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Definition and Evaluation Methodology of the Blue Economy: Focusing on the Difference from the Ocean/Marine Economy

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1. Introduction.

As the benefits of the oceans to humanity become clearer, more attention is being paid to the economic aspects of the oceans. The term "blue economy" is used to describe such an ocean-based industry. The term "blue" is often interpreted simply as the blue of the ocean. However, there are other terms, such as "ocean economy" or "marine economy," that can be used to describe the ocean-based industry. Then why do international organizations and the international community emphasize "blue economy"? Does the blue in blue economy just mean the blue of the ocean, and is there any difference between it and ocean/marine economy?

In conclusion, both refer to the same ocean-based industry but are different, with the blue economy being a more oceanic concept of abundance. It implies that the ocean contains an unknown value to humanity that has yet to be measured, and the importance of the value that preservation of the marine environment will bring to humanity in the future. In the following section, I will define the concept by international organizations (2), clarify its nature based on an environmental economics model (3), explain its evaluation method (4), and discuss future expectations (5). This paper is based on a modified version of Tanaka (2023).[i]

2. International definition of blue economy, industry

Although there is no unified definition of the blue economy, there are common concepts and industries. The foundation of the concept was already included in Agenda 21 adopted at the Earth Summit in Rio de Janeiro in 1992; in paragraph 30 of the Johannesburg Summit Plan of Implementation adopted at the World Summit on Sustainable Development (Rio+20) held in Johannesburg in 2002, It stipulated that the oceans are essential for global food security and the maintenance of economic prosperity and well-being of national economies. And at the United Nations Conference on Sustainable Development (Rio+20) held in Rio de Janeiro in 2012, the green economy, an environmentally conscious economic model that aims to balance environmental protection and economic growth, was advocated as a measure to achieve sustainable development and poverty eradication (Ocean Policy Research Institute, 2019[ii]). In response to further claims by small island developing states and New Zealand, the

Blue Economy was born by extending the concept to the ocean in the Green Economy in a Blue World Report (COL,2016[iii]). The concept "simultaneously promotes economic growth, environmental sustainability, social inclusion, and enhancement of marine ecosystems" (UNCTAD,2014[iv]). The Blue Economy, so to speak, is an environmentally conscious economic model that aims for sustainable development and growth by focusing the Green Economy on the ocean.

In 2017, the World Bank defined the Blue Economy as "employment resulting from economic growth, improved livelihoods and healthy marine ecosystems through the sustainable use of marine resources" and defined the concept as promoting "economic growth, social inclusion, and the preservation of improved livelihoods as well as the environmental sustainability of marine and coastal areas" (World Bank, 2017)[v] . Thus, the blue economy is the promotion of social and economic activities such as economic growth, social inclusion, and improved livelihoods and employment based on the environmental sustainability of marine ecosystems. Put another way, the core of the concept of blue economy lies in the decoupling of marine environmental degradation from socioeconomic growth (UNCTAD, 2014).

There is no unified definition of specific industries. However, it does at least include industries such as fisheries, aquaculture, marine chemistry, marine salt manufacturing, seabed minerals, marine energy, marine agroforestry, shipping, coastal manufacturing, marine tourism, and coastal environmental services (Qi, 2022[vi]). The World Bank further defines indirect activities as ocean monitoring and research, ecosystem-based management, activities that support carbon storage (blue carbon), and financing mechanisms that support the blue economy (blue finance) (World Bank, 2017). The blue economy, so to speak, consists not only of the marine industry, but also of its complementary supporting framework.

3. Difference between Blue Economy and Ocean/Marine Economy

Mcllgorm (2016) [vii] clarified the differences between the Blue Economy and the Ocean/Marine Economy using Total Economic Value (TEV), a framework used in environmental economics to value natural resources (Figure 1). Goods are broadly classified into use value, which results from the use of the good, and non-use values, which result from not using the good. Use values are classified into direct values (values arising from the direct use of resources), indirect use values (values arising without degrading resources), and option values (values held for future use). Non-use value is classified into existence value (value arising from the existence of the resource) and bequest value (value arising from the use of the resource by future generations).

The ocean/marine economy includes only the former use values, while the blue economy includes non-use values. For use values (especially direct use values), a market often exists and the monetary value of the good is clear. Non-use values, however, do not yet have a

market and their value is unknown. In other words, in the blue economy, there is no market now and the value is not known, but the value includes the function as a nursery for fish and goods that can be consumed by future generations resulting from the protection of the ecosystem.

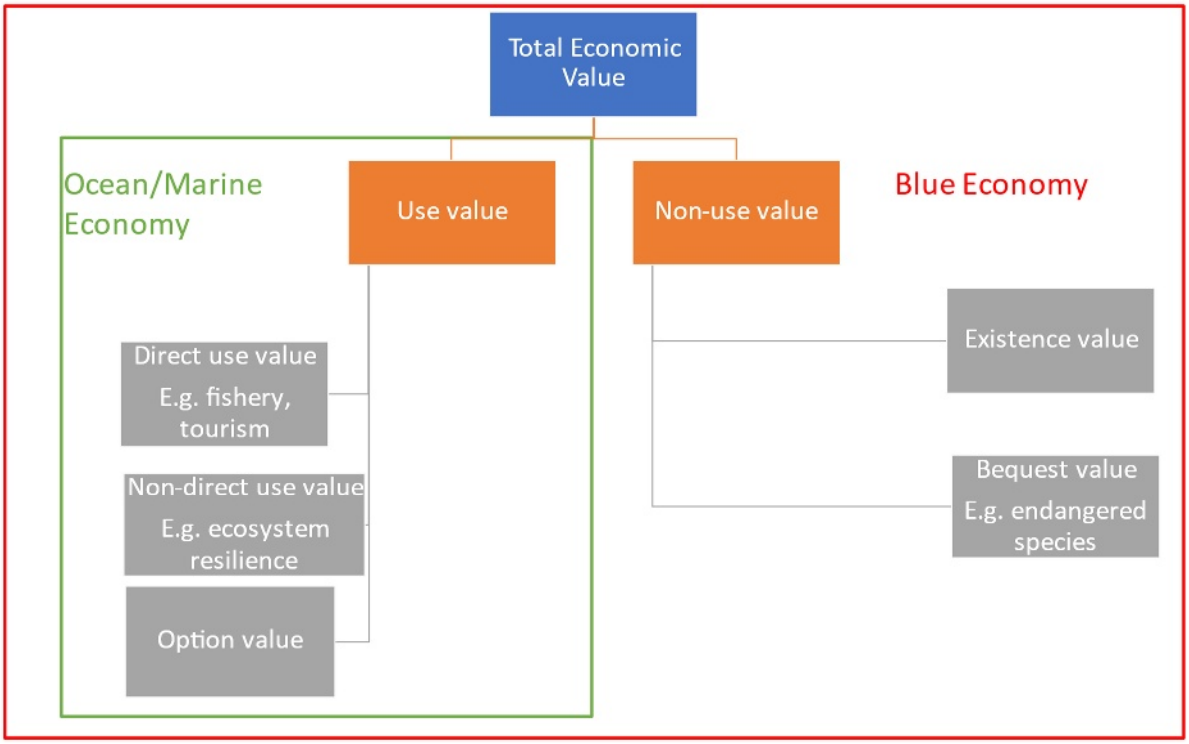

Figure 1: Ocean/Marine/Blue Economy Differences Based on Total Economic Value Model (Corrected by author based on Mcllgorm (2016), Davis et al. (2019))[viii]

4. Blue Economy and Ocean/Marine Economy Evaluation Methodology

As attention has focused on ocean-based industry, attention has also focused on the methods used to assess them. Table 1 summarizes the size of each country's ocean-based industry and the methods used to understand it. First, ocean-based industry tends to be defined as ocean economies in Asia and marine or blue economies in the West. However, they are not strictly classified. The share of the marine economy in Gross Domestic Product (GDP) and Gross Value Added (GVA) tends to be lower in developed countries.

What is important in evaluating and analyzing the value of the blue economy is to consider marine resources as capital, and to look at the value of goods not only in terms of temporary increases or decreases (flow), but also in terms of the balance (stock) up to that point to measure the degree of conservation or damage. The ocean/marine economy is a use value and focuses on flows. The System of National Accounts (SNA) and its component Input-Output Table (I-O) are used to evaluate the value of goods and services produced in the

market during a given period, such as GDP and GVA.

Table 1: List of marine economy categories and evaluation methods for each country (Reproduced from Tanaka (2023)[i])

Country	Economy	Year	Size	Method	Reference
USA	Marine	2018	USD 373 Billion GDP (1.8%)	SNA	Nicolls et al. 2020
China	ocean	2021	9.03 trillion-yuan GDP (8%)	Not explained	MNR, 2022
		2010	USD 239 Billion GVA (4%)	I-O	Zhao et al. 2014
Korea	ocean	2018-2019	KRW 43.1 trillion GVA (2.3%)	I-O	KMI, 2022
Japan	ocean	2000	JPY 16.5 trillion GDP (3.1%) * JPY 7.4 trillion GVA (1.4%) *	I-O	NRI, 2009
		2005	JPY 19.9 trillion GDP (3.7%) * JPY 7.8 trillion GVA (1.5%) *		NRI, 2010
		2014	JPY 21.6 trillion GDP (4.0%) * JPY 7.3 trillion GVA (1.3%) *		PRIOE, 2019
UK	Marine	2014	GBP 13.2 billion GVA (8.1%)	I-O	Stebbings et al. 2020
EU	Blue	2019	EUR 183.9 billion GVA (1.5%)	SNA	European Commission, 2022
Norway	Marine	2007	EUR 1.44 billion GVA (1%)	I-O	Morrissey et al. 2011
Brazil	Coastal and Marine	2015	USD 286 billion GDP (19%)	I-O	Carvalho and Moraes,2021
Jamaica	Blue	2017	USD 80.9 million GVA (6.9%) **	SNA	Ram et al. 2019

*The percentage was calculated by the author; ** the GVA was calculated by the author.

Abbreviations: EU, the European Union; EUR, euro; GDP, gross domestic product; GVA, gross value added

However, the blue economy includes natural capital, which is a stock. In this case, an accounting method is necessary as an evaluation method. For example, Ocean Ecosystem Accounts or System of Environmental-Economic Accounting (SEEA) are suitable (EC,2022[ix] , Talento,2016[x]). The Global Ocean Accounts Partnership (GOAP), an action group of the High Level Panel for a Sustainable Ocean Economy (Ocean Panel), is also developing guidance for

a global standard ocean account by 2023 (GOAP,2022)[xi1] . In looking at the flow aspects, an assessment method that adds natural science findings to the SNA is also useful (Fenichel,2020[xii]).

Finally, Table 2 summarizes the discussion so far on the differences between the blue economy and the ocean/marine economy.

Table 2: Ocean/Marine/Blue Economy Differences

economy	Ocean/Marine	Blue
Major Industries	Ocean-based industry	Ocean-based industry Supporting natural capital and framework
Main Value	Use value	Use value Non-use value
Nature of Principal Goods	Flow	Flow Stock
Main evaluation methods	I-O Table, SNA	Accounting method Interdisciplinary research based on I-O table and SNA

5. Evidence-based policymaking informed by marine economic assessments

As the benefits of the ocean to humanity, society, and the global environment become clearer, the valuation of the ocean economy is becoming an important aspect of the Evidence-Based-Policy-Making (EBPM) process. What is important in this process is a multifaceted perspective that looks at the value of the ocean not only in terms of flows, but also in terms of stocks. For example, even if a fisheries promotion policy temporarily yields a higher catch (flow) than the cost of the policy, if the ecosystem (stock) is irreversibly damaged, the policy should not be formulated. This is because the calculation does not include the flows that future humans would have obtained from the stock, and the policy cannot be said to be economically rational. It is hoped that Japan will make progress in assessing the marine economy, including the value of natural capital, and contribute to the formulation of multifaceted marine policies.

[1] Ocean Panel defines the ocean economy as a "sustainable ocean economy," or blue economy for short. The director of the Middlebury Institute of International Studies at Monterey's Center for Blue Economy, Dr. Jason Scorse, whom the author interviewed in 2019, has a similar definition.

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[vi] Qi, X. (2022). The conceptual framework of the national blue economic system: A multi-agent perspective. Marine Policy, 145. https://doi.org/10.1016/j.marpol. 2022.105287.

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[xi] The Global Ocean Accounts Partnership (GOAP). GOAP in Brief. https://oceanaccounts.atlassian.net/wiki/spaces/WD/pages/940703745/GOAP+in+Brief

[xii] Fenichel, E.P., Addicott, E.T., Grimsrud, K.M. et al. Modifying national accounts for sustainable ocean development. Nat Sustain 3, 889- 895 (2020). https://doi.org/10.1038/s41893-020-0592-8.