ESG PERFORMANCE IN THE MARITIME SECTOR: ANALYSING THE CASE OF EUROPEAN PORTS

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ABSTRACT

The integration of environmental, social and governance (ESG) principles in the maritime sector has become an essential component in enhancing sustainable development and operational transparency. This article explores the growing importance of ESG frameworks in the maritime industry, focusing on the practical applications and comparative assessment of ESG performance among four major European ports: the Port of Rotterdam, the Port of Antwerp-Bruges, the Port of Klaipėda, and A. P. Moller-Maersk. The paper investigates ESG maturity through a set of defined indicators, such as emissions, renewable energy use, green investment, social performance and governance transparency, offering a critical evaluation of their implementation across different port management models. The findings highlight significant variability in ESG integration, with Rotterdam and Maersk leading in environmental and governance indicators, while Antwerp-Bruges and Klaipėda are still developing their ESG reporting practices. The study underscores the importance of standardised ESG frameworks, transparent reporting, and digital innovation for advancing sustainability in the maritime sector.

KEY WORDS: *ESG, sustainability, maritime sector, governance, digital innovation*.

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Introduction

The integration of environmental, social and governance (ESG) principles into port and maritime operations has become a crucial aspect of sustainability and business governance. ESG refers to a set of practices used by organisations to minimise negative environmental and social impacts, while enhancing governance structures (Li et al., 2021). These principles are increasingly being recognised as integral to the long-term success of maritime stakeholders, influencing their market positioning and ensuring compliance with evolving regulatory standards (Li et al., 2024). ESG principles enable ports to evaluate their risks, opportunities, and overall sustainability through a systematic approach.

As global trade and maritime transport expand, the environmental impact of ports has grown significantly. According to the International Maritime Organisation (IMO, 2023), shipping activities, including port operations, contribute significantly to global greenhouse gas emissions. Ports play a central role in reducing this footprint, through innovations such as renewable energy adoption, emission reduction technologies, and improved waste management practices (Acciaro et al., 2014). In line with these efforts, more ports are integrating ESG into their business strategies, using sustainability as a competitive advantage, enhancing

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their reputation, and meeting the growing demand for transparency from stakeholders (Matuleviciene, Stravinskiene, 2015).

Ports that implement ESG principles effectively demonstrate leadership in managing both environmental and social risks. These organisations excel in areas such as CO_2 emission reduction, safety standards, and governance transparency. According to research by Lubin and Esty (2010), businesses with high ESG performance are often more resilient in managing long-term strategic challenges and securing stakeholder trust. In the maritime sector, the lack of standardised ESG metrics complicates efforts to compare the ESG performance of ports, particularly in terms of social aspects. ESG performance often varies, not only due to the size and capacity of the ports, but also due to the governance models in place. Public, private and hybrid governance models influence the pace and scope of ESG integration across the sector.

Moreover, ESG performance is intricately tied to the UN's 17 Sustainable Development Goals (SDGs), with many ports aligning their efforts to address global issues such as climate change, inequality and sustainable resource use. However, as noted by Wodnicka (2023), there is a concern that some organisations treat the SDGs more as marketing tools than genuine commitments, undermining their effectiveness. This highlights the need for stronger regulation and standardised reporting to ensure the authenticity of ESG claims in the maritime sector.

This article addresses the question: How do European ports integrate ESG principles, and how can their ESG maturity be evaluated?

The aim is to analyse the ESG practices and performance of European ports: the Port of Rotterdam, the Port of Antwerp-Bruges, the Port of Klaipėda, and A.P. Moller-Maersk, by examining their environmental, social and governance (ESG) indicators between 2019 and 2024. Using a structured framework, this study compares ESG maturity across these ports, and provides insights into their operational approaches, challenges and successes in implementing ESG practices.

Research methods: The research methodology includes a literature review, data collection from official ESG and annual reports, and comparative analysis. The article provides both a theoretical understanding and empirical evidence regarding the integration of ESG in port governance, exploring how sustainability practices are adopted by different port management models. By analysing large entities like Maersk and Rotterdam, and smaller ones like Klaipėda and Antwerp-Bruges, the study sheds a light on how size and governance affect the level of ESG maturity and performance in the maritime sector.

1. Conceptual foundations and frameworks for ESG assessment in the maritime sector

The growing relevance of sustainability in global supply chains has elevated the prominence of environmental, social and governance (ESG) frameworks in both scholarly and practical discourses. Initially rooted in corporate social responsibility (CSR), ESG has developed into a comprehensive model for non-financial performance assessment that integrates environmental impact, social inclusion and governance quality into strategic and operational decision-making (Eccles, Klimenko, 2019). In the context of global logistics, and particularly in the maritime transport sector, the role of ESG is increasingly being recognised not only as a compliance obligation but also as a competitive advantage. As critical nodes in maritime transport, ports have become focal points in the shift towards more sustainable and transparent infrastructure governance (Poulsen et al., 2018).

The environmental aspect of ESG emphasises how companies affect the natural world, including their efforts to reduce ecological damage by tackling challenges like climate change, greenhouse gas emissions, pollution, waste handling, energy and water conservation, protecting biodiversity, and preventing deforestation (Radzi, 2023). It also includes evaluating environmental risks that could influence a company's financial outcomes and examining how these risks are addressed (Fuadah, 2023). All companies, no matter what their size or sector is, use resources and energy, leaving an environmental footprint, while also being vulnerable to environmental shifts. For instance, firms might incur financial penalties for not adhering to environmental regulations, such as those governing wastewater treatment (Fuadah, 2023). As Lo (2023) notes, to attain high

environmental (E) scores, organisations must show robust performance across various areas, including securing certification for their environmental management systems. From an environmental perspective, ports contribute significantly to carbon emissions, land use transformation and local pollution. They host a range of energy-intensive operations, including terminal handling, ship servicing and on-site logistics activities. As noted by the International Maritime Organisation (IMO, 2023), shipping-related activities account for approximately 3% of global greenhouse gas emissions, and ports themselves contribute to this through both direct (Scope 1) and indirect (Scope 2 and 3) emissions. Academic literature consistently emphasises that port authorities and operators play a crucial role in shaping the environmental footprint of maritime transport. Acciaro et al. (2014) suggest that ports must not only decarbonise their own activities but also act as facilitators of cleaner technologies for shipping companies, through investments in shore-side electrification, hydrogen bunkering and digital energy tracking.

However, environmental reporting among ports remains fragmented. While some ports have adopted international frameworks such as the Global Reporting Initiative (GRI) or the Carbon Disclosure Project (CDP), others continue to rely on narrative descriptions of environmental initiatives without numerical targets or verified performance indicators (Tsatsaronis et al., 2024). Wan et al. (2017) stress that a lack of harmonised metrics makes inter-port comparisons difficult, thereby undermining accountability and limiting the ability of stakeholders to assess climate-related risk exposure. Therefore, scholarly consensus points to the need not only for increased transparency but also for structured environmental KPIs that can be benchmarked across institutions.

Environmental leadership in port governance is typically demonstrated through regular reporting on CO_2 emissions (often normalised per tonne of cargo), renewable energy adoption (as a percentage of total consumption), and targeted investment in sustainable infrastructure. Emissions intensity, in particular, has emerged as a core metric, allowing ports to report not just absolute emissions but also operational efficiency in climate terms. Investment in green infrastructure, such as LNG terminals or cold ironing systems, is also used as a proxy for environmental maturity, particularly when supported by external funding sources such as the EU Green Deal (Merk, 2013; Acciaro et al., 2014).

In contrast, the social dimension of ESG is comparatively underdeveloped in the port sector, although it is gaining attention due to regulatory developments and stakeholder pressure. Ports are significant employers and drivers of regional socio-economic development, and thus their role in labour safety, inclusion and community engagement is substantial. According to Lim and Pettit (2020), ports that embed social sustainability into their organisational culture and human resource practices experience greater staff retention, improved safety performance, and stronger stakeholder trust. Key social indicators typically include occupational health and safety data (e.g. lost-time injury frequency rates), diversity and inclusion statistics (e.g. gender or minority representation), employee training hours, and levels of community investment or partnership.

Academic reviews show that most multinational shipping companies report on social ESG dimensions more rigorously than state-controlled port authorities, which often lack the incentive structures or internal expertise to do so (Zumente, Lāce, 2023). While some ports mention initiatives like employee wellness or gender diversity programmes, very few provide structured indicators with annual tracking. Tsatsaronis et al. (2024) found that only a minority of European ports published measurable targets for workforce composition or community engagement. This absence of consistency creates challenges for social benchmarking, and it undermines the strategic potential of ESG integration, which depends not only on environmental metrics but also on inclusive governance and equitable labour practices.

Moreover, social sustainability reporting is frequently limited to compliance with occupational safety regulations, rather than proactive strategies to improve workplace well-being. For example, while the International Labour Organisation (ILO) mandates certain reporting standards in port operations (International Labour Organisation, 2021), there is no unified social disclosure standard at the EU level comparable to the CSRD's environmental focus. Consequently, ports are left to self-determine the content and scope of social disclosures, which leads to significant variability across actors.

The governance dimension of ESG is perhaps the most directly tied to organisational legitimacy. Governance covers not only the adoption of sustainability strategies but also the systems that ensure their implementation and the transparency of reporting processes. In the port sector, governance is particularly complex due to the coexistence of public authorities, private operators, and hybrid models. Kotsantonis et al. (2016) argue that good ESG governance in infrastructure organisations includes the board-level oversight of sustainability issues, the presence of ESG-linked executive incentives, the adoption of internationally recognised reporting standards (e.g. GRI, SASB), and regular stakeholder engagement activities.

Zumente and Lāce (2023) further emphasise that high ESG governance maturity can be identified through the frequency and clarity of sustainability reporting, especially when it includes scenario planning, third-party verification, and disclosures aligned with SDGs or the Task Force on Climate-related Financial Disclosures (TCFD). Empirical case studies show that corporatised ports such as Rotterdam tend to perform better in governance due to competitive pressure and investor scrutiny, while municipal or state-controlled ports often show inconsistencies and longer reporting cycles.

While many ports now issue sustainability reports, there is still considerable variation in the scope of their governance. Some include detailed breakdowns of policy implementation, stakeholder dialogue mechanisms, and progress tracking tools. Others issue irregular updates lacking methodological transparency. As Notteboom et al. (2021) observe, strong ESG governance is not a function of the ownership model alone, but is driven by leadership commitment, regulatory pressure and organisational capacity.

An emerging aspect of ESG governance is the role of digital innovation in enhancing transparency, traceability and data integrity. The academic literature increasingly points to the potential of Distributed Ledger Technologies (DLT), such as blockchain, to support emissions monitoring, supply chain traceability, and real-time ESG reporting (Ganne, 2018; Deloitte, 2020). For instance, Maersk's implementation of TradeLens has demonstrated that blockchain can be successfully used to automate the verification of shipment data, reduce documentation fraud, and enhance trust among stakeholders.

However, DLT application in port ESG systems remains in its infancy. While a few large operators have begun piloting blockchain solutions for procurement or customs clearance, few have integrated these technologies into ESG performance tracking. Liu et al. (2020) argue that digitalisation and ESG are not separate trajectories but are deeply intertwined. Integrating smart sensors, real-time monitoring and immutable ledgers into port governance could close the ESG trust gap and address longstanding issues around greenwashing and unverifiable claims.

To bridge the conceptual foundations of ESG integration and real-world application, this article investigates four strategically selected maritime entities: the Port of Rotterdam, the Port of Antwerp-Bruges, the Port of Klaipėda, and A. P. Moller-Maersk. These actors represent a diverse cross-section of the European maritime landscape in terms of governance structure, geographical positioning and sustainability reporting maturity. The Port of Rotterdam, operating as a corporatised public authority in the Netherlands, is widely recognised for its leadership in climate adaptation and transparent ESG reporting. Its alignment with international sustainability standards, particularly the Global Reporting Initiative (GRI) and the Sustainable Development Goals (SDGs), positions it as a benchmark in both environmental and governance dimensions. Rotterdam's systematic disclosures on emissions intensity, energy transition investment, and health and safety KPIs, illustrate an institutional commitment to integrated ESG strategy.

In contrast, the Port of Antwerp-Bruges exemplifies a hybrid governance model in Belgium, combining public oversight with private operational logic. While the port produces detailed annual reports outlining key economic and logistical indicators, its ESG disclosures are comparatively fragmented, often narrative in nature, and lacking standardised environmental or social performance metrics. This makes it a valuable case for evaluating partial ESG implementation, especially in the context of recent merger-related organisational restructuring. The Port of Klaipėda offers a contrasting model in Eastern Europe. As a state-owned enterprise, it participates actively in regional sustainability programmes, often funded by the European Union, but has yet to consolidate its reporting into a cohesive ESG framework. Its data-driven annual reports and engagement in initiatives such as PERS (Port Environmental Review System) show potential, but fall short of providing structured disclosures aligned with international best practices.

A. P. Moller-Maersk stands out not as a port authority but as a vertically integrated maritime logistics giant operating globally from its Danish headquarters. Its inclusion provides an insight into how ESG strategy manifests at the corporate level, especially in relation to emissions tracking, social accountability and governance transparency. Maersk is notable for its rigorous environmental targets, including net-zero goals by 2040, its detailed reporting on safety performance, and its board-level ESG oversight mechanisms. Furthermore, it was one of the earliest adopters of blockchain technology for supply chain transparency through the development of the TradeLens platform in collaboration with IBM. Initially celebrated as a transformative tool for digital traceability in global logistics, TradeLens ultimately failed to gain sufficient traction among industry actors and was officially discontinued in late 2022. This outcome underscores the structural challenges of scaling digital ESG solutions in a fragmented and often conservative sector.

These four cases were selected not merely for their visibility or geographical diversity, but for the different ESG trajectories they represent: from Maersk's innovation-driven corporate sustainability strategy, to Klaipėda's data-rich but structurally limited reporting; from Rotterdam's mature and institutionalised ESG model, to Antwerp-Bruges' transitional approach amidst evolving governance. Together, they allow for a multidimensional comparison of ESG implementation in European port systems and maritime logistics. Their inclusion in the study enables the identification of recurring challenges and emerging best practices, while reflecting the broader asymmetries in ESG readiness across the European maritime sector.

Taken together, the literature suggests that a mature ESG system in the port sector is characterised by strategic environmental investment, measurable social initiatives, and accountable governance structures supported by transparent reporting. The presence, quality and consistency of ESG indicators, across environmental, social and governance dimensions, can thus serve as a robust basis for assessing institutional sustainability maturity. These theoretical insights provide the foundation for the empirical comparison presented in the following section, in which four European maritime stakeholders are evaluated using a structured ESG indicator framework.

2. A comparative ESG evaluation of European ports based on reported indicators (2019–2024)

Research methodology

This article evaluates the ESG maturity of four European maritime entities: the Port of Rotterdam, the Port of Antwerp-Bruges, the Port of Klaipėda, and A.P. Moller-Maersk. The analysis is based on a comprehensive review of 21 ESG-related documents published between 2019 and 2024. These documents include annual reports, sustainability reports, ESG performance summaries, and performance statistics from official websites and reports of the respective ports and companies: the Port of Klaipėda's (2022–2024) annual reports (2023, 2022), the news reports 'Klaipėda Port surpassed the limit of 46 million tons in 2019' (2019) and 'Port of Klaipėda 2022 Results – Optimism despite a challenging year' (2021), statistics 'Klaipėda Port growing cargo handling, new records, and increased market share' (2024); the Port of Rotterdam's (2019–2024) annual report highlights (2024, 2023, 2022, 2021, 2020, 2019); the Port of Antwerp-Bruges' (2019–2023) sustainability reports (2023, 2022, 2021, 2020, 2019); and A.P. Moller-Maersk's (2019–2024) ESG reports (2024, 2023, 2022, 2021, 2020, 2019).

The analysis follows the indicator-based framework introduced in the theoretical part, covering nine indicators across the environmental, social and governance dimensions.

Environmental indicators:

1. CO_2 emissions: the total direct emissions from port operations, including emissions from energy usage and transport activities (Scope 1 and Scope 2 emissions).
2. Renewable energy: the proportion of energy used in port operations derived from renewable sources.
3. Green investment: investment in technologies and infrastructure that reduce environmental impact, such as energy-efficient technologies and carbon reduction initiatives.

4. Innovation: investment in and the adoption of innovative technologies that contribute to environmental sustainability (e.g. automation, energy efficiency).
5. Air/water quality: efforts to monitor, mitigate and improve air and water quality in the port and the surrounding regions.

Social indicators:

1. Diversity: the representation of diverse groups in the workforce, including gender, racial and cultural diversity, and the inclusion of marginalised communities.
2. Safety: the level of safety in port operations, tracked through metrics such as lost-time injury frequency rates and other occupational health and safety indicators.

Governance indicators:

1. Transparency: the openness of ESG reporting and the extent to which ports provide clear, regular updates on their sustainability initiatives and performance metrics.
2. Policy implementation: the extent to which ports have implemented and enforced ESG-related policies and strategies, focusing on long-term sustainability goals.

A five-point qualitative scoring system was applied, focusing on the presence, consistency, standardisation, and strategic depth of each indicator, with each entity assessed in its functional and governance context. The selected actors represent a diversity of operational models (public, hybrid, corporate), geographical settings and regulatory exposure, enabling an in-depth comparison of how ESG practices vary across organisational structures. Their reports were reviewed in original form, with performance indicators extracted directly from source data.

Research data

Environmental indicators included Scope 1 and 2 emissions reporting, renewable energy usage, green technology investment, and environmental risk management, such as air and water quality. The Port of Rotterdam demonstrated advanced maturity across all criteria. In its annual report highlights from 2019 to 2023, Rotterdam consistently discloses annual CO_2 emissions, targets for carbon neutrality, and ongoing investment in renewable infrastructure, including shore power, hydrogen bunkering and modal shift logistics (Port of Rotterdam annual report highlights, 2019, 2020, 2021, 2022, 2023). The 2023 report is particularly detailed, documenting its alignment with the European Green Deal and the UN's Sustainable Development Goals. Maersk matched Rotterdam in reporting robustness. Its ESG reports from 2019 to 2023 and its Annual Report 2024 contain independently verified emissions data across all three scopes, including emissions per container moved, vessel energy efficiency indicators, and fuel transition initiatives (Maersk, ESG Report 2023; Annual Report 2024). Notably, the company outlines its pathway to net-zero emissions by 2040, supported by the procurement of green methanol, the construction of zero-emission vessels, and collaboration with green fuel providers.

The Port of Antwerp-Bruges presents a fragmented approach. While its documents (2021–2023) acknowledge environmental actions such as modal shift incentives and habitat protection, there are no quantitative emissions disclosures, no normalised energy data, and no references to third-party validation (Port of Antwerp-Bruges reports, 2021, 2022, 2023). Sustainability is referenced as a value, not as a structured performance framework. The Port of Klaipėda references environmental responsibility in multiple reports, including the 2023 Sustainability Summary and the 2024 Annual Report, but it does not provide data aligned with GRI or SDG frameworks. References to participation in EU projects (e.g. environmental dredging, PERS certification) are present, but the absence of emissions inventories or structured environmental KPIs limits its standing (Port of Klaipėda Sustainability Summary 2023; Annual Report 2024).

Social performance varied substantially, with only Maersk demonstrating high levels of transparency, target setting and performance tracking. Its ESG reports contain occupational health metrics (e.g. Lost-Time

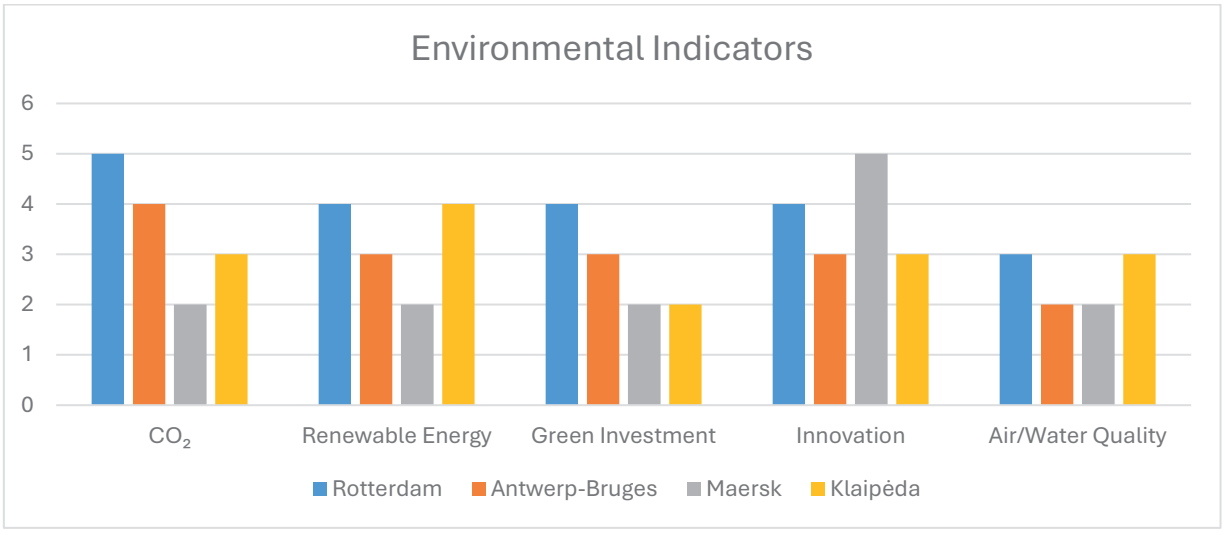

Figure 1. Environmental comparison across ports

Source: The authors, based on research data.

Injury Frequency), workforce diversity goals (including gender parity targets for leadership), and annual training hours per employee (Maersk, ESG Report 2022; ESG Report 2023). The company links these indicators to strategic resilience, talent retention, and stakeholder expectations, integrating them across governance levels. The Port of Rotterdam publishes employee training and safety initiatives in its annual report highlights (2021–2023), including strategic partnerships with educational institutions and workplace development programmes. However, the absence of gender-disaggregated data, quantitative targets and inclusion metrics restricts its visibility into deeper social equity performance (Port of Rotterdam annual report highlights 2021, 2022, 2023).

The Port of Antwerp-Bruges includes references to internal safety policies and labour force well-being, but the discussion remains narrative. Its reports do not contain safety incident metrics or workforce indicators, and there is no evidence of systematic social target-setting or measurement (Port of Antwerp-Bruges reports, 2022, 2023). Social performance is treated as a compliance matter, and not a strategic priority. Klaipėda provides only minimal information on social indicators. Its statistical reports mention briefly safety protocols and educational partnerships, but provide no quantifiable data on workforce development, diversity or employee well-being (Port of Klaipėda Annual Statistics 2024; News, 2021). There is no evidence of systematic tracking or public target-setting in social performance.

Governance maturity was assessed based on the presence of ESG policies, the use of global sustainability standards (e.g. GRI, SASB, SDGs), the frequency and quality of reporting, and stakeholder engagement mechanisms. Maersk scored the highest, supported by third-party verified ESG reports, alignment with major international frameworks, and integrated reporting formats. Its ESG governance structure includes board-level oversight, executive accountability, and cross-departmental coordination (Maersk ESG Report, 2023; Annual Report, 2024). Maersk also conducts materiality assessments and stakeholder consultations to inform ESG priorities. Rotterdam produces regular, high-quality disclosures aligned with the SDGs and national climate targets, and references performance dashboards. However, the absence of board-level ESG roles or any mention of GRI or SASB reporting limits the scope of its governance. There is no public reference to third-party audits or external assurance processes (Port of Rotterdam annual report highlights, 2022, 2023).

Antwerp-Bruges lacks structured governance reporting. Its reports reference long-term sustainability goals, but provide no information on leadership responsibilities, stakeholder engagement, or alignment with

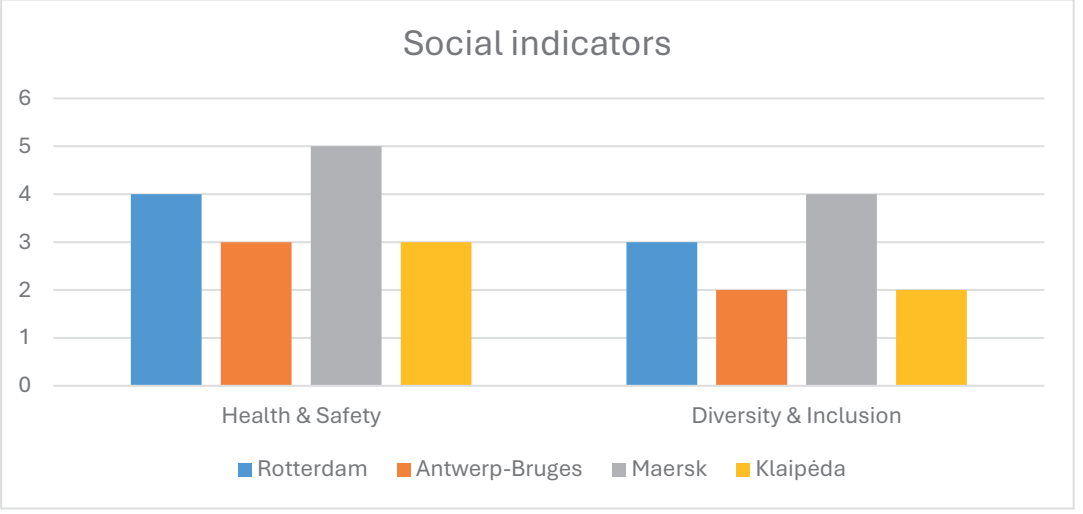

Figure 2. Social comparison across ports

Source: The authors, based on research data.

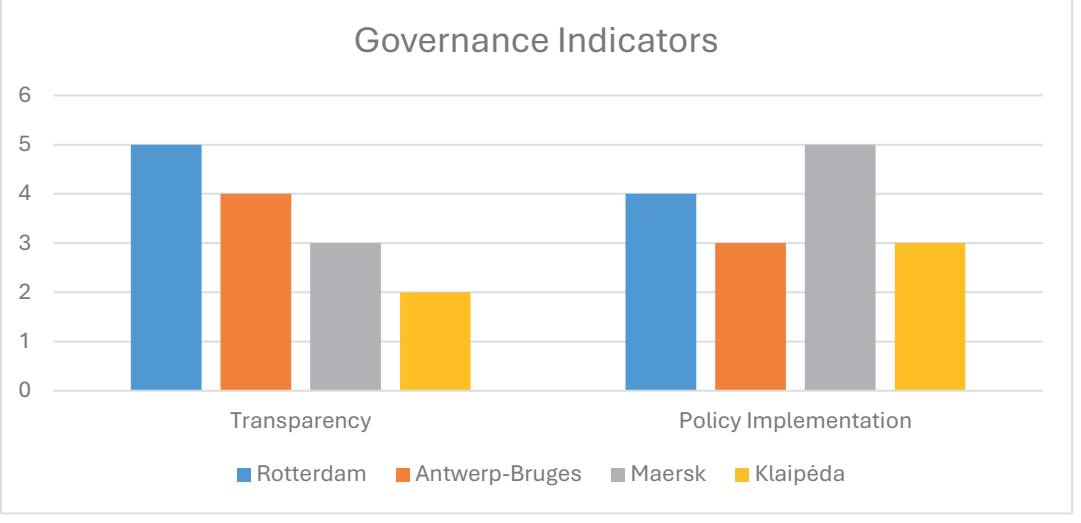

Figure 3. Governance comparison across ports

Source: The authors, based on research data.

ESG standards (Port of Antwerp-Bruges, Reports 2022). ESG-related policy implementation is implied but undocumented. Klaipėda's disclosures are similarly limited. While sustainability is mentioned in broad terms, no formal policies, governance procedures or framework alignments are disclosed (Port of Klaipėda Annual Report, 2024; News, 2022). There is also no indication of internal audit or ESG performance monitoring structures.

A scoring matrix was developed to consolidate ESG maturity across the three dimensions and eight indicators. The aggregated results were visualised in a radar chart to represent the comparative positioning of each entity. Maersk and Rotterdam consistently outperformed the other two cases, although with slightly

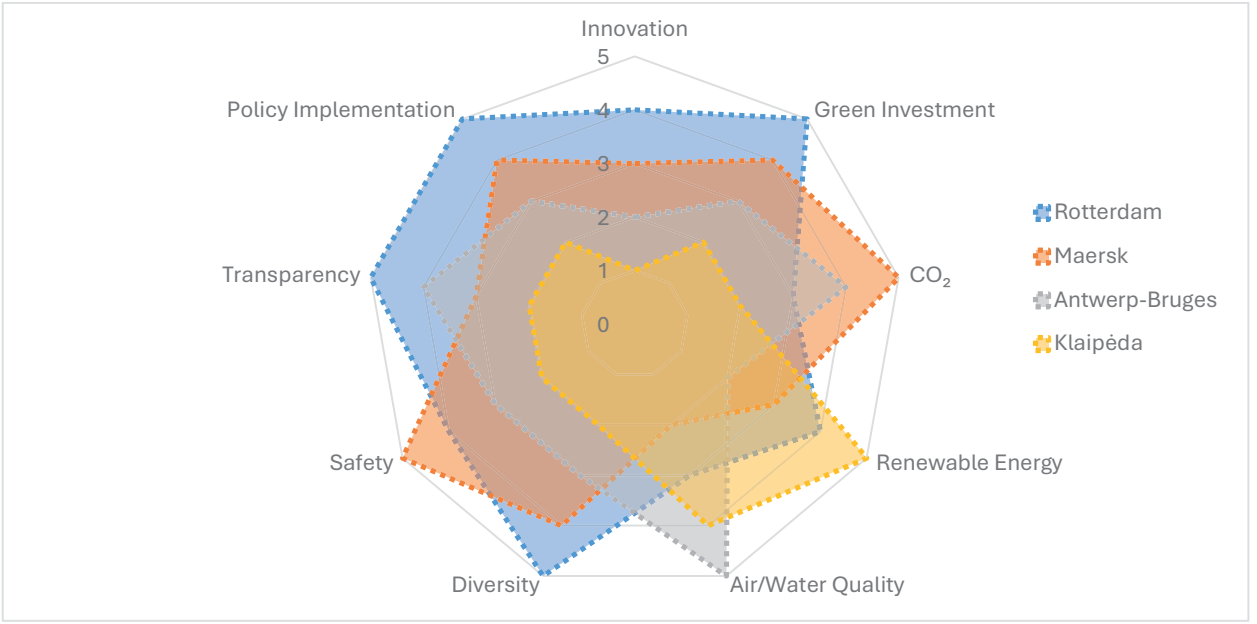

Figure 4. ESG comparison between ports

Source: The authors, based on research data.

different profiles: Maersk dominated the governance and social indicators, while Rotterdam's strength lay in environmental planning and infrastructure development. Antwerp-Bruges occupied an intermediate position with operational awareness, but limited strategic ESG implementation. Klaipėda lagged across all dimensions, demonstrating early-stage engagement and a need for structured policy development.

These results support previous literature on ESG asymmetry across governance structures. Corporate actors like Maersk perform well due to investor pressure, global visibility and operational agility, while corporatised ports like Rotterdam benefit from integrated reporting systems. Hybrid and state-owned models face challenges due to unclear accountability, inconsistent policy continuity, and limited stakeholder pressure. The empirical findings reinforce the conceptual framework that ESG maturity depends not only on strategic intent but also on institutional capacity, reporting culture and external regulatory alignment.

Conclusions

This article examined ESG integration in the maritime sector through a comparative analysis of four entities: the Port of Rotterdam, the Port of Antwerp-Bruges, the Port of Klaipėda, and A.P. Moller-Maersk. Based on 21 ESG-related documents from 2019 to 2024, the study evaluated performance across eight key indicators using a structured framework.

The results show considerable variation in ESG maturity. The Port of Rotterdam demonstrated the highest overall performance, with verified disclosures, strategic emissions targets, and robust governance structures. Maersk also performed strongly, particularly in environmental planning and infrastructure investment, although its social and governance indicators were less formalised. Antwerp-Bruges presented partial ESG integration, while Klaipėda showed early-stage engagement without standardised reporting or clear performance targets.

These findings confirm that ESG implementation in ports is strongly influenced by governance type, institutional capacity and stakeholder pressure. While private and corporatised entities benefit from inves-

tor-driven accountability and strategic alignment, hybrid and public ports often lack structured policies and consistent disclosure practices.

The study also underscores the need for standardised ESG frameworks in the maritime sector, and highlights the future role of digital solutions such as blockchain in enhancing data transparency and traceability. Advancing ESG performance will require stronger regulation, better internal systems, and the deeper integration of sustainability into strategic decision-making.

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ASV VEIKLOS REZULTATAI JŪRŲ SEKTORIUJE ANALIZUOJANT EUROPOS UOSTŲ ATVEJĮ

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Santrauka

Aplinkos, socialinių ir valdymo (ASV) principų integravimas jūrų sektoriuje tapo esminiu tvaraus vystymosi ir veiklos skaidrumo didinimo komponentu. ASV – tai visuma praktikų, kurias organizacijos taiko siekdamos sumažinti neigiamą poveikį aplinkai ir socialinį poveikį, kartu stiprindamos valdymo struktūras. Šie principai vis dažniau pripažįstami kaip neatsiejami nuo ilgalaikės jūrų sektoriaus suinteresuotųjų šalių sėkmės, darantys įtaką jų pozicionavimui rinkoje ir užtikrinantys atitiktį kintantiems reguliavimo standartams. ASV principai leidžia uostams įvertinti savo riziką, galimybes ir bendrą tvarumą taikant sisteminį požiūrį. Šiame straipsnyje nagrinėjama auganti ASV struktūrų svarba jūrų sektoriuje, daugiausia dėmesio skiriant praktiniam pritaikymui ir lyginamajam ASV veiklos vertinimui keturiuose didžiuosiuose Europos uostuose: Roterdamo, Antverpeno-Briugės, Klaipėdos ir „A. P. Moller-Maersk“. Nagrinėjamas ASV brandumas, atsižvelgiant į apibrėžtus rodiklius, tokius kaip išmetamųjų teršalų kiekis, atsinaujinančios energijos naudojimas, ekologiškos investicijos, socialiniai rezultatai ir valdymo skaidrumas, pateikiant kritinį vertinimą skirtingose uosto valdymo struktūrose.

Šiame straipsnyje keliamas probleminis klausimas, kaip Europos uostai integruoja ASV principus ir kaip galima būtų įvertinti jų ASV brandą?

Tikslas – išanalizuoti Europos uostų (Roterdamo, Antverpeno-Brugės, Klaipėdos ir „A. P. Moller-Maersk“) ASV praktiką ir veiklos rezultatus, nagrinėjant jų 2019–2024 m. laikotarpio aplinkosauginius, socialinius ir valdymo rodiklius. Tyrime lyginama šių uostų ASV branda ir pateikiamos įžvalgos dėl jų veiklos metodų, iššūkių bei sėkmės įgyvendinant ASV praktiką.

Tyrimo metodai: literatūros apžvalga, duomenų rinkimas iš oficialių ASV ir metinių ataskaitų bei lyginamoji analizė. Straipsnyje pateikiamas tiek teorinis, tiek empirinis supratimas, susijęs su ASV integravimu į uosto valdymą. Nagrinėjama ASV integracija jūrų sektoriuje, atliekant keturių uostų įmonių – Roterdamo,

Antverpeno-Brugės, Klaipėdos ir „A. P. Moller-Maersk“ – lyginamąją analizę. Analizuojami 2019–2024 m. dokumentai, apimantys tvarumo metines ataskaitas, ESG ataskaitas, tvarumo santraukas ir veiklos statistiką. Analizė atliekama pagal teorinėje dalyje pristatytą rodikliais pagrįstą sistemą, kuri apima aplinkosaugos, socialinius ir valdymo rodiklius. Taikyta penkių balų kokybinė vertinimo sistema, daugiausia dėmesio skiriant kiekvieno rodiklio buvimui, nuoseklumui, standartizavimui ir strateginiam gilumui, kiekvienas subjektas vertintas atsižvelgiant į jo funkcinį ir valdymo kontekstą. Uostų pateiktos ataskaitos peržiūrėtos originalia forma, o veiklos rodikliai išrinkti tiesiogiai iš pirminių duomenų.

Išvadose pabrėžiamas didelis ASV integracijos kintamumas – Roterdamas ir „Maersk“ pirmauja pagal aplinkosaugos ir valdymo rodiklius, o Antverpenas-Briugė ir Klaipėda vis dar plėtoja ASV ataskaitų teikimo praktiką. Tyrimas pabrėžia standartizuotų ASV sistemų, skaidrių ataskaitų teikimo ir skaitmeninių naujovių svarbą didinant tvarumą jūrų sektoriuje. Rezultatai atskleidė didžiulius ASV įgyvendinimo skirtumus. Roterdamo uostas pademonstravo geriausius bendrus rezultatus ir nustatė strateginius išmetamųjų teršalų tikslus bei tvirtas valdymo struktūras. Ir bendrovė „Maersk“ pasiekė gerų rezultatų, ypač aplinkosaugos planavimo ir investicijų į infrastruktūrą srityse, nors jos socialiniai ir valdymo rodikliai buvo mažiau formalizuoti. Antverpenas-Briugė pristatė dalinę ASV integraciją, o Klaipėda buvo ankstyvajame įsitraukimo etape be standartizuotų ataskaitų ar aiškių veiklos tikslų. Šios išvados patvirtina, kad įgyvendinant uostuose ASV ypač svarbus yra valdymas, instituciniai gebėjimai ir suinteresuotųjų šalių spaudimas. Privačioms ir korporatyvinėms įmonėms naudinga investuotojų skatinama atskaitomybė ir strateginis suderinamumas, o mišrūs ir valstybiniai uostai dažnai neturi struktūruotos politikos ir nuoseklios tvarumo informacijos atskleidimo praktikos.

Tyrimo rezultatuose pabrėžiama, kad jūrų sektoriuje būtinos standartizuotos ASV sistemos, būsimas skaitmeninių sprendimų, pavyzdžiui, blokų grandinės, vaidmuo didinant duomenų skaidrumą ir atsekamumą. Norint pagerinti ASV veiklos rezultatus, reikia griežtesnio reguliavimo, tobulesnių vidaus sistemų ir aktyvesnio tvarumo integravimo į strateginių sprendimų priėmimą.

RAKTINIAI ŽODŽIAI: *ASV, tvarumas, jūrų sektorius, valdymas, skaitmeninės naujovės*.

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