayil Blandon, Gonçalo Carneiro, Beatrice Crona et al. "Towards greater transparency and coherence in funding for sustainable marine fisheries and healthy oceans." *Marine Policy* 107 (2019): 103508.

[75] Jouffray, Jean-Baptiste, Robert Blasiak, Albert V. Norström, Henrik Österblom, and Magnus Nyström. "The blue acceleration: the trajectory of human expansion into the ocean." *One Earth* 2, no. 1 (2020): 43-54.

[76] *Ibid*.

[77] Cohen, Philippa J., Edward H. Allison, Neil L. Andrew, Joshua Cinner, Louisa S. Evans, Michael Fabinyi, Len R. Garces et al. "Securing a just space for small-scale fisheries in the blue economy." *Frontiers in Marine Science* 6 (2019): 171.

[78] Klinger, Dane H., Anne Maria Eikeset, Brynhildur Davíðsdóttir, Anna-Marie Winter, and James R. Watson. "The mechanics of blue growth: management of oceanic natural resource use with multiple, interacting sectors." *Marine Policy 87* (2018): 356-362.

[79] Jouffray, Jean-Baptiste, Robert Blasiak, Albert V. Norström, Henrik Österblom, and Magnus Nyström. "The blue acceleration: the trajectory of human expansion into the ocean." One Earth 2, no. 1 (2020): 43-54.

littoral region, and will those blue economic functions positively impact sustainability (i.e., social development, environmental protection and economic growth)?

6. Conclusion

Bangladesh, as a key player in the Bay of Bengal, faces significant coastal and marine challenges that demand a sustainable management framework to balance ecological protection with blue economic growth. Unsustainable practices, inadequate management, and regional cooperation deficits continue to strain marine ecosystems, while ambitious development projects pose further risks to environmental stability. This study underscores the critical need for region-specific initiatives like the proposed Comprehensive Ocean Management Regime (COMR) to address these challenges, ensuring sustainable blue economic functions aligned with global SDG targets. By integrating social, environmental, and economic dimensions, the COMR model aims to guide policy and operational strategies for sustainable maritime development. Future research can extend this framework to other maritime-littoral regions to support global blue economy efforts.

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Conflict of Interest Statement: The author(s) declares that the research was conducted in the absence of any commercial or financial relationship that could be construed as a potential conflict of interest.

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