

Pariwisata Bahari dan Pengembangan Kapal Pesiar di Indonesia: Perspektif Akuntansi Lingkungan Berkelanjutan

Marine Tourism and Cruise Development in Indonesia: Perspective of Sustainable Environmental Accounting

Rani Dian Aryani Rasjid^{1*}

¹Politeknik Pariwisata Makassar, Indonesia

*e-mail (corresponding author): ranirasjid@poltekparmakassar.ac.id

Abstrak

Sektor pariwisata bahari dan kapal pesiar di Indonesia telah memasuki tahap penting dalam transformasi keberlanjutan. Perluasan mobilitas kapal pesiar, daya tarik wisata pesisir, dan pariwisata berbasis pulau menawarkan potensi ekonomi yang besar, tetapi juga menimbulkan biaya ekologis yang belum banyak dicatat dalam akuntansi pariwisata konvensional. Indikator kinerja masih didominasi oleh jumlah kunjungan wisatawan, kunjungan kapal, pengeluaran wisatawan, dan statistik akomodasi, sedangkan emisi karbon, limbah laut, penggunaan air, tekanan terhadap terumbu karang, degradasi ekosistem, dan kebocoran ekonomi lokal masih kurang diperhatikan. Dengan menggunakan studi kepustakaan kualitatif, artikel ini mengkaji pengembangan pariwisata bahari dan kapal pesiar melalui perspektif akuntansi lingkungan, akuntansi modal alam, ekonomi biru, akuntansi karbon, dan pengungkapan keberlanjutan. Hasil analisis menunjukkan perlunya kerangka akuntansi terpadu yang mengukur manfaat ekonomi, biaya ekologis, dan retensi nilai pada tingkat masyarakat. Artikel ini mengusulkan kerangka akuntansi lingkungan berbasis destinasi yang mencakup akun modal alam, biaya lingkungan, emisi dan limbah kapal pesiar, retensi nilai lokal, serta dasbor pengungkapan keberlanjutan. Kerangka ini dapat membantu otoritas pelabuhan, pengelola destinasi, dan pemerintah daerah mengevaluasi kinerja keberlanjutan sekaligus memperkuat tata kelola pariwisata bahari yang akuntabel dan berbasis bukti.

Kata kunci: akuntansi lingkungan; ekonomi biru; modal alam; pariwisata bahari; pariwisata kapal pesiar

Abstract

Indonesia's marine tourism and cruise sector has entered an important stage of sustainability transformation. The expansion of cruise mobility, coastal attractions, and island-based tourism offers substantial economic potential, but it also creates ecological costs that are rarely recorded in conventional tourism accounting. Performance indicators remain dominated by visitor arrivals, port calls, tourist expenditure, and accommodation statistics, while carbon emissions, marine waste, water use, pressure on coral reefs, ecosystem degradation, and local economic leakage receive limited attention. Using a qualitative desk study, this paper examines marine tourism and cruise development from the perspectives of environmental accounting, natural capital accounting, the blue economy, carbon accounting, and sustainability disclosure. The analysis indicates the need for an integrated accounting framework that measures economic benefits, ecological costs, and community-level value retention. The paper proposes a destination-based environmental accounting framework comprising natural capital accounts, environmental cost accounts, cruise emissions and waste accounts, local value retention accounts, and a sustainability disclosure dashboard. This framework can assist port authorities, destination managers, and regional governments in evaluating sustainability performance and strengthening accountable, evidence-based marine tourism governance.

Keywords: blue economy; cruise tourism; environmental accounting; marine tourism; natural capital

1. INTRODUCTION

Marine tourism and cruise development represent one of Indonesia's strategic opportunities in the blue economy era. As an archipelagic country, Indonesia has strong marine assets, including coral reefs, beaches, coastal communities, maritime culture, island routes, and biodiversity. These assets support cruise itineraries, coastal recreation, marine-based attractions, and island-hopping tourism products. The post-pandemic recovery of international tourism has also increased the relevance of marine tourism as a source of local income and destination competitiveness (Badan Pusat Statistik, 2024; Cruise Lines International Association, 2024).

Despite this potential, marine tourism growth cannot be assessed only through visitor numbers, cruise calls, port fees, or tourist expenditure. These indicators are useful for administration, but they do not explain the real environmental cost of tourism activity. Cruise ships and marine tourism operations generate pressure through carbon emissions, wastewater, solid waste, fuel consumption, water use, congestion, coral reef disturbance, and beach degradation. These costs often remain outside conventional tourism accounting.

This accounting gap creates a serious problem for sustainable destination management. Marine tourism depends on natural capital. Clear water, coral reefs, beaches, mangroves, seagrass beds, and marine biodiversity are productive assets that generate visitor demand. When these assets decline, the tourism sector loses its economic base. Therefore, tourism accounting must not treat the environment as a free input. It must record environmental assets, resource use, ecological pressure, restoration needs, and social distribution of benefits.

Environmental accounting offers a relevant approach to address this problem. It connects economic activity with environmental assets, costs, liabilities, and disclosure. In marine tourism, environmental accounting can help destinations compare economic benefits with ecological costs. It can also help identify whether cruise tourism creates local value or only transfers income to external operators. This perspective supports the blue economy principle, which requires economic use of marine resources while maintaining ecosystem resilience and community welfare (Bappenas, 2023; World Bank, 2021).

This paper aims to develop an environmental accounting framework for marine tourism and cruise development in Indonesia. The paper addresses three questions. First, how can environmental accounting improve the measurement of marine tourism performance? Second, what accounting gaps exist in cruise and marine destination management? Third, what instruments are needed to support environmental accountability, local value retention, and sustainability disclosure?

2. LITERATURE REVIEW

Environmental accounting refers to the systematic identification, measurement, recording, and reporting of environmental information related to economic activity. It expands the scope of accounting beyond financial transactions by including environmental assets, resource flows, pollution, emissions, waste, restoration costs, and environmental liabilities. In tourism, this approach helps decision-makers understand whether economic growth occurs within ecological limits. Essentially, it serves as a vital corrective mechanism for the historical blind spots of traditional economic reporting. By internalizing ecological externalities, this framework ensures that a balance sheet reflects the depreciation of natural capital just as rigorously as it accounts for standard operational expenses. Consequently, entities can no longer artificially inflate their profit margins by offloading the hidden costs of environmental degradation onto local communities or future generations.

To operationalize this comprehensive concept within marine tourism and cruise destinations, a proposed environmental accounting matrix serves as a practical framework to bridge persistent accounting gaps with actionable instruments. Traditionally, the success of a tourist destination has been evaluated through a remarkably narrow financial lens, relying almost entirely on visitor arrivals and gross revenue. This conventional approach creates a significant blind spot regarding the hidden ecological and operational costs of hosting those tourists. By

transitioning to full-cost environmental accounting, destinations can systematically integrate expenses such as waste treatment, carbon emissions, ecosystem restoration, and infrastructural pressure into their economic calculations. This critical shift ensures a much more accurate measurement of net tourism performance, clearly revealing whether an influx of visitors is genuinely generating welfare or merely creating a long-term sustainability deficit.

A foundational flaw in the current tourism model is the tendency to treat fragile marine ecosystems—such as coral reefs, mangroves, seagrass beds, and pristine beaches—as free and inexhaustible attractions. To counter this, the matrix emphasizes the implementation of natural capital accounting, which scientifically evaluates and assigns structural value to coastal water quality and biodiversity. By formally recognizing these natural elements as foundational economic capital, decision-makers are compelled to shift their governance mindset from passive extraction to active preservation. Furthermore, within the specific context of cruise tourism, the massive environmental footprint of large vessels is frequently obscured because destination-level emissions and waste flows remain vastly underreported. By establishing dedicated cruise emission and port environmental accounts, destinations can rigorously track specific operational externalities, such as marine fuel usage, wastewater discharge, and port energy consumption. This meticulously documented data is essential to enforce cleaner port operations and justify substantial investments in green infrastructure.

Beyond ecological concerns, this environmental accounting framework also addresses a pervasive socioeconomic challenge: local communities frequently receive limited economic benefits from tourism growth due to high rates of capital flight. To rectify this inequity, local value retention accounts are introduced to measure exactly how much tourism revenue actually circulates within the host community. By tracking variables such as local procurement, the participation of micro, small, and medium enterprises (MSMEs), and the hiring of local guides, destination managers can actively combat economic leakage. Finally, to ensure these comprehensive efforts do not fall victim to unsubstantiated greenwashing, the matrix proposes the deployment of comprehensive destination sustainability disclosure dashboards. By publicly reporting verifiable data on carrying capacity, emission levels, ecosystem conditions, local economic benefits, and actual conservation reinvestment, these dashboards convert vague environmental rhetoric into measurable evidence, ensuring the tourism sector remains entirely transparent and deeply accountable.

Over the past few decades, the business and financial reporting landscape has been heavily dominated by the revenue counting paradigm. In this conventional model, success is narrowly measured through financial metrics, which unfortunately often ignore the increasingly evident environmental and social crises unfolding around us. Currently, we are witnessing a crucial paradigm shift toward Full-Cost Accounting (or True Cost Accounting). The old system, which relies solely on a single materiality lens—merely informing investors about a company's financial bottom line—is no longer considered adequate. Barker and Mayer (2025) assert that entities must begin viewing corporate reporting through the lens of double materiality, which requires them to honestly disclose not only how natural issues affect their financial standing, but also how their operations impact environmental sustainability itself.

The System of Environmental-Economic Accounting (SEEA) provides a highly relevant, standardized foundation for this study, serving as the crucial methodological bridge between ecological health and economic reporting. Designed to correct the historical omissions of traditional finance, SEEA explicitly treats the environment as a distinct set of assets that can be meticulously measured in both physical and monetary terms. Specifically, the SEEA Ecosystem Accounting framework supports the comprehensive measurement of ecosystem extent, condition, services, and overall asset values (United Nations, 2021). By utilizing this globally recognized framework, researchers and policymakers are equipped with a rigorous methodology to quantify ecological variables that were previously considered abstract or unquantifiable.

For the marine tourism sector, adopting this framework is profoundly transformative. It means that critical ecological features—such as coral reefs, mangroves, coastal water quality, pristine beaches, and marine biodiversity—can finally be treated as formal natural capital

accounts rather than unpriced, inexhaustible background conditions. Recognizing these ecosystems as structured capital completely redefines destination management. Instead of viewing a thriving coral reef merely as a free scenic amenity for scuba divers and cruise passengers, it is formally accounted for as a core economic asset that generates continuous, measurable service value. Consequently, any degradation of these marine resources—whether through anchor damage, unregulated wastewater discharge, or sheer over-tourism—is no longer dismissed as an unfortunate external side effect. Instead, it is accurately recorded as a direct financial depreciation of the destination's foundational wealth. This rigorous accounting mechanism forces tourism operators and local governments to acknowledge the tangible financial risks of ecological neglect, ultimately ensuring that environmental conservation is managed not as a charitable afterthought, but as a mandatory capital reinvestment required to sustain the tourism economy.

Natural capital accounting is fundamentally important because the entire marine tourism industry is intrinsically dependent on the continuous provision of ecosystem services. In coastal and island destinations, the environment is not merely a passive, aesthetic backdrop; it is the primary economic engine. For instance, coral reefs provide immense recreational value and serve as major biodiversity attractions that drive the highly lucrative diving and snorkeling markets. Similarly, mangroves do much more than enhance the coastal landscape; they contribute critical structural services, such as natural coastal protection against storm surges and significant carbon storage, effectively saving destinations millions in artificial infrastructure costs while mitigating climate-related risks. Furthermore, clean beaches and crystal-clear coastal waters are absolute prerequisites for sustaining a positive global destination image and ensuring high levels of visitor satisfaction.

Because the tourism product is so deeply intertwined with these natural assets, the correlation is absolute: if these ecological services decline, the economic value and market competitiveness of the marine tourism sector inevitably and proportionally decline. When coral reefs bleach or coastlines become polluted, a destination rapidly loses its core market appeal, leading to a downward spiral of reduced visitor spending, diminished hotel occupancies, and depressed local revenues. Consequently, a destination that records only gross visitor income while ignoring concurrent ecosystem degradation produces a dangerously incomplete performance report. This myopic approach creates an illusion of economic prosperity—essentially reporting a "false profit"—while actively masking the severe depreciation of the underlying environmental assets. By implementing natural capital accounting, destination managers and policymakers can accurately document these unrecorded ecological liabilities. This ensures that financial performance is honestly measured against the true cost of environmental wear and tear, thereby transforming abstract conservation needs into urgent economic imperatives required to safeguard the destination's long-term viability.

The fundamental asset underpinning the value of marine tourism is the quality of its natural capital. Marine natural capital encompasses the stock of biotic and abiotic assets—such as coral reefs, mangroves, seagrass beds, and marine biodiversity—that generate a continuous flow of ecosystem services. These include essential provisioning and regulating services like food supply and coastal protection, as well as cultural services that encompass recreation, tourism, and deep spiritual benefits for coastal and small island communities (Banarsyadhimi et al., 2022; Buonocore et al., 2021; Fairbrass et al., 2025). Ultimately, these pristine coastal landscapes and vibrant ecosystems create the core recreational value and attractiveness of a destination, necessitating that marine tourism treats natural capital not merely as a backdrop, but as a core productive asset.

Beyond the valuation of natural ecological assets, comprehensive environmental accounting must also confront the immediate climate impacts of the sector through rigorous carbon accounting. This practice plays an indispensable role in the governance of cruise and marine tourism, as the industry's operational footprint is inherently carbon-intensive. The cumulative greenhouse gas (GHG) emissions generated by this sector do not originate from a single isolated source; rather, they are produced across a complex, interconnected supply chain

that encompasses massive cruise ships, local tourist boats, heavy port operations, onshore transit buses, and sprawling coastal accommodation facilities. Recognizing the severity of this environmental burden, the International Maritime Organization (IMO) has recently strengthened its global strategy to dramatically reduce greenhouse gas emissions from ships (International Maritime Organization, 2023). This decisive regulatory shift fundamentally alters the operational landscape, placing immense and immediate pressure not only on multinational cruise operators but also on the local host ports to tangibly improve—and empirically prove—their environmental performance.

Consequently, destination managers can no longer rely on superficial sustainability claims; they must implement precise, destination-level accounting mechanisms that capture the true operational costs of hosting maritime traffic. To effectively map this environmental footprint, these accounting frameworks must systematically track specific, actionable metrics. This includes calculating "emission intensity" (the amount of carbon emitted per passenger or per vessel) and overall energy consumption across the destination. Furthermore, the accounts must measure a port's logistical capacity to safely manage physical externalities, specifically evaluating the volume of waste reception and the efficacy of local wastewater treatment facilities, ensuring that maritime pollutants are not simply discharged into fragile coastal ecosystems. Crucially, this accounting must also evaluate "shore power readiness"—the status of critical infrastructure that allows docked cruise vessels to plug into the local electrical grid instead of continuously burning highly polluting marine diesel while at berth. By formally integrating these carbon and operational metrics into the destination's broader environmental ledger, decision-makers can transition from passive regulatory compliance to proactive climate leadership. This ensures that the local tourism economy not only protects its immediate environment but also aligns seamlessly with urgent global emission reduction targets.

The rapid expansion of cruise shipping and port operations imposes substantial environmental and social burdens on host cities, necessitating a fundamental shift toward comprehensive environmental cost accounting. Extensive research underscores that the cruise industry remains a massive source of air, water, and land pollution, posing severe physical and mental health risks to both passengers and local populations (Lloret et al., 2021). On a global scale, shipping and port-sourced emissions have been linked to hundreds of thousands of premature deaths annually, with the most profound impacts occurring along major maritime routes and coastal cities (Mueller et al., 2022). Empirical evidence from specific locales further highlights the severity of this issue; for instance, the arrival of 345 cruise ships in Copenhagen in 2018 drastically increased local nitrogen dioxide (NO₂) concentrations, frequently breaching European safety limits and exacerbating respiratory and cardiovascular vulnerabilities (Lansø et al., 2023). Similarly, environmental assessments in China and Mexico have demonstrated that cruise ships operating within port boundaries and Emission Control Areas (ECAs) are massive contributors to sulfur oxides (SO_x), nitrogen oxides (NO_x), and carbon dioxide (CO₂) emissions, a reality made starkly evident when the COVID-19 pandemic temporarily halted activity and reduced SO_x emissions in China's ECAs by nearly 59% (Chen et al., 2024; Mendoza-Lara et al., 2023).

Local value retention accounting measures the extent to which economic benefits remain within a destination's economy. Relevant indicators typically include the share of local procurement, the employment of certified local guides, the value of contracts awarded to micro, small, and medium enterprises (MSMEs), the utilization of local transport providers, payments for cultural performances, local food sourcing, and the subsequent effects on household income. This dimension of accounting is paramount for establishing social legitimacy. Coastal communities, for instance, are not merely labor providers; they are the fundamental custodians of local culture, traditional knowledge, and marine resources. When these communities receive equitable economic benefits, they develop much stronger incentives to actively support environmental conservation and responsible tourism management.

To solidify the transition from merely measuring environmental impacts to actively taking responsibility for them, sustainability disclosure emerges as the vital mechanism that strengthens

the accountability dimension of environmental accounting. The global financial community has increasingly recognized this necessity, as evidenced by the introduction of IFRS S1 and IFRS S2 by the International Financial Reporting Standards Foundation. These landmark standards emphasize the mandatory and comprehensive disclosure of sustainability-related and climate-related financial information that fundamentally affects an entity's overall enterprise value (IFRS Foundation, 2023a, 2023b). By formally linking environmental risks to financial valuation, these standards effectively elevate sustainability from a voluntary public relations exercise to a core component of fiduciary duty. While these rigorous frameworks were initially designed for corporate financial reporting, their underlying logic is profoundly relevant and urgently applicable to the governance of marine tourism and destination management.

Just as a multinational corporation must transparently report its climate vulnerabilities and environmental liabilities to its shareholders, tourism destinations and port operators must establish the same level of rigorous, data-driven disclosure for their diverse stakeholders, which include local citizens, global investors, and environmental regulators. To systematically avoid the pervasive trap of greenwashing—where destinations make unsubstantiated claims about "eco-tourism"—managers must move beyond vague promotional rhetoric and publish transparent, verifiable indicators. Specifically, this requires clear, public reporting on "ecological pressure" to accurately illustrate the physical and biological strain placed on local ecosystems by tourist volumes. It also demands precise accounting of "mitigation spending" to track the actual financial resources deployed to manage waste, treat water, and offset carbon footprints. Furthermore, comprehensive disclosure must cover "local economic retention" to empirically prove that tourism revenues are genuinely circulating within the host community rather than leaking to foreign entities. Finally, it must include detailed accounts of "conservation reinvestment" to demonstrate that a definitive portion of tourism profits is being actively redirected to restore and protect the natural capital that attracted visitors in the first place. By adopting this stringent, corporate-grade disclosure logic, marine destinations not only dramatically enhance their institutional credibility and public trust but also ensure that their economic growth is verifiably and permanently aligned with long-term ecological preservation.

As the global paradigm shifts toward comprehensive sustainability reporting, the quality and tangible impact of these disclosures remain subjects of ongoing scrutiny. Bibliometric analyses reveal that current research predominantly clusters around the social dimensions of corporate social responsibility (CSR), the financial implications of ESG disclosures, and the pivotal role of corporate governance (Bosi et al., 2022). To ensure the reliability of these reports, there is a distinct regulatory movement from voluntary to mandatory disclosure regimes. For instance, comparative studies demonstrate that mandatory frameworks, such as the comprehensive legislative suite developed in the European Union (which includes the CSRD, Taxonomy, and SFDR), yield higher levels of ESG disclosure and provide greater value to financial markets compared to voluntary systems (Hummel & Jobst, 2024; Rezaee et al., 2023). Furthermore, robust governance attributes—such as board size and female representation—are positively correlated with superior ESG disclosure and profitability (Brogi & Lagasio, 2025). However, as stakeholder pressures mount, the literature also warns of the complex and multifaceted risk of greenwashing, underscoring the urgent need for preventative tools to ensure that ESG reports remain trustworthy and comparable (Sneideriene & Legenzova, 2024).

Based on these foundations, this paper develops an analytical framework with five dimensions: natural capital accounting, environmental cost accounting, carbon and energy accounting, local value retention accounting, and sustainability disclosure. These dimensions connect economic performance with ecological integrity and community welfare.

1. **Natural capital accounting:** measures the condition, extent, and quality of ecological assets that support marine tourism, such as reefs, mangroves, beaches, seagrass, water quality, and biodiversity.
2. **Environmental cost accounting:** records waste management, sanitation, water consumption, pollution control, ecosystem monitoring, restoration costs, and other environmental expenditures.

3. **Carbon and energy accounting:** tracks emissions and energy use from cruise vessels, port operations, tourist boats, land transport, and supporting facilities.
4. **Local value retention accounting:** measures the portion of tourism value that remains in local communities through procurement, guiding, transport, cultural services, and MSME participation.
5. **Sustainability disclosure:** reports measurable indicators on environmental pressure, carrying capacity, local benefits, conservation spending, and climate-related risks.

3. RESEARCH METHODOLOGY

This paper uses a qualitative desk study with an environmental accounting analysis. The study does not test statistical relationships or estimate monetary ecosystem values. Instead, it constructs a conceptual and operational framework that can guide the measurement of environmental costs and local benefits in marine tourism and cruise destinations. The materials consist of official environmental accounting frameworks, blue economy documents, maritime sustainability guidelines, sustainability disclosure standards, and literature on marine tourism and natural capital. The documents were selected because they provide conceptual and practical guidance for integrating environmental information into economic decision-making.

The analytical process followed three stages. The first stage mapped marine tourism assets and environmental cost variables. This stage identified reefs, mangroves, beaches, coastal waters, ports, cruise vessels, waste flows, energy use, emissions, and local supply chains as relevant accounting objects. The second stage identified accounting gaps in conventional tourism performance indicators. The third stage formulated an environmental accounting framework that can be applied by port authorities, regional governments, destination management organizations, and academic institutions. The analysis uses a framework-building approach. Each proposed accounting instrument is linked with an expected sustainability outcome. This format allows the paper to produce practical implications for destination governance while maintaining a clear theoretical basis.

4. RESULTS AND DISCUSSION

4.1. Paradigm Shift from Revenue Counting to Full-Cost Accounting

To effectively measure these broader impacts, a comprehensive and honest measurement tool is essential. Contor, De Keyser, Kasaw, and Mathijs (2026) elaborate that True Cost Accounting (TCA) serves as a transformative framework that allows us to "account for what matters" by incorporating externalities, such as pollution and environmental degradation, into balance sheet calculations. A clear example of this framework's urgency is highly visible in the marine tourism sector. Historically, many tourist destinations have measured success solely by visitor arrivals, berthing frequencies, or the volume of tourist expenditure. While these indicators remain necessary, they unfortunately fail to reveal whether tourism growth genuinely generates net welfare once environmental costs are factored in. Therefore, marine tourism performance must fundamentally shift toward full-cost environmental accounting.

In practice, this requires decision-makers to balance tourism revenues against often-invisible operational and environmental costs, such as waste treatment, carbon emissions, sanitation needs, freshwater consumption, and ecosystem restoration funding. Consider a cruise ship docking at a small island port: while it brings fresh revenue from port fees and visitor spending, its arrival also entails substantial costs for traffic management, coastal cleanup, wastewater control, security, and monitoring of marine ecosystems damaged by anchoring. If these maintenance costs outweigh the local economic benefits, the destination is actually experiencing a sustainability deficit, even if gross revenues appear to be skyrocketing on paper. This shift in perspective is especially urgent for small islands and conservation areas. Without cost accounting and carrying capacity controls, the temporary and sudden concentration of tourists delivered by cruise ships can quickly overload local infrastructure and devastate fragile ecosystems.

The need to comprehensively evaluate environmental impacts aligns closely with a new understanding of whom accounting is actually meant to serve. Brackley (2024) argues that accounting practices must no longer exclusively serve private interests; rather, they should be directed toward recording and creating public value, ensuring that business entities demonstrably make positive contributions instead of merely passing ecological losses onto society. Furthermore, this paradigm shift must be reflected in global governance and taxation. Akhand and Mawani (2023) highlight the challenges of international standards in ensuring fair revenue allocation, noting that multinational companies frequently engage in profit shifting to avoid the true costs of the damage incurred in their operating regions. Ultimately, the transition toward full-cost accounting represents a philosophical transformation; accounting is now evolving from a mere tool for wealth accumulation into an essential instrument for safeguarding economic justice and global sustainability.

4.2. Natural Capital as the Core Asset of Marine Tourism

The economic reliance of marine tourism on these natural assets is substantial and well-documented. A broad review of existing literature reveals that recreation and tourism are among the most frequently valued ecosystem services, often generating hundreds of dollars per person annually (López-Rivas & Cárdenas, 2024). For instance, in Algoa Bay, South Africa, recreation and tourism represent the largest economic component among regional ecosystem services, contributing over USD 1.6 billion annually to the local economy (Orolowitz et al., 2025). Furthermore, the economic valuation of coastal ecosystem services—which can exceed USD 2,000 per hectare annually for cultural services—provides a compelling argument for protecting high-value ecosystems like coral reefs, seagrasses, and estuaries (Caparrós-Martínez et al., 2022). Recognizing this, countries like Canada have used natural capital valuation in their national parks and marine conservation areas to integrate environmental planning with tourism, demonstrating that natural assets serve as vital long-term economic infrastructure (Mulrooney & Jones, 2023).

Despite this overwhelming economic importance, conventional accounting systems rarely record the condition or depletion of these core assets. When destinations measure success solely through financial revenue, ecosystem degradation remains invisible until visitor demand sharply declines. This disconnect poses a severe threat, as the degradation of natural capital directly diminishes destination attractiveness and economic performance. A stark example can be seen in the Red Sea, Egypt, where a 25–40% degradation in coral reefs triggered a roughly 23% drop in visitation, resulting in estimated losses of USD 1.77 billion per year (Gallegati et al., 2025). Similarly, global surfing destinations rely heavily on specific wave breaks and coastal ecosystems to support high-value surf tourism, yet unchecked developmental pressures constantly threaten these unique natural assets, putting the local economy at risk (Manero & Mach, 2023).

To correct this critical blind spot, marine tourism must transition toward natural capital accounting, a framework that actively records ecosystem extent, condition, and service flows. By monitoring indicators such as coral cover, beach cleanliness, water clarity, and biodiversity, destination managers can directly link ecological health with visitor satisfaction, competitiveness, and future revenue potential. This proactive approach helps decision-makers detect ecological decline before it morphs into a market crisis, allowing for timely interventions such as visitor dispersal, strict operational rules, and habitat restoration. Moreover, incorporating natural capital and biodiversity indicators clarifies the trade-offs between economic activities and ecosystem health, enabling policymakers to balance tourism development and conservation (Luisetti & Schratzberger, 2022; Stebbings et al., 2021). Ecotourism within marine protected areas serves as a primary vehicle for this, valorizing natural capital while simultaneously funding and legitimizing regional protection (Casimiro et al., 2023).

Ultimately, designing a sustainable blue economy requires a holistic approach that merges ecological mapping, wellbeing assessments, and active stakeholder engagement. Integrated socio-ecological mapping helps design spatial plans for tourism and protected areas that optimize recreational, spiritual, and economic benefits without sacrificing the quality of natural capital (Banarsyadhimi et al., 2022; Veidemane et al., 2024). Participatory studies highlight that

ecosystem services offering direct economic benefits, such as tourism and food, are consistently prioritized by communities in natural capital-based decision-making processes (Hinson et al., 2022). Furthermore, key user groups, such as scuba divers and global surfers, demonstrate a high willingness to support sustainable tourism products and actively participate in local environmental monitoring and restoration (Forrest et al., 2023; Manero & Mach, 2023). Consistent research underscores that when marine natural capital is managed and valued as an essential economic asset, it secures both the destination's enduring appeal and the long-term conservation of the marine environment.

4.3. Cruise Emission and Port Environmental Cost Accounting

The third finding concerns the need to measure cruise-related emissions and port environmental costs. Cruise vessels and supporting tourism transport produce emissions, generate wastewater and solid waste, and increase energy demand. Port authorities often record ship arrivals and berthing operations, but they need to expand reporting to include environmental flows and costs.

To address these severe impacts, researchers and port authorities have increasingly begun to quantify environmental and health externalities in monetary terms, highlighting a critical need for equity in the distribution of these costs. When cruise operators generate immense waste while public institutions bear the financial brunt of its treatment, local destinations are effectively subsidizing private mobility. Environmental accounting must render this imbalance visible by thoroughly recording waste reception, wastewater handling, fuel use, energy consumption, and environmental service costs. This economic valuation is already being successfully implemented in various regions. In Spain, an environmental efficiency analysis of 37 ports utilized local external costs—such as damage to human health, agriculture, and infrastructure—as an "undesirable output," revealing that more than half of the assessed ports operated inefficiently (Tovar & Wall, 2021). Furthermore, a detailed assessment of four Spanish ports recorded up to €74.4 million in external costs generated by berthed ships alone (Spengler & Tovar, 2022). Similar methodologies have been applied in Busan, where ship emissions were meticulously calculated and converted into social environmental costs through benefit transfer methods, encompassing damages ranging from localized building corrosion to global climate impacts (Yoo et al., 2022).

Ultimately, quantifying these burdens is a vital step toward implementing effective mitigation technologies and establishing sustainable maritime policies. Cruise emission accounting should rigorously measure carbon intensity per port call, per passenger, and per itinerary to support green port investments and justify environmental levies where necessary. Technological interventions have proven highly effective in this regard; the adoption of shore power, also known as cold ironing, significantly reduces both emissions and noise pollution while ships are docked, an initiative currently being driven by targeted regulations and subsidies (Spengler & Tovar, 2022; Wang et al., 2024). Additionally, operational adjustments such as speed reductions, the transition to low-sulfur fuels, and strict adherence to ECAs have successfully curbed CO₂ and SO_x emissions across diverse maritime regions, even though NO_x reductions remain variable (Esteve-Pérez et al., 2023; Tai & Chang, 2022). Recognizing these benefits, several seaports in Northern Europe have proactively begun monitoring energy efficiency using standardized metrics such as the Environmental Ship Index (ESI) and the Ship Energy Efficiency Management Plan (SEEMP), often linking these indicators to differentiated tariff schemes (Kizielewicz, 2022). Moving forward, the systematic integration of holistic accounting frameworks that unify economic, social, and environmental externalities is imperative for internalizing these hidden costs and driving the maritime industry toward genuine, long-term sustainability (Styliadis et al., 2022).

4.4. Local Value Retention and Community Benefit Accounting

The fourth finding shows that environmental accounting must include local value retention. Marine tourism can generate high gross income but low local benefit. This occurs when shore excursions, transport, food supply, guiding, souvenirs, and cultural performances are controlled by external operators. In that situation, the destination bears environmental pressure while local residents receive limited income.

The ability to effectively retain and measure this local value heavily depends on the strategic structuring of value chains and the presence of localized "anchor" institutions. Research indicates that institutions truly rooted in a community—such as universities, hospitals, or established local organizations—are significantly more capable of sustaining long-term economic development than highly mobile corporate tenants that can easily relocate (Van Leuven et al., 2025). The strength of these anchor institutions can be evaluated using the VALUE framework, which assesses visibility, authenticity, loyalty or longevity, utility, and engagement, thereby seamlessly bridging community assets with robust local economic development (Van Leuven et al., 2025). Furthermore, this localized foundation is essential when engaging with broader global markets. Enhancing the domestic or regional share of value-added activities within global value chains (GVCs) can substantially drive regional economic growth, often producing non-linear spatial spillover effects that benefit neighboring areas (Li et al., 2023). Ultimately, a region's intrinsic capacity to absorb knowledge and develop productive capabilities dictates how effectively economic value is retained locally rather than extracted by external actors (Bolea et al., 2022).

However, the true extent of this retained local value cannot be fully understood using traditional financial indicators alone, as conventional metrics frequently fail to capture intangible societal benefits such as place attachment, community cooperation, and civic engagement (Medici et al., 2021). Consequently, explicit socio-environmental accounting approaches are required to translate these hidden community benefits into terms that are visible and actionable for stakeholders. Methodologies such as Social Return on Investment (SROI) have been successfully employed to monetize complex social and environmental impacts—ranging from enhanced food literacy and community cohesion to reduced environmental footprints—consistently demonstrating positive socio-environmental performance with benefit-cost ratios exceeding one (Medici et al., 2023). Similarly, specialized frameworks like Cost-Benefit Analysis (CBA) and risk-based benefit-cost analysis are increasingly utilized to measure the multifaceted impacts of community initiatives, capturing a wide array of metrics from carbon footprint reduction and ecosystem-based disaster risk mitigation to the preservation of land rights and broader socio-ecological co-benefits (Chabba et al., 2022; De Boni et al., 2022).

Ultimately, the successful implementation of these value retention strategies and advanced accounting frameworks is deeply intertwined with social innovation and inclusive governance. True community development is increasingly recognized not merely as a pursuit of raw economic growth, but as the cultivation of a "community of values" that prioritizes long-term quality of life, territorial responsibility, and social sustainability (Stoustrup, 2024). Even when supportive legal frameworks and sophisticated accounting mechanisms are in place, initiatives like community-based tourism can yield minimal economic returns for local residents if the underlying social capital and governance structures remain weak (Rocca & Zielinski, 2022). Therefore, ensuring that local value is truly retained requires a holistic approach: one that combines deeply rooted anchor institutions and rigorous socio-environmental accounting with strong, inclusive community governance.

4.5. Sustainability Disclosure and Destination Accountability

The fifth finding highlights a critical need for rigorous sustainability disclosure. While many tourist destinations frequently adopt the rhetoric of green tourism, the blue economy, and sustainable marine tourism, these assertions require measurable evidence to be credible. Environmental accounting serves as a vital tool to translate broad sustainability claims into verifiable indicators. Consequently, environmental, social, and governance (ESG) disclosures,

alongside robust destination governance, emerge not merely as public relations instruments, but as fundamental mechanisms for strengthening destination accountability and socio-environmental performance. The Social and Environmental Accounting (SEA) approach further reinforces this by framing the disclosure of an entity's impact on society and the environment as a matter of social accountability and justice, moving beyond mere image-building to actual sustainable development (Chopra et al., 2024).

This corporate accountability framework is increasingly permeating the tourism sector, where ESG dimensions provide a strategic blueprint for destinations to balance economic growth, carrying capacity, climate risks, and socio-cultural tensions (Camilleri, 2025). Transparent, accountable, and participatory governance is deemed crucial to translating socio-environmental objectives into concrete policies, regulations, and measurable outcomes at the destination level (Camilleri, 2025). This shift has given rise to the concept of destination social responsibility (DSR), which scales up corporate CSR into a collective, destination-wide obligation. By assessing dimensions across governance, economy, environment, and cooperation from the perspectives of both residents and the government, DSR serves as a comprehensive tool for evaluating performance and identifying practical gaps in sustainability efforts (Lee et al., 2025).

To effectively operationalize concepts such as DSR and ESG, destinations require systematic, participatory performance indicators. Developing a holistic understanding of urban destination sustainability necessitates measurement scales that incorporate the diverse viewpoints of residents, tourists, businesses, and government across economic, socio-cultural, environmental, political, and technological dimensions (Rasoolimanesh et al., 2024).

Engaging multiple stakeholder groups in evaluating sustainability and constructing adaptable composite indicators enables destinations to tailor their approaches to varying sustainability paradigms, whether strong or weak (Damian et al., 2021). Furthermore, evidence-based sustainable tourism planning that prioritizes stakeholder co-creation not only enhances plan quality but also establishes a transparent foundation for destination management decisions (Pham et al., 2023). At the local level, customized indicator systems are vital for monitoring performance and identifying operational drivers and barriers, with higher-level government support playing a key role in driving continuous improvement (Torres-Delgado et al., 2021).

Ultimately, transparent and high-quality sustainability disclosure yields significant institutional and financial benefits. Cross-country studies indicate that organizations demonstrating superior ESG practices and voluntary disclosures exhibit significantly better financial performance and market valuations, as these practices reflect genuine stakeholder accountability and are inherently linked to long-term profitability (Shaikh, 2022). Global stakeholder pressure continues to compel entities to enhance their socio-environmental accountability, even though the lack of standardized metrics and the potential for information manipulation remain significant challenges (Bosi et al., 2022). In conclusion, when supported by clear regulations, robust governance structures, and participatory indicator systems, sustainability disclosures can transcend symbolic greenwashing. Instead, they provide practical, multi-stakeholder frameworks that genuinely drive sustainable development, foster public trust, and ensure the long-term resilience of tourism destinations.

4.6. Proposed Environmental Accounting Matrix

Table 1 presents the proposed environmental accounting matrix for marine tourism and cruise destinations. The matrix links common accounting gaps with practical instruments and expected sustainability outcomes.

To operationalise these five dimensions, the proposed matrix translates the environmental accounting framework into practical instruments applicable at the destination and port levels. Each instrument aims to make environmental costs, ecological assets, carbon and waste pressures, and local economic benefits more visible in tourism decision-making. By linking specific accounting gaps with appropriate measurement approaches and expected sustainability outcomes, the matrix provides a practical bridge between environmental accounting concepts and their application in marine tourism and cruise destination management. More importantly, the

framework enables destination managers, port authorities, and regional governments to identify areas where conventional tourism performance indicators fail to capture environmental and community-level impacts. In this way, the matrix can support more integrated, transparent, and evidence-based decision-making by ensuring that tourism growth is evaluated not only in terms of economic returns but also in relation to ecological sustainability and local value creation.

Table 1. Proposed Environmental Accounting Matrix for Marine Tourism Destinations

[Source: Author, 2026]

Accounting Gap	Environmental Accounting Instrument	Expected Sustainability Outcome
Tourism performance is measured mainly through arrivals and gross revenue.	Full-cost environmental accounting that integrates income, waste costs, carbon costs, restoration costs, and infrastructure pressure.	More accurate measurement of net tourism performance and actual sustainability risk.
Marine ecosystems are treated as free and inexhaustible attractions.	Natural capital accounting for reefs, mangroves, beaches, seagrass, coastal water quality, and biodiversity.	Stronger protection of ecological assets that generate long-term tourism value.
Destination-level cruise emissions and waste flows remain underreported.	Cruise emission and port environmental accounts covering fuel use, wastewater, solid waste, shore power readiness, and energy consumption.	Cleaner port operations and evidence-based green port investment.
Local communities receive limited economic benefits from tourism growth.	Local value retention accounts measuring procurement, MSME participation, local guides, cultural services, and community contracts.	Higher grassroots income and lower economic leakage.
Sustainability claims are not supported by measurable evidence.	Destination sustainability disclosure dashboard reporting carrying capacity, waste, emissions, ecosystem condition, local benefits, and conservation reinvestment.	Transparent, comparable, and accountable sustainability reporting.

The proposed environmental accounting matrix for marine tourism and cruise destinations serves as a strategic framework designed to bridge persistent accounting gaps with actionable instruments, ultimately driving tangible sustainability outcomes. Traditionally, the success of a tourist destination has been evaluated through a remarkably narrow financial lens, relying almost entirely on visitor arrivals and gross revenue. This conventional approach creates a significant blind spot regarding the hidden ecological and operational costs of hosting tourists. By transitioning to full-cost environmental accounting, destinations can systematically integrate expenses such as waste treatment, carbon emissions, ecosystem restoration, and infrastructural pressure into their economic calculations. This critical shift ensures a much more accurate measurement of net tourism performance and actual sustainability risks, clearly revealing whether an influx of visitors is genuinely generating welfare or merely creating a long-term sustainability deficit.

A foundational flaw in the current tourism model is the tendency to treat fragile marine ecosystems—such as coral reefs, mangroves, seagrass beds, and pristine beaches—as free and inexhaustible attractions. This lack of valuation inevitably leads to overexploitation. To counter this, destinations must implement natural capital accounting, which scientifically evaluates and assigns structural value to coastal water quality and biodiversity. By formally recognizing these natural elements as foundational economic capital, decision-makers are compelled to treat environmental degradation as a tangible depreciation of assets. Consequently, this instrument fosters much stronger protection of the ecological resources that generate long-term tourism value, shifting the governance mindset from passive extraction to active preservation.

In the context of cruise tourism, the massive environmental footprint of large vessels is often obscured because destination-level emissions and waste flows remain vastly underreported.

To establish true accountability, the matrix emphasizes the creation of dedicated cruise-emission and port-environmental accounts. This approach rigorously tracks specific operational externalities, including marine fuel usage, wastewater discharge, solid waste management, general energy consumption, and the port's readiness for shore power integration. By meticulously documenting these metrics, destinations can enforce cleaner port operations and generate the hard empirical evidence required to justify and secure substantial investments in green port infrastructure.

Beyond ecological concerns, the matrix also addresses a pervasive socioeconomic challenge: local communities frequently receive limited economic benefits from tourism growth due to high rates of capital flight. To rectify this inequity, local value retention accounts are introduced to measure exactly how much tourism revenue actually circulates within the host community. By tracking variables such as local procurement, participation by micro, small, and medium enterprises (MSMEs), hiring local guides, and establishing fair community contracts, destination managers can actively combat economic leakage. The expected outcome is a more inclusive economy in which tourism growth directly translates into higher grassroots incomes and more resilient community development.

Finally, the pervasive issue of unsubstantiated green tourism claims—often bordering on greenwashing—demands a robust, structural remedy. The matrix proposes deploying comprehensive destination sustainability disclosure dashboards to consolidate and publicly report these newly measured metrics. By providing accessible data on carrying capacity, waste generation, emissions, ecosystem conditions, local economic benefits, and actual conservation reinvestment, these dashboards translate vague environmental rhetoric into measurable evidence. Ultimately, this ensures that sustainability reporting across the tourism sector becomes entirely transparent, highly comparable, and deeply accountable to investors, local residents, and the global community.

5. CONCLUSION

Marine tourism and cruise development in Indonesia should be understood as an environmental accounting issue, not only as a tourism growth issue. The sector creates economic opportunities, but it also generates ecological costs that must be identified, measured, recorded, and disclosed. If these costs remain invisible, tourism growth can weaken the natural capital that supports the industry itself.

This paper concludes that environmental accounting can strengthen the sustainability foundation of marine tourism. It helps destinations move beyond arrival statistics and revenue reports. It also helps decision makers compare economic benefits with ecological costs and community-level value retention. The proposed framework comprises natural capital accounts, environmental cost accounts, cruise emissions and waste accounts, local value retention accounts, and sustainability disclosure dashboards. These instruments can support evidence-based destination governance, green port development, conservation financing, and fairer community participation.

For practical implementation, regional governments and port authorities should begin with measurable indicators that are feasible to collect. Priority indicators include waste volume, wastewater treatment capacity, carbon intensity per cruise call, reef condition, carrying capacity use, local procurement share, MSME participation, and conservation reinvestment. These indicators can become the basis for environmental levies, green port investment, local supplier policies, and destination sustainability reporting. Future research should test this framework through empirical case studies in priority cruise destinations in Indonesia. Quantitative valuation of ecosystem services, carbon cost estimation, and local income tracing would strengthen the accounting model and make it more applicable for public policy and destination management.

ACKNOWLEDGEMENT STATEMENT

The author gratefully acknowledges Politeknik Pariwisata Makassar for providing academic and institutional support during the preparation of this manuscript. The author also extends appreciation to the institutions and scholars whose official reports, standards, and academic publications contributed to the development of this study.

REFERENCES

- Akhand, Z., & Mawani, A. (2023). Arm's length principle vs. formulary apportionment in BEPS Action 13: Stakeholders' perspectives. *Accounting in Europe*, 20(2), 225–243. <https://doi.org/10.1080/17449480.2023.2192356>
- Badan Pusat Statistik. (2025, January 2). *Kunjungan wisatawan mancanegara (wisman) pada November 2024 mencapai 1,09 juta kunjungan, naik 17,27 persen year-on-year* (y-on-y). <https://www.bps.go.id/id/pressrelease/2025/01/02/2395/perkembangan-pariwisata.html>
- Banarsyadhimi, U. R. A. M. F., Dargusch, P., & Kurniawan, F. (2022). Assessing the impact of marine tourism and protection on cultural ecosystem services using an integrated approach: A case study of the Gili Matra Islands. *International Journal of Environmental Research and Public Health*, 19(19), 12078. <https://doi.org/10.3390/ijerph191912078>
- Kementerian Perencanaan Pembangunan Nasional/Badan Perencanaan Pembangunan Nasional. (2023). *Indonesia blue economy roadmap 2023–2045*. https://perpustakaan.bappenas.go.id/e-library/file_upload/koleksi/migrasi-data-publikasi/file/Unit_Kerja/Dir%20Industri%2C%20Ekonomi%20dan%20Kreatif/Dummy_Indonesia%20Blue%20Economy%20Roadmap_Ebook.pdf
- Barker, R., & Mayer, C. (2025). Seeing double corporate reporting through the materiality lenses of both investors and nature. *Accounting Forum*, 49(2), 259–289. <https://doi.org/10.1080/01559982.2023.2277982>
- Bolea, L., Duarte, R., Hewings, G. J. D., Jiménez, S., & Sánchez-Chóliz, J. (2022). The role of regions in global value chains: An analysis for the European Union. *Papers in Regional Science*, 101(4), 771–794. <https://doi.org/10.1111/pirs.12674>
- Bosi, M. K., Lajuni, N., Wellfren, A. C., & Lim, T. S. (2022). Sustainability reporting through environmental, social, and governance: A bibliometric review. *Sustainability*, 14(19), 12071. <https://doi.org/10.3390/su141912071>
- Brackley, J. (2024). Accounting for public value. In H. Vollmer (Ed.), *Handbook of accounting in society* (pp. 78–90). Edward Elgar Publishing. <https://doi.org/10.4337/9781803922003.00016>
- Brogi, M., & Lagasio, V. (2025). Do corporate governance frameworks affect sustainability reporting? *Corporate Social Responsibility and Environmental Management*, 32(3), 3928–3943. <https://doi.org/10.1002/csr.3159>
- Buonocore, E., Grande, U., Franzese, P. P., & Russo, G. F. (2021). Trends and evolution in the concept of marine ecosystem services: An overview. *Water*, 13(15), 2060. <https://doi.org/10.3390/w13152060>

- Camilleri, M. A. (2026). Environmental, social and governance (ESG) factors for sustainable tourism development: The way forward toward destination resilience and growth. *Business Strategy and the Environment*, 35(3), 4057–4082. <https://doi.org/10.1002/bse.70366>
- Caparrós-Martínez, J. L., Martínez-Vázquez, R. M., & de Pablo Valenciano, J. (2022). Analysis and global research trends on nautical tourism and green coastal infrastructures: The case of coral reefs and seagrass meadows. *Environmental Sciences Europe*, 34, Article 33. <https://doi.org/10.1186/s12302-022-00614-2>
- Casimiro, D., Ventura, M. A., Botelho, A. Z., & Guerreiro, J. (2023). Ecotourism in marine protected areas as a tool to value natural capital and enhance good marine governance: A review. *Frontiers in Marine Science*, 9, 1002677. <https://doi.org/10.3389/fmars.2022.1002677>
- Chabba, M., Bhat, M. G., & Sarmiento, J. P. (2022). Risk-based benefit-cost analysis of ecosystem-based disaster risk reduction with considerations of co-benefits, equity, and sustainability. *Ecological Economics*, 198, 107462. <https://doi.org/10.1016/j.ecolecon.2022.107462>
- Chen, Q., Lau, Y.-Y., Kanrak, M., Sun, X., Zhang, P., & Tang, Y.-M. (2024). Using a bottom-up method to assess cruise ship activity impacts on emissions during 2019–2020 in China. *Heliyon*, 10(5), e27101. <https://doi.org/10.1016/j.heliyon.2024.e27101>
- Chopra, S. S., Senadheera, S. S., Dissanayake, P. D., Withana, P. A., Chib, R., Rhee, J. H., & Ok, Y. S. (2024). Navigating the challenges of environmental, social, and governance (ESG) reporting: The path to broader sustainable development. *Sustainability*, 16(2), 606. <https://doi.org/10.3390/su16020606>
- Contor, H., De Keyser, E., Kasaw, M. T., & Mathijs, E. (2026). Accounting for what matters: A review of true cost accounting as a transformative framework. *Sustainability Science*, 21(3), 1347–1364. <https://doi.org/10.1007/s11625-026-01803-1>
- Cruise Lines International Association. (2024). *State of the cruise industry report 2024*. <https://cruising.org/resources/state-cruise-industry-report-2024>
- Damian, I. M., Navarro-Jurado, E., & Ruiz, F. (2023). Involving stakeholders in the evaluation of the sustainability of a tourist destination: A novel comprehensive approach. *Journal of Sustainable Tourism*, 31(7), 1631–1650. <https://doi.org/10.1080/09669582.2021.1919687>
- De Boni, A., Melucci, F. M., Acciani, C., & Roma, R. (2022). Community composting: A multidisciplinary evaluation of an inclusive, participative, and eco-friendly approach to biowaste management. *Cleaner Environmental Systems*, 6, 100092. <https://doi.org/10.1016/j.cesys.2022.100092>
- Esteve-Pérez, J., del Río-González, M., & Gutiérrez-Romero, J. E. (2023). Forecast analysis of pollutant emissions of cruise ship routes in Western Mediterranean. *Applied Sciences*, 13(14), 8149. <https://doi.org/10.3390/app13148149>
- Fairbrass, A. J., Fradera, K., Shucksmith, R., Greenhill, L., Acott, T., & Ekins, P. (2025). Revealing gaps in marine evidence with a natural capital lens. *Philosophical*

- Transactions of the Royal Society B: Biological Sciences*, 380(1917), 20230214. <https://doi.org/10.1098/rstb.2023.0214>
- Forrest, M. J., Favoretto, F., Nisa, Z. A., & Aburto-Oropeza, O. (2023). A deeper dive into the blue economy: The role of the diving sector in conservation and sustainable development goals. *Frontiers in Marine Science*, 10, 1212790. <https://doi.org/10.3389/fmars.2023.1212790>
- Gallegati, S., Masiá, P., Fanelli, E., & Danovaro, R. (2025). The impact of natural capital loss on blue-tourism economy: The Red Sea case study. *Marine Policy*, 172, 106507. <https://doi.org/10.1016/j.marpol.2024.106507>
- Gray, R. (2010). Is accounting for sustainability actually accounting for sustainability ... and how would we know? An exploration of narratives of organisations and the planet. *Accounting, Organizations and Society*, 35(1), 47–62. <https://doi.org/10.1016/j.aos.2009.04.006>
- Hinson, C., O’Keeffe, J., Mijic, A., Bryden, J., Van Grootveld, J., & Collins, A. M. (2022). Using natural capital and ecosystem services to facilitate participatory environmental decision making: Results from a systematic map. *People and Nature*, 4(3), 652–668. <https://doi.org/10.1002/pan3.10317>
- Hummel, K., & Jobst, D. (2024). An overview of corporate sustainability reporting legislation in the European Union. *Accounting in Europe*, 21(3), 320–355. <https://doi.org/10.1080/17449480.2024.2312145>
- IFRS Foundation. (2023a). *IFRS S1: General requirements for disclosure of sustainability-related financial information*. <https://www.ifrs.org/issued-standards/ifrs-sustainability-standards-navigator/ifrs-s1-general-requirements/>
- IFRS Foundation. (2023b). *IFRS S2: Climate-related disclosures*. <https://www.ifrs.org/issued-standards/ifrs-sustainability-standards-navigator/ifrs-s2-climate-related-disclosures/>
- International Maritime Organization. (2023). *2023 IMO strategy on reduction of GHG emissions from ships*. <https://www.imo.org/en/ourwork/environment/pages/2023-imo-strategy-on-reduction-of-ghg-emissions-from-ships.aspx>
- Kizielewicz, J. (2022). Monitoring energy efficiency and Environmental Ship Index by cruise seaports in Northern Europe. *Energies*, 15(12), 4215. <https://doi.org/10.3390/en15124215>
- Lansø, A. S., Winther, M., Jensen, S. S., & Løfstrøm, P. (2023). Impact on air quality from increasing cruise ship activity in Copenhagen port. *Environmental Research Communications*, 5(2), 021003. <https://doi.org/10.1088/2515-7620/acb90c>
- Lee, Y., Sharma, B., & Tham, A. (2025). A scale to measure destination social responsibility perceived by residents and government. *International Journal of Tourism Research*, 27(4), e70084. <https://doi.org/10.1002/jtr.70084>
- Li, C., He, Q., Ji, H., Yu, S., & Wang, J. (2023). Reexamining the impact of global value chain participation on regional economic growth: New evidence based on a nonlinear model and spatial spillover effects with panel data from Chinese cities. *Sustainability*, 15(18), 13835. <https://doi.org/10.3390/su151813835>

- Lloret, J., Carreño, A., Carić, H., San, J., & Fleming, L. E. (2021). Environmental and human health impacts of cruise tourism: A review. *Marine Pollution Bulletin*, 173, 112979. <https://doi.org/10.1016/j.marpolbul.2021.112979>
- López-Rivas, J. D., & Cárdenas, J. C. (2024). What is the economic value of coastal and marine ecosystem services? A systematic literature review. *Marine Policy*, 161, 106033. <https://doi.org/10.1016/j.marpol.2024.106033>