Evaluation of Gender Equality Criteria Related to Social Sustainability in Ports

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Abstract

Ports are developing sustainability frameworks in order to cope with latest requirements from the stakeholders. Economic, environmental and social dimensions of sustainability are the three pillars of the topic. Although economic and environmental aspects of sustainability in ports are widely researched in the literature, the social dimension of gender equality research is scarce. To fill the gap, it is important to identify the most important efforts for improving gender equality in ports. The aim of this study is to evaluate the gender equality criterias by port executives in terms of social sustainability. For this purpose, one of the Multi-Criteria Decision Making (MCDM) methods, Step-wise Weight Assessment Ratio Analysis (SWARA) was used to evaluate the priority weights of five criterias in Turkey. The results show that recruitment policy is the most important criteria in the field. Therefore, some suggestions are made to port industry to become more socially sustainable by minimizing the gender gap.

Keywords: Ports, Gender Equality, Social Sustainability, MCDM, SWARA

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I. Introduction

Elimination of all forms of discrimination against women constitutes the basis of sustainable development. Sustainable development on the other hand, is defined as: "Meets the needs of the present without compromising the ability of future generations to meet their own needs" in Bruntland Report (1987). Social sustainability, one of the third pillar of sustainable development, mainly deals with the effect of the organization has on the social systems within which it operates (Jung, 2017). Human side of sustainability is the main area of this concept. It is suggested that an organization capable of investing in social sustainability can improve stakeholder satisfaction and the firm's image, thus enhancing supply chain performance and rising competitive advantage (Jung, 2017). With gender equality, which is the fifth of the United Nations Sustainable Development Goals (UNSDG), it is aimed to eliminate inequalities in the labor market, to reach equal job opportunities for women, and to eliminate sexual violence and abuse. Gender refers to the social, behavioral and cultural characteristics, expectations and norms associated with being a male or female. Gender equality refers to how these elements determine the relationship between men and women and the resulting power differences between the two genders (The World Bank, 2011).

According to World Bank (2022), labor force participation rate among females in the world was 47,76% in 2019 whilst the rate in Turkey was 34,3% for the same year. Especially concerning the labor force in male dominated sectors, the gender gap is much higher. For example, the proportion of women working in the transport sector in the European Union is only 22% compared to the 46% share of working women overall (United Nations, 2021). In addition, in the maritime sector, which is characterized as a male-dominated sector, the women employee representation is %2 of the total maritime workforce (International Labour Organization, 2019; The International Transport Workers' Federation, 2020). Regarding global women participation in the port operations between 2014-2018, the rate is not satisfactory with 12,10%, although there is a more encouraging picture at management level (34%) (Figure 1). In cargo handling operations, women workforce rate is %5,1, which is the lowest representation among departments. According to the regional analysis, while Asia ranked first in port operations, in cargo handling operations Europe was the leader for 2020 (International Association of Ports and Harbors, 2020).
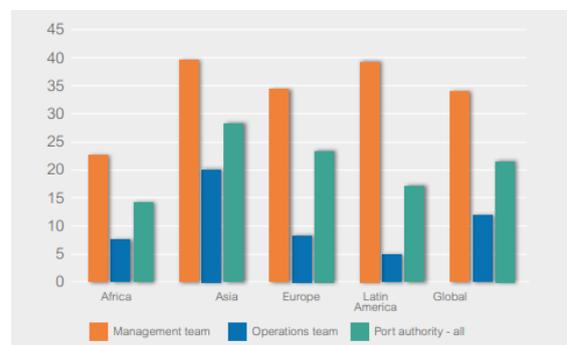

Figure 1. The Ratio of Women Participation in Ports (2014-2018)

Source: International Association of Ports and Harbors, 2020

In the port sector, there are significant initiatives to increase the gender equality. International Association of Ports and Harbors have applied 17 United Nations Sustainable Development goals into port sector. The fifth goal which is gender equality is transformed as follows: (1) Gender-neutral recruitment and compensation policies. (2) Promotion of females to leadership positions; Training and recruiting more females for operational positions in the field (for example forklift operators). (3) Equalization of man/woman proportion of port workers for operational and managerial jobs. (4) Turning port working environment into a more appealing locations for females (International Association of Ports and Harbors, 2020). Port of Barcelona, with women comprising 32% of the workforce, have initiated four equality plans since 2010 (Port de Barcelona, 2021).

DP World Yarımca, is a port located in Marmara Region of Turkey, have carried out "Female Leadership" program on a global scale in 2021. It is announced that in port operations and port management, their women employee rate is 15% of the total workforce. In 2020, the port has initiated "WomenLead" program to create female leaders within the company. The aim of the program is to ensure that talented women employees reach their career goals. Women Heritage Programme is another initiative to boost the philosophy of gender equality. The program suggests that gender equality brings greater innovation, competitiveness and growth opportunites (DP World, 2021). A fund was allocated to develop a program called "Women in Ports Mentoring" by the board of the International Association of Ports and Harbors (IAPH) to increase the share of women in port industry (WPSP, 2019).

Although there are efforts to increase the women workforce share in the port industry, it is found out that the literature is not satisfactory in terms of gender eqality. Thus, in order to fill the gap in the field, it is aimed to rank and evaluate the gender equality criterias in the port industry. The findings shed light on

the efforts by means that port industry can eliminate the gender gap. Thus, decision makers may increase the efforts to raise the women workforce in terms of social sustainability initiatives. The remainder of the study is organized into the following sections: In the second section, a literature review is carried out with a special focus on the logistics industry. The following section explains the research methodology used in the study. The fourth section provides the findings. The managerial implications for port authorities are discussed in the final section.

II. Literature Review

There are numerous studies in the liteature focusing on gender equality in the logistics sector. Above all, most of the studies underlined that the amount of women working in logistics sector was low (Nigam, 2010; United Nations, 2021). Larson (2019), by using the World Bank Logistics Performance Index, Transparency International's Corruption Perceptions Index and the United Nations Development Programme Gender Inequality Index, underlined the gender inequality had a negative effect on logistics performance. It is also found out that gender inequality mediated corruption and logistics performance.

Shakil et al. (2022) revealed that in the transportation and logistics sector, the gender diversity balance of the board is better for aligning the firm's environmental performance with financial performance. But the results didn't support the moderating effect of boards gender diversity on the relationship between social and financial performance. Nigam (2010) suggested diversity management programs to motivate women employees in logistics sector. It was also suggested to create women forums and women networks at companies so that women employees interest and concerns can be taken.

In the maritime industry a body of sparse literature was reached focusing on gender equality. For example, Lares (2017) analyzed World Maritime University's policies on gender equality and women enpowerment. According to the results, the university had increased its female graduates from 2,85% to 19,7% and a significant improvement had been found in the gender balance of academics.

Dragomir (2019), had proposed the term "gendering shipping" as a contemporary trend for comparing shipping organizations in order to promote gender equality both on board and the shore. It is also suggested to apply gender-friendly human resource policies to increase awareness. Key Performance Indicators (KPI) metrics is proposed to shipping companies for measuring their gender policies.

Kim et. al. (2019) researched the impact of automation technology implementation on women employees in the shipping industry by using qualitative methods. The results identified possible opportunities in terms of gender equality in the future. A research was conducted among Turkish maritime students focusing on gender discrimination. The findings revealed that the perception of gender discrimination is higher among female students than male. The discrimination perception was also analyzed according to the majors of the students. Underwater Technology students' perceptions of gender discrimination was the highest (Fidan et. al., 2020).

The literature focusing of gender equality in the port indusrty is actually scarce. Only two studies was reached in the literature review. The other studies were analysing the issue in terms of historical perspective which is not scope of this research. Barreiro-Gen et al. (2021) identified how ports have been directing gender equality. Five stages had been identified respectively which are gender segragation, compliance with national laws and regulations, gender equity, gender equality and more sustainable ports. Esser et. al. (2020) examined the technological innovations in Port of Antwerp. They determined that only one in six workforce at the port is female. They also identified that gender and age had a correlation which means that the majority of the male employees age is in the old category. It is suggested that if young women in the port industry can survive, the industry's gender gap will be decreased. In the study, it also found that wages differentiate according to the gender. Male workers earn higher wages than females employees.

III. Methodology

Theoretical Framework

The study uses a three-step approach to reach the research aim. After having a comprehensive literature review to determine the gender equality criterias in shipping industry as a first step, SWARA method was applied to prioritize the weights. In the third step, the rankings were evaluated to identify and demonstrate the general framework for the port sector. The gender equity criterias in relation to port industry were determined after a detailed literature review. Barrerio-Gen et al. (2021) dimensions were used in the study as gender equity criterias. The criterias that were used in the study are shown in Table 1 below.

Table 1: Gender Equality Criterias

Criteria	Description	Criteria Code
C1- Recruitment policy	Recruiting both genders	RP
C2-Work-life balance efforts	Keeping balance in terms of work-life (flexibility)	W-LBE
C3- Gender equality teams	A group that tracks gender equality	GET
C4- Internal and external policies	A strategy to deal more equality	IEP
C5-Communication	Campaigns and networks	COM

Source: Barreiro-Gen et. al., 2021

The necessary approvement was taken from Yeditepe University Human and Social Research Ethics Committee. The number of approvement is E.50532705-604.02-4664. A total of 8 port executives in Turkey were included to the research. 5 out of 8 responded positively to the invitation and inclusion to research. Due to pandemic conditions while the research was conducted and heavy workload of the executives, the data were collected through online channels.

Step-wise Weight Assessment Ratio Analysis (SWARA)

There are different kinds of multiple criteria decision making (MCDM) methods in the literature which can be explained as a sum of the decision-making techniques (Alinezhad and Khalili, 2019). Among these methods, the Simple Multi-Attribute Rating Technique (SMART), the REGIME Method, the VIKOR Method, the Superiority and Inferiority Ranking (SIR) Method, The EVAluation of MIXed Data (EVAMIX) Method, Analytical Hierarchy Process (AHP), Analytical Network Process (ANP) and the SWARA Method are the some of the commonly used ones in the literature.

The SWARA method is introduced by Keršuliene, Zavadskas & Turskis (2010), which is applied to high level decision-making and can also be used for policy making (Zavadskas, Stevic, Tanackov, & Prentkovskis, 2018). It enables experts to assess the weight values of criteria. There are some benefits of this method when it is compared to other MCDM techniques. Firstly, it is based on estimating the opinions of experts about the importance of the criteria in the weighting phase. Secondly, it is suitable for collecting data from experts and coordinating research. Thirdly, as it can be seen in Figure 2 below, it can be used in conjunction with other methods (Alinezhad & Khalili, 2019). Fourthly it is easy to use which can be evaluated as user-friendly and uncomplicated (Zolfani, Yazdani, & Zavadskas, 2018).
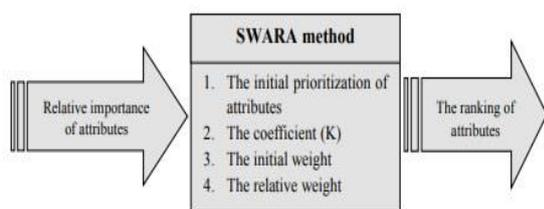

Figure 2. The Framework of SWARA Method

Source: Alinezhad & Khalili, 2019

Over the last few years, this method has been used in several fields including social sciences, mathematics, engineering and computer sciences. Some of the recent research that applied SWARA method are shown in Table 2 below.

Table 2: Researches Using SWARA Method

Year	Author(s)	Context
2022	Xiang, et. al.	The index weights of coal transportation companies were identified.
2022	Garg, et. al.	The criteria weights for Enterprise Resource Planning (ERP) were evaluated.
2022	Jafari-Sadeghi, et. al.	The relationship among factors of knowledge was discussed.
2022	Kazançoğlu et. al.	Circular supply chain success factors using the Internet of Things (IOTs) for the dairy supply chain were evaluated.
2022	Sivageerthi et. al.	Coal supply chain management risks were evaluated.
2021	Elden-Ürgüp	The priority weights of the firm performance criteria were computed.
2021	Ayyıldız et. al.	The wastewater treatment plants input parameters were determined.
2018	Radovic and Stević	Key performance indicators (KPI) in transport sector were selected.
2015	Stanujkic et. al.	Choosing the suitable packaging design is proposed for wine bottles.
2013	Zolfani and Saparauskas	Energy system sustainability indicators were evaluated.

Source: Author's own compilation

Based on the study conducted by Kersuliene et al. (2010), the following steps of SWARA were applied as shown in Figure 3 below.
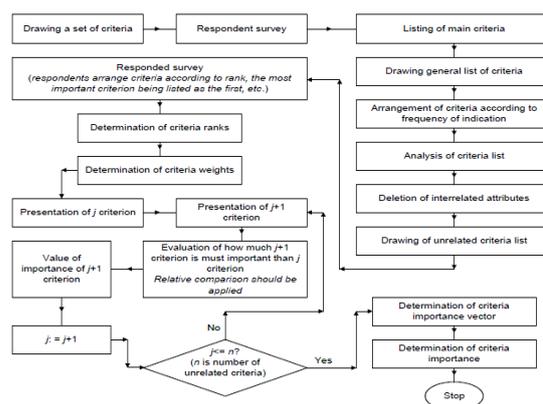

Figure 3. The Framework of Determining Criteria Weights using SWARA

Source: Kersuliene and Turskis, 2014

Step 1. Determine the set of the relevant prioritization criteria and sort them in descending order, based on their expected significances (by port executives in this case).

Step 2. Starting from the second criterion, the respondents determine the relative importance (sj) of the criterion j according to the previous (j-1) criterion, and do so for each criteria. With respect to Kersuliene *et al.* (2010), this ratio is defined as the comparative importance of average value, *sj*.

Step **3**. Identify the coefficient *kj* as shown below:

$$kj = \begin{cases} 1 & j = 1 \\ sj + 1 & j > 1 \end{cases} \qquad (1)$$

Step **4**. Determine the recalculated weight *qj* as shown below:

$q_j=1$, if j=1
$q_j= (q_j - 1)/k_j$, if j >1 $\qquad$ (2)

Step 5. Determine the relative weights wj of the evaluation criteria as shown below: (3)

$$Wj = qj / \sum_{k-1}^{n} qk$$

IV. Findings and Discussion

The gender eqaulity evaluation process at ports begins with the determination of the criterion weighting coefficients based on the SWARA method. For this purpose, first of all, the opinions of five decision makers (DM) who have been working as directors or managers in the port sector for a long time were sought and the criteria were ranked from the most important to the least important. Then, the importance level S_j of the criteria was calculated for each DM. Using equations (1), (2) and (3), K_j, Q_j and W_j values were found, respectively, and the results of these operations are shown in Tables 3, 4, 5, 6 and 7. Then, as seen in Table 8, the final SWARA weight results were obtained by taking the geometric mean.

Table 3: SWARA Weighting Results for DM 1

Criteria	Ranking	s$_j$	k$_j$	q$_j$	w$_j$
C1- RP	1		1	1	0.291
C3- GET	2	0.25	1.25	0.8	0.232
C2-W-LBE	3	0.3	1.3	0.615385	0.179
C5 -COM	4	0.1	1.1	0.559441	0.163
C4- IEP	5	0.2	1.2	0.4662	0.135

Source: Author's own compilation

According to Table 3, the DM 1 ranked the gender equality efforts in ports as recruitment policy, gender equality teams, work-life balence efforts, communication and internal and external polices respectively.

Table 4: SWARA Weighting Results for DM 2

Criteria	Ranking	s$_j$	k$_j$	q$_j$	w$_j$
C1- RP	1		1	1	0.242
C2-W-LBE	2	0.1	1.1	0.909091	0.220
C4- IEP	3	0.05	1.05	0.865801	0.210
C5 -COM	4	0.1	1.1	0.787092	0.191
C3-GET	5	0.4	1.4	0.562208	0.136

Source: Author's own compilation

DM 2 has evaluated the criteria as recruitment policy, work-life balance efforts, internal and external policies, communication and gender eqality teams respectively (Table 4).

Table 5. SWARA Weighting Results for DM 3

Criteria	Ranking	s$_j$	k$_j$	q$_j$	w$_j$
C1- RP	1		1	1	0.296
C2-W-LBE	2	0.1	1.1	0.909091	0.269
C3-GET	3	0.5	1.5	0.606061	0.179
C4- IEP	4	0.2	1.2	0.505051	0.149
C5 - COM	5	0.4	1.4	0.36075	0.107

Source: Author's own compilation

In Table 5, DM 3 considered the gender equality in order of recruitment policy, work-life balance efforts, gender equality teams, internal and external policies and communication.

Table 6: SWARA Weighting Results for DM 4

Criteria	Ranking	s$_j$	k$_j$	q$_j$	w$_j$
C2- W-LBE	1		1	1	0.410
C1-RP	2	0.9	1.9	0.526316	0.216
C4-IEP	3	0.6	1.6	0.328947	0.135
C5-COM	4	0.1	1.1	0.299043	0.123
C3-GET	5	0.05	1.05	0.284803	0.117

Source: Author's own compilation

The DM 4 gave special attention to work-life balance efforts followed by recruitment policy, internal and external policies, communication and gender equality teams (Table 6).

Table 7: SWARA Weighting Results for DM 5

Criteria	Ranking	s_j	k_j	q_j	w_j
C1- RP	1		1	1	0.476
C2-W-LBE	2	0.99	1.99	0.502513	0.239
C5-COM	3	0.75	1.75	0.28715	0.137
C3-GET	4	0.75	1.75	0.164086	0.078
C4-IEP	5	0.1	1.1	0.149169	0.071

Source: Author's own compilation

As seen from Table 7, the last DM has ranked the criteria as recruitment policy, work-life balance efforts, communication, gender equality teams, internal and external policies respectively.

Table 8: Final SWARA Weighting Results

Criteria	DM 1	DM 2	DM 3	DM 4	DM 5	Final Weighting	Final Ranking
C1- Recruitment policy	0.291	0.242	0.296	0.216	0.476	0.292	1
C2-Work-life balance efforts	0.179	0.22	0.269	0.41	0.239	0.253	2
C3- Gender equality teams	0.232	0.136	0.179	0.117	0.078	0.139	4
C4- Internal and external policies	0.135	0.21	0.149	0.135	0.071	0.132	5
C5-Communication	0.163	0.191	0.107	0.123	0.137	0.141	3

Source: Author's own compilation

As a result of the comparison of the criterias according to the DMs, the final weights of the criteria were calculated by taking the geometric mean of the weights of the criteria determined according to the SWARA method. These weights are provided in Table 8.

V. Conclusion and Recommendations

Sustainable development has three pillars, which are economic, environmental and social. There are numerous studies in the literature that conducted a research on social sustainablity in the various sectors. In this study, the gender equality issue in ports as one of the important aspects of social sustainability is addressed. Ports, are the gateways of international trade, which take a critical role in the international supply chains. In order to satisfy its stakeholders and gain competitive advantage, portsincreased their sustainability efforts. As a male-dominated industry, ensuring gender equality is a significant factor for their success. Thus, many ports throughout the world have launched gender equality programs to attract more women employees. Although the industry have risen its effort to change the male-female proportion, it is found out that the academic literature is scarce.

Esser et al (2020) identified that, only one in six employess at the Port of Antwerp is women. Their findings suggested that if young females in the ports can survive, the gender gap will be decreased in the future. Barreiro-Gen et al. (2021) suggested five stages to develop gender equality in ports, which are gender segragation, compilance with national laws and regulations, gender equity; gender equality and more sustainable ports.

In this study by using Barreiro-Gen et al. (2021) gender equality criteria, it is aimed to evaluate this them with the opinions of port executives. Five port executivesparticipated in the research. They were asked to rank five criteria namely: Recruitment policy, work-life balance efforts, gender equality teams, internal and external policies and communication. By using SWARA method which is one of the multiple criteria decision making technique, comparative importance of average value, *sj* was identified first, followed by determining the coefficient *kj* and recalculation weight *qj* and as a last step, the relative weights wj of the criterias were calculated for each port executive. As a final stage, geometric mean of the weights of the criterias were calculated according to the SWARA method. In the findings, port experts ranked the gender equality criteria at port respectively: (1) recruitment policy, (2) work-life balance efforts, (3) gender equality teams, (4) internal and external polices and (5) communication.

The results of this study may help port authorities to arrange their gender equality efforts. Since it is characterized as a male-dominated Sector, the port experts may benefit from the results to improve the male-female proportion at the ports. As recruitment policy was identified as the most important criteria, it is suggested to give special attention to human resource function, which utilize all other resources effectively to achieve the organization goals. As it is stated in Sustainable Transport Report (United Nations, 2021), without taking into consideration of the gender specific needs of women, the human resources policies would never be family-friendy. Thus recruitment policy is suggested to be transparent and have to be planned in such a way that encourages female employees to apply for a job in the ports. The future studies can handle the issue by case studies, or making interviews with female emloyees to identify the motivation factors and barriers in the port industry.

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