

A SYSTEMATIC REVIEW USING THE PRISMA ALGORITHM FOR EXPLORING PORT CONCESSION AGREEMENTS AND SUSTAINABILITY

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ABSTRACT

Port concessions stand as pivotal instruments for ports around the world to consider environmental and socio-economic factors. This research conducts a systematic literature review (SLR) based on PRISMA method aiming to explore the integration of sustainability into port concession agreements, adding value by highlighting their relation. The SLR conducted in English language to Scopus database and to Google Scholar using the Publish or Perish (PoP) software, covering the literature from 2000 to 2023. The searches were performed in the title and abstract fields of papers using various combinations of keywords related to “Port”, “Concessions” and “Sustainability”. Quality and relevancy selection criteria employed within the PRISMA algorithm, and the literature is summarized (97 papers are identified – see appendix) and profiled offering insights to port operators, authorities, stakeholders, and policymakers. Our discussion contributes to scholarly discourse by providing a comprehensive review ensuring a thorough examination of relevant literature across multiple databases, focusing on the intersection of ports, sustainability, and concession agreements. The findings lay the groundwork for future research, shedding light on the intersection of port sustainability requirements and concession agreements.

KEYWORDS: Ports, concessions, sustainability, systematic literature review, PRISMA methodology

INTRODUCTION & BACKGROUND

The international and highly competitive environment in the maritime and port industry has progressively led to an increase in demand for port investments, as well as for privatization schemes which range from devolving terminal operations or in some cases even the whole port, to private market actors.. The most commonly endorsed port governance model which emerged from these changes is the landlord model, whereby according to Brooks et al. (2017) “a public port authority acts both as landlord and regulator, while private companies carry out port operations”. Ferrari et al. (2015) and Notteboom et al. (2022) are also in line with Brooks et al. (2017), referring to the landlord model as “the most common management model”. More particularly, Ferrari et al. (2015) describes the landlord model as a policy tool “in which private operators can manage port activities in their own terminals that are run under a concession agreement, while the PA organizes and regulates the port without a direct involvement in the commercial activities.”

The landlord port model usually manifests through concession agreements. According to World Bank (1998) “concession broadly refers to any arrangement in which a firm obtains from the government the right to provide a particular service under conditions of significant market power”. The most common form of a port concession agreement is a terminal concession. According to Notteboom et al. (2022), in a terminal concession agreement “a private company is granted a long-term lease, in exchange for a rent that is commonly a function of the size of the facility as well as the investment required to build, renovate or expand the terminal’.

Over the past years, environmental and socio-economic concerns about port externalities and their impact, have become an important part of the discussion within the port governance literature. As pressures for sustainable port operations have increased, Port Authorities have been forced to develop sustainability initiatives. Thus, many ports are in a process of realigning their strategies, governance and operations to integrating environmental and societal considerations, in order to enhance their sustainable development (Chlomoudis et al.; 2022). However, according to Hossain et al (2021) “while many seaports claim to operate green or sustainably, sustainable port initiatives and approaches are poorly described in academic literature”.

As the public becomes more aware of the risks of climate change and the composition of port shareholders changes, the philosophy towards port business has also evolved, with the environmental dimension of port externalities becoming an “in-thing” for ports to emphasize the sustainability of their business. (Ibrahim et al., 2023). The Brundtland Report (1986) of the World Commission on the Environment and Development describes sustainable development as balancing people’s needs without risking future generations’ needs. The

emphasis has changed and has been supplemented over the course of years, by introducing regulations for the prevention of oil pollution and other hazardous substances, for ballast water treatment (Seoyeon et al., 2016) as well as by setting ambitious targets for the reduction of exhaust emissions from port and vessels operations (European Commission, 2019). However, as Ibrahim et al. (2023) suggest, in order for these ambitious targets to be translated to action, a robust and clear set of global regulations should be established. Therefore, as sustainability is evolving into a significant component of governance in the maritime industry, ports as well as their stakeholders should consider how environmental, social and economic impacts can be addressed in a holistic and inclusive manner.

Port concessions have remained at the center of this discussion, as they present an instrument for public authorities to commit port operators into taking environmental and socio-economic factors into account. Notteboom (2018) states that “green factors are included when awarding terminals to private terminal operators” characterizing this development as “one of the most interesting fields of action for landlord port authorities at the terminal level”.

Based on the above, this study conducts a systematic literature review (SLR) utilizing the PRISMA method to investigate the extent to which sustainability arises as a critical consideration within port concessions’ academic literature. The SLR, conducted in English, utilized the Scopus and Google Scholar databases with the Publish or Perish (PoP) software, spanning literature from 2000 to 2023. Searches targeted the title and abstract fields of papers, employing various combinations of keywords related to "Port," "Concessions," and "Sustainability." Quality and relevance selection criteria were applied within the PRISMA algorithm, resulting in the identification and profiling of 97 pertinent papers (refer to the appendix). The synthesized literature offers valuable insights to port operators, authorities, stakeholders, and policymakers. This discussion contributes to scholarly discourse by providing a comprehensive review, ensuring a meticulous examination of relevant literature across multiple databases, with a focus on the convergence of ports, sustainability, and concession agreements. These findings serve as a foundation for future research, illuminating the interface between port sustainability requirements and concession agreements.

2. Systematic Literature

2.1 PRISMA Methodology

In our comprehensive review of existing literature, our focus lies on the exploration of scholarly articles pertaining to the relation of port studies, concessions and sustainability with Environmental, Social, and Governance (ESG) aspects. These key areas encompass the mandatory reporting requirements for companies, including those in the port industry. To ensure a rigorous and standardized approach, we adopted the Preferred Reporting Items for

Systematic Reviews and Meta-Analysis (PRISMA) method, as it was used in the survey on information needs and information seeking behaviour of maritime students (Chlomoudis, et al., 2022). This methodological framework, initially proposed by Petticrew and Roberts (2006), Moher et al. (2009), Julien et al. (2011), and Kitchenham et al. (2009), was diligently followed throughout our study (Julien et al., 2011; Kitchenham et al., 2009; Moher et al., 2009; Petticrew and Roberts, 2006). Moreover, we incorporated the updated version of the PRISMA 2020 method, as outlined by Page et al. (2021) in our analysis.

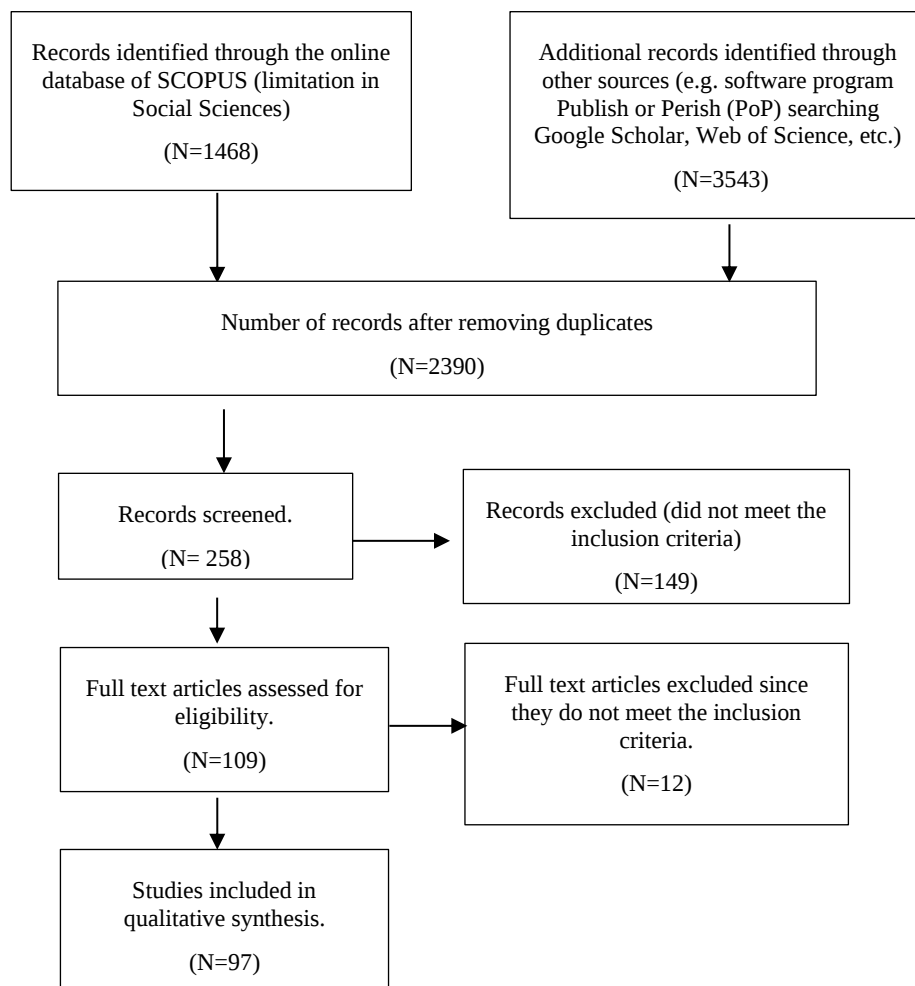
The study was carried out in the English language and covered the period from 2000 to the present day, as the majority of relevant literature is available in English. The Scopus database was utilized for the research, and the obtained results were processed using Microsoft Office365 Excel. Additionally, a software program called Publish or Perish ("PoP") was employed to gather a comprehensive overview of relevant publications from databases other than Scopus. All literature searches were conducted in the title and abstract fields of the papers, encompassing various combinations of the term "Port" (defined as "Context") with keywords related to "Sustainability" such as "ESG," "Environment," "Social," "Sustainability," "Governance," "Economic," "Green," and "Finance." The combination of keywords was further expanded by incorporating terms from the "Agreements/Management" category, including "Concession," "SLA," "PPP," "Agreement," and "Partnership." Furthermore, the same combination of keywords was used in Google Scholar with PoP, with a slight variation. In this case, the keyword "Port" was used as the title, combined with all the keywords from the "Sustainability" category and only "Concession" from the "Agreements/Management" category.

In line with the methodology proposed by Julien and Duggan (2000), we initially conducted a focused investigation on Scopus. Moreover, we incorporated international maritime conferences such as the International Conference on Maritime Transport (ICMT) and the International Association of Maritime Economists (IAME) in our inquiry. It is noteworthy that our search was restricted to the period from 2000 to the present day. Subsequently, upon obtaining the initial results, we eliminated all duplicate entries from the dataset. Additionally, we excluded non-relevant papers, including those pertaining to economics, technical aspects, and grey literature. Our findings encompass a diverse range of publications, comprising papers published in reputable journals, conference proceedings, book chapters, and published essays. Furthermore, we did not discriminate against publications based on their country of origin, as our aim was to avoid disregarding significant research in our literature review. Once the search and selection process were concluded, we further refined our exclusion criteria, following the approach delineated by Petticrew and Roberts (2006) and Kitchenham et al. (2009). Specifically, the papers included in the initial selection were required to possess the keywords either in their titles or abstracts.

Table 1: Aggregate literature search results (authors' elaboration)

Literature Search Results	
Scopus (keywords in Social Sciences)	1468
PoP (keywords Google Scholar)	3543
Total	5011

Figure 1: Flow chart of the literature selection process based on the PRISMA approach (authors' elaboration)



3.2 Results

The research yielded a total of 5011 publications, as shown in Table 1, without removing duplicates. After deduplication, the number of records decreased to 2390. Adhering to the

PRISMA methodology, illustrated in Figure 1, the remaining publications were screened to exclude technical and mathematical papers, grey literature, and those not relevant to the research topic. This process resulted in 258 papers, which were further scrutinized based on their content (e.g. general or specific), publication type (e.g. presentations), or type (e.g. thesis). Subsequently, 109 full-text articles were reviewed for eligibility, with 12 being excluded for failing to meet the inclusion criteria, such as inability to access the published paper or published dissertations. Ultimately, 97 studies (depicted in Appendix) were deemed suitable for further qualitative analysis.

Table 2: Literature Review Profile (authors' elaboration)

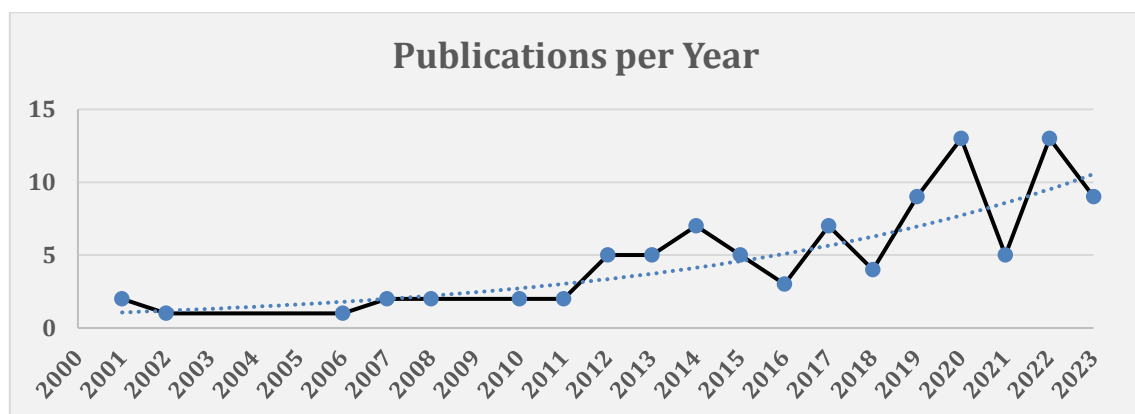
	Frequency	
	<i>N=97</i>	%
<i>Year of Publication</i>		
2001	2	2%
2002	1	1%
2006	1	1%
2007	2	2%
2008	2	2%
2010	2	2%
2011	2	2%
2012	5	5%
2013	5	5%
2014	7	7%
2015	5	5%
2016	3	3%
2017	7	7%
2018	4	4%
2019	9	9%
2020	13	13%
2021	5	5%
2022	13	13%
2023	9	9%
<i>Publication Type</i>		
Article	84	87%
Book	2	2%
Book chapter	3	3%
Conference paper	4	4%
Links/html	3	3%
Review	1	1%

Publishers

Elsevier	21	22%
Emerald	3	3%
inderscienceonline.com	5	5%
MDPI	8	8%
Palgrave Macmillan	2	2%
Springer	4	4%
University of Rijeka, Faculty of Maritime Studies Rijeka	2	2%
Taylor & Francis	13	13%
EBSCO	2	2%
Coastal Education Research Foundation Inc.	2	2%
all others	33	34%
ASCE Library	2	2%

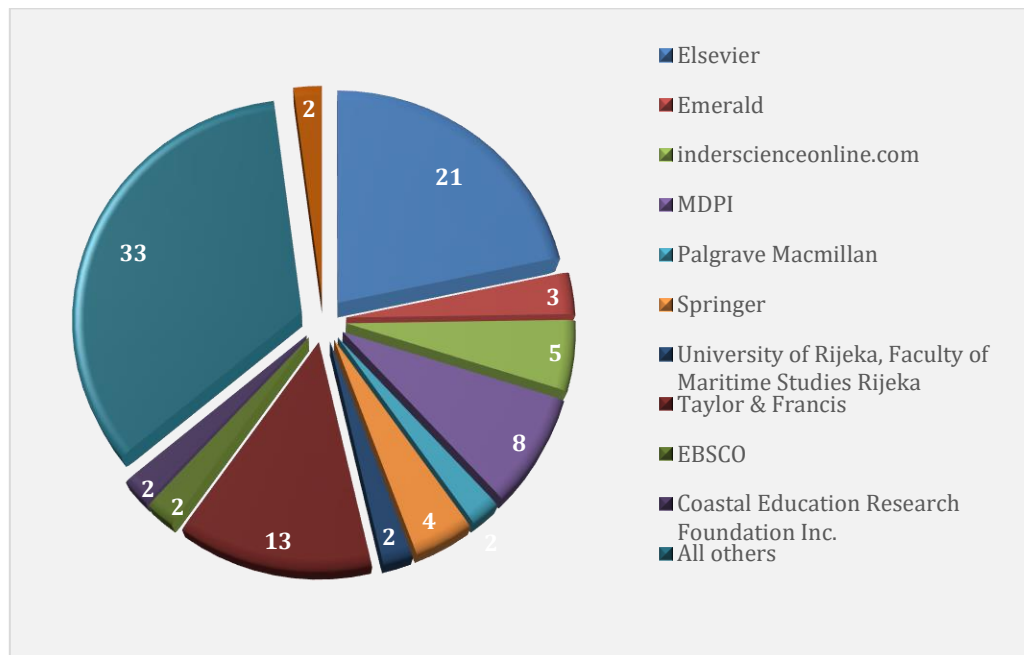
As it is illustrated in detail in Table 2, in the past two decades, there has been a discernible trend in the publication landscape regarding port concessions and sustainability (Figure 2), with a marked rise in scholarly output observed from 2019 onwards, peaking notably in 2020 and 2022. The analysis for terms of publications related to port studies, concessions, sustainability and ESG reveals that years 2022 and 2020 have the highest publication counts, (N=13), followed by 2023 and 2019 (N=9) each, and 2017 (N=7). The table below depicts the number of publications per year.

Figure 2: Publications per Year (authors' elaboration)



As it is depicted in Table 2, articles are the most common type of publications (N=84), with conference papers and links being represented (N=4) equally. Therefore, the selected papers primarily comprise articles, which constitute most publications, while other formats such as books, book chapters, conference papers, and reviews also contribute to the discourse.

Figure 3: Publishers of studies in qualitative analysis (authors' elaboration)



Notably, as Figure 3 suggests, Elsevier emerges as the predominant publisher, accounting for 22% percent of the literature, followed by Taylor & Francis and MDPI with 13% and 8% respectively; while other publishers including Springer, Emerald, Palgrave Macmillan, University of Rijeka, Faculty of Maritime Studies Rijeka, EBSCO, Coastal Education Research Foundation Inc., ASCE Library, and various others, collectively comprising 34% of the publications. Therefore, the field remains diverse, with contributions from a range of publishers including Springer, Emerald, Palgrave Macmillan, and several academic institutions and organizations. This diversity underscores the multidimensional nature of research on port concessions and sustainability, reflecting a comprehensive exploration of the topic from various perspectives and disciplinary lenses related to a wide range of Journals, Conferences in various scholar platforms.

3. Discussion & Conclusions

As evidenced by the data presented in Table 2 and Figure 1, there appears to be a notable upward trajectory in scholarly publications from 2019 onward, a trend that aligns with the announcement of Ursula von der Leyen's "European Green Deal" in late 2019. This landmark announcement has catalyzed a heightened focus on sustainability within the transportation

sector, including maritime operations and, notably, port management. This further illustrates a consistent and dynamic trend of growth in the scientific discourse surrounding port concessions over the above period. This observed surge in literature underscores the increasing recognition of sustainability as a critical consideration within port concessions, reflecting the evolving priorities and concerns of scholars and practitioners alike.

Table 3: Subject areas covered in SLR (authors' elaboration)

SLR Keyword	Concession	Environment	Social	Governance	ESG	Port Case Study	Total
No of selected papers	72	32	4	11	2	46	97
% Percentage	74.2%	32.9%	0.041%	0.113%	0.020%	47.4%	100%

Table 3 presents the subject areas covered by the selected papers. Three main categories were utilized based on the scope of our research: Concessions, Port Case Studies, and Sustainability, further subdivided into Environment, Governance, Social, and ESG. It is evident from Table 3 that the majority of the selected literature overlaps across multiple subjects. The bulk of the PRISMA results focused on Concessions and Case Studies. While there was a sufficient percentage of Environmental papers, the numbers were much lower for Social (0.041%), Governance (0.113%), and ESG (0.020%), indicating a predominant focus on environmental aspects rather than a holistic approach to sustainability in the context of port concessions and governance. This scarcity of literature underscores the necessity for further research in this area, which would enrich not only the scientific literature but also the formulation of concession agreements themselves. The majority of papers concerning Concession Agreements (74.2%) facilitate the analysis of a wide range of agreements globally, aiming to identify challenges, patterns, typologies, and practices in the integration of sustainability. The environmental dimension of sustainable port operations is explored in 32.9% of papers addressing this subject, synthesizing empirical evidence of environmental considerations within the agreements.

This research introduces a systematic approach to the examination of literature within the field, employing methodologies and frameworks that have not previously been extensively utilized in this specific context. By adopting a systematic literature review methodology based on the PRISMA algorithm, this study provides a comprehensive overview of existing literature while offering insights into potential avenues for future research. In this vein, this paper may serve as a resource for future researchers seeking to conduct systematic literature reviews in similar domains. By adapting the selected keywords and methodologies employed in this study to their specific areas of interest, scholars can utilize this research as a guide and reference point, thus facilitating the advancement of knowledge and understanding in the field of port sustainability and concession agreements.

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