



Background and purpose

- Oceans sustain Earth's life systems and play a significant role in advancing human civilization.
 - Oceans are pivotal in solar energy absorption, influencing climate patterns through their currents, and upholding ecological balance by breaking down and assimilating pollutants.
 - Simultaneously, oceans provide humanity not only with food, energy, and minerals but also employment and recreational opportunities.
- Over the last 60 years, human activities have altered the state of the oceans, negatively impacting their sustainability across social, economic, and environmental dimensions.
 - Sustaining the oceans requires navigating complex issues involving various factors.
- Following the UN's adoption of the Sustainable Development Goals (SDGs), member states are advised to set targets and assess methodologies tailored to their conditions to monitor sustainability.
 - The current Korean government periodically reviews its goals through the "National Sustainable Development Assessment (Framework Act on Sustainable Development)" every two years.
- Achieving SDG 14 by 2030 necessitates monitoring the state and changes in ocean sustainability and tracking progress toward the goal.
- There is a lack of assessment systems and research attention toward evaluating sustainability factors and methods specific to oceans.
- This study acknowledges the limitations in holistically assessing the sustainability of oceans, as prior assessments have predominantly focused on individual sectors or functionalities within the maritime and fisheries domain, concerning sustainability elements.
- Therefore, this study aims to develop a comprehensive nationwide assessment framework for the sustainability of oceans that integrates environmental, economic, and societal aspects.
 - The sustainability assessment framework for oceans involves defining the scope of areas or domains to be encompassed for the assessment and selecting methodologies, which refers to determining what domains or sectors will be included for assessment and choosing the methodologies to employ.

Methods

Academic methodology

- This study involves i) a literature review, ii) an analysis of domestic and international cases related to sustainability assessment, iii) conducting seminars, and iv) surveys to gather expert opinions.

Policy-making methodology

- Participation in discussions and policy forums with officials from the Ministry of Oceans and Fisheries, addressing current issues and responding to concerns through policy coordination meetings and policy support tasks related to the activities of the Sustainable Development Committee.

Figure 1. The procedure for deriving the marine sustainability assessment framework

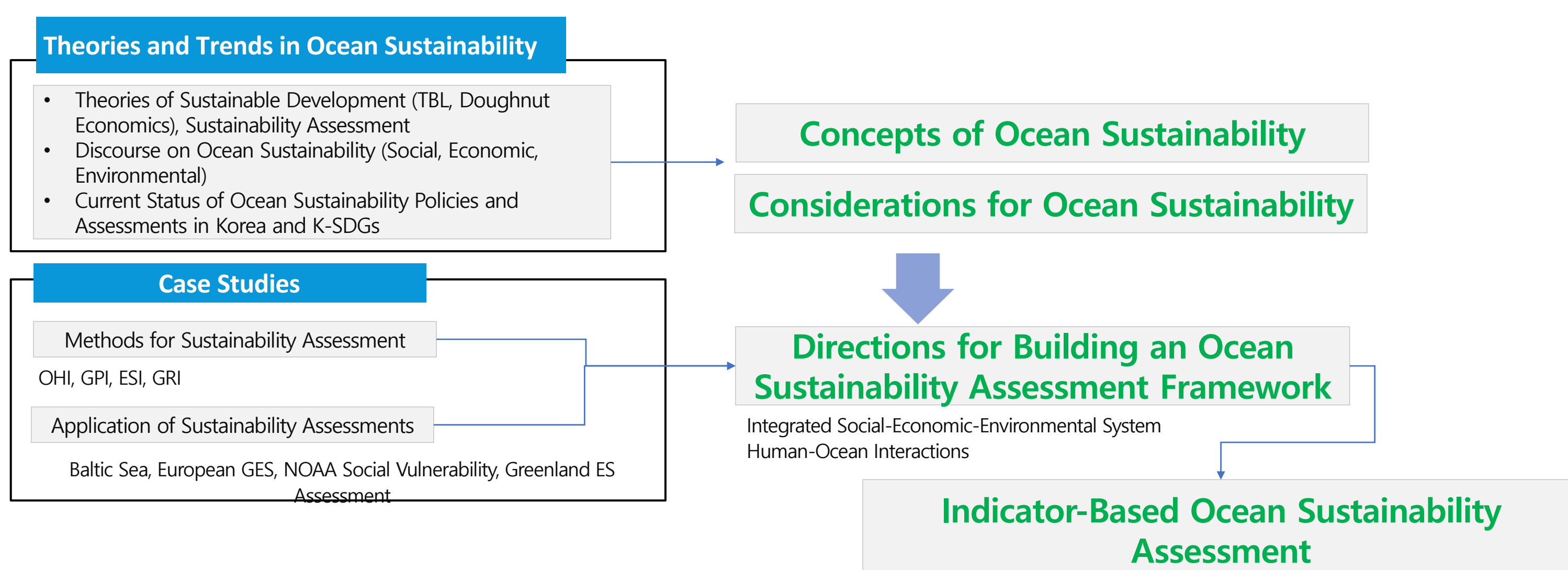


Table 1. Direction for Developing an Ocean Sustainability Assessment Framework

Theory and Trends	Development Direction
<ul style="list-style-type: none"> Various methods for assessing sustainability Multifaceted concept of sustainability A single index has limitations in assessing the sustainability of oceans that provide diverse values No formal platform to share knowledge related to goals The Doughnut Economics theory presents a new economic model that takes into account the basic survival needs of humanity and the Earth's environment, aiming to harmonize economic growth and sustainability. The PB (Planetary Boundaries) theory is a concept that identifies essential areas for preservation to ensure safe human living and sustainable development. 	<p>Indicator-based Assessment System</p> <p>Considerations</p> <ul style="list-style-type: none"> Human-Ocean Interaction Consideration of Marine Ecosystem Carrying Capacity – Ocean Use Level

Results

- In this study, the sustainability of the ocean is conceptualized considering the ideal state of the ocean and its elements of sustainability.
 - Sustainable oceans support marine life to maintain a healthy marine environment, offering diverse marine ecosystem services to support human well-being.
- This study covers several key aspects: ① Understanding theories, trends, and discourse related to sustainability and ocean sustainability, ② Reviewing applicable domestic and international assessment methods for assessing ocean sustainability, ③ Presenting the development direction and a list of indicators for the ocean sustainability assessment system, and finally, suggesting policies related to the ocean sustainability assessment system.
- The ocean sustainability assessment system is defined as a comprehensive indicator-based assessment considering the interaction between humans and marine ecosystems. Its core focus lies in assessing the capacity of marine ecosystems and the level of marine utilization while reflecting economic, social, and environmental values.
 - The development direction of the ocean sustainability assessment system is constructed based on issues regarding ocean sustainability, sustainability theories, domestic and international trends, etc.
- To derive indicators, a hierarchical structure was created based on the assessment system, and three tentative relevant indicators per three main sectors of core elements of ocean sustainability were proposed.
- Regarding sectors related to ocean sustainability, they encompass ① Healthy marine ecosystems and marine resources, ② Ocean-related social capital and human capital, ③ Ocean policy and technology/innovation, ④ Human well-being. In connection with these, three main sectors, 12 sub-sectors, and over 110 indicators related to ocean sustainability were proposed.

Ocean Sustainability

- Ocean sustainability can be conceptualized by considering the desired state of the ocean and its sustainability elements. This study describes ocean sustainability as a dynamic process that allows humans to realize their potential and improve their quality of life through the ocean, while simultaneously protecting and enhancing the ocean environment.
- Ocean sustainability is achieved when there is harmony and balance between the carrying capacity of ocean ecosystems and the level of human use. A sustainable ocean maintains its health to support ocean life, provides diverse ocean ecosystem services to humans, and supports human health and well-being within the safe boundaries of the planet and ocean.

Ocean Sustainability Assessment Framework

- We aim to establish an ocean sustainability assessment framework by incorporating knowledge, theories, and approaches from disciplines that have traditionally addressed sustainability.
- The proposed method for assessing ocean sustainability is a comprehensive, indicator-based approach that considers the interactions between human society and ocean ecosystems.

Figure 2. The conceptual framework of marine sustainability assessment system

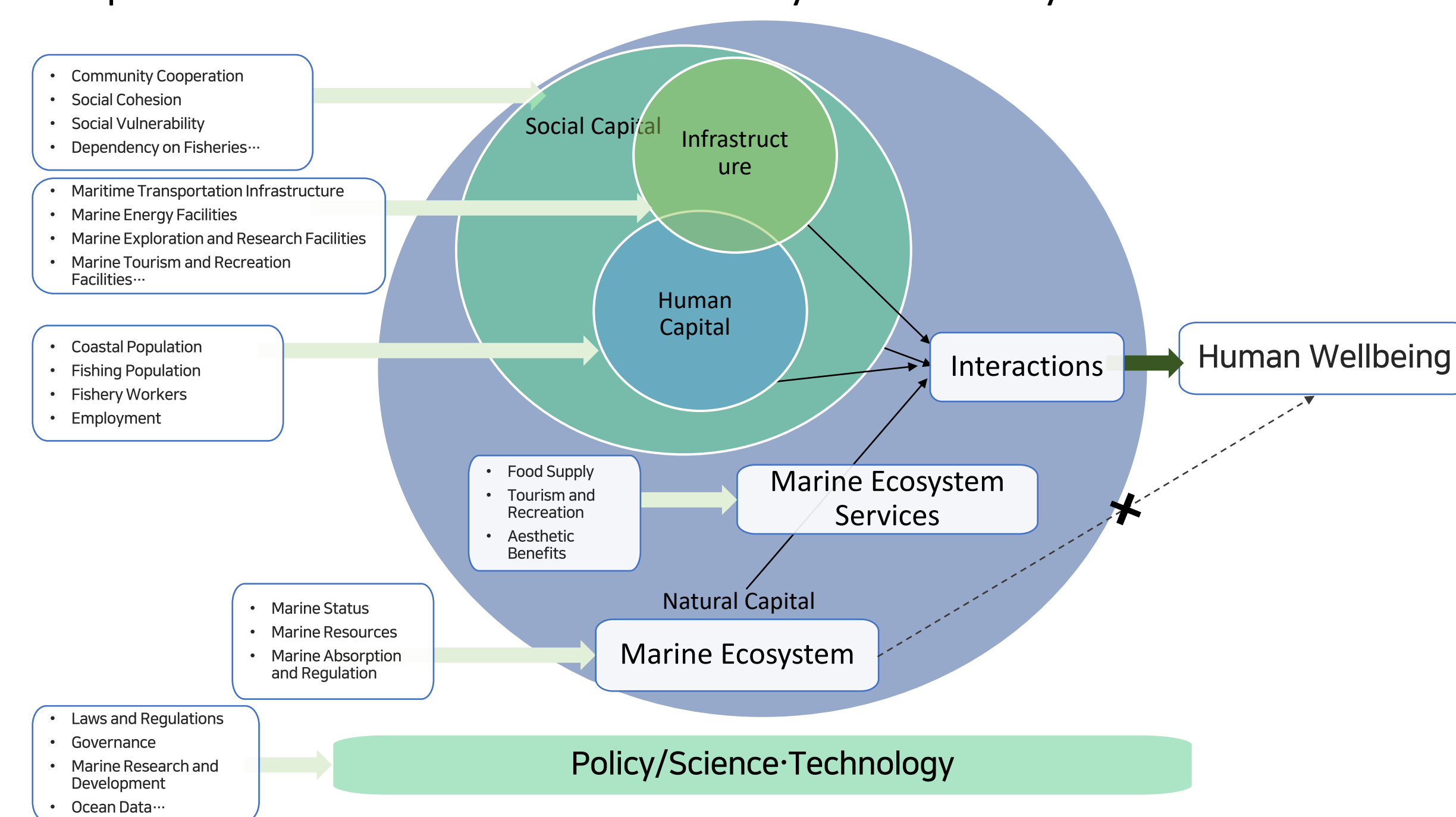


Figure 3. The structure of marine sustainability assessment indicators

