

## REQUIREMENTS AS FOR WORK ON BOARD A SHIP FROM THE PERSPECTIVE OF MARITIME FIELD STUDENTS AND SEAFARERS

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**Purpose:** The study aims to identify the opportunities for improving the employment offers by identifying differences in the requirements as for work on a ship formulated by maritime university students and seafarers.

**Design/methodology/approach:** To achieve the goal, the Kano method was applied, to determine the relationship between the level of requirements fulfilled to work on a ship and the students' and seafarers' level of satisfaction.

**Findings:** It was found that there are differences in how students and seafarers perceive the same requirements for working on a ship. As the perception of these requirements depends on the seafaring experience, shipowners should differentiate the terms and conditions of employment formulated in job offers to the targeted group of potential employees.

**Research limitations/implications:** The survey was conducted among students of only one Polish maritime university and, moreover, only seafarers of Polish nationality participated. Hence, future research in this area may include the identification of the requirements for work on board set by students and seafarers of other countries, as well as the identification of differences in the requirements for future work at sea set by students at the beginning and at the end of their education.

**Practical implications:** The study results obtained may prove helpful to shipowners in adjusting the job offers to the target group recruited. Such knowledge can help shipowner companies to effectively prevent the crisis related to the shortage of highly skilled seafarers and the subsequent disruption of the supply chain. In addition, it can also provide guidance for maritime universities to design academic programs customized to the expectations of both shipowners and future seafarers.

**Originality/value:** Research dedicated to assessing the impact of meeting shipboard job requirements on seafarers' satisfaction and dissatisfaction has not yet been conducted. In addition, the paper makes an innovative attempt to confront the requirements for work at sea formulated by seafarers with the requirements of students as future shipboard employees. The survey used the Kano method, a management-specific method not previously used in the maritime industry. The addressees of the results of the survey can be maritime universities, shipowners and maritime industry employees.

**Keywords:** Kano method, maritime industry, seafarers' requirements, students' requirements, working on board.

**Category of the paper:** Research paper.

## 1. Introduction

The international shipping industry is the backbone of global economy. Without shipping, global trade, mass transportation of raw materials, food or industrial goods would be impossible. Freight transportation by sea accounts for about 90% of global trade (Mitroussi, 2008; International Chamber of Shipping, 2021). This trade continues to grow, providing benefits to consumers around the world, resulting inter alia from competitive transportation costs. The constant increase in the efficiency of the international shipping industry as a mode of transportation and the high level of economic liberalization allows for the continuous intensive development of this industry. One of the key prerequisites for the maritime sector to operate efficiently includes a skilled and experienced maritime workforce that constitutes the ships' crews. The shipping data (e.g., volume and types of shipments, number of ships and seafarers and their characteristics) are constantly monitored by, inter alia, the international shipowners' associations BIMCO (Baltic and International Maritime Council) and ICS (International Chamber of Shipping), and their conclusions and observations are made available in the Seafarer Workforce Report (International Chamber of Shipping, 2021), published every few years.

According to the Seafarer Workforce Report, there are 1.89 million seafarers in the global merchant fleet, handling a total of more than 74 000 ships. The 2021 data indicate that more than half of the global population of seafarers working on merchant ships engaged in international trade were ratings (1 035 180 people), and the remaining 857 540 people were officers (Operational Level and Management Level) (International Chamber of Shipping, 2021). Currently, we can observe an increase in the global supply of ratings, primarily from countries such as the Philippines, the Russian Federation, Indonesia, China and India. At the same time, there is an ever-increasing shortage of qualified seafarers (Operational Level and Management Level), who are facing ever greater requirements as for their knowledge and skills resulting, inter alia, from the advancing digitalization and decarbonization in shipping. The competence and licenses required of seafarers depend on their function on the ship. In international shipping, there are various positions distinguished by the level of responsibility, including the auxiliary, operational and management levels (Directive..., 2022; Rozporządzenie..., 2018). From 2015 to 2021, we could observe a nearly 12% increase in the demand for merchant marine officers (Operational Level and Management Level), which, with the continuation of the current trend, could result in an officer shortage of up to 90 000

officers in 2026; while the greatest demand refers to the management level technical department officers.

In recent years, the efficient operation of logistics processes, including the maritime labour market, has been significantly affected by the pandemic. A significant number of seafarers have given up their jobs at sea, causing those who have continued to work in this sector to work well into the retirement age. Therefore, there is a growing need to identify ways to encourage young entrants to choose and develop a career at sea. The opportunities to address the issue of seafarer shortage also involve the greater feminization of the seafaring profession. The report described above highlights the increasing share of women in the maritime profession. At present, we can observe a steady increase in the share of women working aboard ships (by a total of about 50% since 2015), but this group still accounts for only 1.28% of the global maritime personnel labour market (International Chamber of Shipping, 2021; Kołodziej, 2016). Acquiring competencies specific to the seafarer profession is time-consuming and requires numerous sacrifices, and learning the specifics of the profession often discourages future seafarers from further professional development in this field. In accordance with the legal requirements (primarily the provisions of the STCW Convention), seafarers are required to have specialized education, complete a traineeship, undergo a number of training courses, and obtain certificates and licenses confirming their competence to work on a ship (Directive..., 2022; Rozporządzenie..., 2018; STCW Convention, 2017). In addition, the required training and certificates must be regularly renewed, and seafarers' knowledge should be constantly expanded and supplemented. The documents that all seafarers are required to hold include a maritime health certificate, a safety training certificate, a seaman's book, as well as a certificate confirming the acquired qualifications (such as a seaman's, engineer's, cook's, watch officer's or master's certificate) and a passport (STCW Convention, 2017). Furthermore, depending on the position, type of vessel and the shipowner's requirements, it may be necessary to hold specialized certificates, such as: Certificate of Advanced Training for Ships Operating in Polar Waters or Certificate of Basic Training in Liquefied Gas Tanker (Directive..., 2022; Rozporządzenie..., 2018). Moreover, seafarers are obliged to acquire knowledge of new technological solutions introduced on ships with the technological development occurring in the industry.

Hence, a number of requirements are formulated for all seafarers, depending on the position they occupy, in order to obtain and maintain the maritime diploma. At the same time, seafarers also face a number of requirements (needs and expectations) guiding them when choosing a shipowner or a type of ship and opting for a career in the maritime industry. The type and importance of these requirements most often derive from the seafarers' previous experience related to work on a ship and cooperation with shipowner companies. These requirements include the needs or expectations established (written down in a contract between the seafarer and the shipowner), are customary or mandatory (resulting from legislation) (International Organization for Standardization, 2015).

A similar trend is observed among seafarer candidates - students at maritime universities. Having no work experience, they have a certain idea of working on a ship and the requirements that will or will not be met in their future work, which undoubtedly affects the level of their satisfaction and subsequent choices related to work at sea and professional development (Lau, Ng, 2015; Kalvaitienė, Senčila, 2019). Consequently, it is challenging for today's shipowner companies to identify the requirements of both students and seafarers regarding work on a ship, and to shape and develop employment offers that are customized to the recruited group, to the largest degree.

The identification and implementation of solutions aimed to impede the ever-increasing shortage of highly skilled seafarers is currently a major challenge for shipowner companies. The crewing companies should ensure working conditions that meet the seafarers' specific requirements, and at the same time encourage the current and future students to start working for a given shipowner company. The increase in the number of seafarers with high competence may result from offering such employment conditions that will encourage young students to acquire maritime education and work in the shipping industry. Thus, the proper management of an organization requires the shipowners' (crewing) knowledge on the requirements of their stakeholders, primarily current and future employees (Caesar, Cahoon, 2015). This is confirmed by the results of previous studies devoted to seafarers' needs and expectations of work aboard a ship.

Yildirim, Toygar and Çolakoğlu (2022) indicated that inadequate working conditions adversely affect seafarers' physical and mental health, resulting in increased resignations from this type of work. The authors also point out that high salary is an important factor in encouraging people to choose the seafaring profession, but it is not the essential one. It seems that adequate remuneration is motivating, but not sufficient. In that case, shipowners should develop a strategy taking into consideration other requirements that are no less important to seafarers to increase the number of people interested in working at sea.

The knowledge necessary to develop such a strategy can be derived from information on the requirements that most affect the seafarers' satisfaction. At the same time, this information can provide guidance for improving the quality of crewing services in terms of employment conditions and ensuring a suitable working environment on board.

In view of the growing crisis in the labour market in global maritime logistics, related to the shortage of workers, it also seems valuable to provide information on the requirements of maritime university students as for their future work at sea. This knowledge can help both universities and training organizations, as well as the employees of crewing companies define appropriate HR policies. This relationship was also recognized by Caesar and Cahoon (2015), who indicated that due to the limited knowledge of maritime education and training organizations on their students, students' expectations and career ambitions, it is difficult to effectively retain them on ships. According to the authors, this situation results from the lack

of information on the students' career ambitions, which, in turn, may be the reason why students give up working on ships and choose other career paths.

Whereas Sencila and Kalvaitiene (2018) pointed out the relationship between the generations working together on a ship and the differences in their competencies. They observed that intergenerational differences have both a positive and negative impact on work on board. According to the students who participated in the study, the older generations passed on their professional knowledge and career opportunities, but also a number of negative aspects of a seafarer's career such as long-time separations from the family and isolation. Tezcan, Erdem and Oğuz (2020), on the other hand, pointed out that it is necessary to improve the reputation of the seafaring profession by improving the working conditions while preventing workforce abuse, in accordance with the regulations of the Maritime Labor Convention (MLC), which stipulates seafarers' rights to decent working conditions on ships. The MLC is the organization that develops guidelines for the minimum labour standards and seafarers' rights, such as employment conditions, accommodation, recreation options, food, health and safety, medical care and insurance (Maritime Labour Convention, 2006).

The results of other authors' work presented here indicate the global nature of this issue. However, studies to date have largely focused on identifying requirements as for competencies or employment conditions. In contrast, there has been no attempt to assess the impact of meeting these requirements on seafarers' satisfaction and dissatisfaction and closely related thereto, on their interest in continuing to work at sea. In addition, there have been no studies to date that confront the requirements for work at sea formulated by seafarers (who evaluate employment offers through their previous experience with work on board) with the requirements of students as the future employees working on a ship.

Thus, regardless of the type of seafaring personnel expected by shipowners, it is necessary to take all measures to make students and/or seafarers willing to work and develop professionally on a ship. In the face of growing workforce shortages, it seems rational to look for both highly qualified personnel, who should be encouraged to further develop their professional career, as well as students who, by gaining experience, will quickly acquire the necessary qualifications and competencies and take up the job. Therefore, it is reasonable to conduct the study to compare the requirements of students and seafarers and to assess to what extent meeting these requirements influences their satisfaction and consequently encourages them to continue their professional development in the maritime industry (Kłopotek, Dmowski, Szkiel, 2023).

## 2. Methods

The pilot study aimed to identify opportunities for improving the employment offers, in a particular branch of the logistics industry, which is undoubtedly the maritime transportation, by identifying differences in the requirements as for work on a ship, formulated by maritime university students and seafarers.

In order to fulfil the purpose of this study, it was decided to apply the Kano method, appropriate for management and previously not applied in this area (Howsawi et al., 2020; Yadav et al., 2017; Yao, Chuang, Hsu, 2018), which is used to determine the relationship between the product or service level of performance and the level of customer satisfaction. Since the Kano method is based on the assumption that individual requirements do not affect the level of satisfaction of the person surveyed to the same extent, an attempt was made to use this method to identify and categorize the requirements of seafarers and maritime university students towards work on board. An additional advantage (strength) of this method is that it can be used to analyse the change in requirements over time. After a certain period of time, requirement initially considered attractive may become one-dimensional and subsequently mandatory, making it necessary to repeat the survey over the next few years (Kłopotek, Dmowski, Szkiel, 2021; Rashid et al., 2011; Ulewicz, 2016; Wiśniewska, 2009).

By assessing the seafarers' well-being associated with the fulfilment or no fulfilment of particular requirements, the Kano method allows to categorize these requirements (Wiśniewska, 2009; Matzler, Hinterhuber, 1998; Thipwong, Wong, Huang, 2020). Depending on the category, the fulfilment or non-fulfilment of a given requirement affects the level of student's and seafarer's satisfaction with work on board in a different way. Therefore, depending on the category where a given requirement is assigned, a shipowner can take appropriate measures to increase the satisfaction of the future and current employees (Table 1).

**Table 1.**  
*Product feature categories according to the Kano model*

Type of feature	Characteristics	Recommendations for the company
M – Must-be	The presence of this characteristic is required by the consumer. The presence of the attribute does not make the customer happy, but its absence causes a significant increase in customer dissatisfaction.	These features must necessarily be included in the product.
O – One dimensional	The presence of this feature is expected by the customer. The greater the realisation of this feature, the greater the customer satisfaction and vice versa.	These features should be developed in the product/service and their level should not be lower than in competing products.
A – Attractive	This is a feature that the customer does not expect, but it turns out to be useful to them. The presence of this feature will increase customer satisfaction, but its absence will not cause dissatisfaction.	All these features should not be included in the product/service at the same time. It should be ensured that a few selected features are realised at the maximum level.

Cont. table 1.

I – Indifferent	It is a feature that, whether present or absent, will not result in customer satisfaction or dissatisfaction.	These should be avoided in the product/service.
Q – Questionable	There is a contradiction - customers want the feature to be present as well as not to be present.	No recommendations.
R – Reverse	It is a characteristic whose absence causes customer satisfaction, while its presence causes customer dissatisfaction.	They should not be included in the product.

Source: Rashid et al., 2011; Wiśniewska, 2009.

After categorizing the features, to identify the differences, indices were calculated to indicate where among the two respondent groups the fulfilment or non-fulfilment of a given requirement results in a higher increase in the level of satisfaction or dissatisfaction: size of satisfaction and size of dissatisfaction of students and seafarers (Figure 1).

$$\text{Size of satisfaction} = \frac{A+O}{A+O+M+I} \quad \text{Size of dissatisfaction} = \frac{O+M}{(A+O+M+I) \times (-1)}$$

**Figure 1.** The method of counting the magnitude of satisfaction and dissatisfaction is presented.

Source: Wiśniewska, 2009.

These indices indicate how strongly the fulfilment of a given requirement can affect the student's/seafarer's satisfaction or, if not fulfilled, their dissatisfaction. The positive coefficient (level of satisfaction) ranges from 0 to 1, and the negative index (level of dissatisfaction) ranges from 0 to -1. The closer the value is to 1, the greater the influence of the level of requirement fulfilment on satisfaction, and the closer the value is to -1, the greater the influence of the requirement non-fulfilment on dissatisfaction (Matzler, Hinterhuber, 1998).

The subjects of this study included students at a Polish maritime university who had no experience with work on a ship, and seafarers with different positions depending on their experience. In turn, the subject matter of this study included the requirements for working on board, the identification of which constituted the first of the six stages of the Kano method. The requirements were identified using face-to-face interviews, conducted with five seafarers with a minimum of seven years' experience of work at sea on various ships and positions, familiar with the shipowner cooperation principles and working conditions on board. As many as 35 requirements were obtained (Table 2), which were used in the second stage of study, which involved developing a questionnaire. The seafarers' requirements concerned such aspects as employment conditions, ship and shipowner features, remuneration and other benefits.

**Table 2.**

*Identified requirements for working on board*

Requirement no.	Requirement for working on board
1	Form of employment (through an agency or directly through the shipowner's office)
2	Shipowner's country of origin
3	Number of shipowner's vessels
4	Type of agreement (contract/other)
5	Contract duration
6	Amount of earnings compared to the competition

Cont. table 2.

7	possibility to negotiate the rates/terms of the contract
8	Pension contributions paid by the shipowner
9	Payroll taxes paid by the shipowner
10	Regular, stable medical assistance (insurance)
11	Regular, stable medical assistance for family members (insurance)
12	Currency of remuneration paid
13	Travel costs to and from the ship paid by the shipowner
14	Possibility to collect advance payments
15	Apprenticeship benefits and incentive bonuses
16	Fast-track path of promotion
17	Training to improve competences and all related costs covered by the company
18	Timeliness of crew substitutions (as per the contract)
19	Regular rotation contracts (permanent crew on the ship)
20	Type of vessel
21	Size of vessel
22	Frequency of port calls
23	Age of vessel
24	Access to mobile phone network and the Internet
25	Variety and palatability of meals
26	Access to the products you need, e.g., food, cosmetics, domestic detergents
27	Level of ship's protection against maritime piracy
28	Social conditions on board, e.g., gym, multimedia room
29	Efficiency of ship equipment
30	Crew country of origin
31	Briefings for officers in the shipowner's office
32	Positive feedback among friends and on the Internet
33	Possibility to disembark during ship's stay in port
34	Possibility to get alternative employment, e.g., in the shipowner's office
35	Effective cooperation with the shipowner's office

Source: own elaboration.

The author's questionnaire for each of the identified requirements contained two contrasting questions. The first was designed to assess the student's/seafarer's well-being if the requirement was fulfilled, and the second was designed to assess their well-being if the requirement was not fulfilled.

The selection of a respondent group was non-random on purpose (Walliman, 2022). A total of 144 respondents took part in the questionnaire-based survey, 75 of whom were students of maritime area of study at Gdynia Maritime University who do not yet have any experience with work on a ship, and 69 were active seafarers. All of the students surveyed belonged to the under-30 group. On the other hand, those with experience belonged to both the under-30 group (46 people) and the 31-40 age group (17 people). From among the respondents, only 6 belonged to the over 41 group. Only 22 women participated in the survey, accounting for 15% of the total group surveyed. The low participation of women in the survey is related to the fact that the seafarer profession and the choice of fields of study preparing for this profession is still more popular among men.

Comparing the answers given by students and seafarers made it possible to indicate whether there are differences in the perception of the same requirements depending on experience in work on board. With this end in view, the Pareto method was applied, which made it possible to classify the categorized requirements into three groups taking into account differences in the



values of satisfaction and dissatisfaction indices (Kowalik, 2018). This provided grounds for indicating to shipowners the proposals for measures aimed to increase the attractiveness of job offers and ensure acquiring students as the future employees and retaining the experienced seafarers.

### 3. Results and discussion

The results of the survey made it possible to categorize the requirements of students and seafarers as for work on a ship (Table 3), as well as indicate the influence of the level of fulfilment of each requirement on the level of satisfaction and dissatisfaction of the current and future seafarers. This formed grounds for identifying similarities and differences in perceiving the requirements for work on board, which made it possible to identify directions for improving the employment offer that the shipowner companies should consider when recruiting new and retaining current employees.

**Table 3.**

*Categorisation of student and seafarer requirements for working on board*

R. no.	Requirement for working on board	Category by students	Category by seafarers
1	Form of employment (through an agency or directly through the shipowner's office)	I	A
2	Shipowner's country of origin	A	A
3	Number of shipowner's vessels	I	A
4	Type of agreement (contract/other)	A	Q
5	Contract duration	A	A
6	Amount of earnings compared to the competition	O	A
7	possibility to negotiate the rates/terms of the contract	A	A
8	Pension contributions paid by the shipowner	A	A
9	Payroll taxes paid by the shipowner	R	R
10	Regular, stable medical assistance (insurance)	M	A
11	Regular, stable medical assistance for family members (insurance)	A	A
12	Currency of remuneration paid	A	A
13	Travel costs to and from the ship paid by the shipowner	A	M
14	Possibility to collect advance payments	I	I
15	Apprenticeship benefits and incentive bonuses	A	A
16	Fast-track path of promotion	A	A
17	Training to improve competences and all related costs covered by the company	A	A
18	Timeliness of crew substitutions (as per the contract)	O	M
19	Regular rotation contracts (permanent crew on the ship)	A	A
20	Type of vessel	A	A
21	Size of vessel	A	A
22	Frequency of port calls	I	I
23	Age of vessel	I	I
24	Access to mobile phone network and the Internet	A	M
25	Variety and palatability of meals	A	M

Cont. table 3.

26	Access to the products you need, e.g., food, cosmetics, domestic detergents	A	A
27	Level of ship's protection against maritime piracy	O	M
28	Social conditions on board, e.g., gym, multimedia room	A	A
29	Efficiency of ship equipment	O	A
30	Crew country of origin	Q	I
31	Briefings for officers in the shipowner's office	I	I
32	Positive feedback among friends and on the Internet	O	O
33	Possibility to disembark during ship's stay in port	A	A
34	Possibility to get alternative employment, e.g., in the shipowner's office	A	A
35	Effective cooperation with the shipowner's office	O	M

Source: own elaboration.

After categorizing, a subsequent stage of study referred to calculating the level of students' and seafarers' satisfaction and dissatisfaction for each requirement (Figure 2 and Figure 3).

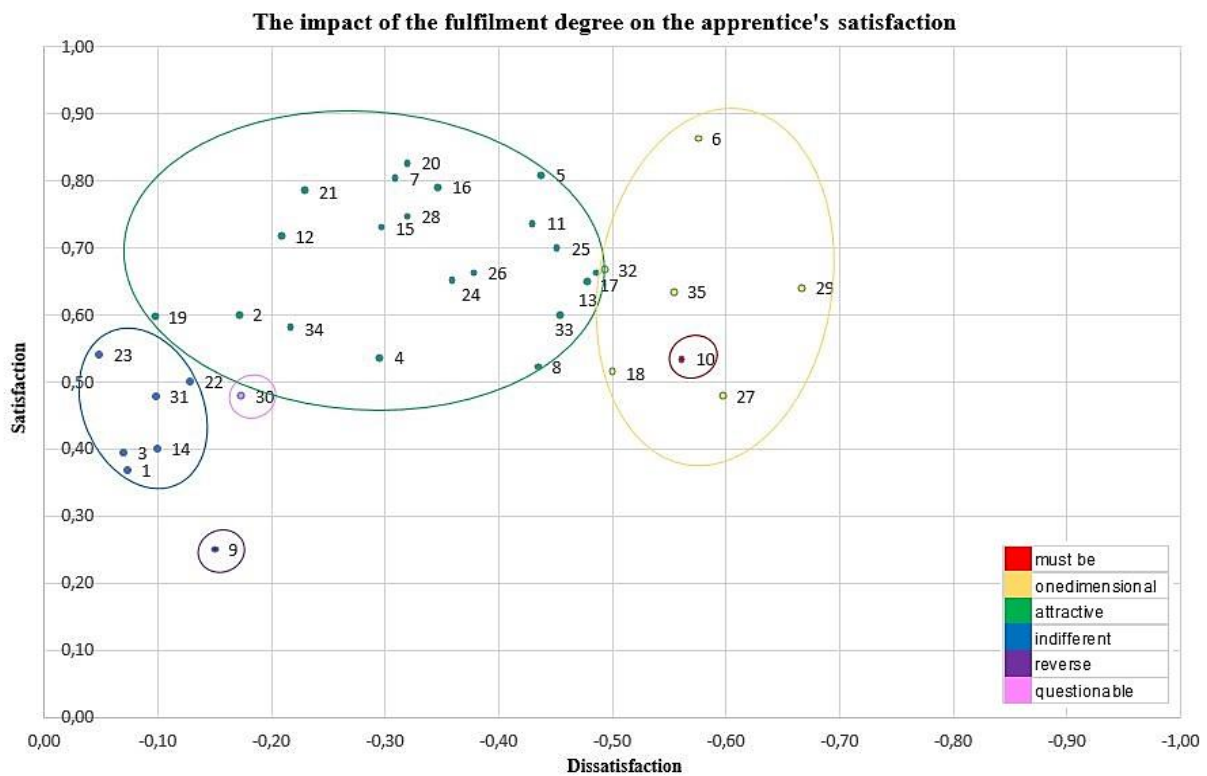
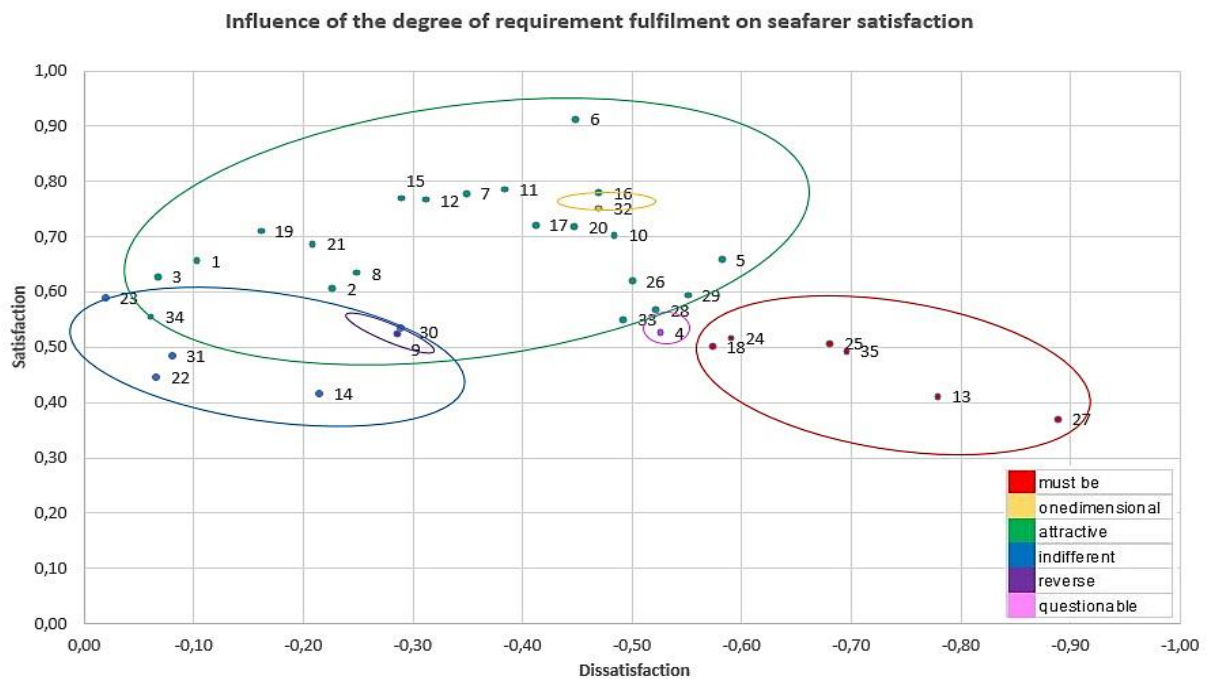


Figure 2. Categorisation of students' expectations of future work on board.

Source: own elaboration.



**Figure 3.** Categorisation of seafarers' requirements for work on board.

Source: own elaboration.

For both students and seafarers, the most numerous category referred to attractive requirements (green). For both respondent groups, more than half of all identified requirements fell into this category. These are the requirements that respondents do not expect to be fulfilled, but they prove useful to them. Hence, their fulfilment will result in increased satisfaction, but their non-fulfilment will be imperceptible (due to the lack of such expectations) and will not result in dissatisfaction, and consequently will not affect the rejection of a given job offer. Depending on a target group, the shipowner should offer to meet these requirements, but not all of them at the same time, due to the fact that their fulfilment may determine the competitiveness of the employment conditions offered and may cause the job offer of a given shipowner stand out against other shipowners' offers. Over time, these requirements may become one-dimensional and then mandatory requirements. Therefore, in order to attract potential employees, a shipowner will have to include in the employment offer the fulfilment of further requirements that will be attractive to students and/or seafarers. Therefore, to regularly surprise employees, the shipowner should ensure a gradual fulfilment of a few selected requirements at the maximum level. The requirements with the highest satisfaction rate should be fulfilled first, as they have the highest impact on the respondents' satisfaction. The requirements that are attractive to students include, for example, the preferred type of ship, length of contract, fast-track path of promotion, possibility to negotiate rates and type of contract. For seafarers, on the other hand, these are the attractive requirements: e.g. higher wages compared to the competition, ongoing medical support, form of employment and reliability of ship equipment.

A significant difference was observed with regard to the category of requirements - must be (red). For students, only one such requirement was identified, while for seafarers there are as many as 6 mandatory requirements. Failure to meet the requirements belonging to this group will significantly increase the respondents' dissatisfaction. The requirements that seafarers consider mandatory have a different meaning (attractive or one-dimensional) for students, but it is likely that after the first contract, these will also become mandatory requirements for students. This confirms the principle of requirement category variability over time. Therefore, shipowners should ultimately offer to meet these requirements when recruiting both groups of employees. It was found that only permanent stable medical support (health insurance during the contract and during the stay at home - requirement No. 10) is a mandatory requirement for students. This means that failure to cover students with medical support is likely to result in a significant increase in their dissatisfaction, which may result in rejecting a given shipowner as a potential employer, which constitutes an undesirable situation for a crewing company. Hence, shipowner companies should consider providing health insurance for seafarers not only aboard the ship, but also outside the contract - while they stay at home. However, for seafarers with experience this is an attractive requirement. This means that health insurance outside the contract would increase their satisfaction with the job offer. But seafarers are aware that such insurance is not common, hence its absence does not affect their dissatisfaction and rejection of the offer. The requirements considered by seafarers as mandatory include access to mobile phone network and the Internet (no.24), variety and palatability of meals (no.25), timeliness of crew substitutions (as per the contract) (no.18), effective cooperation with the shipowner's office (no.35), travel costs to and from the ship paid by the company (no.13) and the level of ship's protection (no.27).

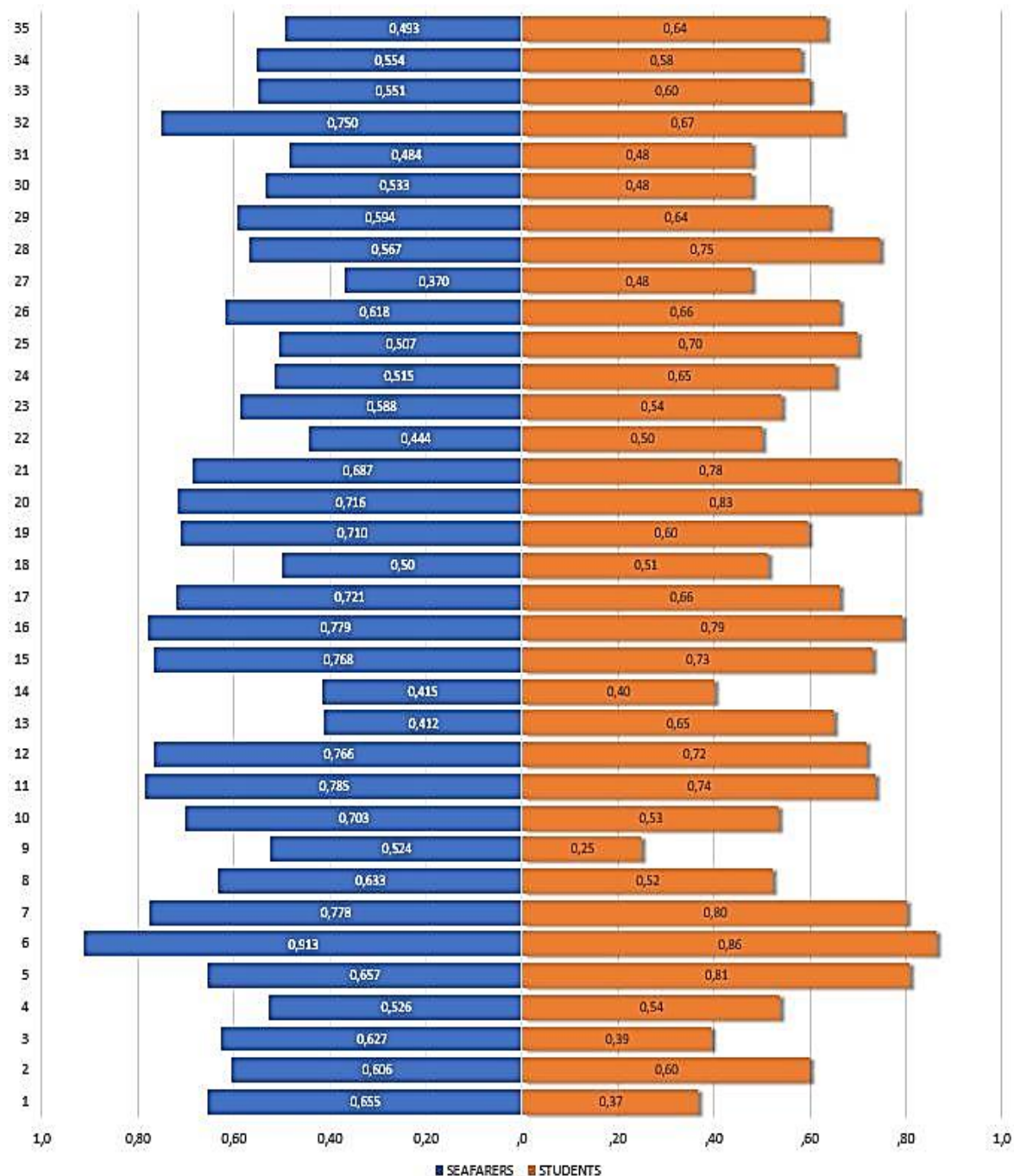
Another category of requirements indicating significant differences includes one-dimensional requirements (yellow), i.e. those that are expected by respondents, and the relationship between the level of their fulfilment and satisfaction is directly proportional. The one-dimensional requirements, the fulfilment of which will have the greatest influence on the level of student satisfaction, include the requirements related to the amount of remuneration compared to the competition (no.6), positive reviews among friends and on the Internet (no.32), efficiency of the ship's equipment (no.29), effective cooperation with the shipowner's office (no.35), timeliness of crew substitutions (as per the contract - no.18), and the level of ship's security (effective protection against sea piracy in dangerous areas - no.27). The greater the level of fulfilment of these requirements, the greater the student's satisfaction, and vice versa. When seeking future employment on a ship, students will pay the most attention to having their requirements in this particular area fulfilled. Therefore, these requirements should be included in the job offer and continuously developed by the shipowner, and the level of their fulfilment should be no lower than that of other shipowners. However, the fulfilment of these requirements has a significant impact on the choice of a given shipowner as a potential employer mainly for students, since for seafarers these requirements are

mandatory (their fulfilment is taken for granted by seafarers), and therefore their fulfilment does not increase the seafarers' satisfaction. A one-dimensional requirement for students and seafarers includes the shipowner positive reviews among friends and on the Internet (no.32). Thus, it can be concluded that when looking for employment opportunities, seafaring personnel take into account the opinion of people who already have some experience of working with a particular shipowner company. Social media is becoming an increasingly popular place to share employer information. For example, sharing information about the shipowner's successes and developments on social media can influence the attractiveness of a job offer for both current and future employees.

In contrast, the reverse requirement (purple), i.e. undesirable for both respondent groups, refers to payroll taxes paid by the shipowner (no.9). This means that unfavourable tax conditions can negatively affect the employer's evaluation or result in rejecting the job offer. Therefore, shipowners should provide optimal conditions for taxed payroll.

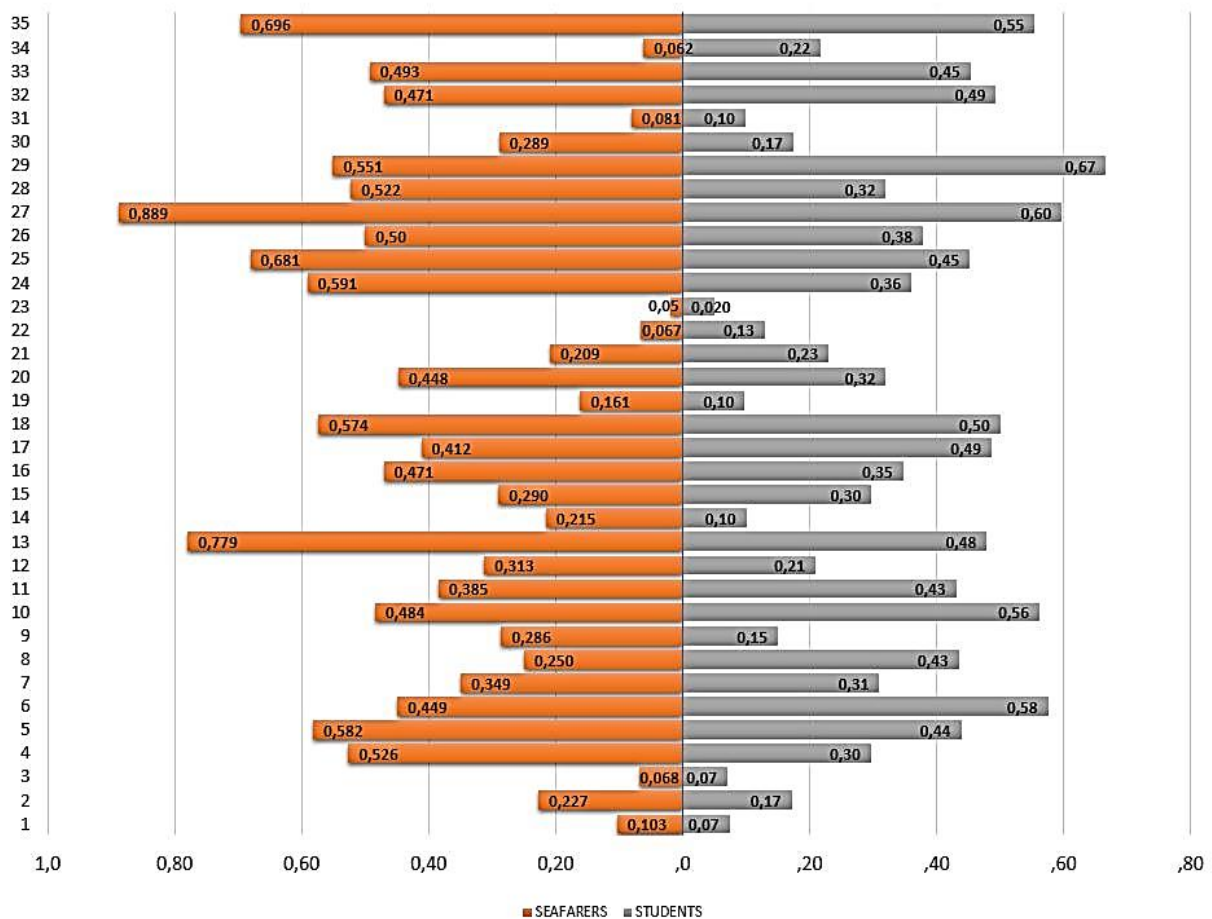
Another group consists of requirements in the indifferent (blue) category, which are similarly perceived by both respondent groups. This category (in both respondent groups) includes the age of the ship (no.23), frequency of port calls (no.22), briefings for officers at the shipowner's office (no.31) and the possibility to collect advance payments (no.14). Meeting these requirements will not affect the employees' satisfaction. These features are not relevant in the context of employment on a ship, and therefore do not affect the choice of a given shipowner as a potential employer. However, a difference was observed in the requirement related to the number of shipowner's vessels (no.3). For students, this feature is indifferent and not important, but seafarers find it attractive. They are aware that with a greater number of ships comes a greater number of potential employment opportunities with a given shipowner, such as potential promotion. Therefore, it makes the job offer more attractive, and as a result, increases job satisfaction. The situation is similar with regard to the requirement as for the form of employment (through an agency or directly through the shipowner's office - no.1). For students, this feature is indifferent, but seafarers notice the benefits resulting from being employed directly by the shipowner. Whereas for seafarers the origin of the crew is an indifferent feature, while students perceive it as questionable (pink). This means that it is difficult to say unequivocally whether the fact that crew members come from one or different countries affects the level of students' satisfaction - this may vary depending on the specific situation on board. This may result from the fact that students do not yet have experience of working with people of different nationalities, so they are not yet in a position to assess whether it is really important to them. Therefore, it is difficult to indicate what actions the shipowner should take in this regard. Currently, most ships are operated by international crews, so it is probably sufficient to inform a prospective employee whether the crew the candidate will be working with is international or exclusively from the candidate's country. However, for seafarers, presumably focused on their duties, the origin of other crew members is irrelevant. For them, on the other hand, the type of contract is a questionable feature. More important are the details of employment, i.e. the terms of contract.

One of the aspects analysed included the differences in assigning the requirements to different categories with onboard experience for students and seafarers. Whereas the second important aspect involved analysing the differences in the values of satisfaction and dissatisfaction indices in order to determine whether fulfilling or not fulfilling a given requirement would have a greater impact on the students' or seafarers' satisfaction and dissatisfaction (Figure 4 and Figure 5).



**Figure 4.** Differences in satisfaction rates between students and seafarers in relation to work on board requirements.

Source: own elaboration.

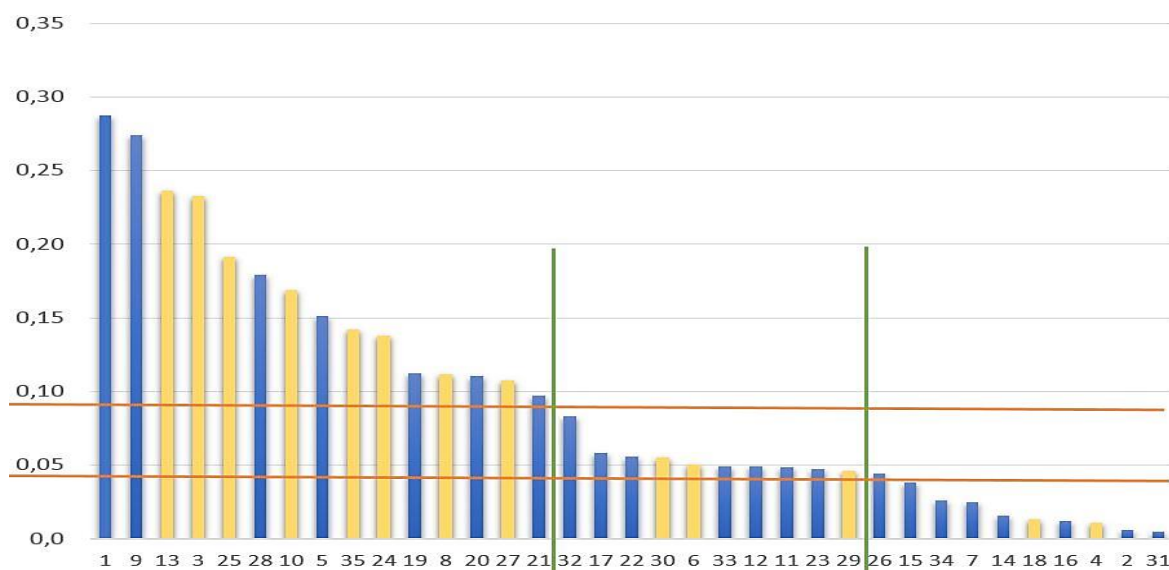


**Figure 5.** Differences in dissatisfaction rates between students and seafarers in relation to work on board requirements.

Source: own elaboration.

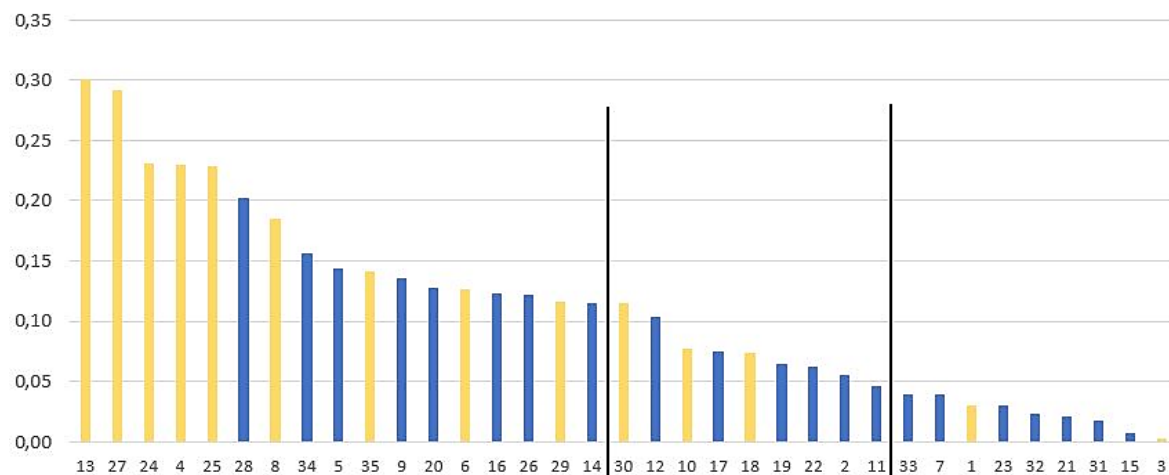
To take appropriate actions to address the labour shortage crisis on the ships, the shipowner needs to identify its target group (people under recruitment) and customize its employment offer to meet its requirements. Depending on whether the shipowner plans to hire workers with no work experience, or to retain or hire seafarers already experienced in work on board, the shipowner should take different actions. The choice of a given shipowner will be influenced by meeting first the students' and seafarers' requirements that are mandatory for them and those whose fulfilment has the highest impact on their satisfaction.

As indicated, the assignment of requirements to different categories varies, depending on the respondents' experience on board. The fulfilment or non-fulfilment of individual requirements affects the satisfaction or dissatisfaction of the two respondent groups to varying degrees. The application of the Pareto method made it possible to group the requirements as for work on a ship by differences in the volume of students' and seafarers' satisfaction (Figure 6) and dissatisfaction (Figure 7) rates. The yellow colour indicates those requirements that changed a category depending on the respondents' experience of work on board.



**Figure 6.** Difference in satisfaction index values.

Source: own elaboration.



**Figure 7.** Difference in dissatisfaction index values.

Source: own elaboration.

The first group includes the requirements that shipowners should primarily take into account when adjusting the job offer and differentiating the terms and conditions of employment for a group of potential employees, since for these requirements the greatest differences were observed, in terms of satisfaction and dissatisfaction rates calculated for students and seafarers. By analysing the data presented in the figures, it can be seen that a significant part of the requirements in group one changed category, depending on their experience of working on a ship. In order to customize the job offer to a selected group, it is necessary to differentiate it, taking into account those requirements that have the highest impact on the group's satisfaction, while avoiding those that have the highest impact on the decrease in their satisfaction.

Groups two and three, on the other hand, combine requirements that are less differentiated in terms of the values of satisfaction indices and the satisfaction calculated for students and seafarers. This does not mean that these requirements are less important - however, since their



fulfilment affects the satisfaction of both students and seafarers to a similar degree, these requirements will not be the criteria for differentiating the job offer directed to these two groups of employees. In the case when a shipowner seeks employees in both study groups, the shipowner should take into account the fulfilment of those requirements that are equally important to the employee groups.

#### **4. Conclusion**

In response to the observed shortage of skilled maritime personnel worldwide, it is essential to seek effective solutions to this issue. A key challenge for today's shipowners involves managing activities aimed to build maritime human capital, based on identifying the requirements of seafarers and young candidates - students at maritime universities, i.e. future employees.

The Kano method is an effective method to categorize the requirements of maritime students and seafarers as for work on a ship and identify which of these have the highest influence on their job satisfaction. A job offer should be customised as much as possible to the requirements of the target group of employees to be targeted by the shipowner. Therefore, the shipowner should be aware in which areas the students' and seafarers' requirements as for work on board coincide, and where there are significant differences. If the recipients of the offer are students, it should first and foremost take into account the fulfilment of those requirements that will have the highest impact on the level of their satisfaction with the employment conditions offered, as this may influence their decision to choose career path at sea and work for a given shipowner. In the case of seafarers, the situation presents itself similarly. A shipowner, wishing to encourage the existing employees to continue to work with their current employer, the shipowner should ensure fulfilling those requirements that are the most important to them and most affect their job satisfaction. By targeting students and seafarers at the same time, the shipowner should focus on those requirements that have a high impact on the satisfaction of both groups and avoid those aspects that have the highest impact on their dissatisfaction.

The survey conducted made it possible to categorize the requirements and identify to what extent the fulfilment of these requirements influences job satisfaction in each group depending on the category of requirement. It was found that students primarily expect the terms of employment to include health insurance both during the contract and while at home. However, this is currently a matter dependent on the terms of the contract, and most often health insurance is provided only while working on board a ship. Hence, for seafarers who are aware of this, this requirement falls into the attractive category. However, given that it is a mandatory requirement for students, it is worth considering meeting the requirements in this regard, since

on the one hand it may encourage them to choose a particular crewing company, and on the other, it will encourage seafarers to extend their cooperation with the shipowner.

Students also expect the highest possible salary - the higher the salary compared to that offered by the competition, the higher their satisfaction. For seafarers, the amount of earnings falls into the attractive requirements, which has the highest impact (among other requirements in this category) on their job satisfaction. One-dimensional qualities that directly determine students' choice of a particular shipowner as a potential employer also include the efficiency of ship's equipment, effective cooperation with the shipowner's office, timeliness of crew substitutions and effective protection against piracy in dangerous areas of the world. For seafarers, on the other hand, most of these are among the mandatory requirements. The fulfilment of these requirements no longer affects their satisfaction, while the lack of fulfilment significantly affects their dissatisfaction. Consequently, failure to meet these requirements is undesirable. Positive feedback about the shipowner company is a requirement expected by both groups, students and seafarers. For seafarers, this is the only one-dimensional requirement identified. Most of the students' and seafarers' identified requirements referred to the "attractive" category. Students' satisfaction is most influenced by the fulfilment of their expectations in terms of a preferred type of ship, preferred length of contract, possibility to negotiate the rate or conditions of the contract, and fast-track path of promotion. Seafarers' satisfaction, on the other hand (ignoring the requirements indicated above), will be most influenced by meeting their requirements such as: negotiable rate/contract terms, fast-track path of promotion, preferred salary currency or apprenticeship benefits and incentive bonuses.

Payroll taxes paid by the shipowner is a requirement categorized as the reverse, undesirable, in both groups. Regarding this requirement, the shipowner should take measures to prevent employee dissatisfaction, such as allowing taxes to be paid directly by employees. In contrast, as regards the requirements categorized as indifferent or questionable, there is no need to take action, as these requirements do not directly affect job satisfaction.

A significant number of the requirements as for work on board that have the highest impact on students' and seafarers' satisfaction relate to issues directly or indirectly related to earnings. Hence, financial issues are very important to seafaring personnel, but they are not the only important aspect, as confirmed by the results of previous surveys in this matter. Especially important to all respondents are opinions about the employer. They trust the opinions and comments for example, on the currently popular social media. Developing a company image in social media and on portals dedicated to maritime issues, publishing information, e.g. as regards favourable working conditions, successes of the company, and at the same time the possibility to comment by the community (followers) can be beneficial for shipowners in the context of encouraging potential employees to take up a job in a given company.

From the point of view of seafarers with work experience, the perception of the requirements as for work on a ship differs compared to that of students. Identifying the differences also confirms the usefulness of the Kano method, which allowed us to identify

which requirements change category under the influence of onboard work experience, that is, under the influence of time. The results of study can provide valuable guidance for counteracting the maritime human resource shortage crisis for both shipowner companies and institutions training future seafarers, and thus prevent potential disruptions in the global supply chains.

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