

Scoring environmental social governance ability: a model of sustainability assessment in the blue economy¹²

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Abstract

Frame of the research. Environmental, social and governance (ESG) scores primarily evaluate sustainability performance but fail to incorporate firms' strategic orientation towards sustainability. This limits the understanding of the key drivers behind successful ESG transitions within the blue economy.

Purpose of the paper. This study aims to develop and test the ESG Ability Score, a novel measurement model that assesses both ESG performance and sustainability orientation, offering a holistic evaluation of firms' sustainability responsiveness in the blue economy.

Methodology. The ESG Ability Score is developed through content analysis of sustainability reports of 22 Italian shipyards and shippers. It is based on the ESG score, quantified using a machine-learning web application, and the Sustainability Orientation Index (SOI), determined by the inclusion of ESG content in the corporate identity and strategic direction.

Results. Neither industry reaches low ESG ability, but a greater number of shipyards exhibit medium-high levels of ESG ability compared to shippers, with shipbuilders outperforming shippers in the SOI overall.

Research limitations. This study is limited to Italian firms and relies on secondary data. ESG Ability Score should be validated across different geographical and industry settings.

Managerial implications. The ESG Ability Score acts as a diagnostic and strategic tool to identify sustainability gaps, align strategies with ESG goals and support informed decision-making.

Originality of the paper. A robust methodological framework is proposed for developing an ESG Ability Score. It uniquely integrates sustainability orientation with ESG performance to comprehensively evaluate the sustainability approaches of maritime firms.

Key words: ESG score; sustainability orientation; ESG Ability score; shipbuilding; shipping firms; blue economy

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1. Introduction

The blue economy includes activities focused on the extraction and use of ocean resources, along with the use of coastal and marine areas for industrial and recreational purposes. It is of significant interest in global economic growth for both developed and developing countries, as well as being a strategic sector for achieving sustainability goals within the European Union (European Commission, 2024). The blue economy encompasses not only established industries - such as maritime transport, shipping, fisheries, and tourism - but also rapidly growing sectors that focus on deep-sea mineral mining, ocean renewable energy, offshore aquaculture and blue biotechnology, driven by research and innovation (KPMG, 2021).

The blue economy will face three main challenges in the coming years: global competition, innovation, and sustainability (Martínez-Vázquez *et al.*, 2021). Long-lasting stresses exerted by human activities on the aquatic environment have led to acidification, pollution, ocean warming, the collapse of fisheries, loss of marine species, destruction of breeding grounds, and ecosystem instability. This issue requires an urgent response, as the negative effects will have long-term implications for the planet's health (Agarwala, 2025). Sustainability is thus central to the blue economy, which signifies a paradigm shift away from solely extractive and exploitative methods. A truly sustainable blue economy aspires to achieve “effective protection, sustainable production, and equitable prosperity” in ocean-related activities (Stuchey *et al.*, 2020, p. 83).

Proper management strategies must be implemented to achieve a sustainable blue economy (Elegbede *et al.*, 2023). In this ongoing transition towards sustainability, environmental, social and governance (ESG) pillars significantly affect the maritime sector's activities (Koilo, 2019; Nömmela and Kõrbe Kaare, 2022). There is also a significant emphasis on ESG criteria, which have emerged as central components for assessing corporate sustainability and social responsibility.

Existing ESG scores focus on measuring the performance of implemented ESG actions, while neglecting aspects such as the orientation of the management team towards incorporating ESG factors into corporate strategy. However, the integration of ESG into business strategy should not be seen as a mere compliance mechanism but rather as a dynamic input-transformation-output process, where resources are strategically optimised to drive sustainability (Dong *et al.*, 2025). This narrow focus results in inconsistencies and hinders the development of a reliable knowledge base. Indeed, while existing research has predominantly examined the most visible aspects of ESG implementation, it is the underlying, less visible processes - such as strategic decision-making, organisational alignment, and cultural integration - that shape and give meaning to ESG initiatives. Addressing these foundational elements is therefore critical, particularly when ESG outcomes deviate from expectations. Currently, the literature lacks a unified methodological framework to assess both performance (measured outcomes) and strategic orientation (management's proactive engagement), despite their combined influence on effective sustainability

management. This gap limits a comprehensive understanding of the key drivers behind successful ESG transitions.

With this background, the present study aims to design, construct, and evaluate a unified and tailor-made tool to comprehensively assess the sustainability approach in the blue economy. It thus seeks to address the following research question (RQ):

RQ: How can a measurement model be developed to integrate sustainability orientation and ESG performance when evaluating the responsiveness of maritime firms to sustainability?

To answer this question, we introduce the concept of ESG ability (which integrates orientation and performance) by proposing a specific score for its measurement. To operationalise this concept, we propose the ESG Ability Score, a tailored composite measurement tool that assesses both the strategic intent behind ESG adoption and its measurable impact. The ESG Ability Score is composed of two main components. The first component is the ESG score as determined using a web application (<http://www.sustainableentrepreneurship.org/>) developed by Mansouri and Momtaz (2022), which employs a machine learning approach. The second component is the Sustainability Orientation Index (SOI), which is based on the inclusion of ESG content in corporate identity - such as vision, mission, and values - and in strategic direction, reflected in the company's goals. The ESG Ability Score, as designed, provides a dynamic and multidimensional evaluation, enabling a more accurate understanding of how maritime firms internalise, implement, and sustain ESG principles.

The score is tested on a sample of 22 Italian firms in the shipbuilding and shipping (i.e. maritime transport) industries. They are known for being heavy polluting and both energy- and material intensive industries (Önal *et al.*, 2021; Zhou *et al.*, 2023). In particular, most shipyards are located near urban areas, thereby affecting the sustainability of cities and society with a significant environmental footprint (Vakili *et al.*, 2022). Likewise, the shipping industry is responsible for a significant portion of air pollutants and impacts on marine environments through harmful aquatic organisms in ballast water, oil spills, and ship recycling (Felício *et al.*, 2021). As a result, these industries are embracing sustainability in two crucial ways. On the one hand, they are innovating in vessel design and construction, adopting advanced and clean technologies, enhancing eco-friendly products and services, and decarbonising transportation (Salas and Arenas, 2024); on the other hand, they are optimising cargo loading and transportation distance through slow-steaming and speed limitations, which are options for ship operators (Tran *et al.*, 2020).

The proposed approach is distinguished by its integration of dynamic and measurable parameters of ESG ability applicable across diverse economic contexts. In contrast to existing models, the ESG Ability Score not only evaluates the current positioning of companies in terms of ESG orientation and performance but also identifies critical areas for intervention. This model is particularly relevant for small and medium enterprises (SMEs), as it offers an accessible and adaptable solution to bridge the gap in ESG transitions. Of note is its introduction of a holistic perspective, which emphasises the interplay between organisational orientation and the

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achievement of measurable impacts, thereby supporting sustainable transitions at scale.

The remainder of the paper is structured as follows: Section 2 reviews the relevant literature. Section 3 presents the methods employed for the model development. Section 4 presents the results of the tool testing. Finally, Section 5 discusses the results and emphasises the contributions to knowledge and industry, as well as the limitations of the study.

2. Theoretical background

2.1 ESG performance through scores

The ESG concept is one modern method for evaluating aspects of a company's sustainability through specific ESG performance indicators (dos Santos and Pereira 2022). ESG scores were initially developed to fulfil investors' need to identify top performers based on three key criteria: environmental concerns, including ecological impact, resource consumption, effects on biodiversity, and waste management; social concerns, encompassing community and supplier impact, working conditions, and other social implications; and governance concerns, related to the organisation's transparency, its relationships with shareholders and the board of directors, executive compensation, and board diversity (Ribando and Bonne, 2010). Nevertheless, ESG scores quickly gained traction by aiding companies in boosting their reputation, easing regulatory pressures on their operations, reducing financial risks, and attracting more investment (Serafeim *et al.*, 2019). In recent years, a growing number of studies has showed that solid ESG performance is also positively related to financial growth (Ftiti *et al.*, 2024). Therefore, businesses are now requested to demonstrate their improved performance in different aspects of ESG.

The need to find a universal metric for ESG performance has led to the development of a vast literature on ESG scores, which has brought to light various issues. The first main issue is the lack of a uniformed framework for reporting, which is currently done on a voluntary basis. In the shipping industry, in particular, the lack of a unified methodological framework has led to the creation of various forms of ESG reports, which attempt to address this gap by incorporating recommendations and initiatives from major international organisations (i.e. the UN Global Compact, UN Sustainable Development Goals [SDGs]), as well as private proposals (i.e. SASB, GRI). Unfortunately, these initiatives often remain generic, with overlapping metrics and a systematic omission of specific parameters. ESG reporting and rating models in the shipping industry also typically adopt approaches from other industries, such as mining, oil, and gas. This practice, however, is broadly "incompatible, inconvenient, and inadequate" (Tsatsaronis *et al.*, 2024, p. 699), given that ESG reporting and implementation constitute a consistent competitive advantage for firms in the blue economy. This advantage is recognised by shareholders and stakeholders alike, fostering innovation and making risk prevention easier (Kannellopoulos, 2024).

The lack of an ESG index that could universally apply to and be used to compare the performance of different firms is another limitation found within the literature. When comparing a company's results across multiple indicators, significant discrepancies emerge concerning the measures used, information overload and the manual entry of certain data in the databases, and the lack of coverage for all the measured variables (Kotsantonis and Serafeim, 2019). The priorities for ESG can vary greatly depending on the specifics of an industry and the size of each firm (Dimson *et al.*, 2020) and even internal characteristics of the board of directors (Ma *et al.*, 2025), thus leading to skewed results. Furthermore, the environmental and governance components of ESG scores significantly influence their outcomes, whereas the social indicator tends to have a lesser effect on the final score's value (Escrig-Olmedo *et al.*, 2019). In sum, these aspects limit the scope and representativity of findings based on ESG scores.

Another crucial and often underestimated drawback of existing ESG scores is that they do not help in understanding what lies behind them; in fact, ESG scores represent more than just specific elements (Clément *et al.*, 2023). They are not a holistic measure of a company's ESG performance (Berg *et al.*, 2022) and therefore do not provide a complete representation of the business. The scores are also influenced by the organisational culture, values, orientation to sustainability or corporate social responsibility (CSR), but their ability to capture philosophical concepts will always be questioned (Clément *et al.*, 2022). Thus, the academic focus here could be centred on the development of new and customised methodologies to allow a more accurate measurement of ESG issues.

2.2 Sustainability orientation

Research on corporate sustainability and business orientation has grown significantly since the introduction of the UN SDGs (Di Vaio *et al.*, 2020). The existing literature is therefore rich with diverse concepts addressing social and environmental issues at a strategic level. There is considerable scholarly confusion, however, regarding the conceptualisation of firms' orientation towards sustainable development. The literature on sustainability orientation has framed it as a strategic orientation that represents a firm-level capability encompassing a philosophy, principles, and guidelines that shape the nature and scope of an organisation's

activities and policies (Amankwah-Amoah *et al.*, 2019). Earlier research has recognised sustainability orientation as either a strategic asset of the firm or a dynamic capability that contributes to achieving a competitive edge and enhanced firm performance (Claudy *et al.*, 2016).

In contrast, another stream of scholarship has examined sustainability orientation at an individual level, attributing it to personal values and beliefs (Kuckertz and Wagner, 2010). The lack of a unified conceptualisation of sustainability orientation remains evident in the various terminologies used to describe it. These include sustainable development orientation (Heikkurinen and Bonnedahl, 2013), sustainable orientation (Shou *et al.*, 2019), sustainable management orientation (Seidel *et al.*, 2018), strategic sustainability orientation (Hong *et al.*, 2019), and ESG orientation (Momtaz

and Mansouri, 2022; Li, 2024). The present study places the concept of sustainability orientation under the umbrella term of strategic orientation. Thus, sustainability orientation demonstrates the readiness of a firm to implement sustainability-related initiatives (Tata and Prasad, 2015) that reflect its long-term internal commitment to incorporating ESG concerns into its decision-making processes (Shou *et al.*, 2019).

Previous researchers have also struggled to reach a consensus on the measurement of sustainability orientation due to its multidimensional nature. A recent literature review (Khizar *et al.*, 2022) identified 20 scales/models for measuring sustainability orientation. However, the Kuckertz and Wagner (2010) scale, which pioneered the operationalisation of sustainability orientation in terms of social responsibility and environmental protection, is widely acknowledged and used by scholars in this field (Sung and Park, 2018).

Scholars have focused on the antecedents and outcomes of sustainability orientation. In particular, micro factors (e.g. owner/entrepreneur's personal, psychological, and socio-demographic characteristics) are considered as individual-level antecedents (Eijdenberg, 2019); firm-level internal factors (e.g. resources, strategic management, philosophy, and culture) represent the organisational level antecedents (Obal *et al.*, 2020); and, macro-level contextual and institutional factors (e.g. legislation, economic factors, and environmental conditions) are the environmental-level antecedents (Danso *et al.*, 2020). The literature has generally found a positive impact for the outcomes of sustainability orientation at the individual level in terms of managerial sensemaking, opportunity recognition, green entrepreneurship inclination, and sustainable entrepreneurial intention (Busch *et al.*, 2020).

Sustainability orientation also leads to firm-level outcomes. Its connection to company performance has been thoroughly examined, with significant focus on financial results such as cost reduction and resource efficiency, mitigation of supply chain risks, and enhanced collaboration (Croom *et al.*, 2018). Moreover, sustainability orientation exhibits a positive association with nonfinancial outcomes such as organisational and technological innovation, sustainable procurement and design, and the success of new product development (Zhao *et al.*, 2021). A company's sustainability orientation also positively influences its legitimating behaviour, carbon strategy, and social impact in terms of value generation and community engagement (de Menezes *et al.*, 2021).

2.3 ESG in the blue economy

The maritime industry lacks a sufficient understanding of the CSR activities (Fjørtoft *et al.*, 2020) that typically form the foundational benchmark for evaluating ESG ratings (Clementino and Perkins, 2021). Blue economy companies are nonetheless encouraged to develop and implement management methods and tools to measure ESG performance goals (Egorova *et al.*, 2021). For instance, the Norwegian Shipowners' Association (2021) has published guidelines for ESG reporting in the shipping and offshore industries, offering indicators to assess operational performance. Similarly, dos Santos and Pereira (2022) have proposed a

methodology for quantifying the ESG performance of international ports that incorporates over 20 metrics to evaluate port ESG scores. Despite such progress, many shipyards, particularly small and medium-sized ones, have yet to adopt appropriate ESG measures (Vakili *et al.*, 2021). Scholars have largely overlooked sustainability principles in shipbuilding, and the limited existing studies have primarily taken a one-dimensional perspective (Vakili *et al.*, 2022). Among the three components of ESG, environmental and social ones have garnered the most attention in the literature, driven by numerous regulations from international bodies aimed at protecting the environment, as well as the proximity of ports and maritime services to urban areas (Lee *et al.*, 2019). Nevertheless, governance aspects also demand greater attention as the governance of the maritime industry has undergone significant transformations in recent decades (Nömmela and Kõrbe Kaare, 2022). There are also other industry-based disparities. In the shipping industry, for example, most leading container shipping companies focus more on disclosing economic or environmental sustainability information, rather than on social sustainability (Vural *et al.*, 2021). Conversely, passenger shipping companies emphasise environmental, social, and philanthropic activities (Greets and Dooms, 2020). Research has also identified gaps in the data, relevance, and comparability within the corporate reporting systems of the shipping industry (Fasoulis and Kurt, 2019; Di Vaio *et al.*, 2021).

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3. Method

3.1 Research setting and sample

The Italian maritime sector is crucial to the country's economy, especially in industries such as shipbuilding and shipping. These industries not only play a central role in the blue economy but also drive the growth of other industries, creating a significant economic impact. The Italian shipbuilding and shipping industries contribute substantially to the European maritime economy, accounting for 19% and 8% of added value, respectively, and positioning Italy in third and fourth place (Unioncamere-Tagliacarne, 2024).

Through the AIDA database developed by Bureau Van Dijk, we identified the Italian companies belonging to the maritime industry and the related data used to describe the sample. The research included two filters: the first retained only active companies, while the second included only those companies classified under ATECO 2007 economic activities as 301200 - Construction of recreational and sport boats; 301102 - Shipyards for metal and non-metal constructions (excluding ship seats); 331500 - Repair and maintenance of commercial ships and recreational boats (excluding engines); 501000 - Maritime and coastal passenger transport; and 502000 - Maritime and coastal freight transport. A total of 218 companies, including 154 shipyards and 64 shipping firms, were identified.

3.2 Data collection

Secondary data were collected in December 2024, offering the primary advantages of saving time and accessing a large volume of data that would be challenging to gather independently (Johnston, 2017). data are frequently used to develop models within the field of organisational sustainability (Barletta *et al.*, 2021). More specifically, official documents like sustainability reports were collected from the corporate websites of the sample of firms. Reports were selected based on two inclusion criteria: public accessibility and publication in 2023. By adhering to these criteria, relevant and homogeneous input data were obtained. The application of these criteria to the entire dataset yielded 22 usable documents from the companies shown in Table 1.

Tab. 1: The companies investigated

Shipyards	Shipping firms
1. Sanlorenzo SpA	1. D'Amico Group
2. Cantiere del Pardo SpA	2. Costa SpA
3. Besenconi SpA	3. Gruppo Caronte & Tourist
4. Ferretti Group	4. Grimaldi SpA
5. Cantiere Rossini	5. Grandi Navi Veloci SpA
6. Amico Group	6. Fratelli Neri SpA
7. Groupe Beneteau Italia	7. Tarros SpA
8. De Wave Group	8. D'Alessio Group
9. The Italian Sea Group	9. Cosiarma SpA (Orserio)
10. Fincantieri	10. Carbonor SpA (Carboflotta)
11. Palumbo SY	11. Britoil Srl

Source: our elaboration

Information from the sustainability reports was integrated and cross-referenced with other reliable sources, including annual reports (specifically management reports), social and integrated reports, and non-financial statements (NFSs) (individual or consolidated NFSs in the case of groups). Additionally, environmental statements, quality and environmental policies, and codes of ethics were reviewed. Furthermore, specialised press and top management magazines, including *Economia del Mare* and *Il Sole 24 Ore*, served as additional sources of data. Triangulation was employed to examine the phenomenon from various perspectives, enrich our understanding of the issue investigated, and assess the convergence of evidence.

3.3 Data analysis

The collected data were analysed through a content analysis, which is a research technique useful for “making replicable and valid inferences from texts to the context of their use” (Krippendorff, 2004, p. 18). It is also recognised as one of the most appropriate methods in sustainability reporting and disclosure research (Duh and Primec, 2024). The content analysis was performed according to a three-step procedure.

The first step involved measuring the ESG performance of the sample firms based on a web application (<http://www.sustainableentrepreneurship.org/>) that uses a machine learning approach, as proposed by Mansouri and Momtaz (2022), to assess ESG properties in the textual data. This application relies on word counts based on a topic-specific dictionary to construct ESG ratings, thus generating an overall ESG score and individual scores for each pillar from text-based data (e.g. whitepapers, pitch decks, blog posts, social media posts). We uploaded the documents in their entirety to the web application, as the qualitative information to be interpreted was highly heterogeneous and not always present in the standard sections of the analysed reports (Montera and Esposito De Falco, 2024). If the original documents were in Italian, they were translated into English, the language in which the dictionary was created.

The results provided by the web application proved to be too similar and too low to be analysed properly. The ESG scores were therefore amplified using a square root transformation ($n^{0.5}$) to highlight differences while maintaining a fixed distance between values. This is common in the literature to normalise data when all numbers are either in a 0-1 interval or all larger than 1 (Osborne, 2010). Moreover - as the data must be skewed to justify a transformation - a test was carried out to certify a skewness level higher than 0.5. Given that our data respect both parameters, we proceeded with the normalisation process.

The second step focused on the measurement of the sustainability orientation by examining textual data on vision, mission, values, and goals, grouped under corporate identity and strategic direction. We focused on these elements because they are often explicitly documented and articulated by the company, which makes them easier to identify and analyse. This also maintained consistency and comparability with previous research (Du and Primec, 2024; He *et al.*, 2024). We chose, however, to exclude corporate purpose, which, while important for the sustainability approach, can be more abstract and less consistently defined across companies (Esposito De Falco *et al.*, 2024); it often overlaps with other elements like vision and mission, which makes it harder to analyse as a separate entity without redundancy.

To minimise subjectivity in identifying items within the documents, we used a keyword list constructed based on an ESG word list developed by Baier *et al.* (2020). Thus, a manual content analysis was implemented based on a keyword search within the sections of the documents related to the description of the firm and its sustainability strategy. The keyword list was then updated after a first reading session of the reports to integrate missing terms.

To ensure the accuracy and reliability of the content analysis, the reports were analysed separately by two coauthors; the results were then compared and discussed, and a shared coding frame was identified. The latter was further checked by a colleague of the authors, who has expertise in this research field. In his opinion, our coding frame fairly represents the sustainability orientation and therefore our coding frame was considered sufficiently valid (Schreier, 2012). The final coding frame is presented in Table 2.

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Tab. 2: Coding frame of the sustainability orientation

Dimensions	Items	Environmental Keywords	Social Keywords	Governance Keywords
Corporate identity	Vision	Climate change, climate mitigation, ecosystem, emissions, biodiversity, water, biofuels, pollution, waste, recycling	Human rights, Labor standards, community relations, health and safety, society, education, employment, diversity, inclusion, equity, minority	Audit and control, board structure, shareholder rights, disclosure and reporting, whistleblowing, transparency, compliance, remuneration, bribery and corruption, stakeholder engagement, business ethics
	Mission			
	Values			
Strategic direction	Goals			

Source: our elaboration

After the content analysis had been completed, the sustainability orientation of sample firms was measured by developing a specific index called the *Sustainable Orientation Index* (SOI), which was calculated as follows³:

$$SOI = \frac{\sum \text{Number of keywords for ESG in each item}}{(\text{Total number of keywords for ESG} \times \text{Total number of items} = 32 \times 4 = 128)}$$

Given the low skewness of the data (0.09), a square root transformation of the SOI data and a consequent normalisation process were not required.

Finally, the third step of the data analysis involved determining the ESG Ability Score, as described below:

$$ESG \text{ Ability Score} = \frac{ESG \text{ Score} + SOI}{2}$$

The sum of the ESG Score and SOI was divided by two to keep the final score in scale, as these two indices were already computed within a 0-1 interval. After calculating the ESG Ability Score, it was clustered into grades following dos Santos and Pereira (2022), who graded the ESG scores of international ports. Thus, the grades of the ESG Ability Score

³ For instance, Carbonor’s vision includes 5 keywords from the list for E, 3 keywords from the list for S, and 2 keywords from the list for G, totalling 10 identifiable ESG keywords in the vision statement. The company’s mission statement contains 6 keywords from the list for E, 5 keywords from the list for S, and 6 keywords from the list for G, adding up to 17 identifiable ESG keywords in the mission statement. Carbonor’s values include 7 keywords from the list for E, 0 keywords from the list of for S, and 2 keywords from the list for G, resulting in 9 identifiable ESG keywords in the values. Lastly, the company’s goals contain 7 keywords from the list for E, 6 keywords from the list for S, and 5 keywords from the list for G, making a total of 18 identifiable ESG keywords in the goals. By summing the number of ESG keywords identified in each item (10 keywords for vision + 17 keywords for mission + 9 keywords for values + 18 keywords for goals), we obtained a total of 54 keywords. This total was then divided by 128 to calculate the company’s sustainable orientation value of 0.42.

were low ability (<0.25), lower-middle ability (0.25-0.50), upper-middle ability (0.51-0.75), and high ability (0.76-1).

Overall, the ESG Ability Score adds a new dimension to more mainstream ESG scores used in previous studies. Indeed, existing scores - such as Refinitiv, Bloomberg, and Sustainalytics - focus on measuring ex post performance of implemented ESG actions (Stewart, 2024). However, in doing so, they neglect aspects related to the incorporation of ESG-related factors into corporate strategy (Clement *et al.*, 2025). By implementing the SOI into the scoring process, this article moves away from this opposition to instead bridge the gap between orientation and performance.

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4. Findings: Testing the ESG Ability Score

The investigated firms showed ESG Ability Scores ranging from lower-middle to high ESG ability, with the latter only reached by Fincantieri. The scores for all companies can be found in Table 3.

Tab. 3: ESG Ability Scores of the sample firms

Shipyards	ESG Ability Score	Ability Level
Sanlorenzo SpA	0.55	Upper-middle
Cantiere del Pardo SpA	0.33	Lower-middle
Besenzoni SpA	0.41	Lower-middle
Ferretti Group	0.55	Upper-middle
Cantiere Rossini	0.31	Lower-middle
Amico Group	0.33	Lower-middle
Groupe Beneteau Italia	0.58	Upper-middle
De Wave Group	0.32	Lower-middle
The Italian Sea Group	0.56	Upper-middle
Fincantieri	0.76	Upper-middle
Palumbo SpA	0.42	Lower-middle
Shippers	ESG Ability Score	
D'Amico Group	0.33	Lower-middle
Costa SpA	0.37	Lower-middle
Gruppo Caronte & Tourist	0.53	Upper-middle
Grimaldi SpA	0.40	Lower-middle
Grandi Navi Veloci SpA	0.31	Lower-middle
Fratelli Neri SpA	0.40	Lower-middle
Tarros SpA	0.38	Lower-middle
D'Alessio Group	0.27	Lower-middle
Cosiarma SpA	0.40	Lower-middle
Carbonor SpA	0.49	Lower-middle
Britoil Srl	0.31	Lower-middle

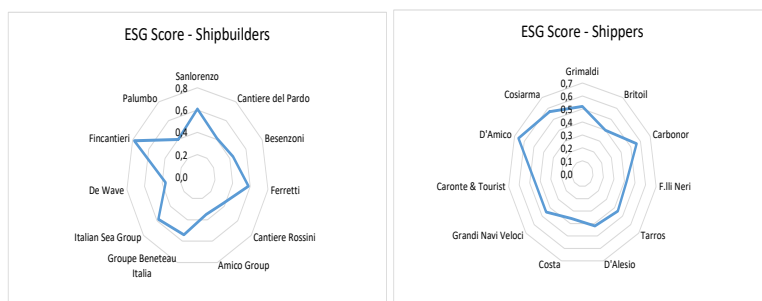
Source: our elaboration

The scores indicate an overall average level of ESG ability, with most companies being placed in the “lower-middle” bracket. There are a few clear outliers in the shipyards industry, with Fincantieri scoring significantly

higher than all others. The same does not apply to the shipping sector, as Gruppo Caronte & Tourist is the only firm to achieve a score in the “upper-middle” bracket. These results show that there is a basic level of ability in both sectors - with shipbuilders having a slight edge over shippers - although potential room for improvement remains.

To gather more information, we then analysed the two individual components of the ESG Ability Score. Concerning the specific results of the investigated firms in terms of ESG Score - which are exemplified in Figure 1 - the two groups achieved a similar mean score (49% for shipbuilders and 48% for shippers). The results did not show strong negative outliers for shipbuilders, while Fincantieri was established as a positive example with a score of 78%. The same can be said for shippers, which achieved consistently average scores, with the lowest being 36% and the highest being 66%.

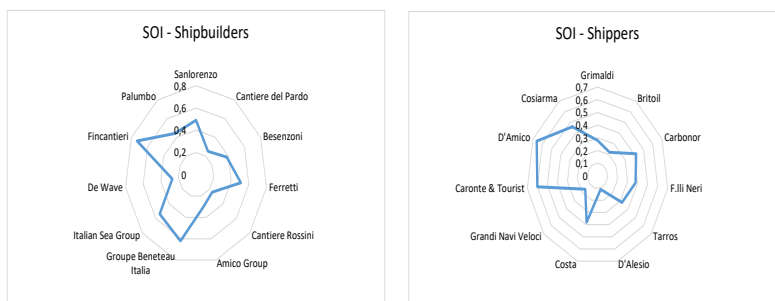
Fig. 1: Firms' ESG Score



Source: our elaboration

The results for the SOI (Fig. 2) showed a more significant gap between shipbuilders - which averaged at 44% - and shippers, with a 36% mean SOI.

Fig. 2: Firms' Sustainability Orientation Index



Source: own elaboration

To provide deeper insight into the composition of the SOI, Table 4 shows the frequency of each keyword, divided into pillars (i.e. environment, social, governance) and items (i.e. vision, mission, values, goals).

Tab. 4: Keywords number by pillars and items

	Shipyards			Shippers		
	Environmental	Social	Governance	Environmental	Social	Governance
Vision	61	47	51	48	46	39
Mission	53	37	50	39	39	31
Values	59	52	57	49	42	37
Goals	53	39	54	60	40	40

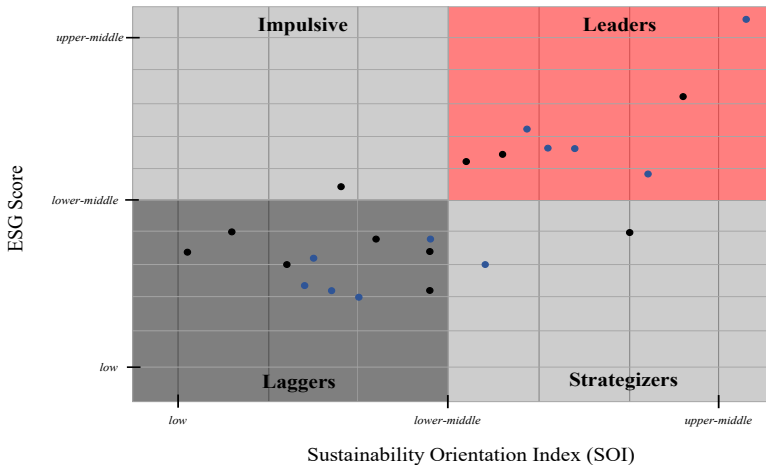
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Source: our elaboration

The main focus for shipyards is on vision-related keywords, and especially on the E pillar. In particular, keywords such as “emissions”, “water”, and “pollution” were mentioned more frequently. This outcome might have been influenced by the existing regulations at the national and international level, which tend to focus on these topics. However, the results drop significantly for the S pillar, for both mission and goals. This is true for both groups, potentially showing the limitations in including social elements in their core purpose (mission) and consequently creating a path from orientation to practical outcomes (goals). Moreover, shippers’ results for the G pillar for all items are significantly lower than the ones for shipyards.

Finally, a more comprehensive interpretation is provided in a four-quadrant matrix, the Sustainability Navigator Matrix, which illustrates the performance of firms for both the ESG Score (y-axis) and SOI (x-axis) (Fig. 3).

Fig. 3: The Sustainability Navigator Matrix



Legend: blue = shipyards; black = shippers

Source: our elaboration

The matrix makes it possible to cross-reference companies’ ESG scores and the SOI, classifying them into four distinct categories: leaders,

laggers, *strategisers*, and *impulsive*. The upper-right quadrant includes *leaders*, which are characterised by high ESG performance and strong integration of sustainability principles into their strategic identity. This group represents the optimal condition, which suggests that the ability to translate sustainability orientation into concrete and measurable actions is a determining factor in achieving high ESG performance. These companies can serve as benchmarks within the sector and demonstrates best practices in ESG strategy implementation. To maintain their competitive advantage, it is crucial for *leaders* to consolidate their ESG governance structures, enhance transparency in sustainability reporting, and invest in continuous innovation in product and process design to further strengthen their sustainability credentials.

The lower-left quadrant comprises *laggers*, which exhibit low scores in both indicators. This configuration suggests a reactive or marginal approach to sustainability that indicates deficiencies in both the definition of a strategic ESG orientation and its operational implementation. These companies are more exposed to the regulatory and financial risks associated with the sustainability transition, as well as pressures from stakeholders, including investors and customers. Given the increasing scrutiny on ESG compliance, firms in this category should prioritise the progressive integration of ESG principles into corporate decision-making. They should consider developing a structured roadmap to incorporate sustainability into their business processes, while managerial training programmes should focus on raising awareness of ESG-related risks and opportunities. The adoption of ESG performance measurement tools would also enable these companies to identify specific areas for improvement and track progress over time.

The lower-right quadrant, which can be identified as *strategisers*, includes organisations that, despite developing a strong strategic sustainability orientation, have not yet achieved high levels of ESG performance. The presence of firms in this category reflects potential obstacles in the practical implementation of ESG strategies, which may stem from resource constraints, operational inefficiencies, or delays in impact measurement. While these companies demonstrate a commitment to sustainability in their corporate identity, they may struggle to convert this into measurable outcomes. To bridge this gap, they should focus on defining clear ESG key performance indicators (KPIs) that align with their strategic objectives, strengthen collaborations with sustainability-driven stakeholders, and leverage financial incentives to accelerate the transition towards more sustainable practices. By integrating ESG into supply chain processes and adopting technology-driven sustainability solutions, they can enhance their performance and position themselves as emerging leaders in sustainable business transformation.

Finally, the upper-left quadrant, representing the *impulsive* group, consists of a single company with a high ESG Score but a low SOI. This result can be interpreted as indicative of a non-systematic approach to sustainability, where ESG performance is the outcome of isolated interventions or reactive actions to external pressures rather than an organic and structured strategy. Such companies may be exposed to the

risk of misalignment between their ESG profile and their actual capacity to integrate sustainability principles into corporate culture and governance, which increases the likelihood of being perceived as engaging in greenwashing. To mitigate this risk, firms in this category should transition from a tactical to a strategic ESG approach, embedding sustainability into core decision-making processes rather than treating it as an external compliance requirement. A more structured governance framework should be established to ensure that ESG considerations are deeply embedded in corporate strategy, while sustainability initiatives should be designed to generate long-term impact rather than short-term reputational benefits.

The quadrant analysis reveals a distribution in which most firms fall into the *leaders* and *laggers* categories, with a minority belonging to the *strategisers* and *impulsive* groups. The concentration of firms in these two extremes suggests a positive correlation between sustainability orientation and ESG performance, which indicates that companies with low sustainability integration tend to achieve lower ESG results, whereas those with a strong strategic sustainability orientation are more likely to translate this orientation into measurable performance. However, the presence of the *strategisers* group suggests that achieving high ESG performance requires an evolutionary process, where sustainability orientation must be progressively translated into concrete and measurable initiatives through effective governance and structured resource management.

The interpretation of this matrix thus provides a reference model for companies in the maritime and shipbuilding sectors that could help them to identify their positioning and define targeted strategies to enhance their ESG ability. The need for the progressive integration of ESG principles into corporate governance and operational processes emerges as a key element for the sustainability transition, thus emphasising the importance of consistent and long-term strategic approaches. By using this matrix as a diagnostic tool, companies can refine their sustainability strategies, align their ESG commitments with business objectives, and enhance their ability to respond proactively to emerging ESG challenges.

5. Discussion and Conclusion

The blue economy calls for an innovative and cutting-edge ESG scoring system to seamlessly measure and evaluate the ESG performance of companies within a holistic, comparable, and adaptable tool for long-term use. This paper responds to this demand by creating a robust methodological framework for developing an ESG Ability Score designed for companies in the shipbuilding and shipping industries.

Some intriguing pieces of evidence were uncovered by testing the proposed new measurement model. Neither industry investigated reaches low levels of ESG ability, thus demonstrating that the ESG transition has been undertaken, as suggested by other scholars (Vakili *et al.*, 2022), with promising results. However, we observed significant room for improvement in the ESG ability of both shipyards and shippers, especially concerning the governance pillar in the ESG Score, which has also been noted in other

studies in the maritime field (Nömmela and Kõrbe Kaare, 2022), and the integration of ESG into companies' mission statements. The more frequent incorporation of ESG into corporate values and vision statements can be interpreted as evidence that sustainability is often perceived as aspirational and desirable, particularly in smaller organisations. Moreover, a greater number of shipyards exhibit medium-high levels of ESG ability compared to shippers, with shipbuilders outperforming shippers in the SOI overall. This denotes that the top management's commitment to ESG is propelling the existing efforts "to do good" more than a mere need to comply with national and international regulations, although these, too, are exerting real pressure on the naval sector to be both green and socially responsible in its sourcing, logistics, distribution, and operations practices (Para-González and Mascaraque-Ramírez, 2020).

Our study uncovers key findings that provide a deeper understanding of sustainability approaches within the blue economy. To begin, an organisation's sustainability orientation serves as a significant predictor of its ESG score. This evidence aligns with recent research exploring the various factors influencing ESG performance and identifying those that enhance ESG outcomes (Besley and Persson, 2023). Policies and regulations are no longer the primary drivers of ESG transformation, while intangible "soft assets" - such as corporate culture, shared values, and business philosophy - play a pivotal role in driving performance within the realm of ESG (Clément *et al.*, 2022; Bai *et al.*, 2024). These soft assets, in fact, have the potential to shape strategic directions and behaviours, decision-making processes, and overall organisational performance (Marshall *et al.*, 2015). This implies the significance of deeply embedding ESG principles into the company's culture and identity, potentially resulting in more stable and profound impacts on ESG performance.

Thus, for the first time, a soft asset - such as the organisation's sustainability orientation - is being considered here alongside ESG performance to establish the ESG Ability Score, a novel metric for measuring the responsiveness of maritime firms to sustainability. In essence, ESG ability reflects the organisational capacity to translate sustainability aspirations into measurable, significant impacts. This echoes studies focused on how sustainability can become a capability, enabling an organisation to adapt, change, and innovate towards sustainable paradigms (Schrettle *et al.*, 2014; Leonidou *et al.*, 2015). Such dynamism is inherent in the concept of ESG ability, according to which sustainability should be viewed as an evolving capability rather than a fixed set of sustainable practices. These practices are often static, limited, and may even become obsolete in the competitive landscape of sustainability within the blue economy, especially in the shipping industry (Yuen *et al.*, 2019).

Thus, ESG ability is tied to the human aspect of sustainability management (Jackson *et al.*, 2011; Renwick *et al.*, 2016), which indicates that a change in both cultures and behaviours is essential to encourage managers to adopt attitudes that result in actions promoting the company's sustainability efforts.

This study addresses the industry's sustainability challenges, which would be valuable for academics and practitioners. From a theoretical

viewpoint, our study contributes to the debate on ESG scores and their current shortcomings in adequately capturing a firm's sustainability characteristics. This paper appears to be the first known systematic attempt to integrate the sustainability orientation into the computation of ESG performance in the blue economy domain. Sustainability orientation is evaluated as a prerequisite, while ESG performance is defined as the measurable realisation of ESG outcomes. In sum, the ESG Ability Score marks a significant advance in existing methodologies by improving upon both the general scores created by large providers (e.g. LSEG ESG, S&P) and the industry-specific scores developed for the shipping and port sectors (dos Santos and Pereira, 2022; Tsatsaronis *et al.*, 2024).

From a managerial perspective, the ESG Ability Score acts as a diagnostic and strategic tool offering significant benefits for various players in the blue economy. The dual perspective of the ESG Ability Score ensures that potential discrepancies between sustainability orientation and ESG performance are explicitly discernible. Firms can therefore adopt the proposed tool for self-assessment to better comprehend their sustainability profile, financial requirements, and necessary actions to facilitate the sustainability transition. A good practice would be to compare the ESG Ability Score obtained by applying our proposed methodology with the sustainability rating calculated by external providers, if available. This comparison would help to reduce the bias related to the content analysis of the sustainability reports reviewed: if a company has used the "right" keywords, it can achieve a high ESG Ability Score even with behaviours that are far from ethical. In our sample, only Fincantieri has high sustainability ratings calculated by external providers that align with the high ESG Ability Score. If there is a discrepancy, the ESG Ability Score would become a diagnostic tool for identifying ESG greenwashing practices.

Moreover, the ESG Ability Score can be incorporated into toolboxes used by companies for internal benchmarking and sustainability road-mapping. The tool can also indirectly guide production systems towards being better prepared for sustainable development. The iterative nature of the ESG Ability Score also allows companies to track progress over time, thus facilitating continuous improvement. Additionally, banks can use the tool to analyse the overall sustainability of their customers, as well as tailor green and social credit products (i.e. green, sustainability-linked, or social loans) to meet the needs of firms. Finally, supply chain leaders can leverage the tool to ensure a sustainable supply chain and assist supplier firms in achieving a swift and effective transition process.

Despite the contributions of this study, it has a few limitations. First, the results may only be applicable to the Italian context. Future research could consider cross-validating the ESG Ability Score with samples collected from other countries to extend the generalisability of the results. Second, the effective application of the innovative score is subject to rich datasets, and large numbers of sample observations, running over long time-horizons. In contrast, our sample comprised a reduced number of shipyards and shipping firms, because there is no comprehensive data on them apart from scattered information in the media and reports on certain activities or from certain entities operating on the market. In future studies,

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the usefulness of the tool could be evaluated based on feedback from survey respondents. Third, this study concerned the use of a prepackaged ESG score, whose machine-learning algorithm could be modified in future research to measure more granular components of ESG tailored to the specificities of the sample analysed. For instance, size is one of the most recurring biases when measuring ESG performance, as larger firms tend to be automatically favoured over SMEs, as the former can afford to invest more resources into sustainability (Pagano *et al.*, 2018).

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