**Objective 1: Develop a comprehensive baseline of global ocean governance, focusing on the role of Intergovernmental Organizations (IGOs)**

1. **Identification of Governance attributes relevant to ocean governance.**

See file: Governance Attributes Evaluation”

**Literature Review**: Our investigation commenced with a systematic literature review conducted through Google Scholar, utilising a carefully selected set of keywords: “governance structures AND mechanisms AND Intergovernmental Global Organisations AND IGOs AND United Nations AND United Nations Environmental Management Group”. This search aimed to capture a broad spectrum of literature discussing governance structures or mechanisms related to global governance, with a particular focus on the ocean economy. The initial search yielded 90 pieces of literature, which were meticulously screened for relevance. We prioritised comprehensive reviews, foundational papers, and recent studies that delve into governance structures, mechanisms, or challenges in global governance.

**Document Selection**: From the 90 pieces of literature identified, we meticulously selected 79 that offered deep insights into governance attributes relevant to our study. This selection process involved a thorough examination of titles, abstracts, introductions, and conclusions, giving preference to literature that provided clear examples, definitions, or discussions on the role, impact, and characteristics of Intergovernmental Global Governance (IGOs).

**Inductive Analysis for Theme/Concept Identification**: An inductive analysis approach was employed on the selected literature to naturally identify recurring themes, concepts, and governance features. This iterative process allowed themes to emerge organically, facilitating a nuanced understanding of governance structures, mechanisms, and outcomes discussed across the 79 pieces of literature.

**Theme Categorization**: The themes that naturally emerged from our inductive analysis of the 79 pieces of literature were then categorised into specific observable governance attributes. This categorisation was grounded in the literature, ensuring that each attribute was a reflection of the discourse within the field of governance.

**Attribute Synthesis**: We synthesised the identified attributes, such as Jurisdictional Scope, Source of Jurisdiction, and Defined Objectives, based on their discussion and framing within the literature. This involved compiling detailed documentation of descriptions, contexts, examples, and literature citations that underscored each attribute's existence and relevance.

**Development of a Structured Table**: The information gleaned from the synthesis was organised into a structured table. This table included columns for each attribute and its description, context and explanation, examples, and relevant literature sources, providing a comprehensive overview of the governance attributes identified through our literature review.

**Validation**: The final step involved reviewing the completed table for accuracy and completeness. We validated the synthesised information against existing knowledge and frameworks found in the literature, ensuring that our findings were robust and grounded in current academic discourse.

1. **Evaluation of governance attributes of IGOs in the ocean economy**

**See file: Ocean Governance and ocean economy governance matrix\_IGOs**

Purposive search methodology to assemble a comprehensive baseline of global governance of the ocean economy.

1. **Identification of Primary Institutions:**

This iterative process began with the **identification of primary institutions involved in ocean governance**. 51 Institutions that are part of the United Nations Environmental Management Group (EMG) were considered for the purpose of this study, as they constitute the requirement of an Intergovernmental Global Organisation, and in addition, a number of them are a part of the UN-Ocean initiative. Meanwhile, Institutions on the list with purely regional scopes or unrelated to ocean issues were excluded from refining our focus. This selection criterion identified 49 key Intergovernmental Organizations (IGOs) relevant to our analysis.

1. **Document Analysis**

**Document analysis** was the primary method used to examine the attributes of the identified IGOs. This systematic procedure entailed reviewing official documents such as **conventions, agreements, protocols, resolutions, statutes, press releases, reports, strategies, and basic procedures and exploring official web pages and other relevant online resources**. Documents were collected from sources like the **UN Treaties Collection and the UN General Assembly Resolutions Tables**. This rich array of documents was then organised and imported into NVivo for detailed analysis.

**a. Document Importation and Organization in Nvivo**

1. Importation into NVivo: • All pertinent documents were imported into NVivo in PDF files. This format ensures that the original structure and content of the documents are preserved, facilitating accurate analysis.
2. Organisational Structure: • To maintain coherence and ease of access, the documents were systematically organised into folders within Nvivo. This organisation was based on several criteria:

* Source: Documents were grouped according to their originating bodies or institutions.
* Type: We categorised documents based on their nature, such as conventions, constitutions, statutes, or resolutions.
* Date: The documents were arranged chronologically, allowing for a temporal perspective in our analysis.

1. Descriptive Naming and Attributes: • Each document was assigned a descriptive name and attributed various metadata for quick identification and reference. For instance, a document might be named “UNESCO\_Intergovernmental\_Oceanographic\_Commission\_Constitution\_1960.pdf,” with attributes including the title (“Constitution of the Intergovernmental Oceanographic Commission”), author (“UNESCO”), year of publication (“1960”), and the document’s URL if sourced online. • This level of detail in naming and attributing documents streamlines the analysis process and aids in referencing specific documents in our research.
2. **Data Extraction in Nvivo**

Once the documents were organised and named appropriately, we proceeded to extract information on the ocean governance attributes of each institution from the relevant documents. We defined ocean governance attributes as the characteristics or indicators that can be used to measure or describe the presence and extent of the key ocean governance features in a given system. We followed the workflow that we developed using Nvivo, a qualitative data analysis software, to perform this task. The workflow consisted of the following steps:

1. Creating a node hierarchy to represent the ocean governance attributes and their definitions. We used the nodes folder in Nvivo to store our nodes or create our own folders to organise them by category, level, or theme. We also added descriptions and memos to our nodes to explain their meaning and scope. For example, we created a node for “jurisdiction” and defined it as “the authority or power of an actor to make and enforce rules or laws over a certain area or domain of the ocean”. We also created sub-nodes for different types or aspects of jurisdiction, such as “spatial jurisdiction”, “functional jurisdiction”, or “institutional jurisdiction”.
2. Developing an evaluation Guideline
   * The evaluation guideline includes defined Indicators and Validation. For each identified attribute, we defined specific, measurable indicators to ensure their empirical observability. For example, the "Year of Establishment" attribute was measured by the institution's official founding date, while "Spatial Jurisdictional" was evaluated through the geographical and spatial coverage the institutions have authority, as precisely indicated in the documents.
   * Ensuring Measurability of Governance Attributes Process: To ascertain the measurability of the governance attributes, we meticulously matched each attribute with specific indicators that could be observed or derived from available data sources.
3. Coding the documents to the nodes using the drag and drop method. We coded at different levels of granularity, such as words, sentences, paragraphs, or entire documents. We also coded to multiple nodes if the text was relevant to more than one attribute. For example, we coded a sentence that mentions the objectives of IGOs to both the “Subject Matter Jurisdiction” node and the “Defined Objective” node. We also used the auto-coding feature to code based on existing patterns or structures in the documents, such as headings, tables, or lists.
4. **Annotating the coded text to standardise the information across the different IOGs** in terms of structure, wording, and additional information. We used the annotations folder in Nvivo to **store our annotations to organise them by attribute,** IOG, or source. In the annotation, we re-organised and interpreted the coded items **following the developed evaluation guideline** to have the extracted data presented in standardised structures, wordings and word length, and capturing what the attributes have been designed to cover in the evaluated documents. This also allowed us to **add additional information to the data from other sources, such as the official webpage (including links)** of the IGOs and content from other official sources, e.g. reports, policy briefs, memos, press releases, etc. The annotation was also used to record our thoughts and insights as we evaluated documents for each IGO.
5. Exporting the annotations as an excel sheet as the main final source of data for further analysis. We used the export feature in Nvivo to export our annotations as a spreadsheet file, with columns for the source name, the node name, the coded text, the annotation text, the annotation comment, and the annotation link. We also customised the export options to include other information, such as the source type, the node description, or the annotation date. We also applied filters or queries to export only the annotations that meet certain criteria, such as the attribute name, the IOG name, or the source type.

The use of NVivo facilitated an organised and efficient approach to data analysis, enabling us to sort and interpret the data effectively.

**Objective 2: How do the organisational structures of global ocean governance bodies shape the management of the ocean economy, and what systemic characteristics contribute to or impede their efficacy?**

* + **The task involves analyzing the data presented in the "Ocean Governance and Ocean Economy Governance Matrix\_IGOs” file.**
  + **The objective is to analyze the relationship between various intergovernmental organizations (IGOs) based on their distinct attributes. This involves examining the attributes: spatial and subject matter jurisdictions of these governmental institutions, objectives, strategies, inter-institutional relationships., etc. The aim is to identify gaps, overlaps, and potential synergies within the existing network of global institutions engaged in ocean governance.**
  + **As I highlighted during our conversation, it is crucial for you to identify the most effective method for summarizing the text in each cell that relates to the attributes of various International Governmental Organizations (IGOs). This summarization is essential for facilitating a meaningful analysis of the data at hand. One effective strategy you might consider is creating a list of key terms or phrases that capture the core meaning of the text in each cell. This approach not only streamlines the information but also allows you to utilize relevant statistical analysis and machine learning techniques to explore the relationships and connections among these keywords and their corresponding attributes across the entire dataset. By doing so, you'll be able to derive insightful interpretations from the collective information regarding the different IGOs.I will be happy to see the approach and methodology you want to take to perform this analysis and present the results in a graphical format**
  + **Please ensure to thoroughly document the method, approach, and process used for the analysis. This information will be essential for the methods section of the upcoming paper resulting from this research endeavour. Your detailed notes will greatly contribute to the clarity and rigour of our findings.**

1. **Data Presentation**

Our findings are presented through a combination of **narrative and graphical illustrations**. The narrative analysis connects each aspect of our findings to the research questions and integrates citations for transparency. Graphical elements like graphs, charts, tables, and maps are employed to provide an intuitive understanding of the data (possibly to be developed using R codes, or similar package).

1. **Ensuring Data Quality**

**Adhering to Lincoln et al. (1985) guidelines**, we emphasize **trustworthiness, credibility, transferability, dependability, and confirmabilit**y. Techniques like **triangulation, peer debriefing, and reflexivity are employed to validate information and ensure robust, comprehensive findings**. Triangulation involves comparing data from various documents and sources, while peer debriefing includes consultations with experts in ocean governance. Reflexivity involves a critical self-examination of our assumptions and biases throughout the research process.

**Objective 3: Investigate the key systemic governance design features of IGOs to understand their effectiveness in the realisation of a sustainable ocean economy.**

* + - 1. **Methodology for Identifying Governance Theories and Design Features relevant to ocean governance**

Involves systematic literature review methodology, focusing exclusively on the Scopus database to identify and analyse publications relevant to governance theories and their application to the global governance of the ocean economy. The methodology comprised several key steps:

1. **Literature review**

Conducted an initial broad literature review to identify common features in governance theories frequently discussed concerning environmental and ocean governance. This review covers foundational/classical studies in governance theory as well as more recent studies that apply these theories to marine and environmental contexts. Scopus was selected as the primary database for this research due to its extensive collection of peer-reviewed articles, conference proceedings, and books in the fields of environmental science, social sciences, and more. Scopus's comprehensive indexing of literature in governance studies made it an ideal choice for this research.

The initial search on the Scopus database using the keyword "governance and theories" retired 816 publications, excluding articles with titles containing keywords mostly focused on countries.

To effectively filter the 816 peer-reviewed publications down to a more manageable number for detailed review, first, the search was narrowed down by adding specific keywords related to ocean governance, such as "marine," "ocean," "coastal," and "environmental governance." This brought down the number of literature to 58. Still considered to be a large number, there was the need to reduce the number to target publications more closely aligned with the research focus. The following inclusion and exclusion criteria were followed:

* Focus on governance theory: Publications were included if they (a) focused on governance theory or its application to environmental or ocean governance,
* Title and Abstract Screening: Read the titles and abstracts of the publications to assess their relevance to the research questions. Exclude publications that, despite meeting the initial keyword criteria, do not focus on governance theories as applied to environmental or ocean contexts.
* Publication published in English with no year restriction, reflecting both traditional and contemporary governance approaches, and (c) were peer-reviewed. Exclusions were applied to publications outside these criteria to maintain a focus on high-quality, relevant literature.
* Citation Count and Impact: Scopus's citation count feature to identify highly cited publications within your initial result set. Publications with a higher citation count are likely to be more influential and relevant, allowing you to focus on key articles and sources in the field.
* Journal Ranking and Relevance: Focus on publications from highly ranked journals in the fields of environmental science, public administration, and policy studies. Journals with a strong emphasis on governance, environmental management, and sustainability are more likely to publish articles relevant to your research.
* Use of Review Articles: Identify review articles within the 816 publications. Review articles can provide summaries of the field and highlight key theories and findings, allowing you to cover broad themes without needing to analyze each primary study.
* Manual Selection Based on Relevance: After applying the above filters, manually select articles based on their abstracts and relevance to your study's objectives. This final selection should prioritise publications that offer insights into governance design features, theoretical applications to ocean governance, or present innovative governance frameworks.

**Applying these criteria allowed us to bring the number of publications to 37** which were prepared for evaluation to extract relevant theories from the selected literature. **A detailed screening process** based on established criteria allowed us to identify theories that directly addressed or could be adapted to the challenges of ocean governance. This process involved thoroughly **reviewing abstracts, introductions, and conclusions of the 37 publications**. **Extract from the text where the theories were identified was also documented in a matrix**, which contains the **exact passage in the paper from where governance theory has been identified**. This information was presented in a quotation and used an ellipsis (…) to exclude extra or unnecessary words. **We then identified various features corresponding to each theory by critically reviewing the documented “passage of text” explaining the theory and extracting keywords and phrases**. These keywords and phrases were documented in the matrix. Following this strategy, a total number of **37 multidisciplinary theories with their corresponding features were initially identified**. A matrix mapping the identified theories against critical governance features further aided in visually discerning which theories encompassed multiple aspects pertinent to our study.

1. **Streamlining Governance Theories for Analysing Global Governance of the Ocean Economy**

37 theories were identified from the reviewed literature, however, there were theories identified more than once from the literature, and there are others that share similar underlying principles or that can be combined to provide a comprehensive understanding of a particular aspect of governance. Given the vast array of governance theories identified from the literature—ranging from "Science-Policy Theory" to "Sociotechnical Change"—the need to streamline these into a focused set applicable to intergovernmental global organisations and the ocean economy was imperative. The objective was to distil these theories into a core framework that captures the key systemic design features crucial for effective global governance. The streamlining process was guided by five key criteria, leading to the selection of theories most pertinent to our research objectives.

**a. Group Related Theories**: Start by grouping theories that share similar underlying principles or that can be combined to provide a comprehensive understanding of a particular aspect of governance. For example:

* + **Adaptive Governance, Adaptive Governance Theory**: Combine under a single category of "Adaptive Governance."
  + **Game Theory, Evolutionary Game Theory**: Consolidate into "Game Theory."
  + **Agency Theory, Agency Theory and Stakeholder Theory**: Merge into "Agency Theory."
  + **Learning Theory** appears twice and should be counted once.
    1. **Align Theories with Ocean Governance Challenges**: Focus on theories that directly address the unique challenges and characteristics of the ocean economy, such as transboundary resource management, stakeholder engagement across scales, and adaptability to ecological and socio-economic changes. Theories like "Collaborative Environmental Governance," "Adaptive Governance," and "Cross-Boundary Governance Theory" are particularly relevant.
    2. **Prioritize Based on Research Objectives**: Select theories that contribute to understanding systemic design features in global governance contexts, such as:
  + **Science-Policy Theory**: Important for understanding the interface between scientific knowledge and policy-making in ocean governance.
  + **Social Network Theory and Actor-Network Theory**: Useful for examining the role of stakeholders and networks in governance structures.
  + **Regime Theory and International Relations Theory**: Relevant for exploring formal and informal international governance arrangements.
    1. **Consider Theoretical Diversity**: Ensure a range of theoretical perspectives is included to capture the complexity of ocean governance. This includes incorporating views from:
  + **Critical Theory and Transparency Theory**: For perspectives on power dynamics, equity, and accountability.
  + **Theory of Planned Behavior and Norm Activation Model**: To understand the behavioral aspects influencing governance outcomes.
  + **Institutional Ecology and Evolutionary Governance Theory**: For insights into the evolution of governance systems and their adaptability.
    1. **Exclude Less Relevant Theories**: Some theories might be less directly applicable to the core aim of identifying governance design features for the ocean economy and can be set aside for this particular research focus. For instance, "Prospect Theory" and "Theory of Production, Life, and Ecology" might be less immediately relevant to the systemic design features of governance.

Applying this strategy, the list of a core set of theories that provide a broad yet focused framework for analysing governance in the ocean economy was reduced to 29, representing a balance between theoretical depth and applicability to the challenges of global ocean governance.

1. **Streamlining Process of Theory features**

Given the expansive list of theory features extracted from the literature, a systematic approach was employed to distil these into a focused set that aligns with our research objective: to identify key systemic design features of global governance for the ocean economy, with a specific focus on Intergovernmental Global Organizations. The streamlining process involved the following steps:

**a. Thematic Consolidation**: The initial step involved grouping similar features to reduce redundancy. For example, features related to "Flexibility, Diversity, Learning, Innovation" and "Capacity to Respond to and Shape Change" were combined under a broader feature of adaptive governance. This consolidation was guided by the conceptual overlap and the potential for thematic synthesis.

**b. Prioritization of Relevance**: Through iterative review, each feature was evaluated for its direct relevance to the challenges and characteristics of ocean governance. Features such as "Joint Participation and Deliberation" and "Management and Coordination" were prioritised due to their emphasis on collaborative governance and coordination across boundaries, crucial for managing global ocean resources. High-priority features directly address the foundational challenges and opportunities in ocean governance, ensuring the research focuses on areas with the greatest potential impact. , features that did not provide additional insights beyond what was covered by the prioritised feature were set aside. This step was informed by the principle of theoretical saturation, where no new information was being added by retaining certain themes.

**c. Alignment with Identified Theories**: The consolidated features (14 numbers) were then aligned with the final selected theories to ensure coherence between the theoretical framework and the identified themes. For instance, "Adaptive Governance" was directly linked to features emphasising flexibility, learning, and innovation, while "Collaborative Environmental Governance" and "Cross-Boundary Governance Theory" were aligned with features focusing on joint participation, trust, and network management.

**d. Final Selection and Validation**: The resulting streamlined set of features (14 numbers) was then validated through a secondary review of the literature. This validation ensured that the selected themes and factors were robust, relevant, and representative of global ocean governance's current challenges and considerations.

1. **Evaluation of governance features in global ocean institution**

**Methodology Overview**

This methodology aims to systematically analyse and categorise information related to ocean governance institutions to identify the presence and characteristics of specific governance design features. The analysis will be structured around the identified design features such as the Science-Policy Interface, Collaborative Governance, and so forth.

1. **Data Preparation**
   1. **Data Extraction**: Utilize the structured data from the provided Excel (extracted annotation from Nvivo) file, focusing on columns that detail the institutions' objectives, strategies, jurisdictional scope, and operational mechanisms.???
   2. **Data Cleaning**: Standardize the information for consistency, removing any redundancies or irrelevant data points to ensure clarity and focus on the governance aspects.

Here you will use the data that has been streamlined into either keywords or phrases from the "Ocean Governance and Ocean Economy Governance Matrix\_IGOs” file

1. **Coding Scheme Development**
   1. **Development of a Coding Scheme**: Based on the identified design features, a coding scheme was developed where each design feature is defined by specific indicators or characteristics that can be observed within the institutional descriptions, objectives, strategies, and governance mechanisms.

*Developing a coding scheme for the identified governance design features, as they relate to various aspects of organisational structure and operation, involves defining specific indicators that can be observed within the categories of Spatial Jurisdiction, Subject Matter Jurisdiction, Source of Jurisdiction, Defined Objectives, Strategies, Defined Inter-institutional Relationship, Vertical Coordination, and Horizontal Coordination.*

*See sheet 2 of “IGOs gov\_design feature\_identification” file for intitail coding scheme*

* 1. **Pilot Coding and Refinement**: Conduct a pilot coding on a subset (first five institutions) of the data using the developed scheme.
  2. **Refine the coding scheme** based on ambiguities or inconsistencies encountered during the pilot phase.

*During the pilot coding phase, several ambiguities or inconsistencies were encountered, such as the broad applicability of some indicators across different governance design features, leading to overlaps. For instance, the "Strategies" and "Defined Objectives" categories broadly applied to multiple design features, making it difficult to distinguish specific governance aspects uniquely. To address this, we further refined the indicators by:*

1. ***Specifying Indicators:****More specific indicators could help differentiate between design features. For example, indicators for "Environmental Stewardship" could explicitly include sustainable resource management practices or biodiversity conservation initiatives.*
2. ***Differentiate Overlapping Features:****Clarify distinctions between features like "Adaptive Governance" and "Resilience and Adaptive Capacity in Governance" by focusing on the former's process adaptability and the latter's outcome resilience.*
3. ***Incorporate Qualitative Assessments:****Some features may require qualitative judgment, such as assessing the effectiveness of "Collaborative Governance" or the inclusivity of "Social Equity and Justice in Governance."*

*See sheet 4 of “IGOs gov\_design feature\_identification” file for the refined coding scheme*

1. **Systematic Analysis**
2. **Coding of Data**: Apply the refined coding scheme to the entire dataset, systematically identifying how each institution may reflect the governance design features based on the refined coding scheme. The coding would require a detailed analysis of each institution's data and identify instances where the governance design features are mentioned or implied.
3. **Qualitative Content Analysis**: Analyze the coded data to evaluate how each institution addresses the design features through its spatial and subject matter jurisdiction, governance strategies, objectives, and coordination mechanisms, etc.

#### . **Completing the Analysis**

*This process would be repeated for each governance design feature across all reviewed institutions. The final matrix would provide a comprehensive view of how each institution aligns with the governance design features, supported by factual justifications derived from their documented actions, policies, and strategies.*

1. **Synthesis and Identification**
   1. **Cross-Analysis**: Perform a cross-institutional analysis to identify patterns, commonalities, and divergences in implementing design features across different institutions.

***Steps for Pattern Recognition from Coded Data:***

1. ***Aggregate Coded Data****:*
   * *Start by compiling all the coded data related to governance features for each institution in 5 and 6. Ensure each feature is clearly marked as present or absent for every institution.*
2. ***Identify Commonalities****:*
   * *Analyze the data to identify features that are commonly present across a majority of institutions. These commonalities suggest widely adopted governance strategies or principles that are considered best practices in the field.*
   * *For example, if most institutions have a strong presence of "Collaborative Governance," it indicates a general trend towards prioritizing stakeholder engagement and partnership in governance.*
3. ***Spot Divergences****:*
   * *Look for governance design features that show variability in their implementation across institutions. Divergences may reveal specialized approaches tailored to the unique mandates, operational contexts, or challenges faced by individual institutions.*
   * *A feature like "Sociotechnical Systems in Governance" might be heavily emphasized in technologically-focused organisations but less so in others, highlighting a divergence in approach.*
   1. **Synthesis of Findings**: Synthesize the findings to highlight how each design feature is represented in ocean governance, including the effectiveness, challenges, and innovations observed.
4. **Validation and Refinement**
5. **Validation**: Validate through comparisons with existing literature to ensure that the identified design features accurately reflect the governance structures and strategies of the institutions analyzed.
6. **Refinement**: Based on feedback and validation, refine the identification of design features, potentially iterating the coding and analysis process to capture nuances or additional aspects not initially identified.