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Research Article

Training maritime students as social maripreneurs: Strategic evidence from student competencies

Pınar Özdemir

Faculty of Engineering, Piri Reis University, Istanbul, Tuzla 34940, Türkiye

Corresponding author's e-mail address: pozdemir@pirireis.edu.tr

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Abstract

International organizations, governments, multinational corporations, and educational institutions take measures to create a more sustainable and resilient maritime sector consisting of environmentally conscious and socially responsible stakeholders. One of the ways to achieve this goal is through entrepreneurship, the process of creating and developing new ventures, and social entrepreneurship, which focuses on generating social value alongside financial returns. This study examines the social entrepreneurship competencies of students at a maritime university and their potential to address the global and local challenges as social maripreneurs, entrepreneurs who develop innovative solutions to maritime-related social and environmental challenges. Data were collected from 461 students using quantitative research methods. The results indicate that students possess high levels of social entrepreneurship competencies that can be further developed through entrepreneurship education focused on social entrepreneurship, an underemphasized topic at maritime universities. These competencies may contribute to addressing global and local challenges while improving social welfare and environmental awareness in maritime communities.

1. Introduction

Social, economic, and environmental developments- such as social inequality, economic globalization, and environmental degradation- have changed expectations of businesses, encouraging them to engage in non-profit activities that benefit society, such as corporate social responsibility (CSR) projects, charitable donations, community development programs, and environmental sustainability initiatives, in addition to profit-generation activities (Kiladze et al., 2024; Somachandra et al., 2024). In this context, CSR has emerged as a framework through which firms integrate social and environmental concerns into their operations and stakeholder interactions. CSR initiatives often include efforts such as reducing carbon footprints, improving labor conditions, supporting community development, and promoting environmental sustainability (Nascimento et al., 2025; Roy et al., 2025; Faeni et al., 2025; Wirba, 2024). These initiatives may be implemented as both short-term projects and long-term strategic commitments, reflecting the growing recognition that businesses have responsibilities extending beyond economic performance (Mao & Yao, 2025; Sarfraz et al., 2023). These evolving expectations have also increased scholarly and practical interest in alternative approaches to addressing social and environmental challenges, particularly social entrepreneurship. While CSR focuses primarily on how existing firms incorporate social and environmental

considerations into their operations, social entrepreneurship is a distinct yet related approach that places social value creation at the core of the organizational mission. Social enterprises can be defined as hybrid companies that combine the fundamental features of non-profit organizations, such as cooperatives, associations, and foundations, with those of for-profit companies that are traditional commercial companies. They address complex social and environmental problems by meeting the needs of beneficiaries (de Souza & de Silveria, 2024; Almeida & Sousa-Filho, 2023; Kurtuluş & İnci, 2024; Wang et al., 2025).

In this context, social entrepreneurship can be defined as the process of identifying an opportunity for a social need, such as poverty, education, health care, or the environment, and fulfilling that need through unique and innovative, resourceful, market-based approaches (Bonfanti et al., 2024; Kraus et al., 2021). The main difference between social entrepreneurship and commercial entrepreneurship is the primary aim and the value orientation of the entrepreneurial endeavor (Zafar et al., 2022). Commercial entrepreneurship tends toward maximization of profit and creation of value for owners or shareholders. Social entrepreneurship differs in that the social mission comes first. The social impact is the primary rationale for the business's existence. If profit is made, it is a means to achieve a social mission; for example, as a way to grow and scale the business's impact (Pathak & Muralidharan, 2024).

In this respect, the principles of social entrepreneurship are increasingly relevant to sectors facing complex social and environmental challenges, including the maritime sector. The maritime sector faces persistent challenges such as marine pollution, the environmental impact of maritime transport, and limited access to education and training in coastal regions, increasing efforts to reduce waste produced at sea, minimize energy consumption, advocate for environmental causes, and engage with coastal communities. The efforts exerted by stakeholders through CSR activities may not be sufficient to respond to these increasingly complex challenges. Therefore, it is necessary to shift the focus from corporate practices to individual competencies and entrepreneurial orientations (Chenavaz et al., 2023). In particular, preparing maritime students to respond effectively to sector-specific social and environmental challenges requires not only awareness of CSR principles but also competencies associated with social entrepreneurship. These competencies may enable individuals to identify opportunities for social value creation and to design innovative responses to pressing maritime issues.

Accordingly, maritime education is increasingly expected to impart an entrepreneurial mindset that enables seafarers to address socio-economic and environmental challenges (Oceanservice 2024; Jokhu et al. 2025). In this context, instilling an entrepreneurial mindset in maritime students and ensuring that industry stakeholders recognize the role and importance of social entrepreneurship in addressing global or local issues, like restoring the marine ecosystem and improving welfare, is becoming increasingly important.

This paper focuses on the competencies of students at a maritime-themed university to become social entrepreneurs operating within or addressing challenges related to the maritime sector. In this study, such individuals are referred to as “social maripreneurs,” a concept adapted from Ozdemir (2025), who introduced the term “maripreneur” to describe entrepreneurs in the maritime sector. In this paper, a maritime-themed university refers to a specialized institution of higher education that provides industry-oriented education and training in maritime (technically oriented seafaring programs, and maritime-related programs in fields like maritime business, logistics and engineering), and that typically has strong institutional ties to the shipping and maritime industries. The university trains students for careers, at sea and ashore, in the marine and operational sectors through sea training, internships, and sectoral collaborations. For ease of reference, ‘maritime university’ is used hereafter to denote maritime-themed universities as defined above.

The study is based on data collected from a university in an Eastern Mediterranean country that serves as a maritime hub for a significant portion of the global fleet due to its strategic location near major sea routes and maritime choke points. The higher education systems in the country are centralized, focused on employability and applied skills, and are labor-market oriented.

The demand for social entrepreneurship is present at both the global and local level. The challenges societies and nations face today- ranging from environmental degradation to inequitable access to education and economic opportunity, as well as the growing complexity of sustainable resource management- are not issues that can be addressed through technical or self-interested solutions alone. These issues are pressing for the Eastern Mediterranean, where there is high maritime traffic, vulnerable ecosystems, and diverse societies. Graduates and practitioners of maritime educational programs, thus, need to acquire a broader range of technical and operational competencies to deal with the regional and post-pandemic challenges of social and environmental sustainability. This makes the development of social entrepreneurial competencies particularly relevant for preparing future professionals to deliver sustainable value to industry and society.

This article examines the social entrepreneurship competencies of maritime students within the framework of social entrepreneurship requirements, which encompass both innate competencies and those acquired through education and experience. It analyzes them through the individual, social, and innovative dimensions proposed by Capella-Perris et al. (2020), and aims to contribute to the future development of social entrepreneurship in maritime education. Additionally, the article discusses how to develop the competencies necessary for students to become effective social entrepreneurs- or “social maripreneurs”- within the maritime environment.

1.1 Social entrepreneurship in the maritime sector

Despite the rapid global growth and institutionalization of entrepreneurship education, social entrepreneurship education remains a relatively new field. The literature further suggests that social entrepreneurship education is commonly developed within institutions where entrepreneurship education is already established (Han et al., 2023). However, in maritime universities, entrepreneurship education itself appears to be insufficiently developed, which may help explain the limited academic attention given to social entrepreneurship in the maritime context (Özdemir, 2023). A preliminary Google Scholar search using keywords such as “maritime,” “social entrepreneurship,” and “entrepreneurship education” identified only a limited number of studies addressing social entrepreneurship in the maritime context, suggesting comparatively limited academic attention to the topic.

Among the limited studies identified, one example is the work of Rivai and Sikar (2024), which examines the role of social entrepreneurship in fostering a maritime-oriented economy. In this study, the authors investigated innovations in social entrepreneurship and community development, focusing on initiatives designed to improve the economic conditions of coastal villages in the Riau Islands. They found that activities such as ecotourism, marine aquaculture, and marine product processing can increase the income of coastal communities by creating jobs and providing sustainable opportunities for the local community. Because they have various income alternatives, their dependence on traditional fisheries decreases, which may help preserve natural resources. The study concluded that social entrepreneurship, with the help of the government, has the potential to increase the quality of life and the welfare of the community.

Shahidullah and Islam (2018) investigated the case of an indigenous cooperative in Northern Manitoba and found that it had the potential to thrive as a social enterprise if it went beyond its current role as a raw fish supplier. The study found that by investing in upstream value chain activities- such as building modern processing facilities- the cooperative could move into secondary markets, create jobs, and generate greater social benefits for the community. In short, strengthening community-level value chain participation can turn cooperation into a more impactful driver of social and economic development. They implied that some form of capacity building, skills development, and entrepreneurial know-how would be needed for this, which means cooperative members would need training in entrepreneurial skills to manage value-added production, distribution, and scaling.

Shokhnekh et al. (2022) investigated the role of social entrepreneurship from a perspective that includes all modes of transportation, including maritime. They found that transportation activities

in areas where large companies are unwilling to operate due to a lack of profitability are carried out by small businesses operating under the status of “social entrepreneurship”. The resulting synergy from these activities could lead to reduced unemployment, the creation and adoption of innovation, accelerated changes in the economic structure, and lower prices in a competitive environment. Furthermore, it may be possible to improve service quality and alleviate some of the state's burden in social areas. The study also highlighted the importance of education in promoting social entrepreneurship, noting that higher education institutions had a role to play in this regard. It emphasized that education at the university level could introduce individuals to social entrepreneurship.

Another study highlighting the role of social entrepreneurship in solving social problems within maritime communities was conducted by Achmad et al. (2024). The researchers introduced the Program for the Implementation of Research Results for Society (PIHAT) and stated that this program aimed to develop a milkfish cracker business as an additional source of income for fishing families in Kalanganyar Village. This program, which is consistent with the social entrepreneurship approach, aims to empower women fishermen by utilizing local potential and, thus, improve the welfare of coastal communities. Ramadhani et al. (2025) mentioned another program in the same region. They emphasized that the community empowerment program in Sidoarjo, a region with great potential in the fishing and aquaculture sectors in Indonesia, guided people to establish a system that can turn organic waste into fish bait with the help of a fly's larvae. Thus, they established the circular economy system there, which prevented environmental pollution and health risks.

A similar study on how social entrepreneurship and social innovation can solve social problems in the fishing sector was conducted by Akinsete et al. (2022). The project named “A Box of Sea” was implemented in Greece. With this project, a distribution model was developed to make low-impact fishing more economically viable and to ensure triple sustainability.

The TRY Oyster Women's Association is another example of a female-led social enterprise that facilitates effective natural resources management, environmental stewardship, and social and economic inclusion within small-scale blue food systems in The Gambia (Nyiauwung & Ayilu, 2025).

On the other hand, although competency-based research has provided insights into social entrepreneurship, it has also attracted criticisms. First, it can be argued that showing entrepreneurial competencies does not necessarily lead to entrepreneurial behavior, as contextual influences, opportunities, and institutional conditions might also play a role in social entrepreneurship behavior (Daliman et al., 2019). Second, education, which is seen as a driver of entrepreneurial knowledge and skills, has had mixed effects on levels of entrepreneurial intention, and performance across different studies (Otache et al., 2021; Mensah-Williams & Derera, 2023). Finally, trait-based views of entrepreneurship have been criticized, for overemphasizing personal traits, and downplaying the potential importance of environmental and situational factors (Shaver, 2024). These complexities indicate that competencies should be seen as part of a broader context, rather than as isolated or absolute standards.

In summary, the literature reviewed indicates that the maritime social entrepreneurship phenomenon is mainly studied in terms of community development, environmental sustainability, and small enterprises. However, the studies are usually context-specific, and tend to study and report case outcomes rather than more general results on provided common denominators and sets of competencies. In addition, while some literature exists on the education and competency building for marine entrepreneurship, very little is known about competencies in a maritime setting. This research also indicates that competencies do not always lead to entrepreneurial action, and that education has contextualized effects. However, measuring the dimensions of social entrepreneurship competencies within the context of the maritime sector remains underexplored, particularly from the perspective of the future maritime workforce.

1.2 Social entrepreneurship education

In response to this gap, recent studies have begun to explore the role of education in fostering entrepreneurship and social entrepreneurship. Research on entrepreneurship courses in maritime education remains limited, though it is increasing as universities recognize the importance of entrepreneurship amid the new world order shaped by technological developments. One viewpoint holds that these developments will cause the loss of traditional jobs while creating new ones across all sectors, including maritime. However, the number of new jobs will not match the number lost, requiring the creation of new roles in unprecedented fields (Zemtsov, 2020; Magnani, 2022). This is possible with people who have an entrepreneurial mindset (Ozdemir, 2025). This suggests the importance of entrepreneurship courses in maritime schools. A study of top maritime universities, referred to as "Blue Universities," found that some entrepreneurship courses, though limited in number, were offered under different names, including "Social Entrepreneurship" (Ozdemir, 2023). These courses are designed to cultivate a social entrepreneurial mindset and to make students aware of the importance of entrepreneurship (Selasдини, 2024). Another study that pointed out the insufficiency of entrepreneurship education in maritime universities was conducted by Cahyadi et al. (2025). They criticized current maritime education programs and noted that many existing training programs focus on regulatory compliance rather than fostering an entrepreneurial mindset for sustainability-driven innovation, which is relevant to social entrepreneurship education. They suggested that these programs should be expanded to incorporate sustainability entrepreneurship, making it a robust part of the curriculum. Another study that emphasized the relationship between sustainability and entrepreneurship was conducted by Barasa et al. (2026). They argued that maritime entrepreneurship should be part of multidisciplinary approaches to education to improve sustainable coastal development that is vital for both the welfare of the people and healthy oceans. They suggested integrating marine conservation education and maritime entrepreneurship training for sustainable coastal socio-economic development. Another study that defined the limited integration of sustainability-focused curricula in education as a challenge in the maritime sector suggested a gap in social entrepreneurship education (Onwuneme & Ubada, 2025).

On the other hand, some maritime higher education institutes (HEIs), which refer to universities, faculties, or academies offering undergraduate and/or postgraduate programs in maritime-related fields such as maritime transportation, marine engineering, naval architecture, and maritime business and logistics, have already started to include social entrepreneurship education in their curricula. One of them is Technology and Maritime Transport's Entrepreneurship Center (AAST-EC), which supports social entrepreneurship ventures contributing to UN Sustainable Development Goals (SDGs) in Egypt (Ead et al., 2026). They investigate how the Entrepreneurial Support Organization- which is part of a maritime academy- empowers social enterprises, using a mixed-methods approach to analyze 12 startups.

Beyond the maritime context, McCarthy (2025) presents a business school example demonstrating how social entrepreneurship can be systematically integrated into higher education through institution-wide initiatives aligned with the United Nations Sustainable Development Goals (SDGs). Although implemented outside maritime education, this approach offers useful insights for maritime higher education institutions seeking to strengthen entrepreneurship education.

There are some examples of social entrepreneurship education activities that aim to increase the welfare of the people living mostly in remote coastal communities. Of these, a large-scale social entrepreneurship education program (SPEED-You-UP or SYU) is designed for at-risk Not in Education, Employment, or Training (NEET) students and NEET young people across coastal regions in France, Belgium, the Netherlands, and the United Kingdom. It aims to engage NEETs in social entrepreneurship and tries to identify enablers and barriers for this (Anwuzia et al., 2025). Another one explains the university's involvement with the Setiu fishing community, which successfully changed the quality of fishermen's lives through social innovation by introducing bonding, bridging, and linkage (Rashid et al., 2024).

Overall, the reviewed studies indicate that social entrepreneurship education in the maritime sector is gaining increasing attention, particularly in relation to sustainability, innovation, and employability. Existing research highlights the growing recognition of entrepreneurship education within maritime institutions and its potential to support sustainable development and community engagement. However, these studies primarily focus on program descriptions, curriculum development, or institutional initiatives, with limited emphasis on systematically assessing student competencies. Furthermore, the integration of social entrepreneurship into maritime education remains uneven and underdeveloped across institutions. This suggests a need for empirical research that examines the competency levels of students and provides evidence-based insights into how social entrepreneurship capabilities can be fostered within maritime education.

The present study seeks to address this gap by evaluating the social entrepreneurship competencies of maritime students.

1.3 Features of social entrepreneurs

Although social entrepreneurship, characterized by the integration of entrepreneurial principles and the resolution of social issues into sustainable economic growth, is fundamentally the same concept as entrepreneurship, upon closer examination, it exhibits certain distinct differences. Therefore, the skills required of a social entrepreneur differ from those of an entrepreneur. Thus, some researchers have approached the subject from the perspective of personal features, exploring the traits that social entrepreneurs should possess. One of these studies revealed that among the most significant features that affect social entrepreneurship intention are agreeableness, conscientiousness, extraversion, emotional stability, openness, social self-efficacy, and social support (Hossain et al., 2024), while the main features of entrepreneurs are defined as innovation, creativity, risk-taking, proactiveness, opportunity recognition, resilience, and self-confidence (Neupane et al., 2025; Li et al., 2022; Rosado-Cubero et al., 2022).

In addition to these features, social entrepreneurs must possess empathy and compassion (Chandra et al., 2022), a sustainability mindset (Kamaludin, 2023), resourcefulness (El Ebrashi & El-Batawy, 2024), and nonfinancial motivations (Ogundipe, 2025). Rojas et al. (2025) conducted meticulous research on social entrepreneurship competencies and identified several traits, including leadership, optimism, perseverance, resilience, creative problem-solving and innovation, empathy, ethics, and emotional and social intelligence.

Capella-Perris et al. (2020) made a comprehensive study to determine which features are required to be a good social entrepreneur and identified 19 features of social entrepreneurship competency. They divided these features into three categories: personal, social, and innovative, as **Table 1** shows. They concluded that, if higher education students are competent enough in these categories, they can be good social entrepreneurs.

Table 1 Features of a Social Entrepreneur (based on the study by Capella-Perris et al., 2020).

Social Entrepreneurship		
Individual Features	Social Features	Innovative Features
Confidence	Offering help and cooperation	Leadership
Goal-orientation	Social awareness	Initiative
Motivation	Co-existence and respect for public affairs	Ability to change
Ability to take risks	Resilience	Belonging to well-informed social networks
	Responsibility	Ability to identify opportunities
	Commitment and coherence	
	Ability to learn and evolve	
	Creativity	

In addition to general social entrepreneurship competencies, the maritime context requires several domain-specific adaptations, including maritime environmental awareness, regulatory and compliance literacy, cross-border stakeholder coordination, and sensitivity to coastal community needs. Furthermore, opportunity recognition and innovation competencies are shaped by the operational conditions of the maritime and blue economy sectors. These adaptations highlight how social entrepreneurship competencies are contextually embedded within the maritime domain. The present study seeks to examine the extent to which students at a maritime university demonstrate competencies associated with social entrepreneurship by proposing the following hypotheses:

Hypothesis 1: Personal characteristics of maritime university students are positively associated with their social entrepreneurship competency.

Hypothesis 2: Social competencies of maritime university students are positively associated with their social entrepreneurship competency.

Hypothesis 3: Innovative capabilities of maritime university students are positively associated with their social entrepreneurship competency.

Hypothesis 4: Personal characteristics, social competencies, and innovative capabilities significantly predict the social entrepreneurship competency of the students.

2. Materials and methods

2.1 Data collection

Several scales measure social entrepreneurship from different viewpoints, such as social entrepreneurial antecedents or orientation of people (Kruse et al., 2025), or opportunity recognition or career decision of the students (Viswanath et al., 2024; Viswanath & Kumar, 2024). However, none of these measure the social entrepreneurship competency of tertiary education students from different viewpoints, such as individual, social, or innovative ones. In this study, the Social Entrepreneurship Competency Scale in Higher Education, developed by Capella-Perris et al. (2020), was used because it was specifically designed for, validated on, and tested with university students. Moreover, it is the only one that measures their individual, social, and innovative features together. The scale is also suitable for assessing the social entrepreneurship competency of not only different educational programs but also social contexts. Since English is not the students' native language, the Turkish adaptation of the scale by Soba and Yıldız (2020) was used in this study to avoid any misunderstanding.

2.2 Study population

The study was conducted at a university with a dedicated maritime faculty and a maritime vocational school, in addition to maritime-related courses integrated into other academic programs. Of the 471 students who participated in the survey, 222 were from the Department of Maritime Business Administration in the Faculty of Economics and Administrative Sciences (FEAS), 145 were from the Department of Shipbuilding and Marine Engineering in the Faculty of Engineering, and 102 were from the Faculty of Maritime Studies, which provides seafarer education and training.

The data was collected by the convenience sampling method. The survey, which was electronically distributed to 655 second-year students in the second semester of the 2024 - 2025 academic year, was completed by 471 students. Second-year students were selected because they had already begun taking entrepreneurship-related courses during the data collection period, allowing the study to examine the early development of social entrepreneurship competencies.

This study was approved by the Ethics Committee of Piri Reis University, Faculty of Social and Human Sciences, with Document Verification Code: FEC281D2-D9DA-4199-B1AF-C0D81B5449A8, and Barcode: 000248395 (Approval Date: January 12, 2026; Decision No: 50). Participation in the survey was voluntary, and informed consent was obtained from all participants

before data collection. All responses were collected anonymously and treated confidentially. Before the survey began, participants were provided with an informational paragraph summarizing the purpose of the study and how long it might take to respond to the survey. Participants were then asked if they wished to continue with the survey and were required to select either the “yes” or “no” option. Those who chose to continue selected the “yes” option and began answering the survey questions.

There were two demographic questions regarding age and gender, and four general yes/no questions related to entrepreneurship, addressing prior entrepreneurship education, the presence of entrepreneurs in the family or close social environment, previous work experience, and intention to establish a business. The questionnaire contained 30 statements on a 5-point Likert scale to assess social entrepreneurship competency across three dimensions: individual, social, and innovative. The options used in the scale were “1- Strongly disagree, 2- Disagree, 3- Neither agree nor disagree, 4- Agree, 5- Strongly Agree.” The full list of questionnaire items is provided in **Appendix A**.

A limitation of this study is that it represents the perspectives of students from only one maritime university in a particular area. While similar outcomes may be expected at other institutions within the same region, the findings could vary in different geographical locations.

Of the 471 students who participated in the study, 249 (52.9 %) were male, and 220 (46.7 %) were female. Regarding faculty distribution, 222 participants (47.1 %) were from the Faculty of Economics and Administrative Sciences, 145 (30.8 %) were from the Faculty of Engineering, and 102 (21.7 %) were students from the Faculty of Maritime Sciences. Participants’ characteristics related to gender and faculty are presented in **Table 2**.

Table 2 Gender and faculty profile of the participants.

		N	N%
Gender	Male	249	52.9
	Female	220	46.7
Faculty	Maritime Faculty	102	21.7
	FEAS	222	47.1
	Engineering Faculty	145	30.8

2.3 Data analysis

The collected data were analyzed using SPSS 26.0 and AMOS 24.0. First, descriptive statistics and frequency analyses were conducted. Confirmatory Factor Analysis (CFA) was employed to test the construct validity of the scale. The Kaiser-Meyer-Olkin (KMO) and Bartlett’s sphericity tests confirmed the suitability of the data for factor analysis. Model fit was evaluated using CFI, GFI, NFI, RMSEA, SRMR, and CMIN/df indices, and the results supported the validity and reliability of the three-dimensional scale structure. Normality analysis indicated a normal distribution. Independent samples, t-tests, one-way ANOVA, and Pearson correlation analyses were conducted to examine relationships between demographic variables and scale dimensions, as well as among the three subdimensions themselves.

2.4 Reliability and validity analyses of the research scale

The Kaiser-Meyer-Olkin (KMO) sample adequacy test, conducted to assess the suitability of scale factors for factor analysis, yielded a result of 0.962. This value indicates that the sample is highly suitable for factor analysis. Furthermore, according to the Bartlett Sphericity Test result ($\chi^2 = 9,768.526$, $df = 435$, $p < 0.001$), the correlations between variables are at a meaningful level for factor analysis. **Table 3** is the KMO and Bartlett’s Test table.

Table 3 KMO and Bartlett's Test table.

Kaiser-Meyer-Olkin Sampling Adequacy		0.962
Bartlett's Sphericity Test	Approximate Chi-Square	9,768.526
	df	435.000
	p	0.000

Confirmatory factor analysis was applied to evaluate the construct validity of the scale used in the study. As a result of the analysis, the fit of the three-factor model with the data was evaluated, and it was determined that the model showed an acceptable level of fit with the proposed modification indices. The goodness-of-fit indices obtained were: $\chi^2 = 1,518.90$, $CMIN/df = 3.83$, $CFI = 0.88$, $GFI = 0.82$, $NFI = 0.85$, $RMSEA = 0.078$, and $SRMR = 0.05$. As **Table 4** shows, these values indicate that the model is sufficiently valid.

Table 4 Goodness-of-Fit indices for the CFA model.

Goodness-of-Fit	Acceptable Range (Byrne, 2013)	Model Values
Chi-square		1,518.900
CFI	$0.80 \leq CFI \leq 0.90$	0.880
CMIN/df	≤ 5	3.830
GFI	≥ 0.80	0.820
NFI	≥ 0.80	0.850
SRMR	$0.05 \leq SRMR \leq 0.08$	0.050
RMSEA	$0.05 \leq RMSEA \leq 0.08$	0.078

Analysis of the standardized factor loadings for the items in the model revealed that most items had loadings above 0.70. This indicates that the items adequately represent their underlying constructs. A few items (e.g., 0.613, 0.662, 0.686) fall below the 0.70 threshold, but are considered acceptable loadings in the literature, as they remain above 0.50. The literature states that factor loadings should be at least 0.50, and that items below this value do not adequately represent the structure they measure and can be removed from the model (Hair et al., 2023). In this context, the factor loading of item S15 belonging to the social features factor was determined to be quite low, at 0.373, and it was seen that the item in question was insufficient in representing the structure it measured. In line with the relevant literature, this item was removed from the model. The factor loading, means, and standard deviations of the items belonging to the factors are given in **Table 5**.

Since the average value of the items in the questionnaire related to the students' personal features at the sampled population is 3.87 out of 5.00, and factor loadings are above 0.70 except for two items, which are above the acceptable value of 0.50, Hypothesis 1 is supported. The findings suggest that the personal characteristics of maritime university students are significantly and positively associated with their social entrepreneurship competency.

Table 5 Factor loadings and descriptive statistics for the scale items.

Factor	Item	Factor Loadings	Mean	SD
Personal Features (Average: 3.87, SD: 0.77)	<i>P1</i>	0.796	3.87	1.05
	<i>P2</i>	0.818	4.06	1.03
	<i>P3</i>	0.791	4.08	0.97
	<i>P4</i>	0.579	3.56	1.13
	<i>P5</i>	0.770	3.70	0.97
	<i>P6</i>	0.678	3.89	1.04
	<i>P7</i>	0.779	3.82	0.93
	<i>P8</i>	0.781	4.18	0.92
	<i>P9</i>	0.613	3.66	1.06
Social Features (Average: 4.00, SD: 0.73)	<i>S10</i>	0.711	4.06	0.91
	<i>S11</i>	0.702	4.01	0.93
	<i>S12</i>	0.783	4.24	0.92
	<i>S13</i>	0.774	3.96	0.93
	<i>S14</i>	0.797	4.00	0.95
	<i>S16</i>	0.674	3.93	0.97
	<i>S17</i>	0.810	3.96	0.89
	<i>S18</i>	0.791	4.15	0.90
	<i>S19</i>	0.558	3.76	1.14
	<i>S20</i>	0.705	3.98	0.99
Innovative Features (Average 3.89, SD: 0.73)	<i>I21</i>	0.686	3.72	1.06
	<i>I22</i>	0.662	3.67	1.03
	<i>I23</i>	0.746	3.83	0.96
	<i>I24</i>	0.701	3.81	0.99
	<i>I25</i>	0.825	4.01	0.92
	<i>I26</i>	0.733	4.04	0.89
	<i>I27</i>	0.841	4.06	0.81
	<i>I28</i>	0.741	3.96	0.95
	<i>I29</i>	0.763	3.83	0.94
	<i>I30</i>	0.686	3.96	0.96

H2, which proposes that the social characteristics of maritime university students make them well-suited to become effective social entrepreneurs, is supported. The factor loadings of all items related to students' social characteristics are above 0.50, with seven items exceeding 0.70. The mean value of the items is 4.00, with a standard deviation of 0.73. One item with a factor loading below 0.50 was excluded from the analysis.

The innovative characteristics of the participants are relatively high, as the factor loadings of all items in the innovation dimension exceed 0.62, above the accepted threshold of 0.50. The mean score is 3.89, with a standard deviation of 0.73. Accordingly, H3 is supported.

H4 proposes that maritime university students exhibit a high level of social entrepreneurship competency, which is reflected in their individual, social, and innovative competencies. Social entrepreneurship competency is conceptualized as an aggregate of these three dimensions. In this study, all three dimensions demonstrate high values, indicating a high level of social entrepreneurship competency. Therefore, H4 is supported.

3. Results

The entrepreneurial competencies of students (personal, social, and innovative features) were analysed according to demographic variables and yes/no questions.

Regarding gender, no significant differences were found in personal ($p = 0.386$) and innovative features ($p = 0.312$). However, female students scored significantly higher in social features ($p = 0.003$), suggesting stronger social entrepreneurial competencies compared to males, as **Table 6** shows.

Table 6 Distribution of factors by gender.

	Male		Female		p
	Mean	SD	Mean	SD	
Personal Features	3.84	0.87	3.90	0.65	0.386
Social Features	3.91	0.85	4.10	0.55	0.003*
Innovative Features	3.86	0.84	3.93	0.60	0.312

In terms of faculty, no significant differences were found in personal ($p = 0.386$) and innovative features ($p = 0.312$). However, as **Table 7** shows, a significant difference was observed in social features ($p < 0.001$), with engineering students showing slightly higher scores.

Table 7 Distribution of factors by faculty.

	Maritime Faculty		FEAS		Engineering Faculty		p
	Mean	SD	Mean	SD	Mean	SD	
Personal Features	3.85	0.87	3.88	0.70	3.86	0.69	0.386
Social Features	3.93	0.97	4.01	0.65	4.04	0.63	< 0.001*
Innovative Features	3.73	0.89	3.91	0.66	3.88	0.67	0.312

Table 8 shows that students who had taken an entrepreneurship course did not differ in personal ($p = 0.173$) or social features ($p = 0.438$), but scored significantly higher in innovative features ($p = 0.041$), indicating a positive effect of entrepreneurship education.

Table 8 Distribution of factors according to entrepreneurship course enrolment status.

	Have you ever taken an entrepreneurship course?				
	Yes		No		p
	Mean	SD	Mean	SD	
Personal Features	3.92	0.82	3.82	0.74	0.173
Social Features	4.03	0.82	3.98	0.65	0.438
Innovative Features	3.96	0.81	3.82	0.67	0.041*

* $p < 0.05$

Having an entrepreneur in the family or close environment had no significant effect on personal ($p = 0.082$) or social features ($p = 0.275$) but significantly increased innovative features ($p = 0.005$), as can be seen in **Table 9**.

Horizontal and vertical table borders were missing in the proof and have been restored for **Tables 9 - 12**.

Table 9 Comparison of features according to entrepreneurial environment.

	Are there entrepreneurs in your family or close community?				
	Yes		No		<i>p</i>
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	
Personal Features	3.92	0.82	3.79	0.68	0.082
Social Features	4.03	0.77	3.95	0.63	0.275
Innovative Features	3.96	0.78	3.76	0.64	0.005*

* $p < 0.05$

As **Table 10** reveals, work experience was associated with higher social ($p = 0.030$) and innovative features ($p = 0.007$), while no significant difference was found in personal features ($p = 0.078$).

Table 10 Comparison of features according to work experience.

	Do you have any experience, such as an internship or working somewhere?				
	Yes		No		<i>p</i>
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	
Personal Features	3.91	0.78	3.76	0.75	0.078
Social Features	4.04	0.73	3.87	0.70	0.030*
Innovative Features	3.94	0.73	3.73	0.74	0.007*

As **Table 11** shows, students intending to start their own business scored significantly higher in all three dimensions: personal ($p = 0.018$), social ($p = 0.014$), and innovative features ($p < 0.001$).

Table 11 Comparison of features according to the desire to start a business.

	Would you like to start your own business?				
	Yes		No		<i>p</i>
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	
Personal Features	3.90	0.78	3.62	0.70	0.018 *
Social Features	4.03	0.73	3.76	0.68	0.014*
Innovative Features	3.93	0.73	3.52	0.71	< 0.001*

* $p < 0.05$

Finally, correlation analysis showed strong positive relationships among all dimensions: personal and social ($r = 0.830$), personal and innovative ($r = 0.780$), and social and innovative ($r = 0.819$), all significant at $p < 0.01$, as shown in **Table 12**.

Table 12 Relationships among personal, social, and innovative features.

	Personal Features	Social Features	Innovative Features
Personal Features	1		
Social Features	0.830*	1	
Innovative Features	0.780*	0.819*	1

* $p < 0.01$

4. Discussion

The findings of this study suggest that female students attending a maritime university have higher social features in terms of social entrepreneurship competence. That means they have higher social awareness in comparison with boy, and are better at offering help and cooperation to people in need, which is quite important in social entrepreneurship. They are creative and have a high level of responsibility, commitment, and coherence in what they do. These, together with resilience, are the features that successful social entrepreneurs should have (Ahmad & Basarudin, 2025; Nazir & Das, 2025). Studies conducted in different geographic areas found that social entrepreneurial intention levels were significantly higher among female university students compared to males (Chipeta et al., 2020; Cardella et al., 2024; López-Cózar-Navarro et al., 2025; Nguyen et al., 2026). Nevertheless, the literature also reports mixed findings, including studies indicating no significant gender differences (Lyu et al., 2024) as well as studies reporting higher entrepreneurial self-efficacy among male students (Vázquez-Parra et al., 2023).

Another finding of the study is that the social features that support social entrepreneurship are higher among the students at the engineering faculty of the maritime university, which suggests higher social entrepreneurial tendencies among engineering faculty students. The studies by Erkir and Kayapinar (2025) found that problem-solving, critical thinking, and self-evaluation skills of the graduates from engineering faculties are significantly higher than those of the graduates of other faculties and that they tend to demonstrate relatively strong leadership skills and creativity. The findings of this study reveal that maritime university students are no exception. Although this finding is supported by Lingappa et al. (2022) and Gurganus et. al. (2025), some studies found contrary evidence, such as Cruz-Sandoval et al. (2023), who identified that social entrepreneurship tendency is higher among business students. While the positive role of education in developing an entrepreneurial mindset has been widely documented (Carpenter & Wilson, 2022; Fauzi et al., 2024), Eesley and Lee (2021) argue that university entrepreneurship programs may not necessarily increase entrepreneurship rates but may instead help students better identify their entrepreneurial potential. They also found that the Business School program at Stanford had a negative to zero impact on entrepreneurship rates among alumni, and participation in the Engineering School program had no impact on entrepreneurship rates.

However, entrepreneurship education can be beneficial for students regardless of their competencies or entrepreneurial intentions, as it supports the development of transferable skills, noncognitive competencies, and an entrepreneurial mindset. In addition, education and training in both formal and informal environments have been shown to strongly influence individuals' social entrepreneurial intentions (Duong, 2023; Zulfigar et al., 2021).

However, the findings should not be interpreted as suggesting that all maritime students want to be entrepreneurs or social entrepreneurs, since the students may have different career expectations,

motivations, competencies, and willingness to engage in entrepreneurial activities. Not all students will aspire to start their own business or social innovation, and will want to pursue other opportunities in the maritime industries, in public sector roles or technical jobs. Therefore, entrepreneurship education should be offered in a flexible and open way that allows students to voluntarily develop their entrepreneurial and other transferable skills in relation to their own aspirations. In this context, an effective strategy to increase the effectiveness of entrepreneurship education programs would be to select highly entrepreneurial students and connect them with special mentoring, incubation, and experiential learning opportunities.

The findings of this study support previous research indicating that entrepreneurship education enhances students' entrepreneurial intentions and competencies (Khalil et al., 2024; Rajpal & Singh, 2024). Moreover, consistent with prior evidence, this study shows that entrepreneurship courses foster maritime students' innovativeness, opportunity recognition, and initiative-taking, as captured by the innovation dimension of the scale.

The study also found that having a successful entrepreneur in the close environment is another factor that supports innovative features in entrepreneurial competence of students in the maritime university, since those who have entrepreneurs in their family or close community scored higher regarding innovative features. As Lin et al. (2024) suggest, having ties with entrepreneurs helps people reach entrepreneurial networks, which, in turn, support them in developing entrepreneurial competencies. Likewise, Mawardi and Sahputri (2022) argued that growing up in entrepreneurial families and adopting entrepreneurial values from family members tends to increase individuals' likelihood of becoming entrepreneurs. On the other hand, Georgescu and Herman (2020) found that family background in entrepreneurship negatively moderates the relationship between entrepreneurship education effectiveness and entrepreneurial intention.

Experience, such as an internship or working somewhere, is another factor that supports maritime students' entrepreneurial competencies and helps them have the required social and innovative features to be social entrepreneurs to a great extent. This finding supports the argument put forward by Zhang et al. (2025), who point out the importance of the development of innovation skills through industry placements. The study also found that the personal, social, and innovative features of the students in the maritime university play a significant role in their intention to establish their own business, since these features are significantly higher among the students aiming at being entrepreneurs than those who prefer to work for other people. It was also proven by the survey results that, as individuals' personal features increase, their social and innovative features also tend to increase. In particular, the relationship between social and personality features is at the highest level.

The high level of association among personal, social, and innovative competencies confirms previous findings in the entrepreneurship literature emphasizing the importance of integrated skill sets for entrepreneurial success (Jardim, 2021; Pennetta et al., 2024), which reinforces the view that entrepreneurial outcomes depend on the synergy of multiple competency domains. Such integration of competencies may be particularly relevant in the context of social entrepreneurship, which differs from traditional entrepreneurship in that it is driven not only by economic objectives but also by social value creation, thereby requiring individuals to integrate personal competencies, social engagement, and innovative thinking (Hietschold et al., 2023; Pansuwong et al., 2023; Vázquez-Parra et al., 2024).

This study also found that there is a high and significant correlation in the relationship between maritime students' personal and social features, which shows that people who have strong personal traits are likely to be socially strong. People with features like self-efficacy, risk-taking, and leadership at high levels are good at collaboration, altruism, and social responsibility, too. This suggests a high alignment between "individual determination" and "orientation for the benefit of society," which are indispensable for social entrepreneurship. In the maritime context, effective communication, leadership, and teamwork are important for safety and operational efficiency (Ververi, 2024), which makes the harmony between personal and social dimensions particularly evident.

There is a significant positive correlation between personal features and innovative features, which indicates that determined, risk-taking, and self-efficacious individuals also tend to produce innovative solutions. That means creative problem-solving capabilities are fostered by entrepreneurial inclination. People with these features can both overcome challenges and find unique solutions to existing problems. This has some implications in the maritime industry, which is in a state of transformation because of sustainability pressures, digitalization, and automation. Because of this, innovation is regarded as an indispensable competency in the maritime sector (Karatsoli et al., 2024). Therefore, maritime students who combine strong personal features with an innovative mindset are better positioned to address emerging sectoral challenges such as reducing carbon emissions, developing alternative fuels, and improving the efficiency of maritime logistics (Qazi et al., 2021).

The correlation between social and innovative features is also high, which is evidence that people who are socially aware and collaborative are inclined to think innovatively. This finding forms a critical foundation for social innovation, as social entrepreneurship requires not only the generation of innovative ideas but also their implementation for social benefit. For maritime students, being socially inclined not only fosters interpersonal relationships within peer groups but also facilitates collaboration with industry stakeholders, non-governmental organizations (NGOs), and local communities, which may expand their capacity to identify social needs and design innovative solutions. In this context, social entrepreneurship education at maritime universities can serve as a powerful mechanism to foster socially integrated innovations that prepare students to become social entrepreneurs, addressing challenges in both the maritime industry and maritime communities.

Based on these findings, the results indicate that students at the maritime university demonstrate strong potential for social entrepreneurship. In particular:

- The strong correlation between personal and social features ($r = 0.830$) indicates that maritime students exhibit both personal commitment and social sensitivity.
- High innovativeness ($r = 0.780$) demonstrates a strong capacity to generate creative solutions to social problems.
- The positive and significant interrelations among the three dimensions (personal, social, and innovative), as shown in **Table 12**, suggest that maritime students possess the integrated competencies required for social entrepreneurship.

These findings also have important implications for major stakeholders in maritime education and industry. For maritime universities, the results highlight the importance of integrating social entrepreneurship, sustainability, innovation, and leadership training into maritime curricula through interdisciplinary and experiential learning approaches. For educators, the findings suggest that entrepreneurship-related competencies can be strengthened through problem-based learning, industry collaboration, mentorship, internships, and community engagement projects. Maritime industry stakeholders and policymakers may also benefit from supporting university-industry partnerships that encourage students to develop innovative and socially responsible solutions to sectoral challenges such as decarbonization, digital transformation, safety, and workforce sustainability. In addition, non-governmental organizations and local communities can play an important role by collaborating with maritime universities to foster socially oriented innovation ecosystems.

As a result, the study reveals that the students are risk-taking, leadership-oriented, socially aware, and innovative, which indicates a high potential for becoming successful social entrepreneurs in the future.

As pointed out by Cahyadi et al. (2025), a holistic approach that prioritizes both technological adaptation and the development of soft skills, such as leadership and resource management, which are vital for future leaders, is needed for maritime education. Upon the evaluation of these findings together, the necessity of an integrated approach appears to encourage maritime students to be social entrepreneurs. The fortification of personal traits through leadership and sustainability training, the development of social capacity through teamwork and social projects, and the encouragement of

innovative thoughts through problem-based learning can create a continuous learning cycle where the developments in one field affect the other fields. This experimental learning is compatible with research on the higher education ecosystem that emphasizes the necessity of a supportive ecosystem integrating interdisciplinary cooperation and mentorship (Cahyadi et al., 2025; Al Issa et al., 2025).

In conclusion, the strong interrelationships observed in this study provide empirical support for the argument that social entrepreneurship is a multidimensional construct where personal, social, and innovative traits operate synergistically. For maritime students in this context, these findings underline the importance of embedding social entrepreneurship education into curricula as a means of preparing students to address the challenges posed by economic fluctuations, environmental pressures, technological changes, and human resource constraints, at both the macro and micro levels, to ensure sustainable and resilient maritime operations.

This study has several limitations that should be considered when interpreting the findings. First of all, it was conducted at only one maritime university; therefore, the generalizability of the findings to other universities, countries, and cultures may be limited. If replicated across multiple or different national maritime universities, or in other countries, the study might reveal if the same relationships would be identified given differing educational and socio-cultural contexts. Additionally, the findings were derived from self-reported survey data, which can be subject to social desirability bias and respondents' subjective perceptions. Future research could employ qualitative methods such as interviews, focus groups, or longitudinal studies to further investigate the development of social entrepreneurship competencies among maritime students. Third, due to its cross-sectional nature, the study has no capacity to identify causality between entrepreneurship education and personal characteristics related to entrepreneurial dispositions (e.g., prior entrepreneurial experience, normative attitudes, entrepreneurial self-efficacy). Longitudinal research could address questions related to the development of entrepreneurial competences over time and the long-term impact of entrepreneurship education on behavioral outcomes. Further research could investigate the differences between students with low versus high entrepreneurial intentions, career orientation, and willingness to engage in social entrepreneurship activities. Identifying why students do or do not follow such entrepreneurial career paths could help to better tailor these programs at maritime universities. Future research could further examine the impact of factors such as institutional support, mentoring programs, maritime industry culture, sustainability awareness, and digitization on the development of social maripreneurial skills.

5. Conclusions

This study aims to evaluate the social entrepreneurship skills of students in a maritime university and their potential to address social or environmental challenges that are neglected or inadequately addressed in maritime communities through these skills.

The maritime sector faces not only global challenges, such as the adoption of green logistics, reduction of carbon emissions, and transition to alternative fuels, but also local or regional ones, like the education, health improvement, or welfare of local communities. While international bodies, governments, and large companies take measures to address global challenges, many of these challenges require the active involvement of local stakeholders with a social entrepreneurship mindset and skills to cope with both global and local challenges. This study indicates that maritime university students have a high level of self-sufficiency, leadership, risk-taking, and resilience, which are strongly related to social awareness, responsibility, cooperation, and sacrifice. These traits may be combined with entrepreneurship education, supporting the development of social entrepreneurial competencies for addressing challenges in maritime communities.

The necessity of finding permanent and sustainable solutions to local or regional challenges and increasing the welfare of coastal communities gives maritime universities a significant responsibility to train sector professionals of the future who are not only technically proficient but also have a high level of social entrepreneurship skills.

This study also provides important insights for policy makers and curriculum designers in maritime universities concerning embedding social entrepreneurship education into the curriculum of maritime tertiary education and adopting experimentally and socially integrated, interdisciplinary models instead of traditional technical ones. This may help maritime universities further develop as educational institutions that contribute to the education of future stakeholders in the maritime industry who can create social values besides economic ones and participate in activities that promote sustainability.

In summary, the findings suggest that many maritime students possess personal, social, and innovative competencies associated with social entrepreneurship potential and the capacity to become social maripreneurs. Maritime universities can support the development of these competencies through flexible and student-centered entrepreneurship education opportunities for students interested in entrepreneurial and socially oriented career pathways. Such approaches may contribute to preparing maritime university students to become social maripreneurs capable of addressing the economic, environmental, and social sustainability challenges of the maritime sector through innovative and socially responsible initiatives.

Although this study provides important insights into the social entrepreneurship competencies of maritime university students and their potential to engage in social maripreneurship, the findings should be interpreted in light of contextual and methodological limitations. These limitations further highlight the need for additional research on social entrepreneurship education and social maripreneurship across diverse maritime higher education settings.

Declaration of generative AI in scientific writing

The author used ChatGPT (OpenAI) solely for language refinement and editing to improve the clarity and readability of the manuscript. With or without AI applications, the author is fully accountable for every process of the work and manuscript writing. All final edits, interpretations, and conclusions are the sole responsibility of the authors. The author academically and ethically confirmed that the stated AI statements are true, and the author is ultimately responsible and accountable for the contents of the published work, including the correctness of the references in the reference list.

CRedit contribution statement

Pınar Özdemir: Conceptualization, Methodology, Investigation, Data curation, Formal analysis, Writing – original draft, Writing – review & editing, Visualization.

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Appendix A

Social Entrepreneurship Competency in Higher Education Scale (Capella-Perris, 2020)

Personal Features

- 1 I believe in my potential.
- 2 I consider myself self-sufficient in achieving my goals.
- 3 I believe I am capable of dealing with most situations.
- 4 I am determined to achieve my goals.
- 5 I think it is necessary to take risks to make progress.
- 6 I always look for the positive side in bad situations.
- 7 I like to take calculated risks with new ideas.
- 8 I think people who take risks are more likely to succeed than those who do not.
- 9 I am able to do things imaginatively, in a different way from how others do them.

Social Features

- 10 I like helping my friends and classmates.
- 11 People who help others are an example to follow.
- 12 Coexistence problems can be solved by dialogue.
- 13 I believe that opportunities can be extracted from problems or difficult situations.
- 14 I take on the consequences of what I have said or done.
- 15 I usually perform very well in my role in any business project I am involved in.
- 16 I enjoy finding effective solutions for problems that nobody has looked at yet.
- 17 I would rather collaborate for free in a non-governmental organization.
- 18 I analyze my mistakes to learn from them.
- 19 I do every job as thoroughly as possible.
- 20 I am able to formulate suggestions to improve projects in which I participate.

Innovative Features

- 21 I like coordinating with other people while working in collaboration.
- 22 Sometimes I have participated in the implementation of group projects or collaborations.
- 23 I am good at handling unforeseen situations.
- 24 I improvise without difficulty when plans change.
- 25 I envision new uses for common objects.
- 26 I have access to the information required to become an entrepreneur.
- 27 I am able to create business opportunities and to take advantage of them.
- 28 When working in groups, I prefer to be the leader.
- 29 I have seriously considered starting my own business sometime after finishing my degree.
- 30 I prefer to work in situations that involve more people.