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Do eco-rating schemes improve the environmental performance of ships?

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ABSTRACT

This paper examines if eco-rating schemes improve environmental outcomes in the context of the international shipping industry. Shipping faces global environmental challenges and has recently witnessed the introduction of several eco-rating schemes aiming to improve the environmental performance of ships. Extending the private environmental governance literature into a mature service industry with global operations, the paper shows that concerns about eco-rating schemes' effectiveness also have relevance here. Shipping eco-rating schemes fall short of best practices for design and governance, and this hampers improvement efforts. The study has policy implications for the achievement of improved environmental outcomes in the shipping industry.

1. Introduction

The environmental footprint of the international shipping industry is a source of increasing global concern. It includes challenges such as oil spills, toxic hull paints, and waste and garbage handling, which have been subject to international policy discussions since at least the 1960s [1]. Within the last two decades, several other challenges, including global climate changes [2,3], air pollution [4–8], invasive species [9–13], underwater noise [14], recycling [15], and interactions with marine mammals [16] have entered the environmental protection agenda of the industry. While shipping shares most challenges with onshore industries (such as other transportation modes, power plants, and manufacturing), it has generally addressed them relatively late [17]. Moreover, forecasts indicate that CO_2 emissions and air pollutants such as nitrogen oxides (NO_x) and particulate matter (PM) are likely to rise in the coming decades [2], and studies have called for further action to decarbonize the industry [18–20]. Accordingly, the circumstances under which improved environmental outcomes can occur in shipping receive increasing attention from maritime and environmental governance scholars [17,21–31,110], and the question remains unresolved.

Since the early 2000s, shipping has witnessed the emergence of several eco-rating schemes aiming for improvements of the environmental performance of ships. The schemes are designed to provide environmental guidance for several industry stakeholders and incentivize improvement efforts. As presented to the Sustainable Shipping Initiative (SSI), a shipping NGO,

> "Most rating schemes are designed to enable comparison between ships, services or fleets, to allow business customers to select and reward best performers, and for ship owners/operators to differentiate themselves in the market. Other schemes have linked up with ports and offer benefits, such as reduced port fees" [32].

The shipping industry is a relatively late adopter of schemes which provide environmental performance information to the market place [27]. Fisheries and forestry were among the first to do so around 1990, when the MSC and FSC labels were introduced [33,34], and several industries have followed suit [35,36]. Extensive numbers of private environmental governance articles have discussed the extent to which eco-ratings and eco-labelling contribute to improved environmental outcomes, i.e. their environmental effectiveness [37–39]. Ideally, they provide environmental benchmarking tools to buyers, who can make informed decisions and acknowledge the environmental footprint of a particular product or service. Sellers can differentiate their products, gain market shares, and create new markets based on high environmental performance. However, several studies have questioned consumers' willingness to pay for eco-rated or eco-labeled products if prices exceed the average [40]. Likewise, scholars have argued that corporations might use eco-rating schemes to deflect regulation or provide confusing or irrelevant information to the market place [38], or squeeze out small competitors, who might not be able to gather sufficient data to qualify for inclusion in the schemes [44,45]. Some scholars argue for a need for regulation of schemes in order to ensure improved environmental outcomes [41].

Most research has been directed towards sectors with early adoption

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of eco-rating and eco–labelling schemes, such as extractive and consumer goods industries. In the context of shipping, the question of eco-rating schemes' environmental effectiveness has not been thoroughly examined, even though the industry faces global environmental challenges and has seen several eco-rating schemes emerge in recent years. This paper extends the discussion on eco-ratings' effectiveness into the context of the international shipping industry, investigating the following research question:

Do eco-rating schemes improve the environmental performance of ships?

Environmental performance refers to any aspect of a ship's environmental footprint. A performance improvement – here also referred to as better environmental outcomes – occurs whenever an aspect of a ship's environmental footprint is reduced. For instance, a reduction in a ship's CO_2 emissions relative to the transport work it performs will represent a performance improvement. Transport work is usually measured in ton-miles, and reflects the volumes of cargoes carried and the distances travelled per year [42]. Likewise, reduced underwater noise levels or more effective ship recycling methods will represent improvements in the environmental performance of ships. Industry level improvements, on the other hand, will depend on the global demand for shipping services. Despite improvements in the environmental performance of individual ships, rapid growth in the demand for shipping service can cause an increase in the world fleet and translate into a higher environmental footprint from the industry at large. In the following analysis, the discussion is focused on the environmental effects of eco-ratings on the ship level only.

The paper sheds new light on the circumstances under which improved environmental outcomes can be expected to occur on the ship-level. In studying shipping, the paper extends the private environmental governance literature into a mature service industry with global operations. Beyond the retail service industry [40], service industries have generally not received as much attention as the extractive sector. They deserve further studies, and shipping is a particularly interesting service industry due to its global operations and environmental footprint. In terms of technology, shipping is a mature industry. The main ship types and designs have existed since the 1960s, and technological developments have largely been incremental in the same period [42,43].

The paper is structured as follows: First, it presents a literature review on the best practices for the design and governance of eco-ratings, as well as literature on environmental disclosure in shipping. Then it presents the methods and data. In section four, shipping eco-rating schemes are analyzed and assessed in the light of the best practices from other industries, and section five discusses the findings. In conclusion, section six presents the implications of the study.

2. Literature review

2.1. Best practices for eco-rating schemes

Numerous private environmental governance articles have examined eco-rating and eco-label schemes, which provide information on the environmental performance of a product or service to the market place. Discussions concern the environmental effectiveness of the schemes: Do the schemes achieve improved environmental outcomes or fail in their promises? For instance, with reference to the Marine Stewardship Council's MSC label, Ponte [44 p. 171] argued that, it "…is not simply a non-political, neutral, and scientific tool against overfishing… It is achieved in the context of global and local competition, special interest battles, and local politics." Auld et al. [45] have argued that the stakeholders' motivations for engagement with eco-ratings and eco-labels can indicate environmental effectiveness (or lack of such). Motivations can range from the creation of market differentiators or new markets, to policy deflection and deliberate information overload in the market place. In the first two cases, improved environmental outcomes are more likely to occur than in the latter two. Therefore, it is important to study the motivation for engagement among stakeholders, and this paper follows suit below.

Table 1
Best practices for ecolabels.

Dimension	Criteria	An eco-rating scheme shall…	Key references
Design	Universality	avoid overlaps with other eco-ratings	[38,47]
	Transparency	allow for environmental benchmarking of a product or service	[37,39,48]
Governance	Legitimacy	enjoy widespread stakeholder support	[37,44,50]
	Credibility	be subject to third party data verification	[37–39,47,49]

A recent study by Baumeister and Onkila [46], on the potential for ecolabels in aviation, is particularly relevant because aviation and shipping share key characteristics as service industries with global operations. Baumeister and Onkila [46] argued that a number of design and governance dimensions are critical to the success of such a scheme. The paper follows their call and investigates both design and governance dimensions. After two decades of research, some best practices for the governance and design of eco-rating schemes have crystalized from the literature (Table 1). With regard to the design dimension, the ideal is *universality* in the form a global recognition of only one scheme for a specific environmental challenge. If several schemes with partly overlapping aims exist (e.g., two or three schemes focused on air pollution), buyers will have difficulty distinguishing between the benefits of each, and sellers will face the same confusing situation [47]. Competition between schemes for members or users might water down entry criteria and reduce environmental effectiveness [38,47]. The literature also emphasizes *transparency* regarding the environmental footprint, which requires data for benchmarking of environmental performance of different products or services [37,39,48]. With regard to scheme governance, *credibility* is crucial. Data should be verified by a professional third party [37–39,47,49]. Finally, engagement from all relevant stakeholders is critical for *legitimacy* [37,44]. This also includes civil society participation in the scheme [50].

2.2. Literature on corporate environmental disclosure in shipping

While the question of eco-ratings' environmental efficiency has not been directly addressed in shipping industry studies, a number of articles have addressed questions pertaining to corporate environmental disclosure more broadly and environmental strategies of shipping companies. Lai et al. [22 p. 631] defined Green Shipping Practices (GSPs) as "environmental management practices undertaken by shipping firms with an emphasis on waste reduction and resource conservation in handling and distributing cargoes" and suggested a positive relationship between such practices and shipping company competitiveness. In contrast, van Leeuwen and van Koppen [51] concluded that shipping companies predominantly employ "crisis-oriented" environmental strategies, in which compliance represents the highest ambition. Rahim et al. [28] followed this line of reasoning in a critique of corporate disclosure practices for CO_2 emissions among the eight largest container lines. They concluded that emission reductions can be achieved, if shipping companies are required by law to disclose information on their CO_2 performance. In the following, it is examined if shipping companies use environmental information to differentiate their services, in order to understand if shipping companies see environmental performance as a potential source of competitive advantage.

In 2012, Wuisan et al. [23] published a case study of the Clean Shipping Project (CSP), which has developed the Clean Shipping Index (CSI), an eco-rating scheme. While still in an early stage of development, the CSP had a "promising" outlook. Since environmental