

Regional report on small ports phenomenon in the Zadar County

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1. Introduction

The FRAMESPORT project has the aim to create a coordinated initiative to support the sustainable development of the small ports of the Adriatic basin in a strategic perspective. Therefore, the objective is to turn small ports into a proactive driver of the socio-economic development of this coastal area. This strategic goal requires a multifaced and interdisciplinary approach, including both the adoption of concrete pilot projects as well as identification of priority themes to be promoted within the overall strategy. These actions are going to be performed by adopting a bottom-up approach, involving local and national stakeholders since the beginning of the project. Also, the various project partners have been selected to guarantee a wide territorial cover. Their aim is to address the planning and management topics, the business models implementation, the enhancement of training and competence, as well as the development of Information and Communication Technologies (ICT) tools and services. In addition, the project aims at developing an ICT platform that collects and systematizes the key data on small ports in order to use this information to drive sustainable development. The portal is going to work as a bridge between the two sides of the Adriatic basin, the Italian and Croatian one. In this way, it is possible to create a more consistent and united network of small ports, businesses and institutions, and promote their sustainable performance, infrastructure and policies in order to favor their development and growth.

The point was to extract the most valuable information regarding the ports and harbors that present a safe haven for many domestic and international passengers. Report has been split into several chapters, each of which had a mission to provide a summary keeping in mind few key points.

The beginning of the document starts with an introduction to the necessity of this report and a description of Zadar County in a nutshell.

Following chapter was based on listing all of the port areas under the management of county port authorities, current state of the art which was illustrated through tables and figures, showing percentage-wise how are Zadar County's ports comparing to other regions. The key take-away was to provide the reader with statistic data presenting the levels of adoption of certain trends, port infrastructure and superstructure, as well as an overall offer port has.

After that, a SWOT analysis was made in order to simplify the external and internal elements that ports of the Zadar County have to face. Despite being an up-and-coming competitor on the Mediterranean, Zadar County is facing a lot of the opportunities to further develop this segment of

business and tourism. Nonetheless, there are also some threats, therefore during the decision-making process all of the elements have to be considered.

Final chapter focused on some of the key metrics that greatly impacted charts and thus should be considered to place county ports within the current timeframe and final remarks were made.

1.1. Purpose of the document

This document is region-based and has the aim to depict an overall picture of the current state of the ports and harbors within a given territory, by presenting relevant information on the existing facilities and single port characteristics and services, on the basis of the data collected through the questionnaire provided under WP5¹. Each document is regionally based so each individual region gets appropriate attention when describing their initial status. The content of this regional report is extracted and fragmented, so the partner is able to provide a document which consists of a full set of data on ports and harbors under the management of county port authorities inside of a region. The key is, after collecting the data from questionnaires present the baseline information on the existing facilities and individual port characteristics and services it provides.

Such information will then serve as to compose the overall puzzle drawing the detailed picture of the two coastlines of the Adriatic Sea, as well as representing a first source of information for ultimately filling the FRAMESPORT platform.

It has to be mentioned that this report in its statistics does not encompass privately held marinas (e.g., ACI Marina), but only ports of regional and local significance.

¹ https://ec.europa.eu/eusurvey/runner/IUAV_questionario_framesport_servizi_porti

2. The region in a nutshell

2.1. Geographical context and socio-economic description of the region/county

County is one of the seven coastal Croatian Counties and it is located in the very center of the Croatian part of the Adriatic coast. It's one of the largest counties in Croatia - with 3.641,91 km² land territory and 2.845 km² of sea surface. The county takes up 6.5% of the total land territory and 12.4% of the total sea surface in Croatia.

Within its waters there are 154 islands and islets, of which twenty are inhabited. There are also 46 reefs. Geographically, it is situated in such a way that it comprises the northern Dalmatian coast and the hinterland Ravni Kotari and Bukovica. From Lika and Croatian continental part it is sharply separated by the high massive of mountain Velebit, which has determined its development for centuries. Today, this separation is felt significantly less because of Sveti Rok tunnel passing through the mountain. The Zadar County therefore has, according to its geo-traffic position, a key position in linking the northern and southern part of Croatia.

Figure 1 Map of Zadar County



Table 1 Zadar - statistical data from 2019.

Flag	
Area	7.276,23 km ²

County seat:	Zadar
Settlements	6 towns and 28 municipalities
Population	170.017
Population density (per km²)	46,66

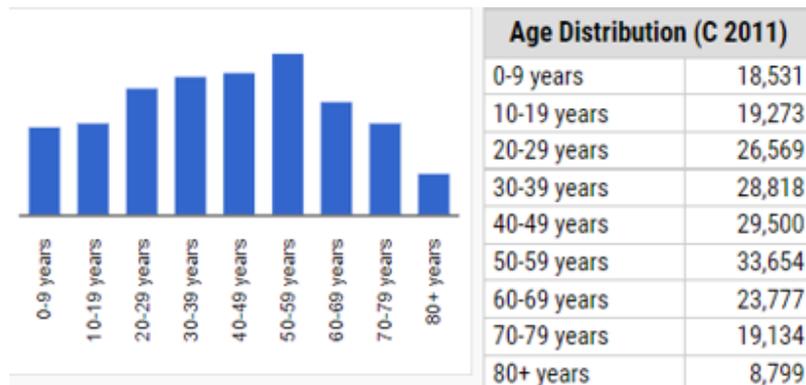
The population of Zadar County has experienced significant in the last 20 years changes in terms of population aging and an increase in the elderly population of 65 years and a decrease in the young population.

A feature of the whole population of Zadar County is the representation of people older than 85 years who in group 65+ in Zadar County make up about 8.56% of the population. Zadar County is in the group of seven counties in Croatia with the highest share of this population.

Table 2 Gender and age diagrams for Zadar County

Type of settlement	Gender	Total	Age groups										
			0-4	5-9	10-14	15-64	65-69	70-74	75-79	80-84	85-89	90-94	95 +
Total	sv.	170.017	8.736	8.342	9.759	111.652	8.392	8.836	7.297	4.305	2.050	543	105
	m.	83.504	4.474	4.224	5.040	56.272	3.961	4.037	3.102	1.615	608	142	29
	ž.	86.513	4.262	4.118	4.719	55.380	4.431	4.799	4.195	2.690	1.442	401	76
Towns	sv.	98.198	5.404	4.965	5.807	66.177	4.454	4.467	3.590	2.022	1.005	249	58
	m.	47.184	2.790	2.519	2.956	32.233	2.003	2.020	1.517	757	292	79	18
	ž.	51.014	2.614	2.446	2.851	33.944	2.451	2.447	2.073	1.265	713	170	40
Villages	sv.	71.819	3.332	3.377	3.952	45.475	3.938	4.369	3.707	2.283	1.045	294	47
	m.	36.320	1.684	1.705	2.084	24.039	1.958	2.017	1.585	858	316	63	11
	ž.	35.499	1.648	1.672	1.868	21.436	1.980	2.352	2.122	1.425	729	231	36

Table 3 Age distribution in Croatia



Average age of the population in Zadar County, according to the Census from 2011, was 41.9 years old and slightly higher than the national average which is was 41.7 years old. Since the 2001 Census, there have been negative ones change and according to the data at the time, the average age in Zadar county was 38.9 years and also lower than the national average (39.3). Analyzing age groups by gender, it can be seen from Table 2 that it is higher the share of women in older age groups, while the higher share of men in younger ones age groups, as well as at the national level. The population density in Zadar County is 46.66 inhabitants / km², which is below average of the Republic of Croatia (75.71 inhabitants / km²). It is also important to note that the largest percentage of the elderly population lives in demographically vulnerable areas (islands and sparsely populated areas), on 17 inhabited islands of Zadar County (9 municipality and one city) has a population of 20,914, of which 27.2% are over 65 years of age.

In the economic structure of Zadar County, the gross income is mostly made in whole sale and retail sale, manufacturing industry, tourism, fishing and mariculture industry as well as shipping trade. All of these take up a significant part of total national economy and are as such of particular value for the entire country. For example, white and tuna fish farmers in the county make up for 72% of total Croatian mariculture, according to the ratio of granted sea surface and total quantity sold.

Numerous locations at the coast and on the islands enable the further development in this field without the risk of damaging the environment or tourism. The sea is also the source of goods for fishing industry, but its industry has been limited by the lack of natural resources and legal limitations. Zadar is also the home of the biggest shipping company in Croatia and its subsidiary. Together, they make for 38% of commercial fleet in the country which has a strong impact at the success of entire economy in the county as well as the living standards of maritime industry workers and their families.

Because of its geographical location and developed transport and traffic infrastructure, the greatest potential of Zadar County is in tourism and other complementary fields of work. The current accommodation capacity of the county counts 170.000 beds, not including marine berths.

According to data from Croatian Pension Institute, there was 58.893 employed inhabitants in June 2018 while there were 3.647 unemployed persons, according to Croatian Employment Service. At the same time, there was 4.755 active entrepreneurs in Zadar County.

Business reports for 2018 accords income from selling goods abroad (total export of goods and services) was 3,72 billion kuna which is an increase of 23,4% from previous year. Among with the growth of export of 7,6%, the year 2018 was concluded with a surplus balance of income in commodity exchange.

Zadar County's gross domestic product in 2018 was 1,401 billion EUR, which puts the County in the 8th place in Croatian counties regarding GDP value.

2.2. Regional transport and mobility overview and main features

The Zadar County occupies a very important place in the Republic of Croatia with its geo-traffic position and plays an important role in the traffic connection between the northern and southern parts of Croatia, as well as in road, sea and air traffic. By building a highway, the Zadar County hinterland is better connected with the coastal area, while the modernization of the seaports makes it easier to connect the inhabited islands to the mainland. Railways directly enter the industrial and storage area of the port of Zadar, i.e. the liquid (petroleum) and bulk storage (mainly soybean) warehouses. The Gaženica industrial-warehouse and cargo port area is optimally located in relation to the city and major traffic routes of highway, rail, sea and air traffic.

Road traffic

The land traffic infrastructure consists of the road and railway routes. The Motorway A1 is the main connection of the Croatian south with the capital city of Zagreb and, indirectly, with all parts of Croatia and neighbouring countries. The Port of Gaženica, as well as other elements of the Zadar Port System, is connected directly to A1 Motorway through D424, a 17.6 kilometres long motorway with two traffic lanes in either direction, with no crossings and traffic lights and practically leads directly to the coast. On the 12th kilometre of the motorway there is a slip road to the Zadar airport which can accommodate all types of passenger or cargo aircrafts. Thus, the entire road transport, regarding the existing and future port facilities, can be carried out without any congestions or

obstructions: passenger transport from the passenger terminal and cruise port by car, taxi and coach; - truck transport from RO-RO and container terminal - truck transport of liquid and bulk cargo from cargo terminal, oil products storages and bulk cargo silos; truck transport of fresh fish from the fishing port.

Maritime traffic

The length of the Zadar County coastline represents 22% of the total Croatian coast, with 116 islands, of which 17 are inhabited and with the fact that 11.6% of Croatian territorial sea area belongs to the Zadar County.

The construction of a modern passenger port Gaženica aims to develop Zadar as a homeport for cruise ships. The Port Authority of Zadar chose the operator to manage the central building of the terminal for international passenger traffic, the coastal area near the operational terminal and the parking lot.

According to the Decree on the Grouping of Ports Open for Public Traffic, Zadar County includes 8 ports with regional significance. These ports are managed by County Port Authority of Zadar.

Table 4. Passenger ports in Zadar County

No.	County Location	Type of Port	Description
1.	Preko	Passenger port	<ul style="list-style-type: none"> - Total area of 35.767 m² with 8.603 m² of coastal area and 27.164 m² of sea surface. - Including nautical part for berthing yachts and vessels of up to 146 meters long - communal area
2.	Zaglav	Passenger port	<ul style="list-style-type: none"> - operational part of the port is 120 meters long - nautical part of the port is 24 meters long <p>The rest of the Zaglav port consists of communal berths.</p>
3.	Brbinj/Lučina	Passenger port	<p>Total area of 145.430 m² with 5.708 m² of coastal area and 139.722 m² of sea surface.</p> <p>The rest of the Brbinj/Lučina port consists of communal berths.</p>
4.	Silba-Žalić	Passenger port	<p>Silba-Žalić port has two operative parts, the first consisting of operative quay long 100 meters and second consisting of operative coast 32 meters long.</p> <p>The rest of the Silba-Žalić port consists of communal berths.</p>
5.	Biograd	Passenger port	<p>Total area of 33.868 m² with 4.441 m² of coastal area and 29.427 m² of sea surface.</p>
6.	Tkon	Passenger port	<p>Total area of 65.286 m² with 8.628 m² of coastal area and 56.658 m² of sea surface.</p> <p>- the port also consists of nautical part, 93 meters long</p>
7.	Pag	Passenger port	<p>Total area of 238.486 m² with 14.571 m² of coastal area and 223.915 m² of sea surface.</p>
8.	Fortica	Passenger port	<p>Total area of 10.912 m² with 525 m² of coastal area and 10.387 m² of sea surface.</p>

An analysis of the overall domestic traffic of passengers and vehicles in the area of the Zadar Port System, including both, the Old City Port and the Port of Gaženica for the period from 2010 to 2020, makes it evident that the traffic increased in 2016 as opposed to 2014 when the traffic of passengers was lowest. At the same time, the traffic of vehicles increased and in 2016 it was by 20% larger in comparison to the somewhat constant traffic between 2010 and 2013. After 2016 we have a constant growth in passenger transport. The only exception is 2020 where the pandemic has coast a significant drop in the number of passengers.

Table 5. Domestic traffic of passengers and vehicles for the period from 2010 to 2016

Year	Passengers	Vehicles
2010	2.362.054	312.939
2011	2.349.575	314.828
2012	2.321.836	312.908
2013	2.367.215	319.251
2014	2.080.811	339.758
2015	2.156.480	360.474
2016	2.238.312	397,618
2017	2.348.950	429,321
2018	2.354.127	457,117
2019	2.390.575	484.429
2020	1.723.512	415.429

An analysis of the international traffic of passengers in the area of the Zadar Port System, i.e. in the Old City Port and the Port of Gaženica, clearly shows a significant decrease of passenger traffic by about 50% in the period from 2010 to 2020. It should be mentioned that the international ferry line Ancona – Zadar did not operate during the first three months of 2010. The international traffic of vehicles was decreasing constantly by more than 50% in the period from 2010 to 2019 (Table 5).

Between 2019 and 2020 the Cruise and Passenger coastal ships traffic has been heavily affected by the COVID 19 crisis.

Table 6. International traffic of passengers and vehicles for the period from 2010 to 2020

Year	Passengers	Vehicles
2010	73.880	14.319
2011	61.112	15.174
2012	47.434	9.623
2013	38.626	6.658
2014	42.406	7.354
2015	33.215	5.580
2016	30.637	5.496
2017	38.532	8.116
2018	38.632	8.218
2019	38.336	7.263
2020	1.672	618

The reconstruction of the “Istarska obala” on the Zadar peninsula in 2004, i.e. the reconstruction of Berth 1b, opened the possibilities for larger ship calls on international cruising voyages.

The local ferry traffic was constantly increasing, although the line Gaženica-Ošljak-Preko carried fewer passengers by approximately 600 thousand due to the splitting of the line into the passenger and the ferry line, while other lines recorded an annual increase in the carriage of passengers and vehicles. High speed lines and local lines had recorded a constant increase in the number of passengers on all lines except in 2020. Were traffic has been heavily affected by the COVID 19 crisis.

Rail-road traffic

The integration into the Croatian and European railway networks is currently the weakest link of the Port’s intermodal junction. Zadar and its transit port were connected with Knin to the already existing transversal Split-Zagreb back in 1967.

The Croatian railway network consists of two main routes that have been used for the transport of passengers and cargo: the Lika railway track, connecting Knin with Ostarije, i.e. with the frequent route Rijeka-Zagreb and the Una railway track, connecting Zagreb with Vinkovci and onwards with Belgrade. Both routes, due to the terrain configuration, have certain restrictions regarding the speed and axial load.

Air traffic

Zadar Airport is only 7 km away from the port of Gaženica directly connected by the four-lane road D424 Zadar, 17,6 km with the A1 motorway (Zadar II - Sveti Rok – Bosiljevo Zagreb) and from Zagreb by motorway with all neighbouring European countries. Importantly, the Zadar County pays lots of attention to the construction of the traffic system, as long-term process, and to the safety of traffic, simultaneously taking care of environmental protection and the implementation of the principle of feasible development.

In October 2019, with more than 600.000 passengers, Zadar Airport registered 14.74% more passengers than in the same month in 2018. The Zadar Airport will be able to accept long distance flight planes (e.g. B 747-400) aimed at the extended runway project that envisages a comprehensive reconstruction and extension of the 700-meter runway. Along with comprehensive development and reconstruction project of the airport, that includes the renovation of the terminal building, apron and flight control total project value is approximately around 177.000.000 EUR. By strengthening the Zadar Airport, County will be strengthening the entire tourism sector.

2.3. Overall governance and transport planning references

The development of transport infrastructure in the Zadar County is considered to be extremely important for economic and social growth as well as for international and domestic connectivity.

The revitalization of the railway, which used to be the main connection for overseas cargos in the past decades, the construction of the new container terminal and fishing port, the extension of nautical port capacities, with the integration of all the elements of the system as a whole, will enable the port to achieve an exceptional competitiveness as well as the complexity of the supply on the market and an even development of the entire system.

3. Analysis of regional small ports phenomenon

The regional report of Zadar County analyses the impact of port activities on local development. Quality improvement of port infrastructure and logistics efficiency could bring the greatest benefit to the economy of the country. Sunny coastline with over 220 islands, islets and reefs justifies significant investment in this branch of development.

The paper has examined the status of existing infrastructure, traffic connections, yearly turnover and strategies for the future development that are meant to serve the purpose of enhancing competitiveness.

The Zadar Port System includes a series of ports and harbours of both the local and county importance, as well as of the national strategic importance. Year after year it has been recording good results in all its elements. However, it should be noted that the most significant growth has been recorded in sectors of nautical tourism and fisheries.

System of nautical ports is well developed, with the capacity of 3,966 moorings and 881 dry berths. By comparing this number of moorings with the number of nautical ports in Croatia (139 nautical ports and 17428 moorings in 2020), it becomes evident that the nautical infrastructure in the Zadar County makes almost 20% of the overall nautical infrastructure in the Republic of Croatia. The growth of nautical tourism in the Zadar County has shown the need for the enlargement of the number of available moorings, i.e. construction of new moorings and extension of existing marinas.

Apart from passenger, cargo, tourist and nautical components, the fishery sector in the Zadar County represents one of the most important strategic and economic components. The important role of the Zadar County fishery, especially in respect of small pelagic fish catch, fish processing and mariculture, determines the importance of its development on a national level.

Other significant role has the port of Zadar (Central Adriatic) primarily operates as passenger port and continues to develop in that direction, with a focus on large cruise liners, ferry traffic and ro-ro traffic. The port also has the facilities to handle liquid, bulk and general cargo and cement and is well connected to the hinterland with direct highway and railway connections.

Very important role in Port system development have ports of public transport of county and ports of local importance (108 in total). They are managed by County Port Authority of Zadar.

The most populated islands in Croatia are Ugljan and Pašman, located entirely in the Zadar County, with 6182 and 2711 residents respectively. The passenger and vehicle traffic from the Croatian mainland to Ugljan and Pašman is operated by Jadrolinija, Croatian liner shipping company for maritime transport of passengers and vehicles.

The coastal line Zadar-Preko consists of two separate segments: ferry (431) and passenger line (431A). Ferries for the carriage of vehicles depart from Zadar’s new port Gaženica. The second segment departs for Preko from the old port of Zadar (Jazine) and carries passengers only.

The line has recorded the highest passenger turnover among all the Adriatic routes for many years, which has been somewhat exceeded by the SplitSupetar line in recent years only. In the high season it runs 18 journeys per day, in total 126 times per week from Zadar.

Busiest ferry lines in Croatian domestic ports are shown on Table 8 by the number of passengers and vehicles carried.

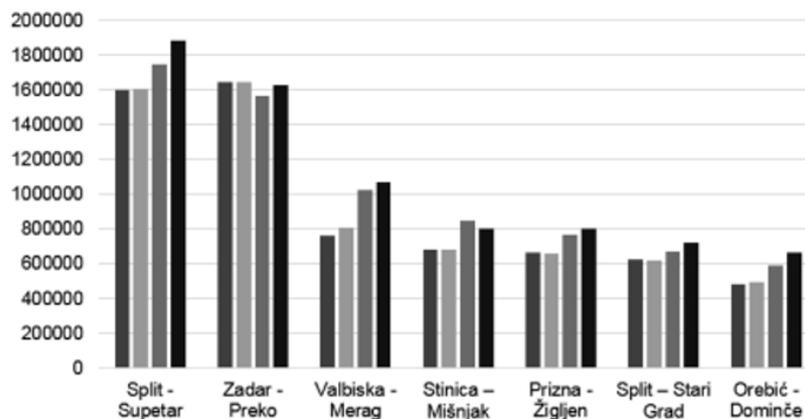


Table 8 – Statistical data for Adriatic ferry lines with heaviest passenger traffic

The ferry connection between Biograd na Moru and Tkon is the second busiest ferry line in Zadar County. It is also only ferry connection between mainland and Island Pašman. The route is running frequently, in July and August there are 13 departures daily, in June and September up to 12 departures daily and rest of year up to 10 daily departures, the sailing time from Biograd na Moru to Tkon is only 20 minutes. The line operates each day year around but with less departures on some public holidays.

Based on the statistical analysis of passengers and vehicles transportation data and on the comparison of available shipping capacities, it was concluded that during the year there are extremely large seasonal traffic differences. During the high season the vessel capacity used for the carriage of vehicles is completely full, while the off-season line utilization is very low.

According to the trend of changes in the traffic observed over time, the traffic will very likely grow in the years to come by approximately 5% per year. Line optimization is possible to achieve, however, within certain limits. It would be desirable to increase either the frequency of ferry departures or vessel boarding capacities in order to reduce vehicle queues during seasonal peak loads.

3.1.2. Communal and nautical ports under County Port Authority of Zadar

The ports managed by the County Port Authority of Zadar includes all ports pools, anchorages and moorings within the port area. Ports under its authority are earlier mentioned ports open to public traffic of county importance and ports open to public transport of local importance (Table 9). Among those ports open to public transport of local importance there are 18 nautical berths and 90 communal ports. This makes the CPA Zadar the largest county port authority in terms of the number of ports it manages.

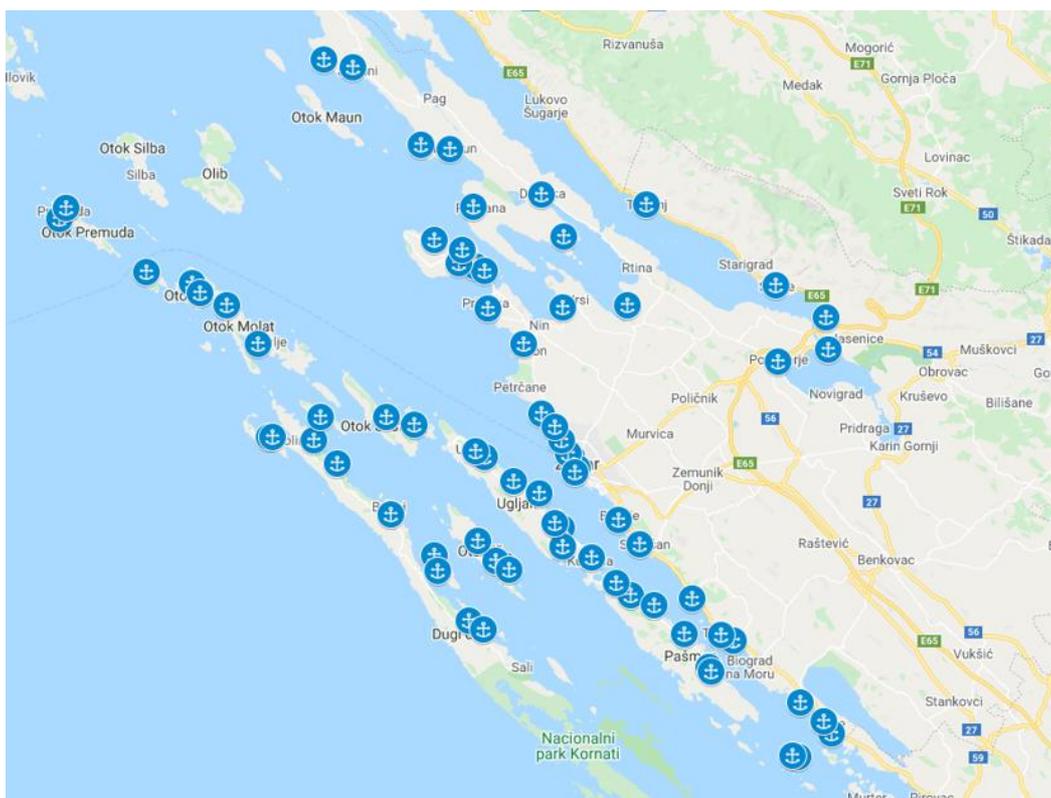


Table 8 – The ports managed by the County Port Authority of Zadar

The main characteristics of the Zadar water area are the numerous strings of islands and islets located not far away from one another and partly connected by narrow passages. The coastal area of the Zadar County is a relatively flat coastline, in some parts even sandy. The coastline is far more indented in the area of the Velebit Channel by the mouth of the river Zrmanja, along the coastline of Novigrad and the Kornati, as well as in the Ljubač and Nin Bay.

Nautical ports under management of County port authority of Zadar

Nautical ports managed by County port Authority of Zadar				
	Manicipality	Settlement	Location	Number of berths
1	Sali	Božava	Dugi otok	25
2	Sali	Brbinj	Dugi otok	15
3	City government — Zadar	Brgulje	Molat island	15
4	City government — Zadar	Ist	Široka lagoon	20
5	Kukljica	Kukljica	Kukljica port	50
6	City government — Zadar	Molat	Molat island	7
7	Preko	Muline	Muline port	15

8	City government — Zadar	Olib	Olib port	8
9	Pakoštane	Pakoštane	Pakoštane port	10
10	City government — Zadar	Premuda	Premuda port	10
11	Rava	Mala Rava	Mala Rava port	5
12	Sali	Sali	Sali port	60
13	Sukošan	Sukošan	Sukošan port	15
14	Tkon	Tkon	Tkon port	5
15	Sali	Zaglav	Zaglav port	6
16	City government — Zadar	Zapuntel	Zapuntel port	10
17	Sali	Žman	Žman port	6
18	Sali	Luka	Luka port	5
TOTAL:				287

The Zadar archipelago is the most indented insular group on the Adriatic Sea with rich natural beauty spots and 4 strings of islands: a total of 24 larger islands and 150 smaller islets and 46 reefs out of which only 20 are inhabited. With a 1,300 km long coastline (islands included), it is the most indented archipelago in the Mediterranean.

The Kornati archipelago has the largest number of islands on the Adriatic Sea and is characterised by narrow elongated smaller islands, islets and rocks.

The coastal area of the Zadar County, along with its islands, is mainly situated in the European part of the Mediterranean. Climatologically, especially regarding the temperature, it is a pleasant area, because during the summer a light landward breeze eases the hot and humid weather.

Categorization of ports under management of County Port Authority of Zadar

13th article of the Ordinance for the procedure criteria for determining the purpose of a particular part of a port open to public transport of county and local importance, method of payment of connections, conditions of use, and determining the maximum amount of compensation and distribution of income (Official Gazette 94/07, 79/08, 114/12 and 47/13), stipulates that the port authority is obliged to categorize ports and its individual parts into zones, and the above-mentioned Ordinance determines the criteria to be taken into account in the process of zoning and categorization. The categorization is carried out by determination of :

- Attractiveness of the geographical location of an individual port as a whole, ie microlocation as part of the port basin within the port area of the port

- The level of order of the port superstructure and substructure in the port
- Degree of port security
- Ecological equipment of the port
- Equipping the port with specialized equipment and environmental protection incidents and sudden marine pollution on a smaller scale
- The degree of equipment of the port with basic facilities
- The degree of equipment of the port with additional facilities
- Distance from the city center
- Connection to road infrastructure
- Close to shipyards and service stations

By this categorization we have divided the ports from the letter A to D, where the ports with the letter A are the most attractive to use while those ports with the letter D are the most unattractive and with the weakest infrastructure and geological location.

In the following tables, we have divided the ports according to the degree of categorization and the number of utility berths.

Table 10. Ports for local use (communal berths)

Port category	Amount of annual fee per indivisible length meter boat /boats	Total number of communal berths
Category A	200	947
Category B	150	4763
Category C	100	2481
Category D	50	55

Table 10. Nautical berths

Port category	The amount of the daily fee per indivisible length for yachts/sailing boats	Total number of nautical berths
Category A	26	125
Category B	20	74
Category C	14	78
Category D	8	0

3.2. Overall description of available services for users (technical services, nautical services, waste collection, touristic services)

Port services are one of the essential mechanisms to ensure the proper execution of the different commercial activities taking place inside ports and harbors. Some of the main functions that will be covered in this paragraph include nautical and technical services, ecological aspect and touristic services.

County Port Authority of Zadar manages 113 ports, none of which are special purpose ports or marinas. In about 15 ports there is regular traffic where there are ferry and ship lines. Also in the ports where the nautical activity takes place, there are no services that were listed in the survey. The mooring service and water and electricity for ships are provided exclusively. Additional contents such as boat service, restaurants, spa, desalinators... that were in the questionnaire simply do not exist as something that we provide.

As previously mentioned, services offered inside ports are mostly centralized, meaning that most services are being offered in the ports inside biggest cities, which is not odd as the most services require proximity of other related services.

The following paragraphs will consist of statistical information interpretation based on the data collected through dedicated FRAMESPORT questionnaires. Zadar County consists of 113 ports of local and county significance ranging from ports in city centre, anchorage berths, buoys, berths in autocamps as well as ferry ports. Each port has a individual value which contributes the ultimate goal of providing and serving of nautical users while trying to maximize the offer and services.

3.2.1. Nautical and technical services

The Port services are the provision activities needed to ensure the running of the Port, aimed at enabling the operations associated with maritime traffic to be carried out in conditions of safety, efficiency, regularity, continuity and non-discrimination.

Mooring and unmooring services - Its function is to pick up a vessel's mooring lines, take them and attach them to the elements arranged on the docks or moorings for this purpose, following the instructions of the vessel's captain, in the mooring sector designated by the Port Authority, and in the order and layout convenient for facilitating docking unmooring and undocking operations.

The unmooring service is understood as being the function whose aim is to detach the mooring lines of a vessel from the fixing elements to which it is moored, following the sequence and instructions provided by the captain and without affecting the conditions of the vessels moored next to it. Approximately **10%** of ports and harbours under management of County port Authority provide the service of mooring and unmooring of the incoming/departing vessels.

Given the fact that a fair amount of small harbours are located in remote places built solely of basic infrastructure needs and an economically tested thesis of more employees, it is physically not possible to provide a 24/7 service of mooring activities (**60%** of ports does not provide a 24/7 mooring service).

90% of ports will manage to provide a mooring service to a berthing need in case of an emergency.

Presence of basic services in the port:

Table 11 Statistic representation of basic services in ports

Lowering and lifting of the vessel into the sea – 5%	Vessel storage space – 0%
Hull washing – 0%	Trailer for moving the vessel – 2%
Temporary storage space – 5%	Cranes (self-propelled, land) – 5%

Availability of boat repairing service/overhaul shipyard falls under the segment of high-end port level of equipment due to the fact that port has to ensure a large enough area for vessel manipulations with all the appropriate infrastructures and superstructure elements.

Table 1 Statistical representation of boat services/maintenance offer in ports managed by CPA Zadar

Sales of technical products for vessels in shops and / or warehouses – 0%	Electrical services – 5%
Hull repair – 0%	Supervisor – 20%
Manufacture and repair of sails and awnings – 0%	Dry dock/Slipway – 10%
Sales of technical products for vessels (custom) – 0%	Electronic services – 0%
Upholstery services – 0%	Warehouse – 0%
Rope fitting and adjustment services – 0%	Plasticization of vessels / glass plastic – 0%
Marine engine service – 0%	Ship joinery – 0%

From the table above, it can be seen that the overall size and relatively small area on which the ports are built on are fairly constricting regarding the developmental needs. Weighted average corresponds to **4%** meaning that the aforementioned services are available in approximately 10 ports out of 113. Percentages are defeating but they were not unexpected taking into the consideration that most of these ports are improvised and were built in a way to ensure a safe haven for vessels without spending too much of resources on anything other than basic needs.

Technical diver service – service providing the expert in sub-aquatic work who is available when the emergency situation arises (slashed ropes/buoys, concrete weight at the bottom...) – **80%**.

Fire protection system on the berths – 0%

3.2.2. Ecological aspect

Supervision and protection of the port are under its authority is performed by the CPA Zadar. Also the Ministry of the Sea, i.e. the Directorate for Maritime Traffic, Transport, Maritime Domain and Ports, through the inspection supervision of the safety of the vessels of port authorities, performs surveillance of pollution from vessels, enforces safety measures and imposes penalties.

The Ministry of Environmental Protection, Physical Planning and Construction performs inspection surveillance of the sea regarding sources of pollution on the land.

In the improving environmental protection in the ports, especially in Zadar County, CPA Zadar is responsible for checking and emptying oil tanks, procurement of absorbent dams, handling nautical waste. In case of big pollution the main body in charge is Zadar County Headquarters which unites the aforementioned bodies together with concessionaires and firms in charge of removing marine pollution.

In the complex of the area of the ports of CPA Zadar, environmental protection depend on the general level of protection, i.e. on locating pollution, the quality and expert assessment of the methods for preventing pollution, technical and technological equipment, and a support system.

CPA Zadar, and to determine how to reduce the level of pollution according to the requirements in the conducting of all port and other operations.

The greatest environmental effects of the small ports, according to the boaters, concern fuel.

Overall ecological impact could be decreased in couple of different ways:

- Taking better care of the waste management infrastructure (emptying containers regularly, locating them close to the ports and enabling waste sorting),
- Better maintenance of shore pump-out stations (checking and repairing them regularly, providing proper instructions on how to use them and ensuring sufficient shore pump-out stations that are safe and easy to use),
- Generally increasing boaters' environmental consciousness
- Limitation of single-use plastic items and favor the use of more sustainable materials
- Marking visitors' berths better, to make them easier for boaters to find.

Table 13 Statistical representation of ecological aspect of CPA Zadar and harbours

Presence of a port wastewater monitoring system – 0%	Presence of desalination equipment – 0%
Presence of a separate waste collection system in the port – 20%	Presence of air purification system in the shipyard (within the port) – 0%
Presence of a sewage treatment plant in the port – 0%	Presence of water purification plant inside the shipyard – 0%
Presence of ecological tanks for collecting waste oils and wastewater – 30%	Level of environmental education and activities promoted for users and staff – 30%
Presence of a proper battery disposal service – 5%	Level of promotion of sustainable modes of transport – 35%
Existence of Environmental Management System Certification (renewable annually) – 0%	Fuel distribution centers/Pump out stations – 5%

3.2.3. Touristic services

Touristic services can be defined as an overall offer to port’s end users enriching the existing offer beyond basic needs. Tourist services encompass the whole array of fields in which costumers search for individual satisfaction which in turns affects the entire perception of available ports.

Welcoming tourists in their own language carries a certain dose of respect and welcoming feeling.

Knowledge of English is at **100%** in ports and harbors all over the Zadar County. Italian, Slovenian and German are following with 30%.

Sport fields and facilities also play a huge role in enrichment of tourist offer. Cities from Lika – Senj county are fairly developed in terms of cultural events and infrastructural needs, but ports are mostly in secluded places, sometimes even a bit harder to reach for by land, thus, are consequently slightly “under-equipped”. By no means that alludes those ports are struggling to find customers but exactly opposite, people are running away from crowded places to those a bit more secluded. In the category of sports activities (wind surfing, sport clubs, sailing schools and diving schools) 0 out of 113 ports in the whole CPA Zadar are in possession with at least one of these activities,

meaning that **0%** of ports doesn't have any additional content regarding the sea-related sport activities.

Wellness facilities are an essential accessory in modern day's world with the ever-rising demand for various forms of SPA and beauty centers. None of the ports have at least one of the forms (SPA center, health resort, medical center, beauty center, hair saloon or barber shop) of wellness facilities in their near vicinity.

The following table summarizes the average distance from ports to important facilities such as police station and fire department. Presumably, this has to be one the biggest factors while choosing the port. Vicinity of these institutions provide an end-user with valuable information regarding the first steps after some kind of emergency ensures.

Proximity of other transport related facilities provide an average distance (from all of the ports -> institution/facility) to end users that might want to explore other options of travelling through Croatia while still being based in chosen ports.

Table 14 Average distance (Zadar County ports - facilities)

Train station	100 km
Airport	35 km
Bus station	4.37 km
Freeway	28 km
Police station / Fire department	10 km
Hospital / Medical service	5 km

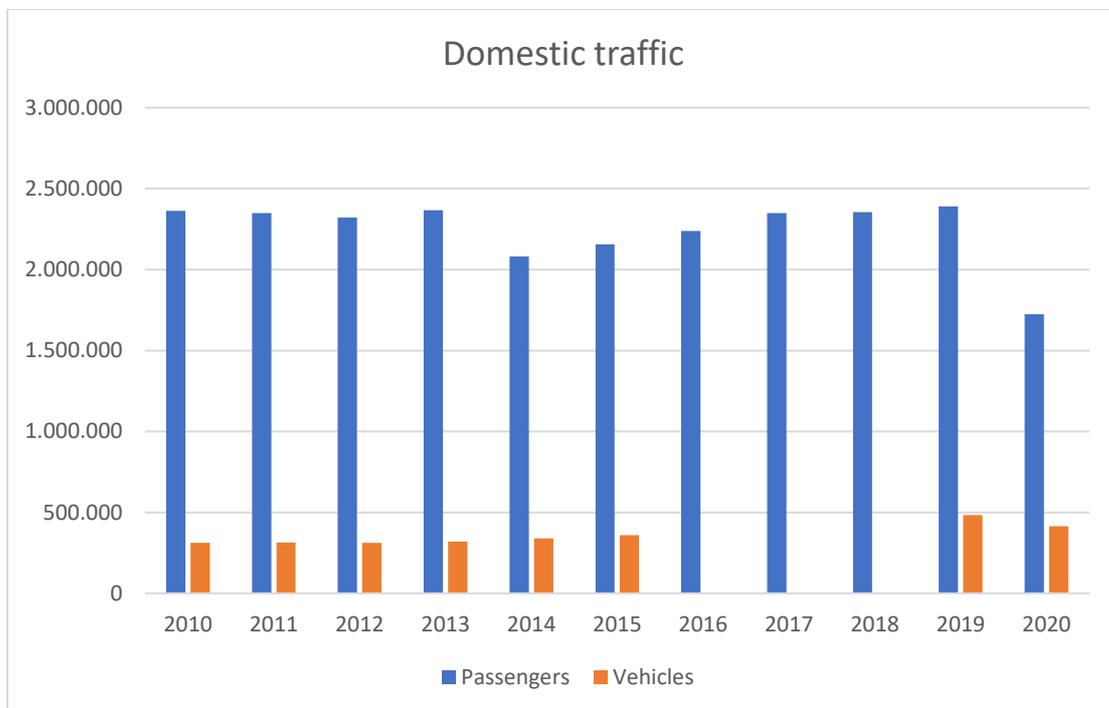
As for pet-friendly facilities, it should be noted that they're also not provided in ports services. The marinas (privately managed and not included into this survey) do so, thus underlining the opportunity to further investigate such aspects for marinas due to ever-increasing demand from end users with facilitation of accommodating their pets.

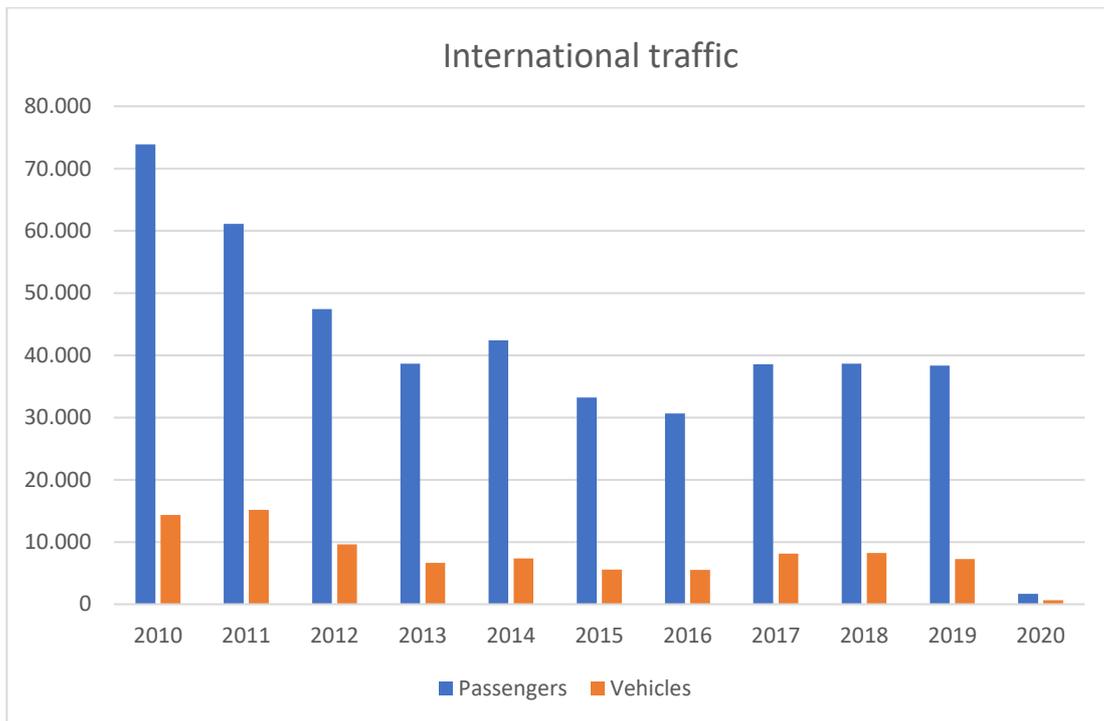
Catering facilities such as restaurants and coffee shops are a necessity within any kind of touristic hotspot. Most of the ports and harbors are in a walking distance from facilities like such, even though they do not technically belong to the port areas (concessions).

3.3. Overall information on annual traffic data (cargo/ro-ro/passengers/locals)

Zadar County includes a series of ports and harbours of both the local and county importance, as well as of the national strategic importance. According to the Maritime Domain and Seaports Act and the Ordinance on Classification and Categorisation of Ports Opened for Public Traffic and Special Ports (Official Gazette, 110/2004, 82/2007), the ports of special (international) economic interest for the Republic of Croatia in the area of Zadar Port System are: Old city port, Passenger port Gaženica, Cargo port Gaženica.

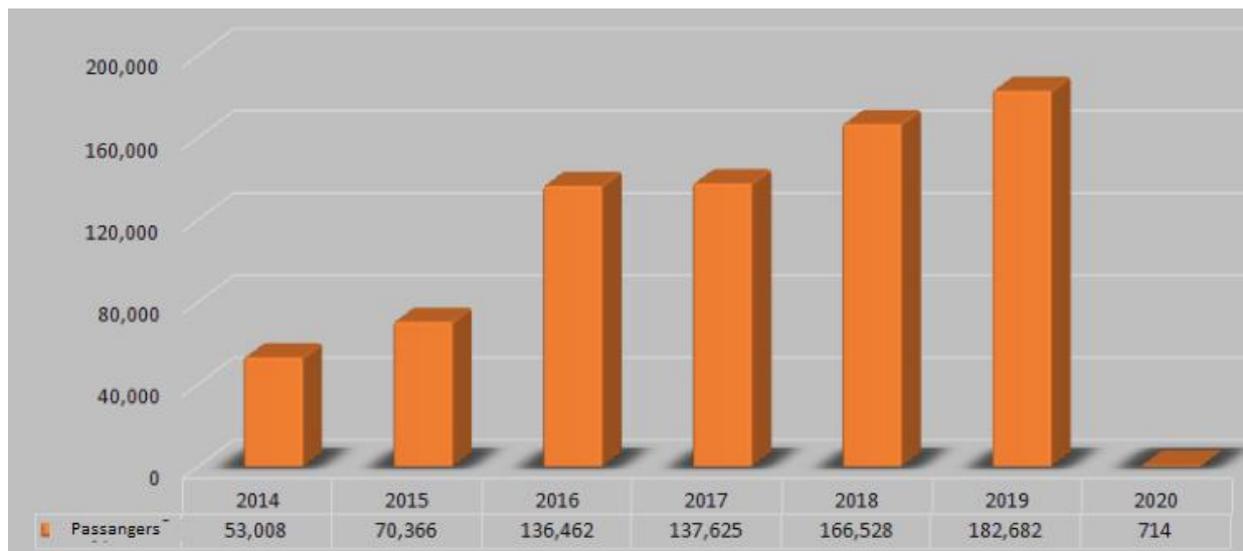
The Port of Gaženica, as the most developed element of the port system, is situated in the vicinity of all the modes of transport (road, air and rail) and as such it represents the economic and transport centre of northern Dalmatia and parts of Lika. The expansion of the Port of Gaženica has been the most important infrastructure project for the Zadar port system in the recent period. The project “New Port Zadar” has included the relocation of the ferry terminal from the historic centre of Zadar and construction of the new passenger port on other location, in Gaženica. The port and the provisional terminal building were opened in April 2015 for all domestic ferries, cruise ships and, as of the beginning of July 2015, for international ferries. Apart from the ferry terminal, there is also a fishing terminal with the new operational quay.



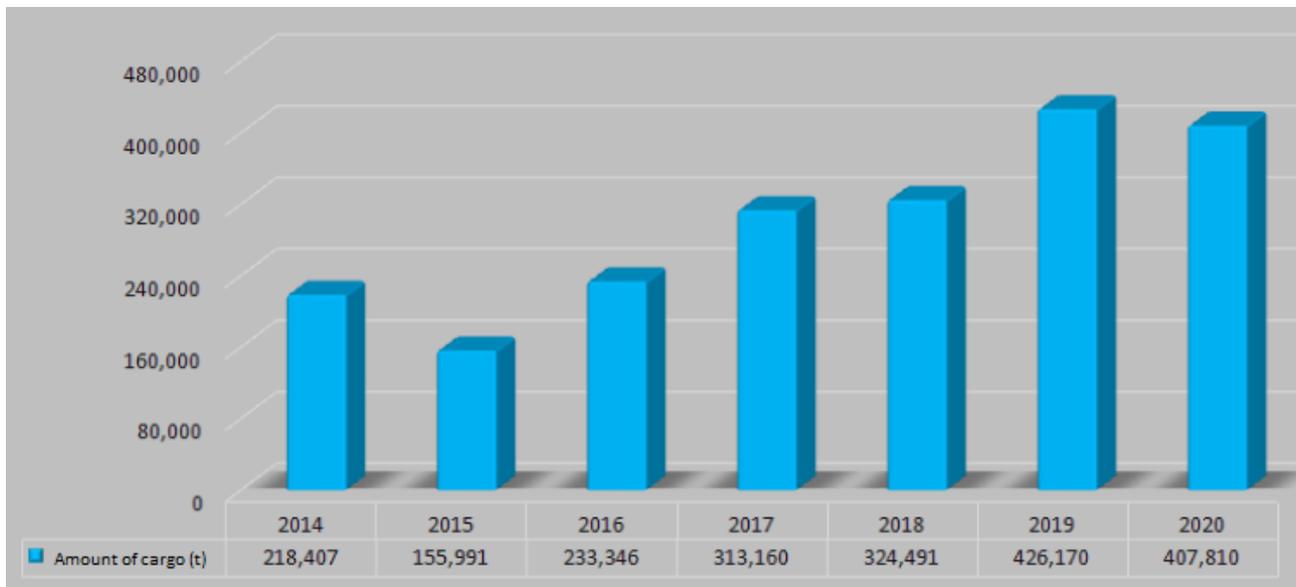


Cruise passenger traffic for the period from 2014 to 2020

Year	2014	2015	2016	2017	2018	2019	2020
Passengers	53.008	70.366	136.462	137.625	166.528	182.682	714



Cargo port Gaženica, is in the industrial and commercial area extending from Bregdetti Bay - Arbanasi to the small town of Bibinje in the vicinity of the passenger port.



Apart from ports of a particular (international) economic importance for the Republic of Croatia, the Zadar Port System includes 8 ports of the County importance which have been opened for public traffic as well. These are: Preko, Brbinj, Silba, Zaglav, Biograd, Tkon, Fortica, Pag. There are also 100 ports of local importance.

Those ports of local importance are mostly built for accommodating smaller boats and sailing boats. Average length of the boats in ports for communal use is 5 meters and in nautical ports average boat length is 8 meters.

The Zadar Port System has a well developed system of nautical ports, with the capacity of 3,966 moorings and 881 dry berths. By comparing this number of moorings with the number of nautical ports in Croatia (139 nautical ports and 17428 moorings in 2019), it becomes evident that the nautical infrastructure in the Zadar County makes almost 20% of the overall nautical infrastructure in the Republic of Croatia.

4. SWOT analysis on small ports phenomenon

This analysis encompasses major issues important for the assessment of strengths, weaknesses, opportunities and threats of the representative ports in Zadar County.

The SWOT analysis is a frequent analytical tool used for the formulation of strategies. It uses both internal and external perspective or influencing factors of the subject under analysis. Internal perspective focuses on the appraisal of strengths and weaknesses within an organization or institution under analysis, whilst an external perspective focuses on threats and opportunities in an environment in which the analysed organization or institution works. It has a clearly identifiable, strategic goal, meant to reveal outside opportunities and threats that have a potential to influence the future of a ports.

<p>Strengths</p> <ul style="list-style-type: none"> • Indented coast with more than 200 island and islets • natural beauty and favorable climate climatic characteristics • Ecologically preserved landscape and underwater world • Strategic position • Traffic connection / accessibility • Supporting tourist infrastructure (service activities) • Hospitality • Educational structure of staff • Nautical infrastructure (nautical ports tourism) • Personal safety and safety of navigation • Possibility of expanding existing ports and harbours • Long maritime tradition 	<p>Weaknesses</p> <ul style="list-style-type: none"> • Insufficient number of berths especially for larger boats and yachts • Lack of sanitary facilities • Content of the offer in marinas and level of service • Seasonality of demand • The quality performance of tourist destinations and services • Need for a more sustainable management and improvement of services for waste collection and water treatment • Inconsistency of legal regulations • Inadequate categorization of ports of nautical tourism • Need for detailed nautical development strategy • Insufficient water and electricity supply • inadequate information and access to them for boaters
<p>Opportunities</p>	<p>Threats</p>

<ul style="list-style-type: none"> • Zadar County is becoming an increasingly popular tourist destination • Improving traffic accessibility • Adoption of a nautical development strategy tourism • Climatic conditions favorable for significant season extension • Increase in the quality of another tourist offer (hospitality, staff education, upgrade of ports) • Foreign investment 	<ul style="list-style-type: none"> • Recession in the world market • Marine pollution • Reconstruction of the coast • the protection and management of biodiversity to obtain resources for sustainable development • Accelerated urbanization of natural beauty • The COVID-19 pandemic
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Once identified, these opportunities and threats may suggest potential remedial or mitigating measures that could be applicable under certain conditions. On the other hand, an internal analysis or a port’s strengths and weaknesses is intended to highlight determined strategies that the port can exploit and, especially, to spotlight certain practices that the port may need to correct.

Main subject in this analyzing tool are nautical ports and development of nautical tourism in Zadar County. It will examine and evaluate the internal (strengths and weaknesses) and the external (opportunities and threats) of the environment or factors in the function of observing the condition and possible development of a particular phenomenon, in this case small port phenomenon.

For Zadar County, nautical tourism represents economy’s new development path and it is expected a lot from a management which deals with the development and operation of nautical tourism, therefore, its knowledge and experience must be transferred into practice. Zadar nautical tourism is still developing and has not used its full potential yet. Nautical tourism management must make better efforts to take advantages of its in order to point itself out among the competition.

Nautical tourism ports still do not provide the required level of structure and the quality of the offer that boaters expect, especially compared to natural and ambient characteristics and benefits we’re gifted with. Due to the lack of additional content, from the accommodation facility in the ports and sports fields to restaurants, nautical equipment shops, supermarkets, boat services, cranes, slipways, etc., the income of the ports is significantly smaller than which is possible, and its structure is unfavorable.

Nautical tourism is a selective form of tourism which ensures at least 180-210 days of business activities in the year, while, in relation to the hotel capacity, the turnover of the invested capital is

much more dynamic. Investments in nautical tourism are lower in relation to the same number of accommodation units, while the invested capital return is as much as twice as fast as in other tourist branches since attracting financially better standing quality clients, promoting in this way the quality and strengthening the image of the country.

The biggest advantages are favorable natural features, i.e., a high degree of indentation of the coast, connectivity and complementarity of the island and coastal belt, the existing tourist infrastructure and capacities from other activities, as well as the benefits of locations for the construction of various types tourist ports and other nautical - tourist capacities. However, with all the above-mentioned advantages that nautical tourism has, there are also some shortcomings that need to be minimized in order to successfully compete in the global nautical market.

Some negative factors, respectively the shortcomings of nautical tourism and the limiting factors of its development are: seasonal character activities in nautical tourism, occupation of the sea and the coast, usurpation of the coast, sea pollution with oil and its derivatives, bacteriological pollution of the sea by wastewater and substances, devastation of biological resources of the sea, pollution of the sea with various wastes and impurities and the destruction of fish and water resources.

The growth of nautical tourism in the Zadar County has shown the need for the enlargement of the number of available moorings, i.e. construction of new moorings and extension of existing marinas that have not changed significantly in recent years either in number or capacity, according to the information provided by the Croatian Bureau of Statistics.

5. Summary and conclusions

This paper clearly presents strategic components important for the improvement and development of the Zadar Port System. The questionnaire filled by the county port authorities provide an overview of the current state of ports and ports areas under the management of County Port Authority of Zadar.

Zadar County has one of the most indented coast in Adriatic sea with more than 200 island and islets which makes it ideal candidate for success in developing port system in future. The resulting decisions aim to solve practical problems related to allocation of the port's resources and services.

Namely most of the small Adriatic ports belong to a category of "satellite ports", meaning they serve a purpose as a temporary seclusion place, as some of the berths are improvised with homemade equipment. Some of them are illegally made and artificially prolonged so there isn't any kind of structural cohesion between berthing piers. It isn't possible to make investments in all of the ports at once, thus, process of becoming sustainable and self-persevering is scheduled as a long-term goal.

A key feature of the development of the port concept is the promotion not only of maritime transport, but also of the integration of sea transport with land transport modes in the form of intermodal maritime-based corridors. The maritime routes of the intermodal corridors in many cases provide a viable alternative to inland routes and road routes in particular.

The revitalization of the railway, which used to be the main connection for overseas cargos in the past decades, the construction of the new container terminal and fishing port, the extension of nautical port capacities, with the integration of all the elements of the system as a whole, will enable the port to achieve an exceptional competitiveness as well as the complexity of the supply on the market and an even development of the entire system.

Based on the above mentioned, it can be clearly concluded that by integrating and realizing the mentioned projects the Zadar port system will become the backbone of the Zadar economy, which will place it in economic terms in the category of justified investments.