

Multi-Criteria Nautical Ports Capacity and Services Planning

N. Perko, N. Kavran, M. Bukljaš, I. Berbić

Abstract—This paper is a result of implemented research on proposed introduced methodology for nautical ports capacity planning by introducing a multi-criteria approach of defined criteria in the Adriatic Sea region. The purpose was analyzing the determinants - characteristics of infrastructure and services of nautical ports capacity allocated, especially nowadays due to COVID-19 pandemic, as crucial for successful operation of nautical ports. Giving the importance of the defined priorities for short-term and long-term planning is essential not only in terms of the development of nautical tourism, but also in terms of developing the maritime system, but unfortunately this is not always carried out. Evaluation of the use of resources should follow from a detailed analysis of all aspects of resources bearing in mind that nautical tourism used resources in a sustainable manner and generates effects in the tourism and maritime sectors. Consequently, identified multiplier effect of nautical tourism, which should be defined and quantified in detail, should be one of the major competitive products on the Croatian Adriatic and the Mediterranean. Research of nautical tourism is necessary to quantify the effects and required planning system development. In the future, the greatest threat to long-term sustainable development of nautical tourism can be its further uncontrolled or unlimited and undirected development, especially under pressure markedly higher demand than supply for new moorings in the Mediterranean. Results of this implemented research are applicable to nautical ports management and decision makers of maritime transport system development. This paper will present implemented research and obtained result - developed methodology for nautical port capacity planning - Port Capacity Planning Multi-criteria decision-making. A proposed methodological approach of multi-criteria capacity planning includes four criteria (spatial - transport, cost - infrastructure, ecological and organizational criteria, and additional services). The importance of the criteria and sub-criteria is evaluated and carried out the basis for a sensitivity analysis of the importance of the criteria and sub-criteria. Based on the analysis of the identified and quantified importance of certain criteria and sub-criteria as well as sensitivity analysis and analysis of changes of the quantified importance scientific and applicable results will be presented. These obtained results have practical applicability by management of nautical ports in the planning of increasing capacity and further development and for the adaptation of existing nautical ports. The obtained research is applicable and replicable in other seas and results are especially important and useful in this COVID-19 pandemic challenging maritime development framework.

Keywords—Adriatic Sea, capacity, infrastructures, maritime system, methodology, nautical ports, nautical tourism, service.

I. INTRODUCTION

THE current level of port services in nautical tourism is not only providing berths and basic services for nautical

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tourists; today, a berth in the marina includes other services, such as souvenir shop, with newspapers and other publications, free wireless internet, internet kiosks, telephone and fax services, supermarkets and duty-free shops, boat rental, possibility for sailing and diving, fishing courses and other sea and land activities, servicing and repair of yachts and boats, shops with sports equipment, meteorological and other data about the weather and nautical safety, medical services, cultural events and others.

The quality of port services represents the development of nautical ports and competitiveness with other nautical ports. However, in order to improve the quality of port services provided by nautical ports, it is necessary to examine the efficiency, accessibility and use of these port services. By evaluating port services, it is possible to develop a new nautical port or reconstruct an existing nautical port.

The paper presents a methodology for assessing the quality and use of port services by multi-criteria approach using the Expert Choice tool with which it is possible to determine the criteria and sub-criteria of nautical port and their importance was assessed through a web questionnaire by nautical experts, ports, port authorities and other interested users of the development of nautical tourism port system.

The methodology was carried out on the example of nautical port models in the Republic of Croatia. However, the methodology can be implemented on any nautical port model, i.e., on a nautical port model within any country in the world.

II. ANALYSIS OF NAUTICAL VESSELS AND NAUTICAL VESSELS TRAFFIC

A. Nautical Traffic Quantification Methods

Volume of nautical vessel transport is a question of quantification in several manners. The most common method classification considers quantitative and qualitative methods. The most used quantitative method is the analysis of the number and structure of the nautical port infrastructure. Primarily this applies to the demand of nautical port carrying capacity [4].

Demand for nautical port capacity reflects: the number of vessels at permanent mooring (at sea and on land), vessels type, the number of vessels in transit and their structure by type of vessels that use moorings, seasonality, and the number of tourist arrivals and overnight sailors, their structure by emitting countries, the share of fixed boaters and the number of issued licenses for foreign vessels in territorial seas for the period of

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one year and their structure based on arrivals [5].

Qualitative traffic research methods of traffic are those related to the definition and validation of indicators of quality of service in nautical tourism.

The service is an activity or series of activities to a greater or lesser extent intangible nature, which usually, but not necessarily, takes place in the user interaction with the person providing the service and/or the physical resources or systems, the one who provides the service [2]. Assessing the quality of port services is subjective in nature whereby users in different ways observe individual indicators and their significance.

Port services are characterized by their commercial nature and the following services are provided in nautical tourism ports, according to the Act on the provision of tourist services (Official Gazette 68/07, 88/10 and 30/14) [1]:

1. lease of berths in nautical tourism ports for accommodation of ships and tourists;
2. charter of a vessel with or without a crew, with or without the provision of accommodation services;
3. vessel maneuvering services;
4. accommodation, protection, and maintenance of vessels at berth in the sea and on the dry dock;
5. services for the supply of seafaring tourists (water, fuel, groceries, spare parts, equipment, etc.);
6. equipping and preparation of vessels;
7. providing various information to tourist sailors (forecasts, nautical guides, etc.);
8. sailing schools, training for skippers and boat leaders; and,
9. other nautical tourism services.

Two major groups of factors that determine the competitiveness of nautical tourism are considered [6]:

1. general ones which include basic climatic and sea conditions; and,
2. specific ones including traffic accessibility, nautical ports facilities, vessel mooring accessibility, human resources competences and hospitality, quality, and price of nautical ports service and other economic, technical and regulation issues.

III. THEORETICAL BACKGROUND AND METHODOLOGY DEVELOPED

A. Methodological Determinants of Multi-Criteria Port Capacity Planning

During the exploration of the port facility planning process and the determination of port service quality indicators, multi-criteria decision making was used [8]. In the following, the applicability of this method to the researched problem of dimensioning and quantification of the capacities of nautical ports and the analytical hierarchical process has been analyzed.

Expert Choice [3] is utilized for this research as it provides collaborative decision software and consulting to improve the understanding and outcomes of decision. Expert Choice is fully adequate for AHP as a powerful and flexible decision-making process to assist and help researchers and decision makers while making decisions.

B. Defining of Criteria and Sub-Criteria for Nautical Ports

Development

Defining criteria and sub-criteria is the basis for defining the goal that the decisions are to be achieved. Criteria are considered to be characteristics of options considered relevant in the election situation and based on which comparison (comparison of importance) and evaluation will be carried out. Decision-making criteria can be quantitative (linked to the characteristics of options that can be meticulously measured or predicted and using different measurement units) and qualitative (they are related to the characteristics of options for whose modes cannot be numerically expressed). In defining the selection criteria for the nautical tourism port, two sets of quantitative criteria were distinguished: criteria whose values cannot be precisely measured but can be compared to the intensity and criteria for which no quantitative comparison can be carried out [7].

Based on the research significance of the nautical ports system, the analysis of quantitative indicators, the analysis of tourists flows, the analysis of spatial plans for the development of towns and counties, especially nautical tourists in the last 10 years, the following criteria were defined for four models [7]:

1. marina, permanent berth;
2. marina, transit berth;
3. town port, permanent berth;
4. town port, transit berth.

The spatial-traffic criterion is a criterion that encompasses the spatial features of nautical ports with regard to the availability of parking facilities and accommodation in the harbor and other factors that mark the geopolitical position of the port itself [7].

TABLE I
 SPATIAL-TRAFFIC CRITERION AND SUB-CRITERIA

C1 Spatial-Traffic
Sc1 The distance from the nearest airport
Sc2 The distance from the highway
Sc3 The distance from the center of the town
Sc4 Secure parking at the harbor and accommodation in the harbor
Sc5 Proximity of national parks and places with cultural events

The distance from the nearest airport gets more and more important because many boaters come to aircraft to charter the boat. Also, ports closer to the airports become interesting for cruising the company as a starting or landing port. This factor cannot be influenced by the port system aspect, but this criterion needs to be considered and evaluated when dimensioning the capacity of the nautical ports of the vessel according to the type of vessel [7].

The distance from the highway reflects the proximity of the highway access and is important to those sailors who come with vehicles to/from the port [7].

The distance from the center of the town is the next important factor which is often a decisive factor for many sailors when choosing the port, they will be accommodating. Most boaters are more appealing ports that are in the center or near the center because it is an acceptable walk to reach the center, which is a problem if the ports are more than 1 kilometer away, and boaters include children or older people. Boaters often have

bicycles on board, but even in this situation, the proximity to the center of the site is important [7].

Secure parking at the harbor and accommodation in the harbor (hotel or other tourist facilities) is a criterion that is not necessary but has a significant impact on the quality of service since many boaters come with cars and have the need to leave cars on the parking lot. Geo-traffic factors of the nautical tourism port are: the distance from the nearest airport, the distance from the highway, the distance from the center of the town/city and the vicinity of the national parks and the places where cultural events are held [7].

The last defined sub-criterion of spatial-traffic criterion is the *proximity of national parks and places* where cultural events are held and reflects the interest of the yachtsman towards recreation, tours of museums, theaters, cinemas, and other cultural events [7].

The price-infrastructure criterion includes the following defined sub-criteria: berth costs, berth equipment (electricity/water), port security, port security and secure emergency service at the port [7].

TABLE II
 PRICE-INFRASTRUCTURE CRITERION AND SUB-CRITERIA

C2 Price-Infrastructure
Sc1 Berth cost
Sc2 Berth equipment
Sc3 Security service
Sc4 Web camera surveillance
Sc5 The emergency maintenance of the hull and nautical equipment of the boat

The berth cost as a factor is not always crucial because sailors are not always the most important criterion for choosing the port [7].

Berth equipment as a price-infrastructure sub-criterion includes the availability of basic equipment that includes water and electricity on a berth, permanent or transit. This equipment is most often available on the berth but there are also berths that this convenient equipment does not provide. Also, for sailors this is not a decisive factor in the choice of port, especially those ones who choose anchorage on floats [7].

The presence of the security service in the port is becoming increasingly important, especially in recent years, with the rise of terrorism threats. Especially boaters with children value this criterion as important when choosing a port. The Republic of Croatia is recognizable among sailors as a tourist destination with a high level of security, and this aspect represents the competitive advantage of a nautical ports, in marinas and town ports, on a permanent and transit berth. However, there is a different ranking of the importance of this sub-criterion, as well as all other sub-criteria by different groups of sailors, according to the types of vessels [7].

Closely related to the security aspect is the existence of web camera surveillance in the port. This aspect becomes more and more important, but it should also be mentioned the lack of positioning of the ports of nautical tourism in the center of the city and the inability to control all areas of the ports themselves.

In addition to the above-mentioned sub-criteria, a sub-

criterion of the *emergency maintenance of the hull and nautical equipment of the boat* in the port is recognized and defined, which is of great importance to sailors in order to ensure the basic functions of the vessel and the possibility of repairing unexpected failures with the aim of continuing the navigation [7].

TABLE III
 ECOLOGICAL-ORGANIZATIONAL CRITERION AND SUB-CRITERIA

C3 Ecological-Organizational Criterion
Sc1 Black tanks collection system cost
Sc2 Black tanks collection system availability
Sc3 The emergency maintenance of the boat
Sc4 Educated and qualified human resources
Sc5 The emergency maintenance of the waste collection equipment of the boat

The ecological-organizational criterion includes all the more important equipment whose presence is regulated by various legal acts. This refers to the price of the black tanks collection system cost and ability to empty black tanks.

The emergency maintenance of the boat is an important factor for selecting nautical ports, with different preferences depending on the availability of maintenance services.

The next factor is the presence of educated and qualified human resources in the port, which primarily refers to the workers who come into direct contact with sailors during their stay in the port. The existence of educated and qualified human resources in port in the navigational structures of the sailors is not decisive, even one can conclude that it is not a particularly important factor as boaters expect a certain level of service quality and the existence of infrastructure and supra-structure capacities [7].

In addition to the above-mentioned sub-criteria, a sub-criterion for the emergency service of the ship's waste collection equipment is identified and defined, which is important to sailors in order to ensure the acceptance of waste from the vessel.

TABLE IV
 ADDITIONAL SERVICES CRITERION AND SUB-CRITERIA

C4 Additional Services
Sc1 Catering in port/ within 10 km
Sc2 Possibility of electronic booking
Sc3 Ensured entertainment facilities and childcare
Sc4 Availability of Internet kiosks and WLAN internet connections
Sc5 The emergency maintenance of the other equipment of the boat

Additional service criteria include the option of using additional services that are not essential to the use of nautical ports but are often very important to sailors when selecting a port. Here it is particularly emphasized that all ports of nautical tourism in Croatia are in common in a clean, unpolluted natural environment and additional services represent a great competitive potential for future development. In this paper sub-criteria of criteria for additional services are defined as those that determine the availability of additional content that would be used by sailors [7].

The catering in the port reflects the presence of catering

facilities in the port itself (restaurants, cafes, etc.) within 10 kilometers, which is actually a very large radius of interest for the boaters.

The following factor is the possibility of electronic booking of the berth which unfortunately does not exist in most of the Croatian ports and compared to competitive ports in the surrounding countries, many of these ports provide this option. This factor will be particularly considered in this paper from the point of view of the availability and success of finding a transit berth in marinas and in town ports, which according to the results of TOMAS Nautika Jahting 2012 for the category is always 58.6% for mariners in the marinas on the transit route and 45.3% for the yachtmen in the town ports on the transit route [7].

The factor of availability of ensured entertainment facilities and childcare is considered by boaters as interesting and useful, and taken into account when choosing a harbor, although it is not crucial or indispensable.

A much more important factor is the availability of Internet kiosks and WLAN internet connections especially to a younger population that uses social networks, entertainment applications and reads electronic publications on a daily basis, compared to the older population that is more attached to traditional communication channels and printed publications. Given the continuing brisk interest in digital media and content, investing in the development of this factor should certainly be one of the priorities of the decision-makers of nautical ports.

In addition to the above-mentioned sub-criteria in this paper, a sub-criterion of the secured emergency maintenance service is identified and defined as a sub-criterion for the emergency maintenance of other boat equipment in the port that is important to sailors in order to secure the secondary functions of the vessel and the possibility of repairing unexpected failures with a view to continuing navigation [7].

IV. MODELING TESTING AND RESULTS

A. Dimensioning of Optimal Capacities of Permanent and Transit Berths in Marinas

Based on the defined criteria and sub-criteria, their importance was evaluated. The evaluation was conducted based on the results of a survey that was publicly available to all on the website and completed by nautical experts, ports, port authorities and other interested users of the development of nautical tourism port system. The first evaluation model is the evaluation of criteria and sub-criteria in marinas, both on a permanent and on a transit berth.

The answers to the questions in the survey, which was publicly available to everyone on the website, were processed and the results of the importance evaluation were shown in Figs. 1-10. For marinas with permanent berth, the following criteria are important: the price infrastructure criterion (PI) amounts to 43%, the criterion of additional services (AS) 41%, the spatial-traffic criterion (ST) 12% and the last in importance is the ecological-organizational criterion (EO) with an importance of 4% (Fig. 1). These results reflect the interest of nautical experts when choosing a marina as a port of choice and a permanent

berth, with the intention of spending some (longer) time in the port.

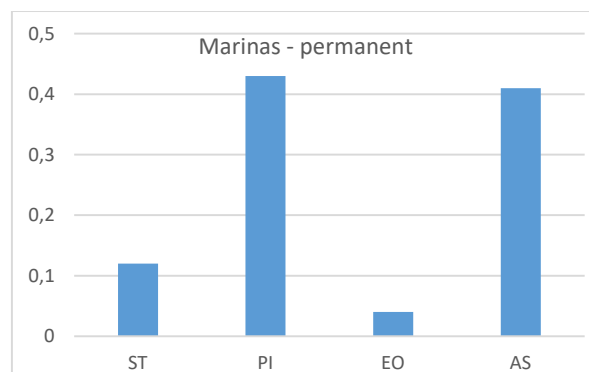


Fig. 1 Weight values of criteria in marinas on a permanent berth

In sizing the optimal capacities, the importance of each individual sub-criterion was further analyzed.

The calculated importance of individual sub-criteria of the spatial-traffic criterion is as follows: the importance of the sub-criterion distance from the airport (DFA) is 18%, the importance of the sub-criterion distance from the highway (DFH) is 35%, the importance of the sub-criterion distance from the center of town/city (DFCT) is 18%, the importance of the sub-criteria secured parking in the port/accommodation in the port (hotel) (SPIP) is 24% and the importance of the sub-criteria proximity to national parks/cultural events (PNPCE) is 5% (Fig. 2). It is concluded that the most important thing for nautical experts who choose to sail into the marina and be tied to a permanent berth from the aspect of the spatial-traffic criterion is the proximity of the highway and the airport or the center of the place. This conclusion reflects the real situation and interest of this group of nautical experts who enter the port with the intention to spend some (longer) time in the port.

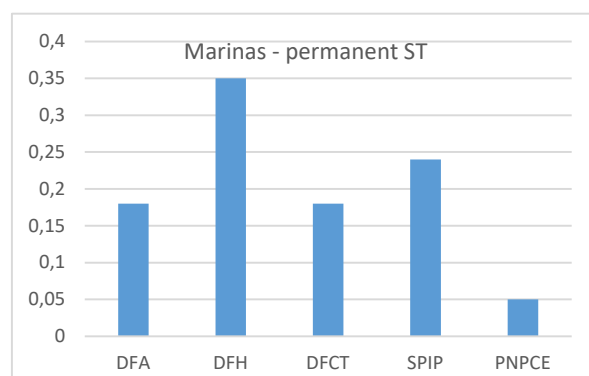


Fig. 2 Weight values of individual sub-criteria of the spatial-traffic criterion in marinas on a permanent berth

The calculated importance of individual sub-criteria of the price-infrastructure criterion is as follows: the importance of the sub-criterion of berth prices (BP) is 22%, the importance of the sub-criterion of berth equipment (electricity/water) (BE) is 25%, the importance of sub-criteria guard port service (GPS) is 18%, the importance of the port webcam surveillance sub-

criteria (PWS) is 14%, the importance of the provided emergency maintenance service for hulls and nautical equipment in the port (PEMS) sub-criteria is 21% (Fig. 3). It is concluded that for nautical experts who choose to sail into the marina and be moored at a permanent berth from the aspect of price and infrastructure criteria, the most important equipment is mooring and then the price of berths and emergency service of hull and nautical equipment in the port.

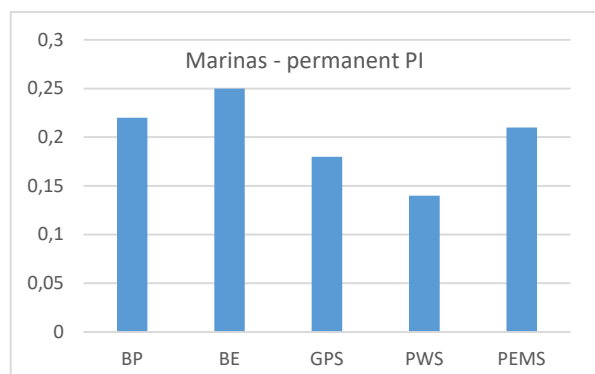


Fig. 3 Weight values of individual sub-criteria of the price-infrastructure criterion in marinas on a permanent berth

The calculated importance of individual sub-criteria of the ecological-organizational criterion is as follows: the importance of the sub-criterion of prices of receiving devices for emptying black tanks (PRET) is 11%, the importance of the sub-criterion possibility of emptying black tanks (PEBT) is 6%, the importance of sub-criteria organized vessel maintenance service (OVMS) is 24%, the importance of the sub-criteria educated and professional human resources in the port (EPhR) is 3%, the importance of the sub-criteria provided emergency maintenance service of vessel equipment for waste disposal in the port (PEMS) is 56% (Fig. 4). It is concluded that for boaters who choose to sail into the marina and be moored to the permanent berth from the aspect of ecological-infrastructure criteria, the most important is the provided emergency maintenance service of the vessel's equipment for waste disposal in the port and organized vessel maintenance service.

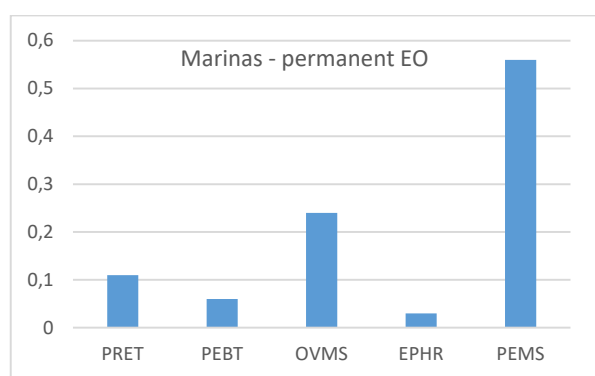


Fig. 4 Weight values of individual sub-criteria of ecological-organizational criteria in marinas on permanent berth

The calculated importance of individual sub-criteria of

additional services criteria is as follows: importance of sub-criteria catering in the port/within 10 km (CP) is 3%, importance of sub-criteria possibility of electronic reservation of berth (PERB) is 4%, importance of sub-criteria provided entertainment content/childcare (PECC) is 14%, the importance of the sub-criterion availability of Internet kiosk/WLAN internet connection (AIKEW) is 9%, the importance of the sub-criterion provided emergency maintenance service of other equipment in the port (PEMS) is 43% (Fig. 5). It is concluded that the most important thing for nautical experts who choose to sail into the marina and be moored from the aspect of the criteria of additional services is the provided emergency service of other equipment of the vessel in the port and provided entertainment/childcare.

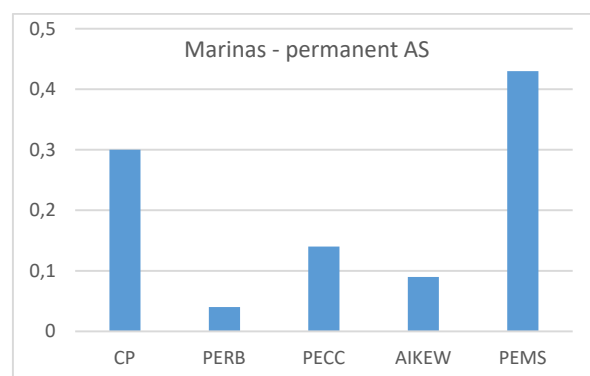


Fig. 5 Weight values of individual sub-criteria of additional services criteria in marinas on a permanent berth

For marinas for transit berth, the following importance criteria were calculated from the model: the spatial-traffic criterion is the highest (ST) and amounts to 52%, the price-infrastructure criterion (PI) is 33%, the ecological-organizational criterion (EO) is 9%, and the last in importance is the criterion of additional services (AS) validity of 6% (Fig. 6). These results reflect the interest of nautical experts when choosing a marina as a port of choice and choosing a transit berth, with the intention of spending some (longer) time in the port. These results are visibly different from the results for a permanent berth marina.

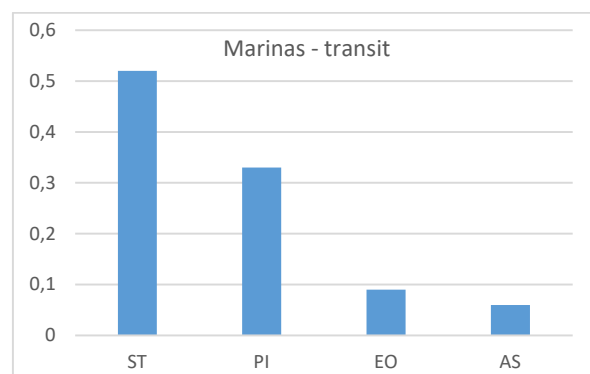


Fig. 6 Weight values of criteria in marinas on transit berth

The calculated importance of individual sub-criteria of the

spatial traffic criterion is as follows: the importance of the sub-criterion distance from the airport (DFA) is 28%, the importance of the sub-criterion distance from the highway (DFH) is 35%, the importance of the sub-criterion distance from the center of town/city (DFCT) is 33%, the importance of the sub-criteria secured parking in the port/ accommodation in the port (hotel) (SPIP) is 22% and the importance of the sub-criteria proximity to national parks/ cultural events (PNPCE) is 8% (Fig. 7). It is concluded that for nautical experts who choose to sail into the marina and be moored at the transit berth from the aspect of the spatial-traffic criterion, the most important thing is the distance from the city center and the distance from the airport. This conclusion reflects the real situation and interest of this group of sailors who enter the port with the intention to spend some shorter time in the port.

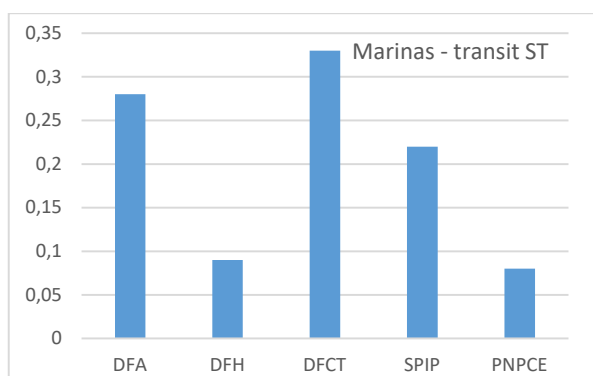


Fig. 7 Weight values of individual sub-criteria of the spatial-traffic criterion in marinas on the transit berth

The calculated importance of individual sub-criteria of the price-infrastructure criterion is as follows: the importance of the sub-criterion of berth prices (BP) is 5%, the importance of the sub-criterion of berth equipment (electricity/water) (BE) is 27%, the importance of sub-criteria guard port service (GPS) is 13%, the importance of the port webcam surveillance sub-criteria (PWS) is 4%, the importance of the provided emergency maintenance service for hulls and nautical equipment in the port (PEMS) sub-criteria is 51% (Fig. 8). It is concluded that for nautical experts who choose to sail into the marina and be moored at the transit berth from the aspect of price-infrastructure criterion, the most important is the provided emergency maintenance service for hulls and nautical equipment in the port and the criterion of berth equipment (electricity/water).

The calculated importance of individual sub-criteria of the ecological-organizational criterion is as follows: the importance of the sub-criterion of prices of receiving devices for emptying black tanks (PRET) is 11%, the importance of the sub-criterion possibility of emptying black tanks (PEBT) is 6%, the importance of sub-criteria organized vessel maintenance service (OVMS) is 24%, the importance of the sub-criteria educated and professional human resources in the port (EPHR) is 4%, the importance of the sub-criteria provided emergency maintenance service of vessel equipment for waste disposal in the port (PEMS) is 55% (Fig. 9). It is concluded that for nautical

experts who choose to sail into the marina and be moored to the transit berth from the aspect of ecological-infrastructure criteria, the most important is the provided emergency maintenance service of the vessel's equipment for waste disposal in the port and organized vessel maintenance service.

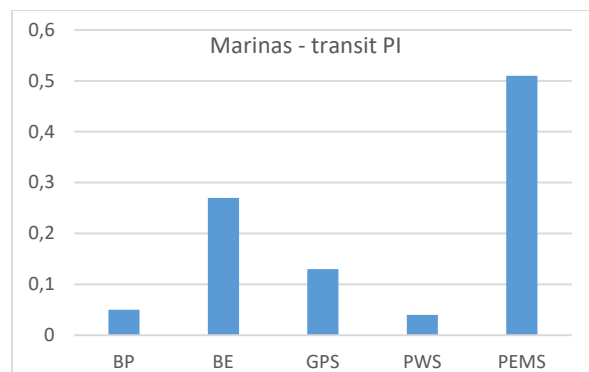


Fig. 8 Weight values of individual sub-criteria of the price-infrastructure criterion in marinas on the transit berth

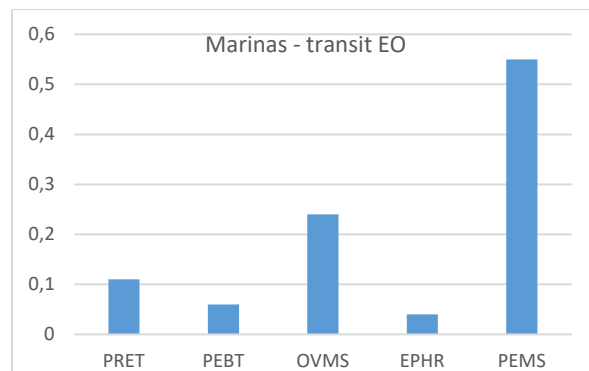


Fig. 9 Weight values of individual sub-criteria of ecological-organizational criteria in marinas on transit berth

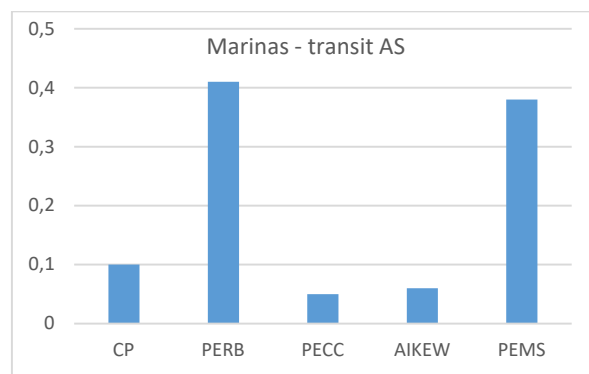


Fig. 10 Weight values of individual sub-criteria of additional services criteria in marinas on a transit berth

The calculated importance of individual sub-criteria of additional services criteria is as follows: importance of sub-criteria of catering in port/within 10 km (CP) is 1%, importance of sub-criteria possibility of electronic reservation of berth (PERB) is 41%, importance of sub-criteria provided entertainment content/childcare (PECC) is 5%, the importance

of the sub-criterion availability of Internet kiosk/WLAN internet connection (AIKEW) is 6%, the importance of the sub-criterion provided emergency maintenance service of other vessels in the port (PEMS) is 38% (Fig. 10). It is concluded that for nautical experts who choose to sail into the marina and be moored at the transit berth from the aspect of the criteria of additional services, the most important possibility is the electronic reservation of berths and provided emergency maintenance service of other equipment in the port.

V. CONCLUSION

Nautical tourism is an important subsystem of the economic branch of the maritime economy and tourism in the entire economic system of a country. Nautical tourism as a phenomenon is one of the aspects of tourism as a whole, from which it is developed as its subspecies, i.e., nautical tourism is the sum of multifunctional activities and relationships arising from nautical tourists staying inside or outside nautical tourism ports, using vessels or other facilities related to maritime and tourist activities, for the purpose of recreation, sports, entertainment, or some other need. Ports for a nautical tourism are becoming specific places for the realization of this segment of tourism.

The basic principle of managing the development of nautical tourism is the principle of sustainable development, which implies to find a balance between the need to preserve natural heritage and the need for economic development.

Ports for the nautical tourism and nautical tourism in general are part of the maritime system and its economy and are becoming one of the fastest growing branches of the tertiary sector. However, accelerated development must also be controlled development, because the state of each element of the system significantly depends on the state of the others. For this purpose, it is necessary to establish the organization of a port for nautical tourism, so as to enable the provision of basic and complementary nautical services.

To investigate the issue of dimensioning the capacity of the ports for nautical tourism ports and the analytical hierarchical process, an analysis was performed, and the method of analytical hierarchical process was used for dimensioning. Based on the conclusions on the analyzed properties, habits of sailors, technical-technological capacities of a ports for nautical tourism and technological processes that are carried out in these ports, the structure of criteria and sub-criteria is defined. Four criteria for the selection of the port have been defined: spatial-traffic, price-infrastructure, ecological-economic and the criterion of additional services.

The importance of the criteria was determined based on the Saaty scale using numerical values 1-9. Based on the matrices of relative importance, the importance of each individual criterion in relation to the others was calculated, i.e., the distribution of the importance of the criteria. The tool used to solve the problem of multi-criteria decision making is Expert Choice.

The achieved goal of the research is to propose the best solution for the correlation of nautical vessels and port infrastructure capacities and to evaluate the impact of nautical

vessel traffic on port capacity. The achieved purpose of the research is: by analyzing the characteristics of nautical capacities and existing infrastructural and superstructural port capacities to consider the scope of the effect of the activities of the nautical tourism system with the intention of evaluating the performance and functioning of the system.

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