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Perceptions of Female and Male University Students on Sustainable Maritime Development Concept: A Case Study from Turkey*

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Abstract

Objective: It is a fact that maritime transport is essential for achieving sustainable transport development, and the concept of sustainable development has recently raised great interest in maritime industry. The fundamental role in driving and supporting the sustainability should be pursued by young people, and in Turkey as a developing country, sustainable maritime development should be particularly emphasized by the young population amounting to one third of total. The aim of this paper is to analyze the perceptions of female and male students on sustainable maritime development concept.

Method: In order to reach this aim, the study was carried out using a questionnaire distributed to maritime faculty students in Turkey. Three pillars of sustainable maritime development were used to reveal how important the issue is for students and how they perceive them.

Results: The study indicated strong emphasis of social sustainable maritime development while the key factor perceived as water pollution as one of the environmental item.

Conclusion: The results of the study reveal not only the perceptional differences between Turkish female and male students on sustainable development concept but also on sources of environmental concerns.

Keywords: Sustainable Development, Maritime Transport, Gender, Turkey

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Kadın ve Erkek Üniversite Öğrencilerinin Sürdürülebilir Denizcilik Gelişimi Kavramı Üzerine Algıları: Türkiye'den Bir Durum Çalışması*

Özet

Amaç: Sürdürülebilir taşımacılığının gelişimini sağlayabilmek için deniz taşımacılığının gerekliliği için inkâr edilemez bir gerçektir ve sürdürülebilir gelişme kavramı son dönemlerde denizcilik sektöründe büyük ilgi görmektedir. Sürdürülebilirliğin harekete geçirilmesi ve desteklenmesinde en büyük rol gençler tarafından üstlenilmelidir ve gelişmekte olan bir ülke olarak Türkiye'de de sürdürülebilir denizcilik gelişimi özellikle toplam nüfusun üçte birini oluşturan genç nüfus tarafından sağlanmalıdır. Bu çalışmanın amacı, kadın ve erkek öğrencilerin sürdürülebilir denizcilik gelişimi kavramına olan bakış açılarını analiz etmektir.

Method: Bu çalışmada, "Sürdürülebilir Denizcilik Gelişimi"nin üç önemli ayağının öğrenciler için ne kadar önemli olduğunu ve nasıl algıladıklarını ortaya koymak amacı ile, Türkiye'de eğitim gören denizcilik fakültesi öğrencilerine anket çalışması uygulanmıştır.

Bulgular: *Çalışma, çevresel etmenlerden biri olan su kirliliğinin önemli etken olarak algılanırken sürdürülebilir denizcilik gelişiminin sosyal ayağının büyük önem arz ettiğini ortaya koymuştur.*

Sonuç: *Sonuçlar Türk kadın ve erkek öğrencilerin sadece denizcilik gelişimi konularına ilişkin algısal farklılıklarını değil, ayrıca çevresel endişelerin kaynaklarına ilişkin sonuçları ortaya koymaktadır.*

Anahtar Kelimeler: *Sürdürülebilir Gelişim, Deniz Ulaştırması, Cinsiyet, Türkiye*

**Bu çalışma, "Maritime Women: Global Leadership 2nd International Conference" isimli konferansta poster olarak sunulmuştur.*

1.Introduction

Sustainable development (SD) has become one of the most popular issues of our time. The concept of sustainable development has received multidisciplinary attention since its appearance in the 1987 United Nations Brundtland Report [35]. Diversified definitions of SD show that SD is a complex and multidimensional issue [8]. Although explained in many ways, most of the SD definitions include three interdependent and mutually reinforcing pillars of social development, economic development, and environmental sustainability [28]. The achievement of SD requires the integration of environmental and social concerns with economic goals [2].

Nearly all countries have addressed sustainable development, especially at European Union (EU) level as a primarily promoted concept. Being sustainable is an important aim for Turkey as a EU candidate country. It is also rapidly growing concept and it will continue to grow in coming years. Sustainable maritime transport has a great part in that future development. Maritime transport is the backbone of world trade and globalization [15], and it is a crucial element to achieve a sustainable future. Researches and discussions on sustainability have been limited in maritime industry until the International Maritime Organizations' (IMO) establishment of the directions and goals to be achieved for a sustainable future in maritime industry. Within this focus, academic research on SD and sustainable maritime transportation has also gained importance.

The present study could be regarded as an attempt to clarify the nature of Turkish maritime students' perceptions on sustainable maritime development and particularly environmental concerns. In other words, it focuses on environmental, social, and economic drivers of sustainable maritime development, and provides a data set collected from a public university in a developing country. Having young people of amounting to one third of the total population is a very important issue to understand sustainable maritime drivers especially in maritime students in Turkey. Thus, this study shed light on concern for environmental problems and on gender based analysis.

The study is organized as follows. Following the introduction, the first section reviews the literature on sustainable development and sustainable maritime development concepts. The second section focuses on the methodology of the study which includes two stages. According to the the aim of the study, an extensive review of the literature regarding the sustainable maritime development drivers is conducted in order to develop questionnaire, and include sampling technique, and methods of analysis in the third section. Section four presents the results and findings of the survey. The last section discusses the conclusions drawn from the analyses.

2. Literature Review of Sustainability and Sustainable Maritime Development

The concept of "sustainability" has been much discussed over the past years. Despite many articles and proposed definitions and the attention of a large number of government and non-government bodies around the world, sustainability remains

a contested concept [13]. The concept of the sustainable development can be found in a variety of literature sources. 57 different definition of sustainable development was collected in 1997 by Susan Murcott [23], and in 2007 Johnson et al. [17] stated the existence of three hundred definitions of 'sustainability' and 'sustainable development'. Although the debates about the definition of the sustainable development has still been going on, the most known definition of sustainable development stated in "Our Common Future": "Humanity has the ability to make development sustainable — to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs" [42]. Carter and Rogers (2008) [7] indicate sustainability increasingly refers to an integration of three pillars: economic, social, and environmental.

A literature search was undertaken to review articles with "Sustainable transport" keyword spanning 1980-2014 within the scope of SSCI and CPCI-SSH, and 110 articles were found. 94 of them addressed passenger and urban transportation issues, Roth and Boltze (2011) [32], Ülengin et al. (2010) [41], Ciliberti et al. (2008) [9], Blonk (1994) [6] addressed freight sustainability issues, Rodernburg (2002) [31] and Schade (2005) [33] addressed both passenger and freight transportation issues. 6 of the articles were covered other sustainable transportation issues* and 4 of them couldn't be reached. This literature review presents lack of sustainability issues in transportation. This finding supports Basurko et al. (2008) [3] that the lack of comparative studies analyzing the sustainability among transportation modes. The other sustainable term as of "sustainable transportation" does not formally have one universally accepted definition [27], and it is considerably difficult to define more like the concept of SD [40].

*other issues such as energy assessment, innovation, education ect.

The same literature review was carried out with the keywords "sustainable maritime development, sustainable shipping, sustainability and maritime", and 29 publications were found. It was found that most of researches [25] [19] [14] [1] contributes environmental sustainability issues, only few of them [29; 18] addressed economic and social issues. It is observed that the studies consists sub issues such as; maritime spatial planning [30; 10], emissions from ships [11], emissions from ports [24], maritime sustainability polices [14], sustainability education [5] and coastal zone management. The findings show the lack of sustainability studies in maritime industry.

According to the Organisation for Economic Co-operation and Development (OECD) (1997) [26], sustainable transportation is the expression of SD within the transportation sector. For occurrence of sustainable transportation economic development, environmental integrity, and social quality of life should be captured [16]. Regarding the maritime industry, the industry has a key role to play in achieving this objective [21]. Basurco et al. (2008) [3] defined sustainable shipping or a sustainable waterborne transport as "a cost-effective commercial activity, in which the environmental load is not bigger than that which the environment can currently and in the future bear, and that the social community (directly and indirectly) in contact with it is not being negatively affected".

Researches and discussions on sustainability have limited in maritime industry until the IMO's establishment of the directions and goals to be achieved for a sustainable future in maritime industry. By this way, there is a growing interest between large shipping companies and stakeholders [4]. As mentioned before, economic, social, and environmental requirements have to be integrated to achieve sustainable maritime transportation. While economic and social sustainability requirements of

shipping are complicated, environmental requirements have always been well defined and understood. Studies analyzing the sustainable maritime development among the sustainable drivers of maritime transportation studies are in general unsatisfactory. The main sources found mostly are reports that mentioned maritime SD drivers. While Svensson (2012) [37] and Monnet and Net (2011) [22] cover three of the drivers, Simongati (2010) [36] covers social and environmental drivers, ESPO (2012) [12], Miola et al, (2009) [20] only cover environmental issues, and The North Sea Foundation Report (2008) [39] only covers social drivers.

3. Methodology

3.1. Model Development

This study focuses on the Turkish maritime faculty students' approach to the three pillars of maritime sustainable development and importance of the sources of environmental concern. Figure 1. represents the conceptual model of the study. The basic premise of the proposed model is that gender influences the perception of the three pillars of sustainable maritime development and the sources of environmental concern.

Table 1. *Researches on Sustainable Maritime Development Drivers*

Dimension	Simongati (2010)	ESPO (2012)	Svensson (2012)	Miola et al (2009)	Monnet and Net (2011)	The North Sea Foundation (2008)
Environmental Drivers of Maritime Transportation						
Air pollution	x	x	x	x	x	
Climate change	x	x	x	x	x	
Energy consumption	x	x	x		x	
Noise pollution	x	x			x	
Soil pollution	**x**			**x**	**x**	
Water pollution	x		x	x	x	
Ecosystem				x	x	
Indirect environmental impacts			x			
Economic Drivers of Maritime Transportation						
External costs of maritime transport			**x**			
Customer satisfaction			**x**		**x**	
Intermodality			**x**		**x**	
International competition			**x**			
Efficiency, optimality and capacity of infrastructure (ports, ect)			**x**			
Investments (R&D, Technology, Infrastructure)			x			

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Table 1. *Researches on Sustainable Maritime Development Drivers (Cont')*

Dimension	Simongati (2010)	ESPO (2012)	Svensson (2012)	Miola et al (2009)	Monnet and Net (2011)	The North Sea Foundation (2008)
Economic Drivers of Maritime Transportation						
Economic instruments (Taxes, subsidies, market-based measures, ect.)			x			
Social Drivers of Maritime Transportation						
Safety	x		x		x	x
Security			x			x
Human and society health			x		x	x
Manpower and recruitment			x		x	
Social contributions as jobs and incomes	x		x			
Social contributions as trade	x		x			
Ethics						x
Corporate social responsibility						x

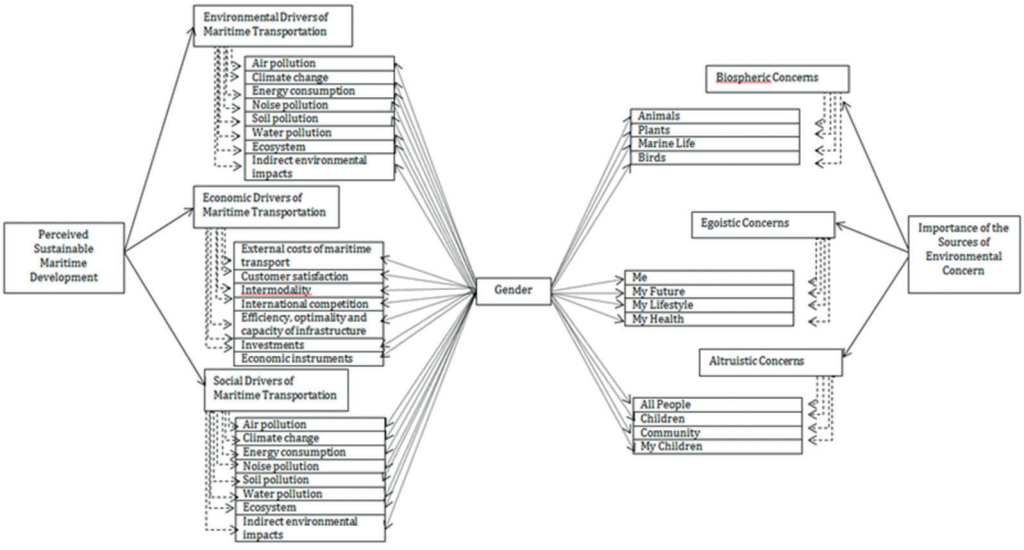

Figure 1. *The Conceptual Model of the Study*

3.2. Questionnaire Development

In order to address research issue, a questionnaire was selected as the tool for data collection. The questionnaire is comprised of 3 different parts. The first part covers 2 open ended and multiple choice questions on the information about the student for the purpose of profile establishment. The second section contains questions on determining the Turkish maritime students' perceptions on sustainable maritime development drivers. This section inference through the literature review that mentioned above in Table 1, and 23 sustainable maritime drivers were used to design this part of the questionnaire. The final section contains questions on sources of environmental concern which adopted from Schultz (2000) as shown in Table 4.

The questionnaire was reviewed by three experts, and all were asked if the items were relevant to the goal of the questionnaire. Revisions were made based on their comments and suggestions. Respondents were asked to evaluate the importance of these 23 drivers on a 7 point Likert scale, where 1 indicated the least importance and 7 indicated the greatest importance. In the third part the value sources of environmental scale measure [34] have conducted in order to measure the environmental concerns of the students. Totally 12 statements were emphasized on value sources of environmental scale on a 7 – point Likert scale (1= strongly disagree, 7= strongly agree) and the opinions of the students proposed to be collected.,

3.3. Sample

The research was carried out during the semester registration in February 2014 at Dokuz Eylul University (DEU) Maritime Faculty. The Faculty started education in 1988 with the title "School of Maritime Business and Management" in the body of the DEU as the first higher education school in Turkey, and provides undergraduate education in three departments: maritime business administration, marine transportation engineering, and department of marine engineering. Although all of the students were included in the population, due to the irregularities of some of the students, a total of 173 (%86.5 response rate) questionnaires were received, as of; 112 from maritime business administration, 33 from the marine transportation engineering and 28 from the marine engineering department.

3.4. Data Analysis Procedures

Participation was voluntary, and students were informed and invited to participate in this study. After the purpose of the study was explained, students were invited to answer the questions in the questionnaire on their own.

The statistical package for the social sciences (SPSS) 20 program pack was used for statistical analysis of the data collected by the surveys filled in correctly and fully according to the explanations in the frame of the general aims of the study. The frequency, percentage, arithmetical mean and standard deviation of the answers were calculated. Descriptive analysis and independent samples t-test were performed to analyze the data. Internal consistency was estimated using the reliability coefficient Cronbach's alpha.

4. Findings

The profiles of the students are summarized in Table 2. 1st year students (%62,4) dominate the sample whereas 3th and 4th year are lower in the numbers. Female (%34,1) account for one third of the population. Most of the students are from Maritime Business Administration department.

Table 2. *Respondent's Profile*

Department	Number of Students	%
Maritime Business Administration	112	64,7
Marine Transportation Engineering	33	19,1
Marine Engineering	28	16,2
Total	173	100
Year		
1st Year	108	62,4
2nd Year	29	16,8
3rd Year	19	11,0
4th Year	17	9,8
Total	173	100
Gender		
Girls	59	34,1
Boys	114	65,9
Total	173	100

The perceived importance of the 23 drivers of sustainable maritime development from a student perception in Turkey summarized in (Table 3), they were evaluated by descriptive analysis. The perceived importance of the drivers ranged from a high mean of u=6,39 to a low of u=5,35 in which a higher value indicates water pollution. As far as the means imply, the top of the three important sustainable maritime development issues are water pollution (u=6,39), human and society health (u=6,45), and security (u=6,39). Again, the least important issues are indirect environmental impacts (u=5,38), soil pollution (u=5,38), and external costs of maritime transport (u=5,71). The perceptions of the students according to the frequency analysis are also shown in table 1A.

59 female and 114 male students contributed the study. Independent sample t-test was used to measure the gender differences in sustainable maritime development perceptions. Consistent with the expectation female students show higher level of importance to the sustainability issues than male students. However, based on the results, there was a statistically significant mean difference between female and male students only on three drivers: "ecosystem, ethics, and corporate social responsibility". No significant difference was found for the other drivers. According to the table, female students give importance to the "water pollution, ecosystem and security" drivers (u=6,58) respectively, while "human and society health (u=6,38), water pollution (u=6,29) and security (u=6,27)" drivers are respectively important for male students. The least important driver for female students is indirect environmental impact (u=5,42). Further, male students are tend to perceive the least important driver as soil pollution.

The reliability of the each three pillars for the importance was estimated first by using internal consistency reliability coefficient Cronbach's alpha. The scales revealed internal consistency (0.83, 0.77 and 0.77 for economic, environmental and social pillars, respectively).

The environmental perceptions of Turkish maritime faculty student are measured by the value sources of environmental concern measure (Schultz, 2000). Four items measured under each source of environmental concern: biospheric (birds, animals, plants and trees), egoistic (my health, my lifestyle, my prosperity, and my future), social-altruistic (future generations, people in community, children and humanity) in Table 3. The scales revealed internal consistency (0.90, 0.88 and 0.89 for biospheric, egoistic and social altruistic items, respectively.) Students' perceptions on environmental

Table 3. *Importance of the Three Pillars of Sustainable Maritime Development*

Dimensions	Total		Female		Male		(2-tailed)
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	
Environmental drivers of maritime transportation							
Air pollution	6,02	1,236	6,22	1,146	5,91	1,273	,121
Climate change	5,73	1,294	5,78	1,365	5,70	1,262	,709
Energy consumption	5,88	1,326	6,08	1,343	5,77	1,311	,142
Noise pollution	5,97	1,122	6,07	1,048	5,92	1,161	,417
Soil pollution	5,38	1,772	5,71	1,630	5,20	1,825	,073
Water pollution	6,39	1,037	6,58	,894	6,29	1,095	,067
Ecosystem	6,17	1,300	6,58	,894	5,96	1,426	,001
Indirect environmental impacts	5,35	1,438	5,42	1,556	5,32	1,378	,641
Economic drivers of maritime transportation							
External costs of maritime transport	5,71	1,379	6,07	1,112	5,53	1,471	,008
Customer satisfaction	6,02	1,080	6,17	1,020	5,94	1,107	,184
Intermodality	5,73	1,295	5,78	1,286	5,70	1,262	,709
International competition	5,98	1,188	6,03	1,286	5,96	1,140	,685
Efficiency, optimality and capacity of infrastructure (ports, ect)	6,13	1,164	6,29	1,246	6,04	1,116	,192
Investments (R&D, Technology, Infrastrucure)	6,12	1,168	6,22	1,247	6,07	1,127	,424
Economic instruments (Taxes, subsidies, market-based measures, ect.)	5,75	1,339	6,02	1,239	5,61	1,373	,053
Social drivers of maritime transportation							
Safety	6,26	0,974	6,32	1,008	6,23	,960	,549
Security	6,38	0,960	6,58	,855	6,27	,998	,048
Human and society health	6,45	0,917	6,58	,835	6,38	,954	,177
Manpower and recruitment	6,05	1,088	6,15	1,096	5,99	1,085	,357
Social contributions as jobs and incomes	5,97	1,123	6,07	1,048	5,92	1,161	,417
Social contributions as trade	6,07	1,054	6,05	1,136	6,08	1,014	,869

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Table 3. *Importance of the Three Pillars of Sustainable Maritime Development (Cont')*

Dimensions	Total		Female		Male		(2-tailed)
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	
Ethics	5,95	1,320	6,41	,949	5,72	1,424	,000
Corporate social responsibility	5,80	1,292	6,08	1,103	5,66	1,362	,028

p- significance level < 0.05

concerns were evaluated by descriptive analysis. An examination of 12 items shows that the students of this study agreed the statement with a mean of 6,24 related to altruistic concern that "I am concerned about environmental problems because of the consequences for my children" . %51 of the students agreed with the items related to animals, all people, and people in my community. The results also show that the least agreed item is my lifestyle with the %41.6. The perceptions of the students according to the frequency analysis are shown in table 1B.

The perceived importance of the sources of environmental concern from a maritime student perspective in Turkey summarized in (Table 4), they were evaluated by descriptive analysis. The importance of the drivers ranged from a high mean of u=6,24 to a low of u=5,70. The As far as the means imply, the top of the three important environmental concerns are "my children" (u=6,39), "for children" (u=6,20), and "my health" (u=6,14). Again, the least important sources are "me" (u=5,88), "my lifestyle" (u=5,74), and "birds" (u=5,70).

Independent sample t-test was used to measure the gender differences in sources of environmental concern. Consistent with the expectation female students show higher level of importance to the sustainability issues than male students. However, based on the results, there was a statistically significant mean difference between female and male students only on three sources: "marine life, birds, and my future". No significant difference was found for the other items.

5. Discussion and Conclusion

The perspectives of DEU Maritime faculty student towards the sustainable maritime development and environmental concerns have been evaluated. In order to pursue this, three pillars of sustainable maritime development and sources of environmental concern have been emphasized. The results revealed that "water pollution" was the most important driver perceived by the students, followed by "human and society health, and security drivers". This study also aimed to find out whether the Turkish maritime faculty students approach the three pillars of maritime sustainable development in the same manner or not. Results indicate that the Turkish maritime faculty students did not approach importance of the three pillars of maritime sustainable development in the same manner as consistent with the expectation of the study. The perceived social drivers are observed more important than the other drivers. Another topic of the current study was students' perceptions on environmental concerns were obtained from evaluating the frequencies. The result leads us the perceptions' of the students to all items are approximately in the same manner. Altruistic concerns significantly perceived as more important according to egoistic and biospheric concerns.

Gender is one of the factors affecting the perceptions of students on the sustainable maritime development and on environmental concerns. In the study we expected to find out that significant difference between female and male perceptions of the students' both on each of the three pillar of sustainable maritime development and on each source of environmental concern. However, female students have only been found more sensitive towards sustainable maritime development in environmental and social issues compared to male students, and on environmental concerns female students have only been found more sensitive towards only biospheric items.

Table 4. *Importance of the Sources of Environmental Concern*

Dimensions	Total		Female		Male		(2-tailed)
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	
Biospheric Concerns							
I am concerned about problems because of the consequences for animals	6,00	1,329	6,27	1,257	5,86	1,349	,053
I am concerned about problems because of the consequences for plants	6,00	1,253	6,15	1,157	5,92	1,298	,250
I am concerned about problems because of the consequences for marine life	6,09	1,158	6,34	1,044	5,96	1,197	,044
I am concerned about problems because of the consequences for birds	5,70	1,463	6,02	1,293	5,54	1,524	,031
Egoistic Concerns							
I am concerned about problems because of the consequences for me	5,88	1,365	6,08	1,368	5,77	1,357	,154
I am concerned about problems because of the consequences for my future	6,04	1,300	6,32	1,166	5,89	1,346	,040
I am concerned about problems because of the consequences for my lifestyle	5,74	1,485	5,81	1,491	5,70	1,487	,640
I am concerned about problems because of the consequences for my health	6,14	1,188	6,29	1,084	6,06	1,236	,235
Altruistic Concerns							
I am concerned about problems because of the consequences for all people	6,06	1,235	6,31	1,235	5,94	1,221	,064
I am concerned about problems because of the consequences for children	6,20	1,271	6,36	1,214	6,12	1,298	,254

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Table 4. *Importance of the Sources of Environmental Concern (Cont')*

Dimensions	Total		Female		Male		(2-tailed)
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	
I am concerned about problems because of the consequences for people in community	6,01	1,379	**6,19**	1,371	5,91	1,380	,216
I am concerned about problems because of the consequences for my children	6,24	1,306	**6,47**	1,104	6,11	1,387	,065

6. Limitations and Further Research

While the results of our study are expected to be useful to maritime industry to show the understanding of young industry members' perceptions, some possible limitations of the approach must be acknowledged. The scope of the study does not cover departments and educational levels of the students, so the ANOVA test has not been applied. The research findings are based on the regional responses, and it was conducted in Turkey and only applied to Dokuz Eylul University Maritime Faculty Students. Due to the possible cross-national and cross-cultural changes on sustainable maritime development drivers should also be considered. Future research should include more stakeholders from different universities on a large scale before the research findings and conclusions could be generalized.

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