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Developing a Comprehensive Yacht Captain Selection Model for Enhancing Competitiveness in Yacht Tourism: a Fuzzy AHP Approach

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ABSTRACT

Yacht tourism is a prominent and popular sector within the global marine tourism industry, and it has experienced significant growth in our country in recent years. The increasing desire of customers to seek tranquility and distance themselves from residential areas has been a contributing factor to this growth. Furthermore, the COVID-19 pandemic has further accelerated the inclination of customers towards yacht tourism, as it allows for reduced interpersonal interactions and the maintenance of social distancing protocols. Despite the pandemic's impact on people's lifestyles and recreational activities, yachts' safety, hygiene, privacy, and other distinctive features have become increasingly attractive, providing yacht tourism with a relative advantage over other activities in the tourism sector. Alongside countries such as the Netherlands, Germany, and Italy, which boast highly developed yacht destinations, there has been a notable surge in demand for yacht tourism along the southern coasts of Turkey. As a result, yacht owners and management seek to recruit exceptional yacht captains who can effectively meet this growing demand and remain competitive in the sector. Consequently, the primary objective of this study is to present a comprehensive Yacht Captain Selection Model to yacht operators by utilizing the Fuzzy Analytical Hierarchy Process (AHP) methodology to create a comprehensive framework encompassing the factors that influence the yacht captain selection process. Given the scarcity of research on the selection criteria for yacht captains, conducting the decision-making process for employing a yacht captain in accordance with these criteria, expert knowledge, and the weighting provided by the Fuzzy AHP method, is expected to enhance the competitiveness of the expanding yacht tourism industry.

1. Introduction.

The vast seas and oceans, which serve as vital transportation routes for global trade and international travel, have increasingly gained prominence in the realm of entertainment and sports. They have become sought-after destinations for tourism, sports, and various recreational activities. Marine tourism holds significant importance within the tourism sector, catering to people's needs for relaxation and entertainment in an increasingly globalized world. Particularly during the summer months, there has been a substantial surge in demand for sea-related activities. The concept of combining entertainment with sea transportation, exemplified by cruise ships, has garnered immense popularity among customers. Consequently, yacht tourism has emerged as a flourishing sector, propelled by the allure of cruise travel, and has witnessed a remarkable increase in demand in

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recent years.

In recent years, Turkey has witnessed continued growth in yacht tourism, with an increasing number of domestic and international visitors seeking to explore its captivating coasts and bays. Yachters and tourists alike could explore the stunning coastal landscapes, visit ancient ruins, and experience the unique blend of Turkish hospitality and cuisine. The country's strategic location, bridging the East and West, further contributed to its appeal as a yachting destination. The government has recognized the potential of this sector and has implemented measures to further develop infrastructure, improve services, and protect the environment to ensure sustainable growth. The government's efforts to promote the country as a tourist destination, coupled with the growing global interest in yacht tourism, led to the establishment of marinas and infrastructure to accommodate yachters and their vessels. This development allowed Turkey to tap into the international market of yacht tourism and attract visitors from various parts of the world.

While the demand for yacht tourism continues to grow, yacht owners and management face the challenge of recruiting the most qualified yacht captains to meet this increasing demand effectively and maintain a competitive edge in the sector. However, there is a lack of comprehensive research on the selection criteria for yacht captains. To address this gap, the present study aims to develop a Yacht Captain Selection Model by utilizing the Fuzzy Analytical Hierarchy Process (AHP) methodology. This model will provide yacht operators with a comprehensive framework that considers the factors influencing the yacht captain selection process.

By incorporating expert knowledge and employing the Fuzzy AHP method for weighting these factors, the proposed Yacht Captain Selection Model is expected to significantly contribute to the competitiveness of the burgeoning yacht tourism industry. This research endeavors to fill the gap in the existing literature and provide practical insights for yacht operators, ultimately enhancing their ability to recruit and employ the most suitable yacht captains in the ever-expanding yacht tourism market.

2. Literature Review.

Personnel selection plays a crucial role in the maritime industry, and extensive research has been conducted on this topic. Literature reveals that various methods and criteria have been utilized to select qualified ship personnel. Studies have examined personal selection criteria, aptitude tests, interviews, and psychological perspectives to understand candidate perceptions and reactions (Robertson and Smith 2001). Additionally, multi-criteria decision-making approaches have been employed to evaluate applicants in the maritime sector. In this part, the existing body of research on personnel selection in the maritime industry is explored to highlight the diverse methods and criteria used.

Using the AHP-based MOORA method, they evaluated 6 main criteria and 27 sub-criteria and selected the ideal applicant for field operations. Efe and Kurt (2018) created a decision-making model using AHP and fuzzy TOPSIS applications to address personnel selection issues in a port operation. They presented distance- and similarity-based solutions to the port management for the selection of human resource specialists.

Öner (2013) conducted a thesis study to determine the best yacht category and used the Analytic Hierarchy Process (AHP) as the method. Demirel and colleagues (2020) conducted a study on the selection of the appropriate roll stabilizer type for motor yachts using hybrid fuzzy AHP and VIKOR methodology. Zamarin and colleagues (2013) conducted research on the optimal mast and boom selection for a racing yacht using AHP and FEM methods. Chludil and colleagues (2000) conducted a study on a yacht captain training system based on VRML and Java collaboration, providing information on training yacht captains. Muslu A. (2022) conducted a study on outsourcing crew management services in global yachting tourism. Şimşek and colleagues (2014) conducted a study on personnel selection in the tourism sector using fuzzy AHP methodology. In the sample study, they evaluated three candidates with 20 sub-criteria and created a model.

Karaatlı and colleagues (2014) conducted a study on tour operator selection in the tourism sector. They applied the AHP-based TOPSIS method. Two main criteria and 13 sub-criteria were used. Gümüş M. (2010) conducted an application on personnel selection for a hotel business in Bursa, evaluating 11 criteria.

Yıldırım and Güzel (2019) conducted a study by using the Analytic Hierarchy Process method to evaluate the selection of tourist guides by travel agencies based on 6 main criteria. Arıcan and Oksaş (2022) conducted a study on the selection of long-distance shift officers for 2 different types of ships using 3 main criteria and 9 sub-criteria. They created a different model for selection using the Analytic Hierarchy Process method.

In conclusion, the literature review reveals a significant body of research on personnel selection in the maritime industry. Various studies have employed different methods, such as the Analytic Hierarchy Process (AHP), multi-criteria decision-making approaches, and fuzzy TOPSIS, to evaluate and select qualified ship personnel. The research extends beyond ship operations to include port operations, yacht category determination, roll stabilizer selection, mast and boom optimization, captain training systems, crew management services in yachting tourism, and tour operator selection in the tourism sector. These studies provide valuable insights into the selection processes, criteria, and decision-making models employed in the maritime and related industries. The findings contribute to the development of effective personnel selection strategies and the enhancement of operational efficiency and safety in the maritime sector.

Based on a literature review, the criteria used in multi-criteria decision-making applications for personnel selection in maritime and other industries are given in Table 5. This comprehensive overview highlights the diverse range of criteria utilized in personnel selection processes, enabling a better understanding of the factors considered in the recruitment and evaluation of personnel within the maritime and related industries.

Table 1: Articles/methods and criteria used for personnel selection in different sectors.

Author	Study Type	Methodology	List of criteria used in the study
Acer & İnci (2020)	Article (port)	AHP&MOORA	Analytical Thinking, Physical Appearance, Health Status, Family and Social Status, Age, Self-Confidence and Self-Expression, Oral Comprehension, Written Comprehension, Ability to Understand and Communicate, Discipline, Vision, Initiative, Sense of Duty, Communication and Social Adaptation, Maturity Level, Volunteerism, Motivation and Desire, Not Being Introverted, Creativity, Professional Competence and Experience, Education Level, Graduated Department, Computer Knowledge, Foreign Language, Interview Score, References, Evaluation Test
Efe & Kurt (2018)	Article (port)	FAHP&TOPSIS	"Self-confidence", "computer skills", "past experience", "verbal communication skills" and "education level", "organization and planning skills", "foreign language" and "knowledge of labor law"
Yu et.al., (2013)	Article (transportation)	Fuzzy Group Decision Making	Work attitude, communication skills, problem-solving skills, and learning ability.
Dereli et.al., (2010)	Article (Industrial Engineering) Fuzzy PROMETHEE	Article (Industrial Engineering) Fuzzy PROMETHEE	"Self-confidence", "computer skills", "past experience", "verbal communication skills", "educational level", "organizational and planning skills", "foreign language proficiency", and "knowledge of labor law".
Lin (2010)	Article (Machine Industry) ANP and Data Envelopment Analysis	Article (Machine Industry) ANP and Data Envelopment Analysis	Knowledge and expertise, previous professional career and educational background, as well as achievements and personality and potential.
Qin et.al., (2016)	Article (Industry)	The Frank triangular method	oral communication skills, previous experience, general aptitude, and self-confidence.
Kabak & Kazançoğlu (2012)	Article (Tourism)	FAHP	Analytical thinking, social adaptability, physical appearance, being open-minded, health condition, willingness to volunteer, vision, teaching experience, taking initiative, computer

Source: Authors.

One notable observation from the literature review is the limited number of studies focusing specifically on yacht captains and personnel in the context of personnel selection. Most studies have primarily concentrated on areas such as yacht selection, equipment, and marina management. This gap in research addressing the selection of qualified yacht captains is a significant issue in the tourism and maritime sectors.

Considering the vital role played by yacht captains in maneuvering vessels, ensuring customer satisfaction, and upholding order, their selection holds great importance. Yacht captains serve as the visible representatives of both the company's vision and the country they operate in. Therefore, the demand for competent and skilled yacht captains remains high, particularly during the peak summer season when tourism activities surge.

Addressing this research gap and conducting further studies on the selection and recruitment of yacht captains would be beneficial for both the industry and academia. Such studies could explore criteria, methodologies, and decision-making models that facilitate the identification and evaluation of qualified and suitable yacht captains. Understanding the factors that contribute to successful personnel selection in this specific domain would enhance the overall effectiveness and professionalism of yacht operations in the tourism and maritime sectors.

3. Method.

The study utilized the Fuzzy Analytic Hierarchy Process (FAHP), which is a commonly used multi-criteria decision-making method. The FAHP was developed by combining fuzzy logic with the Analytic Hierarchy Process (AHP) to address uncertainties and better reflect human thinking in decision-making processes (Cheng, 1996; Göksu & Güngör, 2008). Various methods utilizing fuzzy set theory have been presented by researchers to determine the best option or rank options in a multicriteria environment (Şengül et al., 2012).

In this study, Chang's degree analysis method, which uses triangular fuzzy numbers for pairwise comparisons and synthesizes dimensional degrees in fuzzy AHP, was employed to determine the weights of criteria for the selection of a yacht captain (Chang, 1996). The following steps were followed:

Step 1: The value of the fuzzy synthetic degree for criterion is defined as follows:

$$S_i = \sum_{j=1}^{m} M_{g_i}^{j} \otimes \left[\sum_{i=1}^{n} \sum_{j=1}^{m} M_{g_i}^{j} \right]^{-1} \tag{1}$$

To obtain the value of, the following fuzzy summation operation is applied to the m degree analysis value:

$$\sum_{j=1}^{m} M_{g_i}^{j} = \left(\sum_{j=1}^{m} l_j, \sum_{j=1}^{m} m_j, \sum_{j=1}^{m} u_j \right) \tag{2}$$

To obtain the fuzzy sum of the values, the following operation is performed:

$$\sum_{i=1}^{n} \sum_{j=1}^{m} M_{g_i}^{j} = \left(\sum_{i=1}^{n} l_i, \sum_{i=1}^{n} m_i, \sum_{i=1}^{n} u_i \right) \tag{3}$$

and the inverse of the vector is calculated as follows:

$$\left[\sum_{i=1}^{n} \sum_{j=1}^{m} M_{g_i}^{j} \right]^{-1} = \left(\frac{1}{\sum_{i=1}^{n} u_i}, \frac{1}{\sum_{i=1}^{n} m_i}, \frac{1}{\sum_{i=1}^{n} l_i} \right) \tag{4}$$

Step 2: The degree of possibility of M2 ≥ M1 is defined as follows.

$$V(M_2 \geq M_1) = \sup_{y \geq x} \left| \min \left(\mu_{M_1}(x), \mu_{M_2}(y) \right) \right| \tag{5}$$

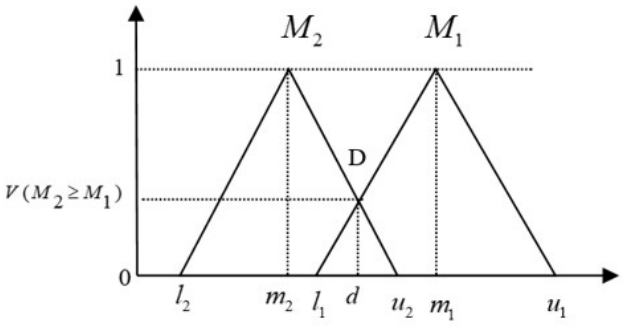
Similarly, it can be defined as follows.

$$V(M_2 \geq M_1) = hgt(M_1 \cap M_2) = \mu_{M_2}(d) =$$

$$= \begin{cases} 1, & \text{if } m_2 \geq m_1, \\ 0, & \text{if } l_1 \geq u_2, \\ \frac{l_1 - u_2}{(m_2 - u_2) - (m_1 - l_1)} & otherwise, \end{cases} \tag{6}$$

The ordinate of the highest intersection point D can be expressed as shown in Figure 3.

Figure 1: M1 ve M2 intersection between.



Source: Chang, 1996.

Figure 1. Intersection point between M1 and M2 (Chang, 1996). In order to compare M1 and M2, both V(M2 ≥ M1) and V(M1 ≥ M2) values are needed. Step 3: The degree of possibility that a convex fuzzy number is greater than k convex fuzzy numbers Mi (i=1, 2, ..., k) is defined as follows.

$$V(M \geq M_1, M_2, ..., M_k) =$$

$$V\left[(M \geq M_1)\ and\ (M \geq M_2)\ and \ldots and (M \geq M_k)\right]$$

$$min\ V(M \geq M_i),\ i = 1, 2, 3, \ldots, k. \tag{7}$$

$$d'(A_i) = \min V(S_i \geq S_k), k = 1,\ 2, ..., n;\ k \neq i \tag{8}$$

Let's assume that Then the weight vector is defined as follows:

$$W' = (d'(A_1), d'(A_2), ..., d'(A_n))^T \tag{9}$$

$$W = (d(A_1), d(A_2), ..., d(A_n))^T \tag{10}$$

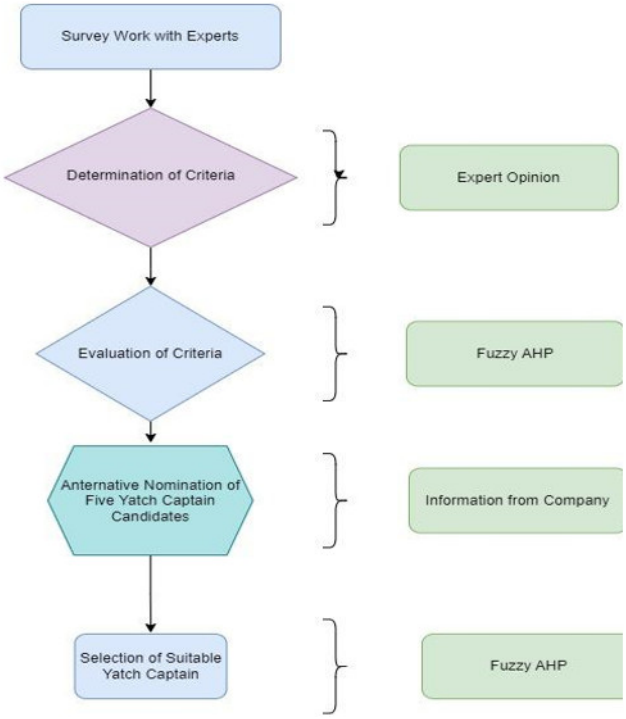
Here, (i=1, 2, ..., n) where n is the number of elements.

Step 4: Normalized weight vector is defined as follows: Here, W is a crisp (non-fuzzy) number.

4. Research Methodology

The research methodology employed in this study consists of a Fuzzy Analytic Hierarchy Process (FAHP) approach to determine the selection of a yacht captain tailored to each specific yacht. The overall yacht captain selection methodology is depicted in Figure 2. It should be noted that this methodology is applicable to each group of yachts.

Figure 2: Yacht captain selection methodology.



Source: Authors.

5. Findings and Discussion.

A survey study was conducted to identify the criteria and priorities considered by marine tourism companies in the selection of yacht captains. The relative weights of these criteria were calculated using the Fuzzy Analytical Hierarchy Process (AHP) Excel program. In order to determine the criteria, 10 human resources managers (HRM) responsible for selecting yacht captains in Turkish maritime tourism companies were approached. Discussions were held regarding the personnel selection criteria mentioned in the literature, and a survey was subsequently conducted to establish the hierarchy of criteria and sub-criteria. The survey also included open-ended questions to gather additional insights.

The criteria proposed by the 10 HRM were collected, and common criteria were selected for inclusion in the study. These managers who had been working in the industry for a minimum of 10 years and were considered knowledgeable in their respective fields. Table 2 provides information on the total number of yachts in their companies and the number of personnel they managed.

Based on insights gathered from yacht industry companies, recruitment personnel were consulted to identify the key criteria in the job recruitment process. A comprehensive evaluation was conducted, resulting in the identification of 16 common criteria. These criteria were categorized into four main criteria, namely Vocational Competence, Technical Competence, Physical Competence, and Social Competence. Within the Vocational Competence criterion, the specific criteria included Experience (Years), Previous Experience with Similar Yachts, Li-

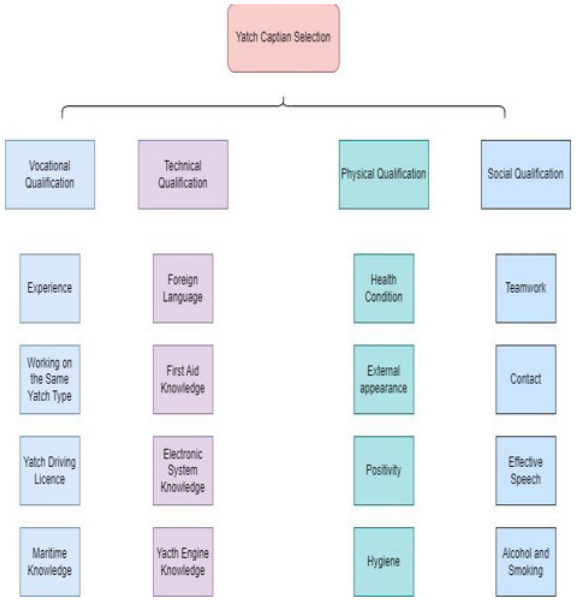
Table 2: Number of yachts and yacht personnel managed by HRM.

Experts	Number of Yachts	Number of Yacht Personnel
HRM 1	4	16
HRM 2	5	25
HRM 3	4	14
HRM 4	6	32
HRM 5	3	12
HRM 6	7	36
HRM 7	4	16
HRM 8	3	12
HRM 9	5	22
HRM 10	6	26

Source: Authors.

censing, and Knowledge of Maritime Practices. The Technical Competence criterion encompassed criteria such as proficiency in a foreign language, first aid knowledge, familiarity with yacht electronics, and motor expertise. The Physical Competence criterion incorporated criteria related to health status, a pleasing appearance, positive demeanor, and adherence to hygiene practices. Lastly, the Social Competence criterion comprised criteria pertaining to teamwork, interpersonal skills, effective communication, and restrictions on alcohol and smoking.

Figure 3: Yacht captain selection decision tree diagram.



Source: Authors.

To provide a visual representation of the hierarchy and relationships among these criteria, Figure 3 illustrates the hierarchical tree structure associated with the selection of yacht captains.

Table 3 presents a brief description of the criteria identified in the yacht captain selection process. These criteria are organized under the main categories of Professional Competence, Technical Competence, Physical Fitness, and Social Skills.

Table 3: Brief description of the criteria.

Main Criteria	Sub-Criteria	Short Description
Vocational Qualification	Experience (Years)	Years worked in the profession
	Working on the Same Yacht Type	Having experience in similar yacht types
	Yatch Driving License	Document issued by the Republic of Turkey
	Maritime Knowledge	Being knowledgeable in navigation, meteorology, seamanship, and maneuvering
Technical Qualification	Foreign Language	Languages other than Turkish (English)
	First Aid Knowledge	Having certifications in medical interventions during emergency situations.
	Electronics System Knowledge	Having the ability to operate the electronic devices present on the yacht.
	Yatch Engine Knowledge	Being familiar with the yacht's engine equipment and being able to provide information in case of malfunctions.
Physical Qualification	Health Condition	Not having any health condition that would hinder working at sea.
	External Appearance	Having a well-groomed appearance and visually presentable attire.
	Positivity	Exhibiting positive behaviors towards others.
	Hygiene	Maintaining cleanliness and tidiness in personal appearance and surroundings.
Social Qualification	Teamwork	Collaborating effectively and harmoniously with the team.
	Contact	Having smooth and respectful relationships with people around them.
	Effective Speech	The ability to speak clearly, fluently, and without errors.
	Alcohol and Smoking	The presence of alcohol and smoking habits.

Source: Authors.

Table 4 presents a list of captain candidates provided by a tourism company in Göcek, consisting of 7 motor yachts. The candidates' names are not specified in the table. The company has entrusted us with the task of identifying the most suitable candidate based on the available information. The provided information includes assessments of candidates' positivity, hygiene, teamwork, and interpersonal relationships, which have been conveyed through references from their previous employers. Additionally, other details, such as certificates and work permits, have been examined to compile the information presented in the table. Abbreviations of the determined criteria are shown in Table 4.

Table 4: Abbreviations of main criteria and sub-cri.

No	Main Criterion	Abbreviation
1	Vocational Qualification	VQ
2	Technical Qualification	TQ
3	Physical Qualification	PQ
4	Social Qualification	SQ
No	**Sub-Criterion**	**Abbreviation**
1	Experience (Years)	E
2	Working on the Same Yacht Type	WSYT
3	Yatch Driving License	YDL
4	Maritime Knowledge	MK
5	Foreign Language	FL
6	First Aid Knowledge	FAK
7	Electronic System Knowledge	ESK
8	Yatch Engine Knowledge	YEK
9	Health Condition	HC
10	External Appearance	EA
11	Positivity	P
12	Hygiene	H
13	Teamwork	TW
14	Contact	C
15	Effective Speech	ES
16	Alcohol and Smoking	AS

Source: Authors.

A pairwise comparison matrix was created for each decision maker using Fuzyy numbers in Table 5. The consistency and comparison matrix was created for each decision maker by taking geometric averages.

Table 5: Main criterias.

	VQ			TQ			PQ			SQ		
	l	*m*	*u*	*l*	*m*	*u*	*l*	*m*	*u*	*l*	*m*	*u*
VQ	1,00	1,00	1,00	0,25	0,33	0,50	1,50	2,50	3,50	2,00	3,00	4,00
TQ	2,00	3,03	4,00	1,00	1,00	1,00	1,00	1,00	1,00	0,25	0,33	0,50
PQ	0,90	0,95	0,99	1,00	1,00	1,00	1,00	1,00	1,00	2,00	3,00	4,00
SQ	0,25	0,33	0,50	2,00	3,03	4,00	0,25	0,33	0,50	1,00	1,00	1,00

Source: Authors.

The normalized weight vector W was calculated using Chang's (1996) extent analysis method, with formulas entered into an Excel file. This method involved deriving normalized weight vectors from synthetic dimension values obtained from pairwise comparisons within the fuzzy evaluation matrix. Normalization was achieved by summing all elements of the vector and dividing each element by this sum. The resulting normalized weight vector W is not represented as a fuzzy number. Table 6 illustrates the normalized weight vector of the criteria obtained through Chang's (1996) extent analysis method.

Table 6: Normalized main criterias.

				Average	normalised
VQ	0,17	0,30	0,52	1,00	0,31
TQ	0,15	0,23	0,37	0,76	0,28
PQ	0,17	0,26	0,40	0,86	0,19
SQ	0,12	0,21	0,34	0,65	0,21
TOTAL				3,28	1,00

Source: Authors.

Referring to Table 7, it becomes evident that vocational qualification stands out as the most crucial primary criterion.. This situation emerges as the most important feature sought in professional captains, especially in boating. This importance stems from the necessity for captains not only to possess adequate professional expertise but also to be well-versed in the maneuverability of the vessels they operate, ensuring safe navigation. The comparison matrix of the sub-criteria related to the vocational qualification criterion is shown in Table 7.

Table 7: Comparison matrix of sub-criteria for vocational qualificaiton main criterion.

Vocational Qualification	TQ			WSYT			YDL			MK		
	l	*m*	*u*	*l*	*m*	*u*	*l*	*m*	*u*	*l*	*m*	*u*
TQ	1,00	1,00	1,00	1,00	1,00	1,00	2,00	3,00	4,00	1,00	1,00	1,00
WSYT	1,00	1,00	1,00	1,00	1,00	1,00	2,00	3,00	4,00	0,25	0,33	0,50
YDL	0,90	0,95	0,99	0,25	0,33	0,50	1,00	1,00	1,00	2,00	3,00	4,00
MK	1,00	1,00	1,00	2,00	3,03	4,00	0,25	0,33	0,50	1,00	1,00	1,00

Source: Authors.

As a result of Chang's (1996) extent analysis method, the normalized weight vector of the criteria for vocational qualification is shown in Table 8.

Table 8: Normalized table of sub-criteria for vocational qualification main criterion.

Vocational Qualification				Average	Normalised
E	0,19	0,27	0,40	0,19	0,28
WSYT	0,16	0,24	0,37	0,16	0,24
YDL	0,16	0,24	0,37	0,16	0,23
MK	0,16	0,24	0,37	0,16	0,24
Total				3,56	1,00

Source: Authors.

Referring to Table 8, among the criteria associated with pro-

fessional competence, E is weighted as the most critical criterion. Following experience, WSYT and MK carry equal weightings. In this context, gaining familiarity with the yacht types, especially through experience with similar yacht types, can provide a significant advantage by expediting the learning curve. Additionally, possessing strong maritime knowledge is paramount for captains to effectively respond to varying sea conditions and navigate the specific areas in which they operate. The comparison matrix of the sub-criteria related to the technical qualification criterion is shown in Table 9.

Table 9: Comparison matrix of sub-criteria for technical qualification.

Technical Qualificaiton	FL			FAK			ESK			YEK		
	l	*m*	*u*	*l*	*m*	*u*	*l*	*m*	*u*	*l*	*m*	*u*
FL	1,00	1,00	1,00	2,00	3,00	4,00	1,00	1,00	1,00	0,25	0,33	0,50
FAK	0,25	0,33	0,50	1,00	1,00	1,00	0,25	0,33	0,50	2,00	3,00	4,00
ESK	0,90	0,95	0,99	2,00	3,03	4,00	1,00	1,00	1,00	0,25	0,33	0,50
YEK	2,00	3,03	4,00	0,25	0,33	0,50	2,00	3,03	4,00	1,00	1,00	1,00

Source: Authors.

As a result of Chang's (1996) extent analysis method, the normalized weight vector of the technical qualification criteria is shown in Table 10.

Table 10: Normalized table of sub-criteria for technical qualification.

Technical Qualification				Average	Normalise
FL	0,15	0,23	0,38	1,00	0,25
FAK	0,12	0,21	0,35	0,87	0,22
ESK	0,15	0,23	0,38	1,00	0,25
YEK	0,18	0,33	0,55	1	0,25
Total				3,87	1,00

Source: Authors.

According to Table 10, FL, ESK, and YEK are weighted equally. Among these criteria, proficiency in a foreign language holds significant importance for ensuring safe navigation. It's crucial to note that even when sailing in territorial waters, encounters with numerous foreign-flagged yachts and vessels are common, necessitating adherence to collision avoidance regulations. Hence, effective communication, particularly in English, is essential, especially in VHF radio communication.

Furthermore, with advancements in technology, electronic navigation aids have become increasingly efficient, providing considerable convenience to captains on board. The proficiency of captains in utilizing these electronic systems proves invaluable, particularly in heavy traffic situations. Additionally, the absence of dedicated engine personnel, especially on smaller yachts, underscores the necessity for captains to possess mechanical knowledge.

The comparison matrix of the sub-criteria related to the physical qualification criterion is shown in Table 11.

Table 11: Comparison matrix of sub-criteria for physical qualification.

Physical Qualificaiton	HC			EA/GA			P			H		
	l	*m*	*u*	*l*	*m*	*u*	*l*	*m*	*u*	*l*	*m*	*u*
HC	1,00	1,00	1,00	2,00	3,00	4,00	0,25	0,33	0,50	0,25	0,33	0,50
EA/GA	0,25	0,33	0,50	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
P	0,90	0,95	0,99	1,00	1,00	1,00	1,00	1,00	1,00	2,00	3,00	4,00
H	2,00	3,03	4,00	1,00	1,00	1,00	0,25	0,33	0,50	1,00	1,00	1,00

Source: Authors.

As a result of Chang's (1996) extent analysis method, the normalized weight vector of the technical qualification criteria is shown in Table 12.

Table 12: Normalized table of sub-criteria for physical qualification.

Physical Qualification				Average	Normalised
HC	0,15	0,24	0,38	0,71	0,27
EA/GA	0,14	0,17	0,22	0,05	0,01
P	0,21	0,31	0,44	1,00	0,38
H	0,18	0,28	0,41	0,86	0,32
TOTAL				2,63	1,00

Source: Authors.

According to Table 12, P is weighted as the most important criterion. It's imperative for captains to adopt a positive and solution-oriented approach towards negative events or challenges. Moreover, strictly adhering to hygiene regulations across all departments of the yacht, particularly concerning personnel, holds paramount importance for both health and customer satisfaction. The comparison matrix of the sub-criteria related to the social qualification criterion is shown in Table 13.

Table 13: Comparison matrix of sub-criteria for social qualification.

Social Competence	TW			C/IS			ES/EC			AS/ASH		
	l	*m*	*u*	*l*	*m*	*u*	*l*	*m*	*u*	*l*	*m*	*u*
TW	1,00	1,00	1,00	2,00	3,00	4,00	0,25	0,33	0,50	2,00	3,00	4,00
C/IS	0,25	0,33	0,50	1,00	1,00	1,00	1,10	1,30	1,50	0,25	0,33	0,50
ES/EC	0,90	0,95	0,99	0,67	0,77	0,91	1,00	1,00	1,00	2,00	3,00	4,00
AS/ASH	0,25	0,33	0,50	2,00	3,03	4,00	0,25	0,33	0,50	1,00	1,00	1,00

Source: Authors.

As a result of Chang's (1996) extent analysis method, the normalized weight vector of the social qualification criteria is shown in Table 14.

Table 14: Normalized table of sub-criteria for social qualification.

Social Competence				Average	Normalised
TW	0,20	0,35	0,60	1,00	0,41
c/is	0,10	0,14	0,22	0,08	0,03
Es/ec	0,18	0,28	0,43	0,75	0,31
AS/ash	0,14	0,23	0,38	0,57	0,24
total				2,40	1,00

Source: Authors.

According to Table 14, the weights of the TW and ES criteria were significant. Upon analyzing Table 15, it becomes evident that fostering effective communication between staff and managers, as well as promoting teamwork, plays a pivotal role in cultivating a positive and cohesive working environment. Furthermore, establishing clear and efficient communication channels between departments and facilitating transparent communication between management and employees can contribute to mitigating near-miss incidents from a safety standpoint.

Table 15: Overall Weights Of Sub-Criteria.

Criteria	Primary Criterion Weight	Sub-criterion Weight	Sub-criterion Importance Weight	Ranking
Experience (Years)	0,31	0,28	0,086	1
Similar Yacht Experience	0,31	0,24	0,074	3
License	0,31	0,23	0,071	6
Maritime Knowledge	0,31	0,24	0,074	4
Foreign Language	0,28	0,25	0,071	7
First Aid Certification	0,28	0,22	0,061	11
Yacht Electronics Expertise	0,28	0,25	0,071	8
Engine Knowledge	0,28	0,25	0,071	9
Health Condition	0,19	0,27	0,051	13
Good Appearance	0,19	0,01	0,001	16
Positivity	0,19	0,38	0,072	5
Hygiene	0,19	0,32	0,060	12
Teamwork	0,21	0,41	0,086	2
Interpersonal Skills	0,21	0,03	0,006	15
Effective Communication	0,21	0,31	0,065	10
Alcohol and Smoking Habits	0,21	0,24	0,050	14

Source: Authors.

According to the FAHP analysis, Table 15 illustrates the importance level of the sub-criteria obtained by multiplying the main criterion and the corresponding sub-criteria. Upon examining the importance level of all sub-criteria, it becomes apparent that E, TW, SYE, MK, and P criteria rank among the top five. This data underscores that the most desirable traits in captains include having substantial work experience, particularly with similar yacht types to facilitate quicker familiarity with the vessel. Additionally, possessing strong maritime knowledge is imperative for proficient yacht operation. Moreover, fostering a team-oriented atmosphere by establishing a warm working environment between the captain and the crew under their command, alongside the captain's positive approach towards potential challenges, emerges as critical aspects.

Conclusions.

In recent years, yacht tourism has experienced significant growth and increased demand, particularly during the summer months, making it a prominent branch of marine tourism. Even prior to the COVID-19 pandemic, yacht tourism was a popular choice for customers seeking a getaway from crowded beaches, opting for more peaceful and private experiences. However, the majority of customers predominantly engaged in daily yacht tours, with only a limited segment choosing to spend their entire vacation onboard a yacht. Nevertheless, the global pandemic has brought about a notable shift in customer perspectives towards yacht tourism, resulting in a significant surge in demand. Families and friend groups now desire holidays that afford them privacy and seclusion, shielding them from disturbances while simultaneously minimizing their impact on the environment. This trend has created an immensely appealing opportunity for yacht operators.

To meet this growing demand, yacht operators are expanding their service areas and striving to provide enhanced quality and improved services to their customers. Alongside considerations of technical features and comfort, the quality of personnel and the service they deliver hold equal importance for yacht operators. In this regard, yacht operators seek out yacht captains who can not only ensure the safe navigation and operation of their yachts but also provide exceptional service to customers. A yacht captain not only serves as an authorized individual responsible for managing and operating the yacht but also functions as an effective leader who oversees the yacht crew. Therefore, a prospective yacht captain must possess both experience and technical as well as commercial knowledge to effectively resolve yacht-related issues and act as an intermediary between customers and the yacht personnel. However, it should be noted that possessing extensive maritime experience and a successful track record as a captain does not guarantee the same level of managerial skills when interacting with customers and yacht personnel. This necessitates a comprehensive study to examine the priorities of yacht operators concerning yacht management and customer relations, thereby identifying the primary selection criteria.

In the study focused on the selection criteria for yacht captains in the yacht operator sector, preferred and considered criteria were compiled and classified into four main categories, resulting in 16 initial criteria. These criteria were evaluated and weighted in terms of their importance by a panel of 10 HRMs with significant experience in the yacht industry and yacht operations. The obtained data revealed that the top five qualifications, in order of importance, were experience, teamwork,

familiarity with the yacht type, maritime knowledge, and positivity.

The prioritization of these top five criteria by yacht operators is both accurate and necessary. Experience, as the most crucial criterion, plays a fundamental role in yacht knowledge acquisition and the ability to promptly address emerging problems. Ensuring the safety and security of the yacht is one of the primary responsibilities of a yacht captain, and experience gained from working in the field is essential in fulfilling this duty. The second important criterion is teamwork. Although the yacht captain holds a managerial position onboard, they must maintain compatibility with the yacht crew. A yacht captain who fails to foster a positive team dynamic or establish effective teamwork may disrupt the overall harmony onboard. Even with extensive experience, a yacht captain unable to cultivate teamwork will struggle to navigate the yacht independently. The third significant criterion is familiarity with the yacht type. While it may be advantageous for a yacht captain to have experience on various types of yachts for career growth and job opportunities, yacht operators generally prefer captains who are knowledgeable and experienced with their specific yacht types. The more a yacht captain has worked on a particular type of yacht, the easier their adaptation and ability to swiftly establish teamwork on a new yacht. This facilitates a seamless transition to teamwork, demonstrating their acquired experience.

The fourth important criterion is maritime knowledge, which serves as a foundational requirement for the safe navigation and operation of the yacht. Yacht captains must possess a comprehensive understanding of both local and international maritime regulations and practices. Their proficiency in maneuvering and operating the yacht in marinas and confined areas relies on their substantial knowledge of seamanship. Lastly, the fifth criterion is positivity. When customers choose yacht tourism, they not only seek quality and comfort but also observe the behavior and demeanor of the yacht's staff. It is therefore crucial for all yacht personnel, including the captain, to approach customers with kindness and maintain a consistently positive attitude. The captain's response to challenges, both in relation to customers and the crew, serves as an example. By embodying this criterion, the yacht captain becomes a respected and well-liked figure in the eyes of both customers and staff, transforming their role from a mere manager to a trusted leader. This fosters trust and support among the crew, ensuring effective yacht management.

The study concludes that the 16 established criteria are suitable and sufficient for general evaluation purposes, making them an essential selection model for other yacht operator companies. The evaluating yacht operator company primarily prioritized the top three criteria and made the selection accordingly. These yacht captain selection criteria possess broad applicability and can serve as a vital model for future selection processes within the yacht operator industry. The findings of this study offer valuable recommendations for human resources managers in the maritime industry, particularly in the selection and management of yacht captains. By following these recommendations and utilizing the insights gained from the study, managers can make better decisions, improve their selection processes, and enhance overall customer satisfaction and yacht operations in the yacht tourism sector.

When reviewing the literature, the absence of any study on determining the desired qualifications of yacht captains operating in the yacht tourism sector makes this study unique and served as the primary motivation for its undertaking. It has been observed in the literature that studies mostly focus on the selection of ship personnel. Upon comparing the findings of this study with those in the literature, Vlasenko & Tsaran (2016) concentrated on both professional and psychological requirements in their examination of seafarer selection. The professional requirements highlighted in their study appear to align with the necessity of vocational qualifications emphasized here. Arıcan and Oksas (2022) identified officer selection criteria for various ship types, emphasizing leadership and competence as the most critical primary criteria. In terms of sub-criteria, experience, bridge teamwork, and communication emerged as paramount. The findings of this study corroborate the importance of experience while supporting the significance of teamwork and communication. However, what distinguishes this study from those in the literature is the emphasis on maritime knowledge and positivity. This study's findings can be extrapolated to inform personnel selection across different ship types, and the utilization of various MCDM methods could inspire future research endeavors.

For future studies, it is also recommended to expand the analysis of yacht captain selection criteria to consider the impact of evolving technologies and changing yacht types. With advancements in technology, the maritime industry is witnessing the integration of various innovative features and systems into yachts. For example, emerging technologies such as advanced navigation systems, automation, and remote monitoring systems can greatly impact the skills and knowledge required of yacht captains. Future research could investigate the specific technical competencies and familiarity with advanced yacht systems that would be desirable in yacht captains. This analysis would enable human resources managers to adapt their selection criteria and identify candidates who possess the necessary technological expertise to operate modern yachts effectively.

Additionally, the application of these selection criteria could be explored beyond the role of yacht captains. While yacht captains play a crucial role in yacht operations, there are various other positions within the yacht personnel that contribute to the overall customer experience. These positions may include yacht engineers, deckhands, stewardesses, chefs, and more. Future research could examine how the established criteria can be applied to select and manage other yacht personnel effectively.

By expanding the scope of the study to encompass other yacht personnel, researchers can gain insights into the specific competencies and qualities that are essential for each role. This would enable human resources managers to develop comprehensive selection processes for all yacht personnel, ensuring a cohesive and efficient team onboard. metrics, such as customer satisfaction ratings, repeat bookings, and positive reviews, researchers can assess the effectiveness of the selection criteria in achieving desired outcomes. This analysis would provide

empirical evidence for the significance of each criterion and guide future decision-making processes for human resources managers.

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