



Global research landscape of blue accounting: Bibliometric insights from 2015 to 2025

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Article Info

Article history:

Received Feb 28, 2026

Revised Mar 3, 2026

Accepted Mar 13, 2026

Keywords:

Bibliometric Analysis;
Blue Accounting;
Blue Economy;
Ocean Governance;
Sustainability Accounting.

ABSTRACT

The Blue Economy has gained global attention as a framework for balancing marine resource utilization with environmental sustainability. Supporting this transition requires effective systems to measure and report ocean-related natural capital, leading to the emergence of Blue Accounting as an integrative approach linking accounting practices, sustainability governance, and policy decision-making. This study examines the development of Blue Accounting research between 2015 and 2025 using a bibliometric approach combined with qualitative synthesis. The findings indicate a gradual evolution of the field, beginning with conceptual discussions of the blue economy, followed by growing attention to environmental valuation, ocean accounting integration, and blue carbon assessment. More recent studies emphasize operational applications, including policy implementation and cumulative impact accounting. Although publication growth remains moderate, research trends show increasing interdisciplinary collaboration and policy relevance. Key challenges include institutional coordination and the lack of standardized accounting frameworks. Overall, Blue Accounting is evolving into a strategic tool that supports sustainable ocean governance by integrating ecological and economic perspectives, contributing to more transparent decision-making and advancing the objectives of sustainable marine development.

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1. INTRODUCTION

The Blue Economy has emerged as a key paradigm in global development, emphasizing on the sustainable utilization of marine resources to support economic growth, livelihoods, and the health of marine ecosystems (Liang et al., 2022). As ocean-based industries expand the need for transparent governance mechanisms that can capture the economic and ecological value of marine resources becomes increasingly critical. In this context, Blue Accounting has gained attention as an emerging framework that integrates accounting tools, valuation approaches, and reporting standards into marine resource management to support transparent governance and sustainable financing (Abreu et al., 2019). By enabling the systematic identification, measurement, and disclosure of marine natural capital, Blue Accounting provides a mechanism through which ocean-based assets and ecosystem services can be incorporated into decision-making processes at both national and organizational levels.

Beyond, its technical function, Blue Accounting represents a broader governance framework that translates complex marine ecological information into standardized and comparable accounting data. This facilitates improved policy coordination, enhances accountability in marine resource management, and supports the alignment of economic activities with sustainability goals (Tropika, 2025). Importantly, the development of Blue Accounting is closely linked to the implementation of global sustainability agendas, particularly the Sustainable Development Goals (SDGs), with a strong emphasis on SDG 14 (Life Below Water). By recognizing and valuing marine ecosystem services that are often excluded from conventional national accounts, Blue Accounting contributes to a more comprehensive understanding of ocean-based wealth and sustainability (Apriantoro et al., 2025; Liang et al., 2022).

Over the past decade, the academic literature on Blue Accounting has expanded significantly. Early studies primarily focused on conceptual discussions and theoretical frameworks aimed at integrating environmental accounting with ocean governance. However, since around 2018, research has increasingly shifted toward empirical investigations and interdisciplinary applications (Lu & Li, 2025). A notable surge in publications occurred during the 2023–2024 period, reflecting growing scholarly and policy interest in topics such as blue taxation, digital finance for marine sustainability, and integrated reporting frameworks for climate change mitigation (Hal et al., 2025; Hasanah et al., 2024). Despite this rapid development, the literature remains fragmented across disciplines, with limited synthesis of the intellectual structure, thematic evolution, and collaborative networks shaping the field (Abreu et al., 2019).

This fragmentation highlights an important research gap. Although existing studies discuss the conceptual relevance of Blue Accounting, there remains a lack of systematic quantitative mapping that can reveal how the field has evolved, what themes dominate the literature, and where significant knowledge gaps persist. Without such mapping, it becomes difficult for researchers, policymakers, and standard-setters to identify priority research areas, develop coherent frameworks, or advance the theoretical maturation of Blue Accounting. Bibliometric analysis provides a useful methodological approach to address this limitation by synthesizing dispersed scholarly works, identifying research clusters, and visualizing emerging trends within the knowledge structure of a field (Liang et al., 2022; Lu & Li, 2025).

Therefore, this study aims to present a comprehensive bibliometric analysis of global Blue Accounting research from 2015 to 2025. By mapping publication trends, influential authors and institutions, collaborative networks, and thematic research clusters, this study provides a systematic overview of the intellectual landscape of Blue Accounting. The findings are expected to support scholars and policymakers in identifying future research directions and strengthening the role of accounting in sustainable ocean governance (Wang et al., 2024).

This study offers several conceptual contributions to the development of Blue Accounting literature. First, it reinforces the theoretical positioning of Blue Accounting as a governance-oriented accounting framework that facilitates the translation of marine natural capital into standardized and comparable information for sustainability reporting and policy decision-making. Second, through bibliometric mapping, this study synthesizes fragmented knowledge across disciplines and clarifies the intellectual structure and thematic evolution of Blue Accounting research. Third, by identifying emerging themes and underexplored areas—such as marine ecosystem valuation methods, disclosure frameworks, and blue finance integration—this research provides a conceptual roadmap for future theoretical and empirical developments in the field. In doing so, the study contributes to strengthening the theoretical foundation of Blue Accounting as an essential instrument for advancing accountable and sustainable marine development within the broader Blue Economy agenda.

2. RESEARCH METHOD

This study employs a quantitative bibliometric approach, a technique that centers on the systematic analysis of bibliographic metadata from scholarly journals and articles (Zahra et al., 2025).

Bibliometric analysis serves as a robust method for evaluating the evolution of a specific research domain, encompassing the identification of key topics and influential authors by examining the field's social, intellectual, and conceptual structures (Donthu et al., 2021).

In this research, the bibliometric approach is operationalized through co-word (keyword) and limitation subject area analysis to process and visualize data. This process enables the generation of thematic maps that illustrate the progression and hotspots of research topics. The execution of this study follows the five-stage bibliometric research framework proposed by Fahimnia et al. (2015), which consists of:

Defining Search Keyword

The literature search was executed in the Scopus database using the keyword 'Blue Accounting.' A total of 1,363 publications were identified during the initial search phase for the 2015–2025 period, with the cut-off date set at December 31, 2025.

Initial Search Results

Table 1 illustrates the top 18 most-cited publications retrieved from the Scopus database (Unrefined Search results).

Table 1. Most-cited publications in the scopus database

Year	Title	Citation
Nelson et al. (2018)	First Results From The IllustrisTNG Simulations: The Galaxy Colour Bimodality	1324
Howarth & Jacobson, (2021)	How Green is Blue Hydrogen?	703
Gascon et al. (2016)	Residential Green Spaces and Mortality: A Systematic Review	672
Hertwich et al. (2015)	Integrated Life Cycle Assessment of Electricity-Supply Scenarios Confirms Global Environmental Benefit of Low-Carbon Technologies	639
Kaiser et al. (2017)	Effects of Biofouling on The Sinking Behavior of Microplastic	568
Gerson et al. (2015)	ACG Clinical Guideline: Diagnosis and Management of Small Bowel Bleeding	551
Ummah, (2019)	Dimensions of Blue Carbon and Emerging Perspectives	403
Krause-Jensen et al. (2018)	Sequestration of Macroalgal Carbon: The Elephant in The Blue Carbon room	297
Greene et al. (2024)	UNCOVER Spectroscopy Confirms the Surprising Ubiquity of Active Galactic Nuclei in Red Sources at $z > 5$	277
Berihun et al. (2019)	Exploring Land Use/Land Cover Changes, Drivers and Their Implications in Contrasting Agro-Ecological Environments of Ethiopia	265
Graham et al. (2019)	Rydberg-Mediated Entanglement in a Two-Dimensional Neutral Atom Qubit Array	262
Chukalla et al. (2015)	Green and Blue Water Footprint reduction in Irrigated Agriculture: Effect of Irrigation Strategies and Mulching	254
Woodsley (2019)	The Evolution of Massive Helium Stars, Including Mass Loss	228
Schyns et al. (2019)	Limits to The World's Green Water Resources for Food, Feed, Fiber, Timber, and Bioenergy	225
Zhao et al. (2018)	Field-Based Evidence for Microplastic in Marine Aggregates and Mussels: Implications for Trophic Transfer	223
Yang et al. (2017)	Highly Efficient Photocatalytic Degradation of Methylene Blue by P2ABSA-Modified TiO ₂ Nanocomposite Due to The Photosensitization	211
Hansis et al. (2015)	Relevance of Methodological Choices for Accounting of Land Use Change Carbon Fluxes	207
Zhuo et al. (2016)	The Effect of Inter-Annual Variability Consumption, Production, Trade and Climate on Crop-Related Green and Blue Water Footprints and Inter-Regional Virtual Water Trade: A Study for China (1978-2008)	204

Source: Processed Data

Refinement of the Search Results

Next, a screening process was conducted, and articles that did not meet the criteria were excluded. Out of the initial 1,363 articles identified, 1,357 articles were removed for various reasons, leaving 6 articles. Further details are presented in Table 2.

Table 2. Publication screening results

Search Screening	Publication
Total Initial Search Results	1363
Subject Area: Limited to Economics, Econometrics and Finance	(1311)
Document Type : Article	
Keyword: Limited To Blue Economy; Economics; Blue Accounting; Economic and Social Effects; Systems of Environmental Economic Accounting; Sustainable Development Goals (SDGs); Marine Economy; Ocean Economy; Environmental Accounting	(44)
Source Type : Journal	(2)
Total	6

Source: Processed Data

Compiling Statistics on The Initial Data

After refining the search, the results were downloaded and stored in Mendeley, then exported into RIS format to include important article information such as the title, authors, abstract, keywords, and journal details (journal name, year, volume, issue, and pages).

Data Analysis

The selection of data sources in this study was based on several criteria designed to ensure that the publications analyzed accurately represent the research phenomenon of Blue Accounting within the context of the Blue Economy. First, the data source was limited to the Scopus database, which is widely recognized as one of the most comprehensive and reliable indexing platforms for high-quality peer-reviewed academic publications. Using Scopus ensures that the data analyzed meet international academic standards and have undergone rigorous editorial and peer-review processes.

Second, the search process was restricted using the keyword “Blue Accounting”, which directly reflects the core concept investigated in this study. Additional related keywords such as Blue Economy, Economics, Economic and Social Effects, Systems of Environmental Economic Accounting, Sustainable Development Goals (SDGs), Marine Economy, Ocean Economy, and Environmental Accounting were used during the refinement stage to ensure thematic relevance to the accounting and economic dimensions of marine resource management.

Third, the timeframe of the publications was limited to the 2015–2025 period. This period was selected to capture the most recent developments in Blue Accounting research and to reflect the rapid growth of scholarly attention toward sustainable ocean governance and blue economy initiatives in the last decade.

Fourth, the subject area was restricted to Economics, Econometrics and Finance to ensure that the selected publications are directly relevant to the accounting and economic perspective of marine resource governance. This limitation helps avoid unrelated studies from other disciplines where the term “blue” may appear but does not refer to the Blue Economy or Blue Accounting context.

Fifth, the document type was limited to journal articles, as journal publications typically represent validated scientific contributions and are considered the primary medium for disseminating peer-reviewed academic research. Additionally, the source type was restricted to academic journals, ensuring the credibility and scholarly relevance of the analyzed data.

Through the application of these criteria, the study refined the initial 1,363 publications retrieved from the Scopus database to 6 articles that specifically address Blue Accounting within the economics and accounting context. These selected publications serve as representative sources for analyzing the conceptual and thematic development of Blue Accounting research.

3. RESULTS AND DISCUSSIONS

Scopus Database Publications



Figure 1. Document by year

Source: Database Scopus 2025

Based on Figure 1, the number of publications related to blue accounting in the Scopus database shows significant fluctuations from 2017 to 2025. The trend reflects an uneven development pattern, characterized by periods of absence followed by gradual re-emergence of scholarly attention.

In 2017, only 1 publication was recorded, indicating that blue accounting was still an emerging research topic and had not yet gained widespread academic recognition. The absence of publications in 2018 (0 documents) suggests limited research activity or a lack of conceptual development linking accounting practices with the blue economy during that period.

A recovery appeared in 2019 with 1 publication, signaling renewed academic interest. However, research activity again declined in 2020 and 2021, when no publications were recorded. This decline may be associated with shifting research priorities during the COVID-19 pandemic, where sustainability discussions were more heavily concentrated on broader environmental and social issues rather than marine-based accounting frameworks.

A more stable phase began in 2022, with publications increasing to 1 document and remaining consistent through 2023, 2024, and 2025. This stability indicates growing awareness of the importance of integrating accounting practices with marine resource management, ocean economy governance, and sustainable coastal development. The emergence of global discussions on the blue economy and Sustainable Development Goals (SDG 14: Life Below Water) likely contributed to strengthening research continuity in this field.

Overall, the publication trend demonstrates that blue accounting research is still in an early but developing stage. The non-linear pattern reflects the evolving conceptualization of blue accounting as a specialized extension of sustainability and environmental accounting. Nevertheless, the consistent publications during 2022–2025 suggest that the topic is gaining recognition and moving toward a more established position within the global academic research landscape.

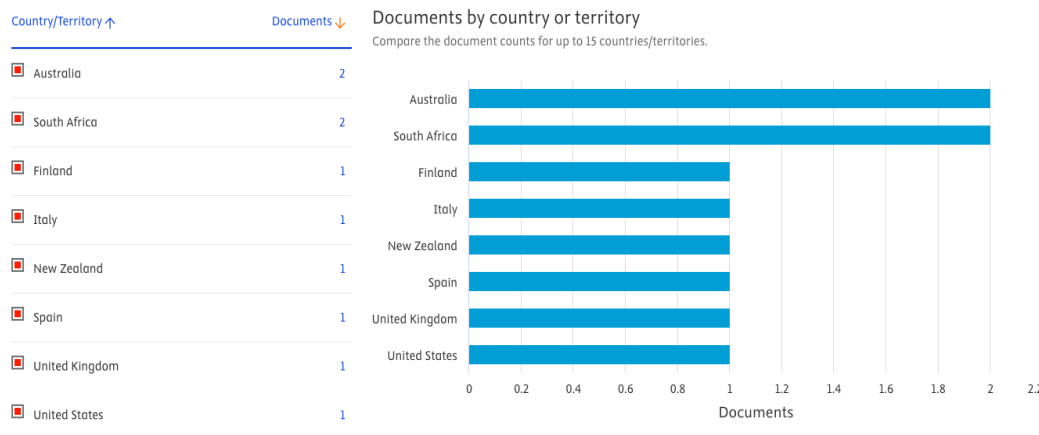


Figure 2. Document by Country

Source: Database Scopus 2025

The synthesis of the six selected studies reveals an important intellectual transition in marine sustainability research, moving from conceptual discussions of the blue economy toward the operationalisation of blue accounting as a governance and decision-making framework. Collectively, the findings demonstrate that sustainable ocean development increasingly depends on the ability to quantify ecological assets, integrate environmental values into economic systems, and support policy decisions through structured accounting mechanisms.

Early scholarship emphasised the conceptual ambiguity surrounding the blue economy and blue growth paradigms. The study by Mulazzani & Malorgio (2017) highlighted the absence of standardized definitions and stressed the need to embed ecosystem services within environmental-economic accounting systems. Their work laid the theoretical foundation for blue accounting by proposing adjusted value-added measures that consider environmental degradation and non-market ecosystem benefits. This conceptual shift marked a departure from traditional economic valuation approaches, positioning marine ecosystems as productive capital rather than passive natural resources.

Subsequent research strengthened the economic justification for integrating environmental considerations into accounting frameworks. Jones (2019) demonstrated that water ecosystem degradation generates measurable socio-economic consequences through public health impacts. Improvements in water quality were associated with better infant health outcomes and substantial healthcare cost savings, illustrating how environmental externalities translate into tangible economic effects. These findings reinforce the necessity of blue accounting systems capable of capturing indirect and long-term societal benefits derived from healthy aquatic ecosystems.

The evolution toward governance integration became more explicit with the emergence of ocean accounting frameworks. Gacutan et al. (2022) argued that Marine Spatial Planning (MSP) and Ocean Accounting (OA) function as complementary tools: MSP allocates marine space strategically, while OA provides standardized and integrated environmental and socio-economic data. Their analysis suggests that blue accounting serves as the informational backbone enabling adaptive and evidence-based ocean governance. Without such accounting systems, policymakers struggle to balance competing objectives between conservation, economic growth, and social welfare.

Empirical advancement is further illustrated by Qu et al. (2023), who quantified the carbon storage value of kelp forest restoration. By monetizing blue carbon stocks, the study demonstrated how marine ecosystem conservation can be integrated into carbon markets and investment mechanisms. This represents a critical transition from theoretical valuation to financial operationalisation. Blue accounting, in this context, becomes a mechanism for mobilising funding for marine restoration while aligning ecological objectives with economic incentives.

However, institutional challenges remain significant. March et al. (2024) showed that despite growing policy adoption of the blue economy in Africa, implementation remains fragmented due to sectoral governance structures, limited coordination, and dependence on external financing. The absence of integrated accounting tools contributes to policy silos and weak accountability mechanisms. These findings indicate that blue accounting is not merely a technical framework but also an institutional instrument capable of improving governance coherence and regional cooperation.

The most recent contribution by Kuempel et al. (2025) reflects the maturation of the field through the introduction of cumulative impact accounting for offshore energy development. As ocean industries expand rapidly, particularly renewable energy, decision-makers must evaluate trade-offs across ecological, economic, and social dimensions simultaneously. The proposed framework emphasises transparency, cross-jurisdictional integration, and systematic impact pathways, signalling a shift toward predictive and risk-informed accounting systems. This development positions blue accounting as a strategic tool for managing large-scale marine investments and sustainability transitions.

Taken together, the literature illustrates a progressive evolution of blue accounting across three major phases: conceptual development, valuation and integration, and operational governance application. The growing convergence between ecosystem valuation, spatial planning, and cumulative impact assessment indicates that blue accounting is becoming central to sustainable ocean governance. Rather than functioning solely as a reporting mechanism, it increasingly supports policy alignment, investment decisions, and long-term environmental risk management.

Overall, the findings suggest that the future effectiveness of the blue economy will depend heavily on the institutional adoption of comprehensive accounting systems capable of integrating ecological integrity with economic development objectives. Blue accounting therefore represents a critical bridge between sustainability science and practical ocean governance, enabling nations to pursue marine economic growth while maintaining ecosystem resilience and social well-being.

Scientific Development Synthesis

Table 3. Scientific development synthesis (2017-2025)

Stage	Research Focus	Development of Blue Accounting
2017	Definition of the blue economy	Conceptual Stage
2019	Environmental Health	Economic Justification
2022	Ocean Accounting and Governance	System Integration
2023	Blue Carbon Valuation	Ecosystem Monetization
2024	Policy Implementation	Institutional Challenges
2025	Cumulative Impact Accounting	Operational and Strategic Stage

Source: Processed Data

The scientific development of blue accounting demonstrates a gradual transition from conceptual exploration toward operational and policy-oriented implementation. Based on the chronological synthesis presented in Table X, the evolution of research can be understood as a multi-stage maturation process reflecting the growing integration between marine economics, environmental accounting, and ocean governance.

In 2017, early studies primarily focused on defining the blue economy concept, emphasizing theoretical and conceptual foundations. At this stage, research aimed to clarify the relationship between marine resource utilization and sustainability principles, positioning blue accounting as an emerging analytical perspective rather than a practical tool.

By 2019, the research direction expanded toward examining environmental and public health impacts, particularly the economic consequences of ecological degradation. This phase provided economic justification for blue accounting by demonstrating that marine environmental conditions generate measurable socio-economic costs and benefits, strengthening the rationale for incorporating ecological variables into accounting systems.

The period around 2022 marked a significant shift toward system integration. Studies introduced ocean accounting and governance frameworks, highlighting the need to combine environmental data, spatial planning, and policy decision-making within a unified accounting structure. Blue accounting began to function as an integrative mechanism supporting strategic ocean governance.

In 2023, research advanced into ecosystem monetization through blue carbon valuation, translating ecological services into measurable financial values. This development positioned marine conservation as an investable economic activity.

Subsequently, 2024 research emphasized institutional and policy implementation challenges, revealing governance fragmentation and coordination barriers across sectors and regions. Finally, by 2025, the focus evolved toward cumulative impact accounting, indicating a mature phase where blue accounting operates as a strategic and operational decision-support system capable of managing complex trade-offs in offshore development and sustainable ocean management.

Overall, the trajectory illustrates a clear progression from conceptualization to practical governance application, confirming blue accounting's emergence as a critical framework for sustainable marine resource management.

Conceptual Framework

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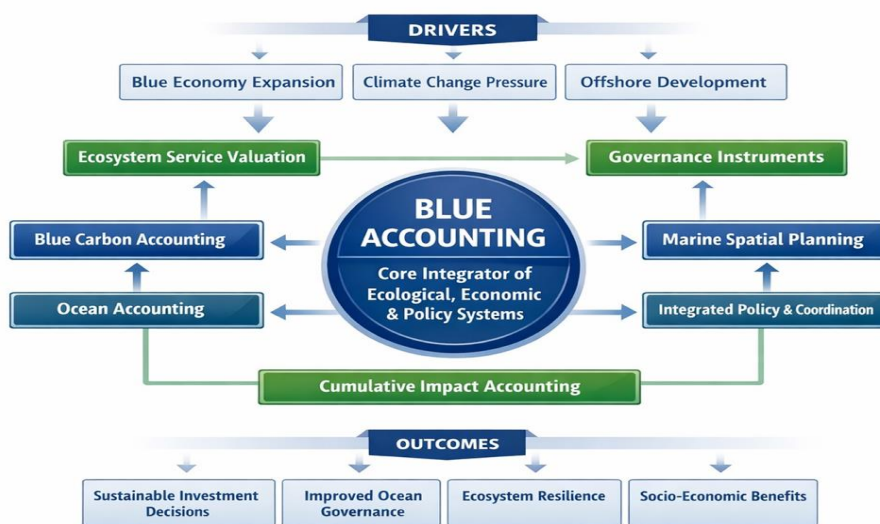
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Conceptual Framework for Blue Accounting
As an integrator linking ecological, economic and policy systems

Figure 3. Blue accounting conceptual framework

Source: Processed Data

The synthesis of the selected studies indicates a clear evolution in blue accounting research, moving from early conceptual explorations toward more operational and policy-oriented applications. Earlier studies primarily focused on defining the blue economy and establishing theoretical frameworks, whereas recent research demonstrates the increasing use of blue accounting as a governance and decision-support tool integrating ecosystem valuation, marine spatial planning, and cumulative impact assessment. This shift reflects the maturation of the field and the growing recognition that sustainable ocean development requires systematic mechanisms to quantify marine natural capital and incorporate environmental values into economic decision-making.

However, several research gaps remain evident. Despite conceptual progress, empirical implementation of blue accounting remains limited and uneven across regions. In addition, the integration of blue accounting into policy frameworks and investment mechanisms is still at an early stage, indicating challenges in translating accounting data into practical governance and financing strategies. Institutional fragmentation and the absence of standardized reporting frameworks further constrain the effective adoption of blue accounting in marine resource management.

From a policy and practical perspective, these findings highlight the importance of institutionalizing integrated ocean accounting systems that enable governments to measure marine ecosystem services and incorporate them into national economic planning. The monetization of ecosystem services, particularly blue carbon, also presents opportunities to mobilize innovative financing instruments such as blue bonds and sustainability-linked investments to support marine conservation. Furthermore, integrating blue accounting with marine spatial planning and environmental governance frameworks can strengthen cross-sectoral coordination and support risk-informed decision-making for offshore industries. Overall, blue accounting has the potential to function as a strategic instrument for enhancing policy coherence, guiding sustainable investment, and supporting long-term governance of ocean-based economies.

4. CONCLUSION

This study contributes to the development of academic research on Blue Accounting by providing a comprehensive bibliometric and conceptual synthesis of the field's evolution between 2015 and 2025. First, it maps the intellectual development of Blue Accounting and identifies three major phases of

scientific progression: conceptual formation, valuation and integration, and operational governance. This classification offers a structured analytical framework that clarifies how Blue Accounting has evolved from a theoretical discourse within the blue economy toward a practical governance instrument.

Second, the study bridges fragmented literature across environmental accounting, marine governance, and sustainability studies by positioning Blue Accounting as an interdisciplinary framework linking ecological valuation, economic planning, and institutional decision-making. By synthesizing diverse research streams, this study strengthens the conceptual foundation of Blue Accounting and highlights its role as a strategic decision-support system for sustainable ocean management.

Third, the research expands the academic discourse by emphasizing the growing importance of integrated ocean accounting in supporting transparency, evidence-based policymaking, and sustainable investment aligned with global sustainability agendas such as SDG 14. In doing so, the study contributes to the theoretical consolidation of Blue Accounting as an emerging subfield within sustainability and environmental accounting research.

The synthesis of selected studies reveals a clear scientific progression consisting of three major phases. The early stage focused on conceptual clarification of the blue economy and the integration of ecosystem services into environmental–economic accounting frameworks. This was followed by a valuation and integration phase, where research emphasized economic justification through environmental health impacts, ocean accounting systems, and blue carbon monetization. The most recent phase reflects operational maturity, characterized by policy implementation challenges and the development of cumulative impact accounting to support complex marine governance decisions.

Future research can expand and deepen the findings of this study in several directions. First, empirical studies are needed to examine the practical implementation of Blue Accounting frameworks in different national and regional contexts. Such studies would help evaluate how accounting systems for marine natural capital are integrated into policy processes and economic planning.

Second, future research should explore the development of standardized methodologies and reporting frameworks for ocean accounting to address current institutional fragmentation and improve comparability across countries and governance systems.

Third, further investigation is required on the integration of Blue Accounting with financial instruments and sustainable investment mechanisms, particularly in relation to blue carbon markets, blue bonds, and ecosystem-based financing strategies.

Finally, interdisciplinary research combining environmental accounting, marine spatial planning, and environmental economics could provide deeper insights into how cumulative impact accounting and ecosystem valuation can support more adaptive and risk-informed ocean governance.

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