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Development possibilities for ferry transport in Adriatic-Ionian region

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Abstract: Adriatic and Ionian Sea form a body of water that connects seven countries of the South East Europe. This area was always used as a transport route, and ferry traffic boomed in the 1990s. However, in the last decade we have been witnessing a continuous decline of ferry traffic in most of the Adriatic-Ionian ports.

In this paper we provide a description of the current situation on ferry transport in Adriatic-Ionian region with the focus on passenger flows. We determine trends and assess the potential for the extended use of ferry shipping in the region.

Introduction

A ferry is a form of transportation, usually a boat, but sometimes a ship, used to carry (or ferry) primarily passengers, and sometimes vehicles and cargo as well, across a body of water (Wergeland 2012). Rodrigue, Comtois, and Slack (2013) expand this definition by stating that ferries provide fixed-route services over short or long distances. The theory distinguishes three main types of ferries, namely (TRB 2003):

- water taxis: small watercrafts that typically serve short cross-waterways or waterway circulation routes;
- passenger ferries: larger vessels that have higher passenger capacity and speeds than water taxis and typically serve short- to moderate-length routes;

- auto ferries: also known as roll-on, roll-off ferries, used to ferry transport vehicles as well as passengers. They are typically used on longer routes across major bodies of water.

Although, the vessels used in the ferry market share many common characteristics, such as ro-ro access, vehicle decks, accommodation for passengers, and entertainment facilities, there are many permutations of these basic characteristics that the ferry fleet is extremely diverse (Stopford 2009), primarily depending on the travel motive and cargo mix as can be seen in Fig. 1.

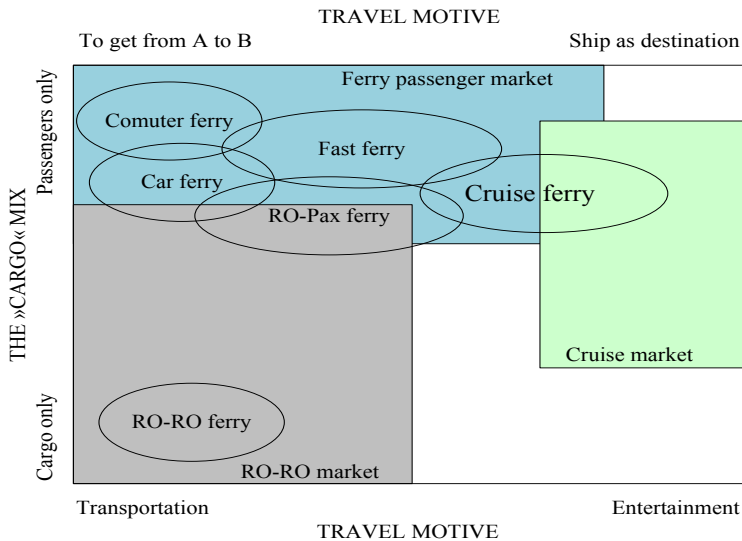


Fig. 1. Overlaps in the ferry market

Source: Wergeland (2012).

Ferries offer either mandatory sea routes, i.e., the connection between the mainland and island, or represent the alternative to land transport. The latest is being stimulated by the European Union (EU) since the environmental aspect of transport started to gain the importance and the necessity to find an efficient and sustainable solution for the congested land, mainly road connections, emerged. In such a view, the concept of short sea shipping (SSS) was introduced in 1992 by White's paper on a common transport policy. Ferry shipping represents only one segment of SSS. Interestingly, in the ferry transport the energy content of the vehicle is exceptionally high, because the ferry involves also other facilities, like accommodation and restaurant services, which need considerable amount of space. Because the distances are comparably short and the travelling speed is low, the transport performance is relatively small and the energy efficiency calculated per passenger mileage is high (Kalenaja 1996).

The global ferry industry transports approximately 2.1 billion passengers per year plus 250 million vehicles and 32 million trailers (InterFerry 2016). According to a recent study performed by Martino and Brambilla (2016) for the Transport and Tourism Committee of the EU, in 2014 around 805 million passengers were transported by ferry ships in EU, among which more than 57% were transported in the Mediterranean region. Another two important regions for ferry transport in EU are the Baltic Sea and the North Sea. The share of Mediterranean region has been pretty much constant in the last decade, with the annual average growth rate (AAGR) of 1.4%.

The purpose of this paper is to present the current situation and the opportunities for further development of intra-regional ferry flows in the Adriatic-Ionian area, which is located in the northernmost part of the Mediterranean Sea.

1. The Adriatic-Ionian region

Adriatic Sea is rather shallow, about 800 km long and 150 km wide, northernmost arm of Mediterranean Sea, which borders to Italy on one side and Slovenia, Croatia, Bosnia and Herzegovina, and Montenegro and Albania on the other. On the southern part, it is bordered by the Ionian Sea.

After the fragmentation of the former Yugoslavia, which was followed by the war and political as well as economic instability in the region, the idea of jointly considering the areas of Adriatic and Ionian Sea arose as there was an obvious need to provide common solutions to the identified common problems. The Adriatic-Ionian initiative (AII) was established in Ancona in May 2000 during the Summit on Development and Security on the Adriatic and Ionian Seas. Apart from the previously mentioned countries, AII includes also Greece and Serbia. Following the EU approach to support multilateral sub-regional cooperation, AII started work aimed at raising awareness on the necessity of establishing a Macro-Region for the Adriatic Ionian basin, and the Strategy for the Adriatic and Ionian Region (EUSAIR) was finally endorsed by the end of 2014 (AII 2016).

The Adriatic-Ionian macro region covers the area of approximately 610,000 km² and has a population of around 94 million people. The countries of this macro region have somewhat different recent history and they differ significantly in terms of economic development which is consequently perceptible also on the state of transport infrastructure and national transport priorities.; While northern Italian provinces register gross domestic product per capita (GDPc) of more than 28,000 EUR, the GDPc in Albania drops to only 3,500 EUR. In addition, four of the region's countries are EU member states, while other four are still not, which makes cross-border transit and trade more demanding.

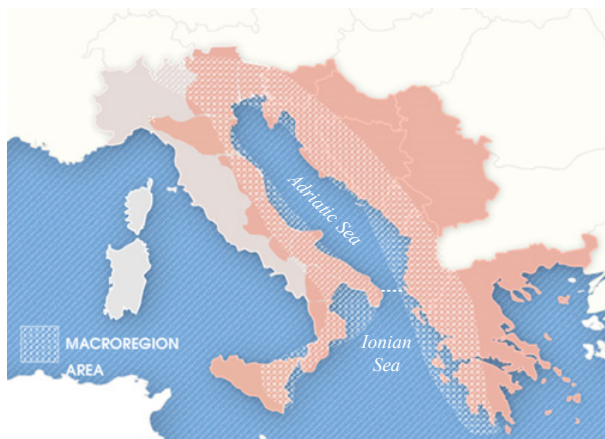


Fig. 2. Adriatic-Ionian region

Source: MED-IAMER (2014).

2. Port infrastructure in the Adriatic-Ionian region

On the Adriatic-Ionian coastline ports range from small quays for berthing boats to large-scale ports with many specialized terminals, free zones, and even industrial facilities within port areas. These ports are dissimilar in their assets, operations they perform, and roles they play, as well as in a governance type.

While passenger ports are distributed along the entire coastline of Adriatic and Ionian seas, the main cargo ports are located in the northern part of the Adriatic Sea, where the Mediterranean Sea most deeply penetrates into European continent and the Italian region of Puglia in southern Italy, where the country gets closest to Greece and Albania.

There are about 40 ports which are involved in a ferry transport in the Adriatic-Ionian region, and about ten of them are important as international ferry ports. These ports are the Italian ports of Venice, Ancona, Bari and Brindisi, Greek ports – Patras and Igoumenitsa, Croatian ports – Split and Dubrovnik, Montenegrin port of Bar, and Albanian port of Durres.

Within the EA SeaWay project, we determined that adequate physical infrastructure in the ports, including vast, preferably protected parking areas, decent passenger space, and good connections to the national road system (especially important for cargo ferry) are preconditions for the development of ferry ports. The availability of public transportation is also a plus.

As expected, facilities in a walking distance from the ports, especially educational institutions, but also a post office, bank, or health care centre are more important for domestic than international ferry passengers.

3. Ferry flows in the Adriatic-Ionian region

Ferries operating on a regional, national, and international scale show different characteristics that change according to a geographical and economic context (Martino, Brambilla 2016). In the northern Adriatic, fast passenger crafts connect the attractive city of Venice to Slovenia and Croatia. The longer-distance cross-sea connections are carried out by regular or fast ro-pax ships. In fact, the Adriatic ports and in particular the Port of Ancona are mainly at the service of trade between Greece and other European Countries – about 25% of Greek goods transit through the port of Ancona, and about 50% through Italian Adriatic ports (Pettenati, Simonella 2010). Thus ferry transport in the Adriatic-Ionian region is definitely not only passenger oriented.



Fig. 3. International ferry routes in Adriatic-Ionian region

Source: MED-IAMER (2014).

There are 15 ferry operators in the Adriatic Sea that deliver international ferry services. Altogether, they offer from approximately 200 to 400 weekly connections (inbound and outbound routes included), depending on the season. The ports of Bari and Brindisi alone accumulate for two thirds of cross Adriatic connections.

These routes are often carried out by old and environmentally unfriendly ships. For example, the 43-year-old *Jadrolinija* ferry ship connects Split to Ancona. Equally old is the ship that operates on the route Bar–Bari, and even older are the ships connecting Albania to Italy. On the other hand, SuperFast (and SNAV) ferries are relatively new, but as the company's name suggests, the ships involved are faster than regular ro-pax ships, however, such ships have higher environmental impacts per passenger kilometre

as compared to the conventional ones. So ferry flows in the Adriatic-Ionian region are not a very clean alternative of transportation.

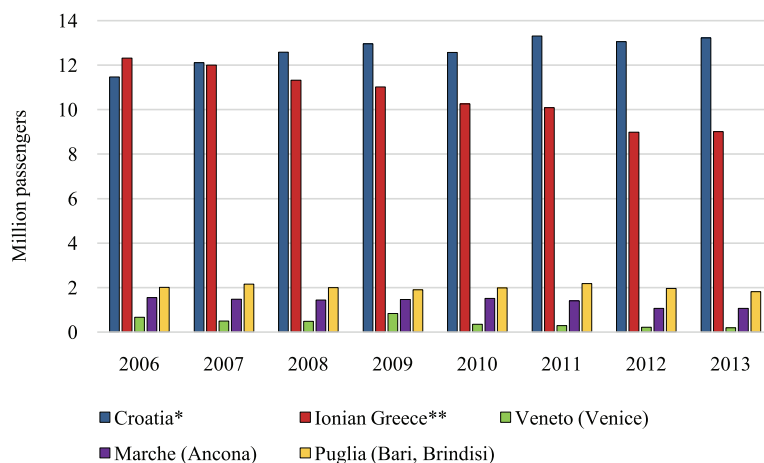
Around 17 million passengers transit Adriatic-Ionian ports every year. In addition, around 900,000 trailers are transported by ferry ships annually.

Table 1. International ferry operators and their routes in the Adriatic–Ionian region

Operator	Route	Operator	Route
Superfast Ferries	Ancona–Patras Ancona–Igoumenitsa Bari–Patras Bari–Igoumenitsa Bari–Corfu	Anek Lines	Ancona–Patras Ancona–Igoumenitsa Ancona–Corfu Igoumenitsa–Venice Patras–Venice
Grimaldi Lines	Brindisi–Patras Brindisi–Igoumenitsa Ravenna–Igoumenitsa Ravenna–Patras	Minoan Lines	Ancona–Patras Ancona–Igoumenitsa Trieste–Igoumenitsa Trieste–Patras
Egnatia Seaways	Brindisi–Corfu Brindisi–Igoumenitsa Brindisi–Sami	Adria Ferries	Ancona–Durrës Bari–Durrës Trieste–Durrës
Red Star Ferries	Brindisi–Vlore Brindisi–Durrës	Jadrolinija	Dubrovnik–Bari Split–Ancona
European Ferries	Brindisi–Vlore	Montenegro Lines	Bar–Bari
Blue Line	Split–Ancona	SNAV	Split–Ancona
Adriatic Lines	Pula–Venice	Commodore	Piran–Venice
Venezia Lines	Venice–Pula Venice–Rovinj Venice–Mali Lošinj		

Source: own elaboration.

Ferry traffic is dropping in the analysed ports, although ferry connection is in most cases cheaper than all road routes. It is also more comfortable, however, it lasts longer and is less flexible. In addition, it is in general much safer. Similar observations hold also for cargo transportation, as we can see in Table 2, although the land border crossing can be time consuming and the rules of European Agreement concerning the Work of Crews of Vehicles engaged in International Road Transport can significantly extended the travel time.



Note: * – around 95% is domestic traffic; ** – around 70% is domestic traffic; embarkations and disembarkations are presented in the chart.

Fig. 4. Maritime transport of passengers by NUTS 2 regions

Source: Eurostat (2015); EA SeaWay data collection.S

Table 2. The main flows of cargo RO-RO units in the ports of Adriatic-Ionian region

Port	Partner country	Average annual flow (2006–2013)	AAGR (2006–2013) (%)	Ratio between 2013 and 2006 (%)
Patras	Italy	3,153,250	-9.3	48
Igoumenitsa	Italy	2,107,750	-8.9	49
Ancona	Croatia	160,250	-2.5	79
Ancona	Greece	2,045,875	-0.9	90
Bari	Albania	402,125	8.7	133
Bari	Greece	837,00	1.9	93
Bari	Montenegro	49,875	47.5	87
Brindisi	Albania	67,500	21.9	43
Brindisi	Greece	502,875	32.6	78
Trieste	Albania	148,500	14.9	68
Venice	Greece	1,018,500	0.0	53

Note: The global economic crisis affected the RO-RO flows in the region so the Average Annual Growth Rate (AAGR) can be misleading due to the huge oscillations in the period of 2007–2010, however, the pre-crisis volumes have not been reached in the majority of cross Adriatic RO-RO routes. In addition, the data does not allow to assume that all the listed flows occur in the Adriatic-Ionian region.

Source: Eurostat (2016).

In addition, railway network, where existing is in a very poor condition (Italy is an exception), deteriorated, with small radiuses and big slopes, not able to sustain high speeds, and with very limited axle loads allowed, it does not represent a viable alternative for massive road passenger or cargo flows. Consequently, roads are becoming more and more saturated and the progress in traffic safety might be soon jeopardized.

Furthermore, although there are many airports of international significance in the region and the low-cost airlines often provide a cost- and time-efficient travelling alternative, the regular intra-regional low-cost airline connections exist only from the Venice airport Marco Polo towards seven regional airports, as can be seen in Fig. 3. Obviously, the cross-Adriatic distances in the southern part of Adriatic Sea are too short with the passenger demand being rather low, and thus setting up a regular airline connection would not be rentable for airline operators.



Fig. 5. Intra-regional low cost airline connections

Source: Adapted from Low Cost Airline Guide (2016).

4. Development possibilities for ferry traffic in Adriatic-Ionian region

The determination of trends suggests that we can expect a further decline of ferry passenger traffic in the region if nothing changes – so far the AAGR is –1.4%. This trend is even more decisive if we deduct the approximated amount of domestic ferry traffic – AAGR becomes 3.8% with the R squared of determined linear trend being 0.89. Similarly, the calculated AAGR for RO-RO ferry flows in the selected ports in the Adriatic-Ionian region is –4.7%, and in 2013 the accumulated flows in these ports represented only 64% of those achieved in 2006. The linear trend suggests a further decline of RO-RO flows, however, the coefficient of determination (R squared) is only 0.59.

Developing new ferry connections can help improve accessibility and reduce road congestion, while it also gives the possibility of transport mode selection. All these are the priorities of EU transport policy. However, before establishing new ferry lines, certain factors have to be considered (Bruzzone 2012):

- transportation demand: existing traffic congestion, landside public transit demand, ro-ro demand, interstate/state transportation system, and legislative policy;
- economic development: ferries can be used to respond to economic growth or as a catalyst to encourage it;
- safety and regulatory compliance;
- cost-effectiveness: cost factors must be considered during ferry planning, especially for public projects;
- environmental issues: energy efficiency, air quality, water quality, community impacts, etc.; and
- geographical conditions: weather patterns, shore and water body conditions, operation requirements, etc.

The majority of countries in Adriatic-Ionian region are facing a tough economic situation followed by non-transparent privatisation processes and with the industry sector losing share in the GDPs. However, certain trade flows are present. Table 3 presents the main import and export markets for the countries in the region to investigate whether there is any potential for further ferry flows that are geared by cargo movement needs.

As can be seen in Table 3, there is some, but relatively small and to certain point already exploited, potential for cross-sea trade in the region, however, a more detailed analysis should address the location of the industrial facilities and consumption centres to determine if a maritime transport can be a sustainable solution.

At the same time, the population in the Adriatic-Ionian region faces tougher living conditions than the inhabitants of majority of other European countries, which can reduce their need or desire to travel. In addition, hydroplane services exist in Adriatic region.

Table 3. The market potential of eight countries in the Adriatic-Ionian macro region

Country	Population*	Export partners and value	Import partners and value
Albania	3,029,278	Italy 45.2%, Kosovo 7.6%, China 7.4%, Spain 6.7%, Greece 4.6% \$1.011 billion (2015 est.)	Italy 35.4%, Greece 11%, China 8%, Turkey 6.7%, Germany 4.3% \$3.597 billion (2015 est.)
Bosnia and Herzegovina	3,867,055	Slovenia 16.4%, Italy 16.1%, Germany 12.8%, Austria 12.3%, Croatia 12% \$3.942 billion (2015 est.)	Croatia 20.2%, Germany 12.6%, Slovenia 12.2%, Italy 9.8%, Russia 6.8%, Austria 5.7%, Hungary 5% \$8.784 billion (2015 est.)
Croatia	4,464,844	Italy 13.7%, Bosnia and Herzegovina 12%, Slovenia 11.2%, Germany 11.1%, Austria 6%, Serbia 5% \$12.23 billion (2015 est.)	Germany 15.1%, Italy 14.1%, Slovenia 10.7%, Austria 8.6%, Hungary 6.5%, Russia 5% \$19.28 billion (2015 est.)
Greece	10,775,643	Turkey 12.2%, Italy 9.4%, Germany 6.8%, Bulgaria 5.3%, Cyprus 5% \$25.31 billion (2015 est.)	Russia 10.1%, Germany 10.1%, Iraq 8.2%, Italy 8.1%, China 5.2%, Kazakhstan 5.1%, Netherlands 5%, France 4.6% \$47.21 billion (2015 est.)
Italy	61,855,120	Germany 12.8%, France 10.7%, US 7.2%, UK 5.3%, Switzerland 4.7%, Spain 4.6% \$454.6 billion (2015 est.)	Germany 16.1%, France 9%, China 7.3%, Netherlands 5.8%, Spain 5%, Belgium 4.5% \$389.2 billion (2015 est.)
Montenegro	647,073	Croatia 22.7%, Serbia 22.7%, Slovenia 7.8% (2012 est.) \$370.2 million (2014 est.)	Serbia 29.3%, Greece 8.7%, China 7.1% (2012 est.) \$1.982 billion (2014 est.)
Slovenia	1,983,412	Germany 19%, Italy 11.2%, Austria 8.7%, Croatia 6.6%, Hungary 4.4%, France 4.4%, Russia 4.1%, Slovakia 4.1% \$28.09 billion (2015 est.)	Germany 16.2%, Italy 14.4%, Austria 10.3%, South Korea 4.6%, China 4.4%, Croatia 4.3%, Hungary 4.1% \$27.1 billion (2015 est.)
Serbia	7,176,794	Italy 17.4%, Germany 12%, Bosnia and Herzegovina 8.8%, Russia 7%, Romania 5.6%, Macedonia, FYRM* 4% \$12.8 billion (2015 est.)	Germany 12%, Russia 11.3%, Italy 11.3%, China 7.6%, Hungary 5%, Poland 4.8% \$17.21 billion (2015 est.)

Note: * – Est. July 2015; ** – The Formal Yugoslav Republic of Macedonia.

Source: CIA (2016).

Nevertheless, if the need to start a new ferry service is identified, it is necessary to determine if the line would be more cargo- or passenger-driven, and certain trade-offs should also be considered. The most significant ones are speed versus cost and comfort, and service level versus cost (Wergeland 2012).

On the other hand, having a politically stable and sustainable Adriatic-Ionian region with the potential for economic growth is one of the interests of EU. Several recently

ended or still ongoing projects analyse maritime transport and hinterland connectivity in this region, as it can be one of the pillars for further development. A few most relevant recent projects from different EU programmes are:

- a) Motorways of the seas (MoS) projects within Trans-European Transport Network (TEN-T):
 - Development of North Adriatic ports' multimodal connections and their efficient integration into the Core Network (July 2013–December 2015) – development of the North Adriatic Ports as the points of interconnection between the sea transport and other modes of transport through the creation or improvement of hinterland access); and
 - Adriatic Motorways of the Sea – ADRIAMOS (January 2011–December 2014) – investments into infrastructure and facilities in order to remove bottlenecks and to improve the efficiency of the logistic chain on the Adriatic-Ionian corridor);
- b) Instrument for Pre-Accession Assistance (IPA) projects:
 - supporting intermodal transport solution in the Adriatic area – INTERMODADRIA (October 2012–February 2015) – the integration of short sea shipping transport in the logistics chains crossing the Adriatic Sea, and the activation of intermodal rail-sea transport services between the ports and their hinterlands);
 - Adriatic multimodal system – ADRIMOB (February 2011–June 2014) – development of a sustainable transport system along and between the Adriatic coasts as well as their inlands);
 - EASY CONNECTING (November 2013–March 2016) – definition of common solutions to the challenges of improving freight transport infrastructures and services;
 - European Adriatic Sea-Way – EA SEAWAY (November 2013–February 2016) – improvement of accessibility and the mobility of passengers across the Adriatic area and its hinterland by developing new cross-border sustainable transport services and to improve the physical infrastructures related to those services;
 - multimodal platform to facilitate mobility in a sustainable area of the Adriatic macro region – TISAR (October 2012–September 2015) – implementation of ICT platform for multimodal traveller information and journey planning;
- c) European Territorial Cooperation Programme Greece–Italy 2007–2013:
 - Greece–Italy facilities for transport 2.0 – GIFT 2.0 (November 2013–September 2015) – development of a platform able to give information on cost and transit times of public transport services in the project area to improve the mobility of passengers and freight;

d) Med Programme:

- Mediterranean network for custom procedures and simplifications of clearance in ports – MEDNET – establishment of a network of port authorities and transport experts to exchange experiences concerning port and customs procedures and develop simplified clearance for vessels and cargoes to achieve seamless logistics.

Furthermore, the Commission's communication titled Blue Belt, a Single Transport Area for Shipping, which was released on 8 July 2013, provides a roadmap for simplifying the procedure for intra-EU shipping and shipping with ports in third countries (EC 2013).

Within the TEN-T programme, 329 European key ports were determined. Among them, 8 ports which we analysed for the purposes of this paper are included either in the core network (Ancona, Bari, Trieste, Venice, and Igoumenitsa) or in the comprehensive network (Dubrovnik, Pula, and Split) (EC 2015). These ports will benefit from the EU financial aids that will be aimed at the development of the ports' infrastructure, as well as to the infrastructure connecting the ports with their hinterland. Consequently, this can boost also the ferry traffic in the region.

In addition, the recently endorsed EUSAIR strategy focuses on blue growth, connecting the region with transport and energy networks, environmental quality, and sustainable tourism (EUSAIR 2016).

Conclusions

Ferry shipping was very suitable mode of transportation in the Adriatic-Ionian region during turbulent times in the Western Balkan countries, but, regardless of the fact that the ports are well equipped and well connected to the hinterland, it has been losing its share – the traffic is switching to roads as the railways do not provide a satisfying alternative.

Ferry shipping is promoted as a sustainable transportation solution, but the current fleet in the Adriatic-Ionian region is rather unsustainable, at least from the environmental and safety point of view, and requires a gradual replacement. The question arises if the shipowners will be able to take the challenge and modernize the fleet or will drop the least efficient lines. This mainly depends on the economic development in the region and the foreseen demand for ferry services, as well as on the European initiatives.

EU is making a lot of effort to ease the procedures in ferry shipping and make the entire process less demanding in a bureaucratic way, which is particularly important for the Adriatic-Ionian region, where out of 8 involved countries, four are not EU member states.

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MOŻLIWOŚCI ROZWOJU ŻEGLUGI PROMOWEJ W REGIONIE ADRIATYCKO-JOŃSKIM

Słowa kluczowe: żegluga promowa, region adriatycko-joński, terminale promowe

Streszczenie: Adriatyk i Morze Jońskie tworzą akwen, który łączy siedem krajów Europy Południowo-Wschodniej. Ten akwen był zawsze używany jako szlak komunikacyjny, a ruch promowy rozkwitł w 1990 roku. Jednak w ostatnim dziesięcioleciu dostrzega się systematyczny spadek ruchu promowego w większości portów regionu adriatycko-jońskiego.

Celem artykułu jest zobrazowanie aktualnej sytuacji na rynku przewozów promowych w regionie adriatycko-jońskim, ze szczególnym z uwzględnieniem ruchu pasażerskiego. W artykule zaprezentowano także aktualne trendy rozwoju tego rynku i dokonano oceny jego potencjału w perspektywie długookresowej.

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