

## Careers in Maritime Transport – Gender Equality and Climate Change Perspectives

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### Abstract

*Gender equality and climate change perspectives are both important aspects of sustainable development, and they are likely to have a significant impact on careers in the maritime transport industry.*

*The study presented in this paper has the objective to understand to what extent contemporary maritime and port jobs evolved in the context of sustainability expectations. A second objective is to discover which are the new sustainable jobs that are expected to appear on the international maritime market. Results show that many of the classic jobs in the sector have integrated sustainability responsibilities to meet the updated legislative requirements. Most of the classic maritime jobs include tasks necessary for the sustainable development of the company, without explicitly mentioning such responsibilities in the title of the job. However, an increasingly number of new jobs in port, maritime and related fields have titles that explicitly includes sustainability – gender related or environmental protection tasks. Based on the advancements in the maritime, new emerged technologies and changes in traditional biased mindsets, is expected an increase in the need for professionals delivering sustainable solutions and hence, the appearance of new sustainable jobs specific for the sector.*

**Key words:** employment, sustainability

**J.E.L. classification:** J21, J24, J60, Q01, R11

### 1. Introduction

Although the concept of sustainability refers to environmental aspects, as defined by the United Nations in 1972 as a view according to which „people should strive to fulfill the needs of the present generation without compromising the needs of future generations”, the concept of „sustainability employment”, as used by several researchers, is more narrow and outside the scope of our study, implying that, in the context of ageing working population (e.g. in Europe and in Asian countries), employers should try to organize work in such a way that their employees are fostered, not exploited, in order to be used further in the future (Docherty et al., 2009; Hedge, 2008; Mohrman and Worley, 2010; Van Dam, Van Vuuren and Kemps, S. 2017).

In this paper the concept of “sustainable career” is used in relation with meeting the 17 United Nations Sustainable Development Goals (SDG), not in relation with the time-dimension as suggested by the above researchers.

For meeting the research objectives of our paper, the analysis focused on aspects related to SDG 5 – Gender Equality and SDG 13 – Climate Change. Other SDGs were also considered, directly or indirectly.

Gender equality and climate change are both important issues that intersect in the context of maritime transport, although research has not been delivered so far to understand which is the extent of intersection and its further implications.

Besides economic and trade benefits, the maritime industry is strongly related to significant environmental and social impacts (Karagiannis et al., 2022).

There are a variety of sustainable careers in the maritime transport industry that can help address both gender equality and climate change issues. Sustainable careers in maritime transport can include positions that focus on reducing the environmental impact and gender inequalities of shipping operations, thus promoting sustainable practices within the industry.

Regarding the gender perspective in the maritime, there are historical, social, economic and scientific evidence that indicate the maritime industry has historically been male-dominated, with women facing discrimination and limited opportunities for career advancement. To promote gender equality, efforts should be made to increase the participation and representation of women in all levels of the maritime industry, including in leadership roles (Kitada et al, 2015; Dragomir, 2018; Dragomir, 2019).

From a climate change perspective, the maritime industry is a significant contributor to greenhouse gas emissions and other forms of pollution. To address this, the industry should transition to more sustainable practices, such as using cleaner fuels and implementing energy-efficient technologies. Additionally, there is a need for policies and regulations that encourage or mandate the reduction of emissions from ships.

## **2. Theoretical background**

While research on maritime sustainability logistics is increasingly published, it is considered “fragmented in terms of conceptual development, empirical testing and validation, and theory building” (Sung-Ho Shin et al., 2018).

Wang et al. (2020) analysed theoretic process of maritime industry’s transitional involvement in sustainability from the social entrepreneurship perspective, by reviewing content of sustainability reports published by container shipping liners and terminal operators from 2016 to 2019. They provided a unified framework of motives and levels of comprehensiveness of the sustainability efforts by the maritime industry, revealing the theoretic process of maritime industry’s transitional involvement in sustainability.

Karagiannis et al. published in 2022 a study on cross-sectoral materiality analysis of sustainability reporting in the transportation industry and reviewed sustainability reports of 90 maritime organizations of different sectors, sizes, types and locations. Results show that only 46,6% included a materiality assessment section, where most of the headquarters were located in Europe around Scandinavian region (61%) and 26% were located in Asia.

The International Maritime Organization (IMO), which is a United Nations agency responsible for the safety and security of shipping and the prevention of marine pollution, have published a number of studies on sustainable employment in the maritime transport industry, including guidance on how to improve the welfare of seafarers. The International Labour Organization (ILO), which is another United Nations agency promoting social justice and promotes decent working conditions., have also published a number of studies on sustainable employment in the maritime transport industry, including guidance on how to improve the welfare of seafarers and on how to promote gender equality in the maritime transport industry.

Other published studies on sustainable employment in the maritime transport industry including guidance on how to improve the welfare of seafarers and how to promote gender equality in the maritime transport industry, the environmental impact of shipping and how to improve the efficiency of the maritime transport industry were conducted by researchers from the World Maritime University (WMU), an international post-graduate maritime university in Malmö, Sweden; the Center for Sustainable Transport at the University of California, Berkeley, the Sustainable Shipping Initiative (SSI) which is an industry-led coalition of companies, NGOs and academics aiming to create a sustainable global shipping industry.

### 3. Research methodology

Between 2021-2022 we have analyzed trends and employment information collected from 5 recruitment online databases and from various online scientific sources. There were analyzed more than 100 jobs ads related to maritime field, gender equality and climate change, enlisted on the following types of recruitment databases: global websites with jobs listings from general sectors (LinkedIn, InDeed and Jooble) and recruitment websites specific for maritime careers advertisements (Seacareer and Maritimejobs.com). Job searches were delivered around the topics: “gender equality in maritime employment” and “climate change in maritime employment”. Scientific published articles were searched on Google Scholar, Researchgate, Academia, Tandfonline and ScienceDirect. Considering the term “sustainable employment” is used by researchers in relation with age-supportive employment conditions, which is not in line with the objectives of our paper, we carefully considered the risks of confusion when we accessed published works on such topic.

### 4. Findings

Careers in maritime and port sector, explicitly considered “sustainable” due to the job’s name, suggest a significant requirement of professional specialization in aspects related to climate change and environment. The trend of employing such professionals emerged once with the major focus and interest of companies and institutions on the environmental legislation and sustainability. The maritime transport industry is vast and sustainable careers opportunities are many, therefore it’s important to note that sustainable practices and environmental responsibility should be integrated in every position in the industry. As the industry continues to evolve, new opportunities for sustainable practices will arise.

#### 4.1. Gender equality perspectives influencing port and maritime career trends

Promoting gender equality in the maritime transport industry is an important aspect for achieving sustainable development. Explicit career names related to gender equality play an important role in reducing gender bias and providing equal opportunities for men and women, while addressing the barriers that may prevent women from entering and advancing in these fields.

In the below table in column 2 are synthesized 11 examples of careers that explicitly promote gender equality tasks in maritime transport and in column 3 there are 60 classic jobs that span across various roles and levels within the maritime transport industry while not explicitly suggesting a gender dimension. Such jobs, once occupied by female candidates, would reduce the gender bias or glass ceiling challenges. In the table the jobs order is random. The purpose of the table is to highlight the discrepancy between the number of gender-related jobs compared with classic jobs with no gender related dimension, due to the specificity of gender related area of expertise.

*Table no. 1 Sustainable careers in maritime transport related to climate change dimension*

No.	Jobs with explicit gender related dimension	Classic jobs with no explicit gender related dimension
1	Gender Equality Officer	Ship Captain
2	Diversity and Inclusion Manager	Navigation Officer
3	Gender Equality Training Coordinator	Marine Engineer
4	Gender Equality Project Manager	Mariner
5	Gender Equality Data Analyst	Marine Surveyor
6	Gender Equality Advisor	Ship Safety Trainer
7	Gender Mainstreaming Specialist	Ship Safety Inspector
8	Seafarer Welfare Officer	Ship Safety Engineer
9	Gender Equality Program Coordinator	Marine Safety and Environmental Protection Officer
10	Gender Equality Communications Specialist	Maritime technical advisor
11	Maritime Gender Researcher	Marine Safety and Environmental Protection Manager
11		Marine Resources Manager
12		Marine Resources Engineer
13		Marine Resources Consultant
14		Shipping Fleet Manager
15		Ship Operations Manager

16	Shipyards Manager
17	Shipyards Engineer
18	Shipyards Supervisor
19	Marine Recruiter
20	Shipping Company HR Manager
21	Maritime Transport Planner
22	Maritime Transport Logistics Coordinator
23	Port Operator
24	Logistics Coordinator
25	Supply Chain Manager
26	Maritime Lawyer
27	Human Resources Manager
28	Crewing Manager
29	Shipping Agent
30	Ship Broker
31	Ship Surveyor
32	Ship Manager
33	Maritime Economist
34	Marine Environmental Consultant
35	Marine Insurance Broker
36	Terminal Operator
37	Marine Pollution Control Officer
38	Marine Pollution Control Manager
39	Marine Environmental Engineer
40	Marine Environmental Consultant
41	Marine Biologist
42	Marine Ecologist
43	Marine Geologist
44	Marine Meteorologist
45	Marine Geographer
46	Marine Archeologist
47	Marine Engineer Officer
48	Marine Engineer Technician
49	Marine Electrician
50	Marine Mechanic
51	Marine Carpenter
52	Marine Plumber
53	Marine Welder
54	Marine Painter
55	Marine Rigger
56	Marine Survey Technician
57	Marine Quality Control Inspector
58	Marine Safety Equipment Inspector
59	Marine Safety Equipment Technician
60	Maritime researcher or trainer

Source: Authors' study

It can be observed that job titles in column 2, gender-related, are not exclusively maritime-related. No maritime related explicit job title was found in the analyzed databases and resources, however such jobs were offered by maritime, crewing, shipping or port companies.

The titles of the enlisted jobs may vary depending on the company, organization or the specific role within the organization. Gender equality is a key aspect of sustainable development and many role and positions can be adapted to include it as a key objective. Such job titles may vary depending on the company, organization or the specific role within the organization.

Nevertheless, gender equality is a key aspect of sustainable development and many role and positions can be adapted to include it as a key objective, so many job titles can have a component of gender equality within them.

#### 4.2. Climate change perspectives influencing port and maritime career trends

The findings of the study, regarding the evolution of contemporary jobs in maritime transport for meeting sustainability requirements, are further synthesized in two tables which indicate that most of the classic jobs’ titles in the port and maritime doesn’t explicitly integrate sustainable responsibilities. However, such integrated responsibilities are further added to the job’s tasks in order to meet the updated legislative requirements. Only in a small number of cases such integration is explicitly visible in the job’s name and we can consider it as and evidence for labeling the job as being “sustainable”.

*Table no. 2 Maritime careers with integrated sustainable tasks related to climate change dimension*

No.	Careers with no explicit sustainable dimension related to climate change	Conventional responsibility and tasks	Integrated sustainable responsibility and tasks
1	Shipping company executives	Strategic management of current operations and investments	Takes strategic decisions to: <ul style="list-style-type: none"> <li>invest in sustainable technologies</li> <li>promote sustainable practices throughout the industry.</li> </ul>
2	Supply Chain Manager/Maritime logistics manager	<ul style="list-style-type: none"> <li>Management of logistics and transport</li> <li>Supply chain management</li> <li>Coordination and management of the movement of goods by sea</li> </ul>	Manages logistics and transportation of goods, with focus on: <ul style="list-style-type: none"> <li>reducing the environmental impact of shipping operations</li> <li>promoting sustainable practices</li> <li>the use of sustainable shipping routes and practices to reduce emissions and fuel consumption.</li> </ul>
3	Port and Terminal Operations Manager	Management of daily operations of a port/terminal: <ul style="list-style-type: none"> <li>management of cargo and passenger ships logistics</li> <li>handling and storage of goods</li> </ul>	Management of day-to-day operations of a port, with a focus on: <ul style="list-style-type: none"> <li>reducing the environmental impact of port/terminal operations</li> <li>promoting sustainable practices</li> <li>reduce emissions</li> <li>reduce other forms of pollution using sustainable technologies and practices to minimize environmental impacts.</li> </ul>
4	Naval Architect	Ship design, marine structures design	Design and construction of ships and other marine structures, with a focus on: <ul style="list-style-type: none"> <li>energy efficiency</li> <li>emission of fewer pollutants</li> <li>reducing the environmental impact of shipping operations.</li> </ul>
5	Seafarers (rated and unrated)	Seafaring tasks related to navigation and ship maneuvering, manipulation of cargo and transport	Tasks related to minimize pollution impact, required by international maritime regulations as the International Convention for the Prevention of Pollution from Ships (MARPOL) and the International Convention for the Safety of Life at Sea (SOLAS).
6	Electric/Hybrid marine propulsion specialist	Design and maintenance of propulsion systems	Design and maintenance of sustainable electric and hybrid propulsion systems for ships

7	Researchers and maritime education and training academics	Study of maritime transport	<ul style="list-style-type: none"> <li>• Study of the environmental impact of maritime transport</li> <li>• Development of new technologies and practices to reduce emissions</li> <li>• Development of new technologies/practices to protect the marine environment</li> </ul>
8	Marine Engineer	Design, building and maintenance of ships, other marine vessels, marine structures or propulsion systems	Design, building and maintenance focused on: <ul style="list-style-type: none"> <li>• energy efficiency</li> <li>• reducing emissions</li> <li>• sustainable propulsion systems</li> </ul>
9	Wind propulsion specialist	Design and maintenance of wind propulsion systems for ships	<ul style="list-style-type: none"> <li>• Design sustainable fuel-powered systems.</li> </ul>
10	Offshore wind and wave energy specialist / Offshore wind farm operations and maintenance specialist	Design, construction and maintenance of offshore wind and wave energy facilities	<ul style="list-style-type: none"> <li>• Advocate on reducing dependency on fossil fuels.</li> </ul>
11	Dredging Engineer	Design and implementation of dredging operations used to maintain navigable channels and ports	Design and implementation of sustainable dredging operations with a focus on minimizing environmental impact.
12	LNG (Liquefied Natural Gas) Engineer	Design, construction and maintenance of ships and other marine vessels and structures that run on LNG	Design, construction and maintenance of ships and marine structures that run on cleaner burning alternative to traditional fossil fuels
13	Ship Recycling Coordinator / Ship recycling and decommissioning	Coordination of safe recycling of ships at the end of their lifetimes, in compliance with international regulations.	<ul style="list-style-type: none"> <li>• Coordination of safe and sustainable decommissioning of ships</li> <li>• Coordination of environmentally-friendly dismantling and recycling of materials</li> </ul>
14	Maritime weather forecasting meteorologist and ship routing specialist	Allows ship navigation teams to re-route vessels as needed, avoiding hurricanes, cyclones, and storms	<ul style="list-style-type: none"> <li>• Minimize pollution risks</li> <li>• Improve crew and cargo safety</li> </ul>

Source: Authors' study

Examples of most known classic careers in port and maritime are enlisted non-exhaustively in Table 2, where conventional responsibilities and general tasks were updated in the last column with sustainable perspectives. Further, in Table 3 are enlisted sustainable careers in maritime transport that are explicitly related to climate change dimension.

Table no. 3 Sustainable careers in maritime transport explicitly related to climate change dimension

No.	Career	Responsibility and tasks
1	Sustainable Transport Planner	Planning and implementing sustainable transport solutions to reduce emissions and congestion in ports and on roads: <ul style="list-style-type: none"> <li>• intermodal transportation</li> <li>• short sea shipping</li> </ul>
2	Environmental (compliance) Officer	Identifying ways to reduce the environmental impact of ships and ensuring that a shipping company and its ships: <ul style="list-style-type: none"> <li>• complies with environmental regulations such as those related to air and water pollution</li> <li>• complies with international agreements related to the protection of the marine environment</li> <li>• implements sustainable practices (e.g. waste management, reduction of emissions etc.)</li> <li>• becomes more energy-efficient</li> <li>• becomes environmentally friendly</li> </ul>
3	Marine Biologist	Study of the ocean, fauna and flora and advising on sustainable practices in the maritime sector
4	Marine conservation and restoration specialist	Working to protect and restore coastal and ocean ecosystems, such as mangrove forests, coral reefs, and sea grass beds, and developing sustainable fishing practices.
5	Ship Energy Manager	Managing the energy consumption and efficiency of ships, with a focus on reducing emissions and costs.
6	Smart Shipping Solutions Engineer; Smart ports and logistics optimization specialist	Responsible for developing and implementing innovative technology solutions that improve the efficiency and sustainability of shipping operations, such as autonomous ships and digital twin technology.
7	Carbon offset specialist/ Carbon offsetting and carbon credits trading/ Decarbonization Engineer	Identifying, monitoring and offsetting the carbon emissions of a shipping company
8	Marine Consultant	Advising shipping companies on sustainable practices, such as reducing emissions, improving energy efficiency, and complying with environmental regulations.
9	Coastal and ocean management	the conservation and management of coastal and ocean resources, including the protection of marine ecosystems and the reduction of pollution.
10	Port sustainability manager	Development and implementation of sustainable practices in port operations, e.g.: <ul style="list-style-type: none"> <li>• reducing waste and emissions</li> <li>• improving energy efficiency and promoting energy efficiency</li> <li>• waste management.</li> <li>• working with port operators or shipping companies to improve their environmental performance.</li> </ul>
11	Energy-efficient ship design engineer	Designing and constructing ships that use less fuel and emit fewer pollutants, and researching new technologies to improve energy efficiency
12	Low-emission propulsion systems researcher; Electric and hybrid propulsion systems researcher	Developing new technologies that reduce the environmental impact of ships, such as hybrid propulsion systems and alternative fuels.
13	Green logistics and supply chain manager	Managing the transportation of goods in a way that minimizes environmental impact, such as through the use of low-emission vehicles and the optimization of routes.

14	Sustainable cargo handling and storage specialist	<ul style="list-style-type: none"> <li>• Organise the storage and distribution of cargo</li> <li>• Ensure that the right products are delivered to the right location on time and at a proper cost.</li> <li>• Other tasks related to transportation, stock control, warehousing and monitoring the flow of goods, while considering principles of environmental standards and waste management</li> </ul>
15	Sustainable shipping education and training professional	Educating seafarers, dockworkers and other maritime workers about sustainable practices and technologies, and developing training programs to improve environmental performance.

*Source:* Authors' study

It is important to specify that this is not an exhaustive table and there are many more careers options in maritime transport industry with sustainable perspective. Additional examples of sustainable careers that are in demand on the recruitment platforms, that might inspire businesses and further lead to similar career prospects in maritime sector, were related to:

1. Clean energy policy: Professionals working on energy policy and regulation, including renewable energy standards, carbon pricing, and clean energy research and development.

2. Sustainable urban development: Urban planners, architects, and developers working on sustainable and livable cities, including green infrastructure, sustainable transportation, and affordable housing.

3. Sustainable water management: Engineers, hydrologists, and water resource managers working on sustainable water supply, treatment, and conservation.

4. Sustainable waste management: Professionals working on reducing, reusing, and recycling waste, as well as designing and implementing sustainable waste management systems.

5. Sustainable tourism: Professionals working on sustainable tourism development, including ecotourism, responsible travel, and sustainable destination management.

6. Sustainable packaging: Professionals working on designing and implementing sustainable packaging solutions, including bioplastics, compostable packaging, and sustainable packaging design.

7. Sustainable finance: Professionals working on sustainable investing, socially responsible investing, and environmental, social, and governance (ESG) analysis.

8. Green chemistry: Scientists and engineers working on developing sustainable and non-toxic materials, products, and processes.

9. Carbon capture and storage: Engineers and scientists working on developing and implementing technologies to capture and store carbon emissions from power plants and industrial processes.

10. Sustainable transportation planning: Transportation planners and engineers working on sustainable transportation planning, including active transportation and public transportation planning, and working on the integration of new technologies like drones, autonomous vehicles, and electric vehicles.

11. Sustainable supply chain management: Professionals working on sustainable sourcing, production, and logistics, including sustainable procurement, responsible sourcing, and circular economy.

12. Green marketing: Professionals working on sustainable and environmentally friendly marketing, including green advertising, sustainable branding, and social responsibility.

13. Sustainable business strategy: Professionals working on sustainable business strategy, including sustainability reporting, corporate social responsibility, and sustainable innovation.

14. Sustainable community development: Professionals working on sustainable community development, including green infrastructure, sustainable housing, and community resilience.

15. Sustainable product design: Product designers working on sustainable product design, including life cycle assessment, green product development, and sustainable materials.

16. Sustainable human resources management: Professionals working on sustainable human resources management, including employee engagement, sustainable recruitment, and sustainable employee development.



17. Sustainable facilities management: Professionals working on sustainable facilities management, including energy efficiency, water conservation, waste management, and sustainable procurement.

18. Climate science: Climate scientists, atmospheric scientists, and meteorologists working on understanding and addressing the causes and impacts of climate change, including climate modeling and climate adaptation.

19. Renewable energy systems engineering: Engineers working on the design, installation, and maintenance of renewable energy systems, including solar, wind, and geothermal systems.

20. Sustainable agriculture: Professionals working on sustainable farming and food systems, including organic farming, agroforestry, and sustainable fisheries,

21. Sustainable forestry: Foresters and ecologists working on sustainable forestry practices, including reforestation, conservation, and sustainable timber harvesting.

22. Sustainable fisheries: Professionals working on sustainable fisheries management, including fishing quotas, habitat conservation, and sustainable aquaculture.

23. Sustainable building design: Architects, engineers, and construction professionals working on sustainable building design, including green building certification, energy-efficient building systems, and sustainable materials.

## 5. Conclusions

This paper presents one of the first studies on employment trends in maritime transport considering sustainable perspectives of gender equality and climate change needs, while similar studies are tackling these two topics separately. From a gender equality and climate change perspective, the maritime transport and connected industries are affected and are affecting society welfare through employment inequalities or through pollution activities. To address this, the industry should transition to more sustainable practices, such as using cleaner fuels and implementing energy-efficient technologies, which implies sustainable professionals with relevant expertise. Additionally, there is a need for policies and regulations that encourage or mandate the reduction of emissions from ships.

A first important conclusion results even from the introductory chapter of this paper and highlights the confusion when using the terms “sustainable” or “sustainability”. These terms, depending on the context of speech or discourse, either have an environmental dimension being related with pollution impact, either have a temporal dimension being related to generational time-constraints, either have a broader meaning, referring to multiple sustainable aspects, as proposed by the United Nations 2030 Agenda through the 17 sustainable development goals. The precise understanding of such terms becomes clear once the reader advances in the context of discourse.

Another important conclusion underlines the increase occurrence of sustainable jobs ads that relates to gender equality and climate change and are relevant for the transport system. In the analyzed sector of port and maritime transport, there is an evolving context for sustainable careers opportunities. Sustainable practices and environmental responsibilities are becoming integrated in many positions in the industry. Is important to consider both gender equality and climate change perspectives to have a sustainable maritime transport system.

Although gender related jobs are not exclusively titled related to the maritime field (there is no “marine” title added to the job), they are increasingly being offered by maritime companies. Much more other technical jobs have no title explicitly connected to the gender equality dimension, however if they are occupied by female candidates, they might contribute to reducing gender inequalities and bias in the sector.

There is a dynamic extent to which contemporary maritime and port jobs evolved in the context of sustainability expectations. In the paper were enlisted several new sustainable jobs in the maritime port sector, in a non-exhaustive list. Most of the classic maritime jobs’ postings enlisted on employment websites suggest no explicit sustainability responsibilities, however such responsibilities are requested by employer as job tasks, in order to meet the updated legislative environmental and sustainable requirements. However, the occurrence of jobs where such integration appear explicitly visible in the job titles is significant.

Overall, our study shows that there are many more jobs titles related to climate change and the maritime domain, compared to gender equality in the same field. However, technological and societal advancements in the maritime sector and the need for professional sustainable solutions suggest that will increase the appearance of sustainable jobs specific for the sector. This trend brings challenges for the educational system that needs to keep up with the industry changesets. Nevertheless, is important to consider both gender equality and climate change perspectives for the development of a sustainable maritime transport system.

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