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Analysis of the tourist attractiveness of selected Greek islands: comparison of the Ionian Islands, the Dodecanese and Crete of the basis of the tourist attractiveness index

Abstract: The tourism sector is responsible for a large part of Greece's GDP because the tourist assets of this country generate a lot of tourist traffic. The aim of the article is to compare the tourist attractiveness of the Ionian Islands, Dodecanese and Crete. This allowed for the creation of an attractiveness index. The following aspects were analyzed in detail: the number of tourist attractions, the number of hotels, the quality of these hotels, the number of airports and the number of seaports. Each of the elements was rated on a five-point scale. The region of the Ionian Islands turned out to be the most attractive for tourists. It has the most seaports and airports, so it is the most available in terms of communication. The number of attractions in the Ionian Islands is the largest among the studied areas. The number and quality of hotels is comparable to other analyzed places.

Keywords: tourism in Greece, Ionian Islands, Dodecanese Islands, Crete, tourist attractiveness index

1. Introduction

The article presents a comparative analysis of the tourist attractiveness of selected Greek islands. Tourist attractiveness is a complex concept defined by various authors in a different way. According to Kurek (2007), it is a property of a given area or locality that results from its natural or non-natural features, arousing the interest of tourists. In turn, according to Gołembski (2009), the tourist attractiveness of a given area consists of: the state of the environment, the effects of its protection, transport accessibility and natural and anthropogenic tourist values.

Tourist values are understood as all elements of the natural and anthropogenic environment that are of interest to tourists. Their presence determines the tourist attractiveness of a given area. The overall tourist value consists of natural and non-natural attractions (Rapacz and Jaremen, 2011). All elements shaped without human interference that arouse the interest of tourists are considered to be natural values. They include recreational,

sightseeing and specialist values. The recreational values include areas of high natural attractiveness that are free from air pollution and are conducive to both physical and mental regeneration. Specialized qualities, such as water reservoirs, forest areas or mountain slopes, make it possible to practice active tourism. Non-natural values are defined as all anthropogenic elements that are the object of tourist interest. These include museums, monuments of architecture and construction, objects related to history, places and martyrdoms, economic and technical elements, as well as cultural events (Kowalczyk, 2000).

Another factor that determines tourist attractiveness is the tourist infrastructure, consisting of accommodation, catering establishments, communication and accompanying facilities. The accommodation base is the basic factor of tourism development, it includes all facilities and devices used to provide tourists with accommodation outside their permanent place of residence. The catering base is

a complex of food facilities that satisfy the nutritional needs of tourists. The transport base consists of road networks and transport connections, as well as trails and lifts. The entire local technical and social infrastructure as well as sports and recreational facilities are considered to be the accompanying base. Transport accessibility is the possibility of getting by means of transport to a given place of destination. Transport accessibility consists of the actual distance, time, comfort and costs of travel from the source place to the destination place (Kurek, 2007).

The aim was to compare the studied areas – the Dodecanese Islands, Ionian Islands and Crete, in terms of their tourist values, transport accessibility and accommodation facilities. An attractiveness index was created for the assessment, based on the analysis of individual elements on a specific scale. The indicator is based on partial elements determining the number of tourist attractions, the number of hotels, the quality of hotels and the transport accessibility of the surveyed areas. Each element was rated on a five-point scale, where 5 points is the highest possible rating.

2. Characteristic of area and methods of studies

2.1. Characteristic of Greece

Greece is a land-insular state located in the southeastern part of the Balkan Peninsula. Apart from the mainland, the country's territory comprises about 2.500 islands, 165 of which are inhabited. The largest islands are Crete, Euboea, Lesbos, Rhodes and Chios. The largest archipelagos are the South Aegean Islands, the North Aegean Islands, the Dodecanese Islands, the Cyclades and the Ionian Islands (Rettinger, 2010). The area of the country is over 130.000 km^2, while the population is less than 11 million. This gives a population density of 82 people per square kilometer (World Bank www.worldbank.org).

The Hellenic Republic shares its borders with four countries: Albania, North Macedonia, Bulgaria and Turkey. Greece has access to four seas: the Aegean Sea, the Cretan Sea, the Ionian Sea and all of them are parts of the Mediterranean Sea. Greece is located in the subtropical Mediterranean climate zone, characterized by dry and warm summers and mild, rainy winters (Rettinger, 2010). The lowlands are mainly found in the valleys of larger rivers. The mountains occupy 81% of the country's area, their average height is between 1.200 and 1.900 m above sea level. The highest point is Mount Olympus, whose peak is at an altitude of 2.918 m above sea level (Tampakis et al., 2019).

2.2. Tourism in Greece

The tourist attractiveness of Greece results from the country's location in a warm Mediterranean climate, access to water reservoirs and the presence of many natural and anthropogenic attractions. Due to the aforementioned factors, Greece is visited by millions of foreign tourists every year (Kajzar, 2013). Additionally, each of the tourist regions has an individual characteristic that is typical only for a given region (Gryszel and Nawrocka, 2011). For Greece, these are ancient monuments shaped by the rich history of the country and unique islands, each of which stands out from the rest. In 2017-2019, it was noted that each year the number of tourists' arrivals to Greece was between 20 and

30 million (www.statistics.gr), the vast majority of which were non-residents (Table 1). In 2020, with the start of the SARS-CoV-2 virus pandemic, global tourism decreased significantly, and was also completely suspended for a certain period. Comparing 2019, in which there were over 27 million tourist arrivals to Greece, with 2020, where the number of arrivals was slightly more than 8 million, shows that due to the prevailing pandemic, tourist traffic decreased by about 70%. In 2021, the borders were opened and the pandemic restrictions were reduced. Tourists visited Greece more willingly than in the initial stages of the epidemic. The available data show that by September 2021, over 3.4

Table 1. Arrivals of tourists to Greece, broken down into residents and non-residents in the period from 2017 to 09.2021 (source: own study based on data from the Greek Statistical Office www.statistics.gr.)

Period	Residents	Non-residents	Together
2017	6.238.989	15.065.146	21.304.135
2018	7.494.338	19.680.942	27.175.280
2019	7.530.810	20.008.624	27.539.434
2020	3.732.380	4.686.054	8.418.434
until 09.2021	3.444.454	8.127.776	11.572.230

million residents and over 8 million non-residents traveled to this country (Tab. 1).

The sectors that make up Greece's GDP are agriculture, industry, services, and the "other" sector, which includes the acquisition, processing and provision of information (Kalantzi et al., 2016). Agriculture is the least developed sector, its share in GDP is below 5% in each of the analyzed periods. The industrial sector hovers around 13% of Greece's annual income. Services have the largest share in the creation of the Greek economy. Their contribution constitutes about 70% of GDP in each of the analyzed periods (Tab. 2).

Table 2. Greece's GDP in 2018-2020 along with the percentage share of individual sectors of the economy (source: own study based on data from the Ministry of Development, Labor and Technology)

Year	Agriculture	Industry	Services	Other	GDP in billion euro
2018	3.66%	13.23%	69.79%	13.32%	184.713
2019	3.78%	12.87%	70.04%	13.31%	187.000
2020	4.12%	13.91%	69.81%	12.16%	159.600

Tourism accounted for 30% of all services, which translated into 20% of Greece's annual GDP. In 2020, due to the prevailing coronavirus pandemic, the share of tourism in services dropped to 13%, while its total share in Greece's GDP was less than 9%. That was more than twofold decrease compared to 2019 (Tab. 3).

Table 3. The share of tourism in generating Greece's GDP, including its share in the service sector in 2018-2021 (source: own elaboration based on data from the website www.statista.com.)

Year	Contribution of tourism to Greek GDP in billion euros	The share of tourism in Greece's GDP	The share of tourism in the service sector
2018	36.9	19.98%	28.62%
2019	38.1	20.37%	29.09%
2020	14.8	9.27%	13.28%
2021	10.6	6.63%	27.65%

2.3. The geographic scope of study

Apart from the mainland, Greece consists of 8 archipelagos, these are: Cyclades, Dodecanese Islands, North Aegean Islands, Northern Sporades, Southern Sporades, Ionian Islands, Crete with offshore islands and Saronic Islands. The following study discusses the largest islands of the Dodecanese archipelago, the Ionian Islands and Crete, which is a separate administrative region of the state (Rusin, 2007).

Dodecanese Archipelago is situated in the south-eastern part of the Aegean Sea and in the eastern part of the Mediterranean Sea (Fig. 1). It is the easternmost part of Greece, bordering with Turkey. The administrative territory of the archipelago includes 15 larger and
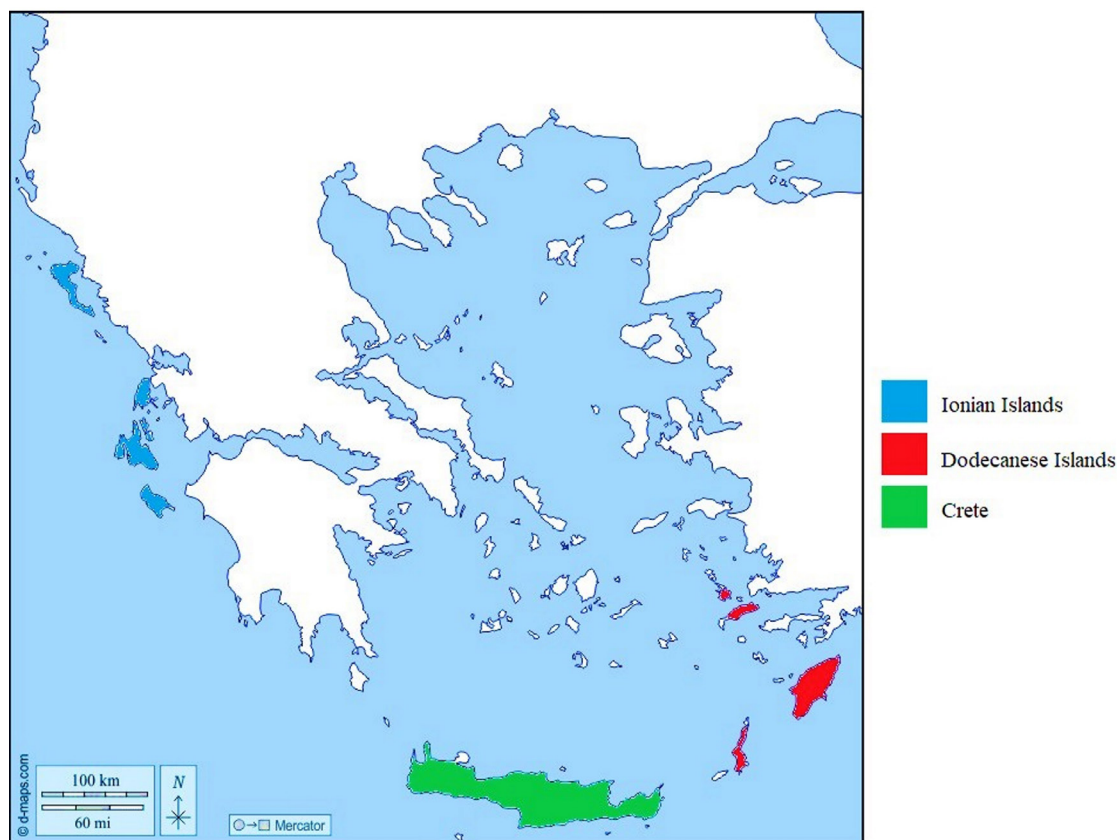
Figure 1. The studied islands of Greece (source: www.d-maps.com)

150 smaller islands. According to the Hellenic Statistics Office, the islands cover an area of 2.714 km^2,which is inhabited by 200.452 people (www.statistics.gr). The capital of the archipelago is the city of Rhodes, located on the island of the same name. This study explores the largest islands of the archipelago: Kalymnos, Kos, Karpathos and Rhodes. These islands also act as regional units, the administrative region of the South Aegean Sea. The studied area covers a total area of 2.150 km^2 (www.greeka.com, 2022).

The Ionian Islands are an archipelago located in the Ionian Sea along the west coast of Greece and partly Albania (Fig. 1). The total area of the islands according to the data of the Hellenic Statistical Office is 2.307 km^2, while the population is 220.097 people according to data from 2006 (www.statistics.gr). The capital

of the region is the city of Corfu located on the island of the same name. The research areas of the Ionian Islands are regional units covering the islands of Ithaca, Kefalonia, Corfu, Lefkada and Zakynthos. They cover an area of 2.231 km^2 of the entire archipelago (Andriotis, 2008).

Crete is the largest Greek island located in the Mediterranean Sea. It is located in the southern part of the country (Fig. 1). The island is a separate administrative region of the state with 4 regional units: Chania, Rethymno, Heraklion and Lasithi. The area of the island is 8.336 km^2, which makes it the fourth largest island in the Mediterranean Sea, while the area of the region covers an area of 8.450 km^2. The island is inhabited by 622.911 people. The capital city is the city of Heraklion (Matzarakis et al., 2014).

2.4. The method of calculating the attractiveness index

The main research method used in the work is the method of querying literature and documents. In order to select the most attractive tourist area, a comparative analysis of the examined elements influencing the

level of attractiveness assessed by tourists was performed.

The first analyzed element of the indicator is the number of tourist attractions in a given area, which was developed on the basis of the analy-

sis of the most popular attractions according to the opinions of tourists from the Google Travel service. This site determines which attractions are the most popular based on visits and feedback from tourists and locals. After a tourist adds a review or rating of attractions on the Google website, it automatically sorts the most-rated places in order of the highest rated ones. On this basis, the number of the most popular attractions on each of the islands was summed up, and then a comparison was made which of the examined areas has the most attractions. The most popular attractions are ranked mainly by popularity, based on the frequency of mentions on the internet as well as the distance to the destination from the search location.

The second element of the index is the density of the hotel base on each surveyed island. Information on available hotels comes from the Hellenic Chamber of Hotels (www.statistics.gr), the study was conducted in 2020. Based on the information obtained, it was determined which area has the highest density of hotel facilities per square kilometer.

The third element examined was the quality of hotels available on the islands. The star scale awarded by the Hellenic Tourism Organization

(EOT) was used to assess hotel standards. Each of the hotels has from one to five stars, depending on the standard it offers. On the basis of this information, it was determined which of the surveyed islands has the most hotels of the highest standard, and which area has the highest average rating of all available hotels.

The fourth examined aspect concerned communication accessibility. On the basis of data from the website www.flightconnections.com, the number of international and domestic airports on the islands was calculated. Information on the number of seaports and marinas was obtained from the website www.marine-traffic.com. From the information provided, it was concluded which of the studied islands has the most communication places, which allowed for the selection of the most accessible area.

Then, the scoring method was used, the maximum number of points was summed up and the results for individual areas were calculated. It was determined which area scored the highest and which scored the lowest.

All elements of the index were assessed on a five-point scale for individual tourist regions. The table below (Tab. 4) presents the method of assessing the indicator elements.

Table 4. The method of assessing the elements of the tourist attractiveness index (source: own study)

| Indicator element	1 point	2 points	3 points	4 points	5 points
number of attractions	0-100	101-200	201-300	301-400	> 400
number of hotels (per km²)	0-0.2	0.21-0.4	0.41-0.6	0.61-0.8	> 0.8
average quality of hotels	0-1	1.1-2	2.1-3	3.1-4	> 4
number of airports	1	2	3	4	> 4
number of seaports	0-15	16-30	31-45	45-60	> 60

3. Results

3.1. Tourist attractions of the islands

Analyzing the data obtained from the Google Travel service (www.google.com/travel), it appears that the most attractions are located in the Ionian Islands, there are 452 of them. In the Dodecanese Islands there are 273 attractions, and in Crete 100 (Fig. 2).

Island with the greatest number of tourist attractions is Kefalonia, located in the area of

the Ionian Islands, where 101 of the most popular attractions have been recorded. There are 100 attractions each on the islands of Corfu, Lefkada and Crete. The smallest number, however, is on the island of Kalymnos in the Dodecanese Islands (Tab. 4).
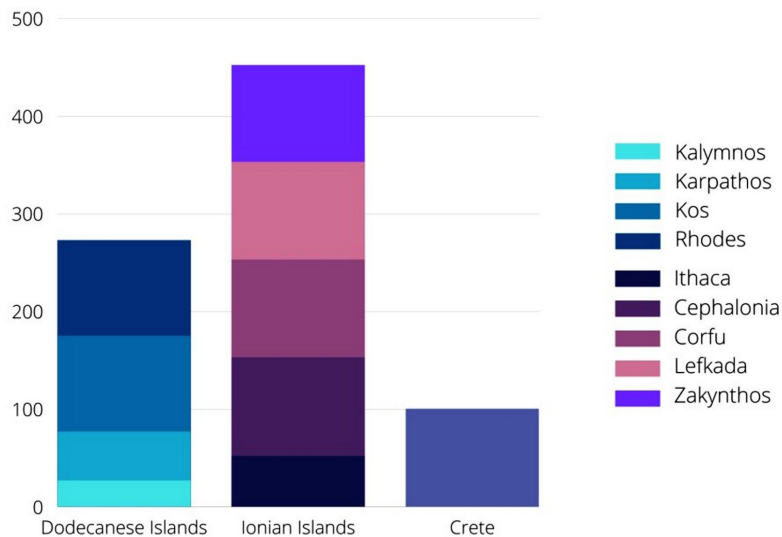
Figure 2. Number of attractions on the Dodecanese Islands, Ionian Islands and Crete (source: Own elaboration based on www.google.com/travel.)

Table 5. Number of attractions located on individual islands. (source: own elaboration based on www.google.com/travel.)

Dodecanese Islands	Ionian Islands	Crete
Kalymnos – 27	Ithaca – 52	100
Karpathos – 50	Cephalonia – 101	
Kos – 98	Corfu – 100	
Rhodes – 98	Lefkada – 100	
	Zakynthos – 99	
270	452	100

The most-rated elements in Crete are beaches, viewpoints and urban architecture. The Ionian Islands are dominated by anthropogenic attractions such as palaces, museums and churches, while natural elements such as caves or beaches are also important. In the Dodecanese Islands, beaches and architectural monuments are most often rated.

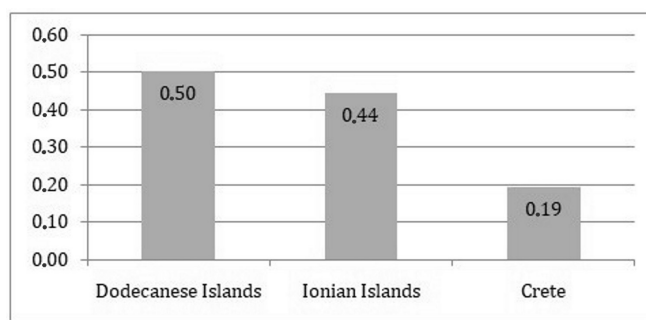## 3.2. Number of hotels on the islands

The largest number of hotels, as many as 1.634, is located in Crete. In the Dodecanese Islands there are 1.081 hotels, while in the Ionian Islands there are 989 hotels. In the Dodecanese archipelago, the island with the greatest number is Rhodes – with 545 hotels, while this number is lowest on the island of Karpathos – 123 hotels. In the area of the Ionian Islands, the largest number of hotels is on the island of Corfu – 413 facilities, while the lowest – on the island of Ithaca – 8 hotels. Among the 1.634 hotels in Crete, the most are located in the Chania region – 576 hotels (Fig. 3).

The highest density of hotel facilities is in the Dodecanese Islands: 0.5 hotels per one square kilometer. The Ionian Islands have a hotel density of 0.44 hotels per square kilometer, while Crete has the lowest density of 0.19 hotels per square kilometer (Fig. 4).

a) number of hotels

b) Dodecanese Islands

c) Ionian Islands
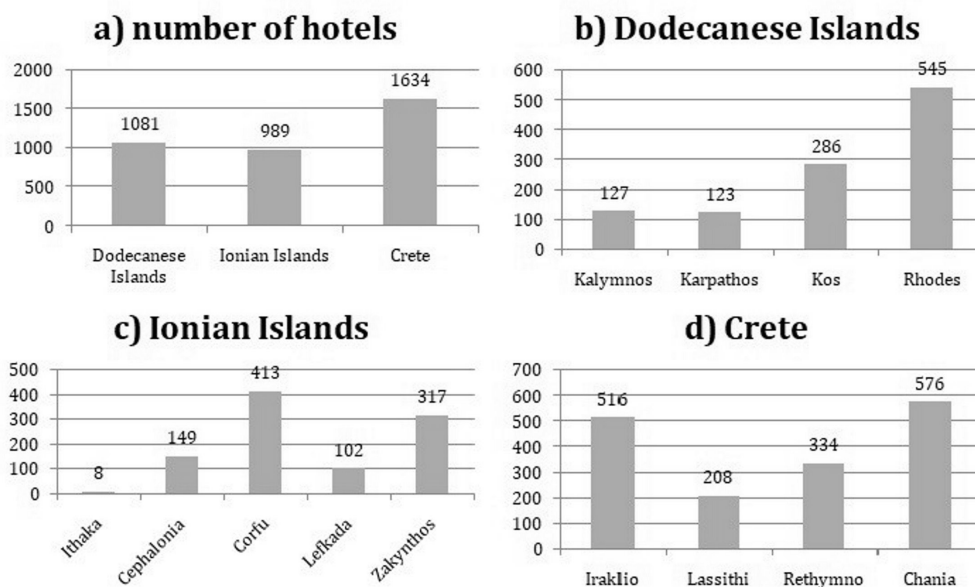
d) Crete

Figure 3. Number of hotels in the studied area, broken down into individual islands. There are four tourist regions in Crete (source: Own elaboration based on data from the Hellenic Tourism Organization)

Figure 4. Density of hotels (number of hotels per km²) in the studied areas (source: Own study)

3.3. Quality of island hotels

The analysis of the data of the Hellenic Tourism Organization (EOS) shows that in the entire analyzed area the most common are four-star hotels. In the Dodecanese Islands, there were 109 one-star hotels (10%), 194 two-star hotels (18%), 271 three-star hotels (25%), 441 four-star hotels (41%) and 66 five-star hotels (6%). On the Ionian Islands there are: 66
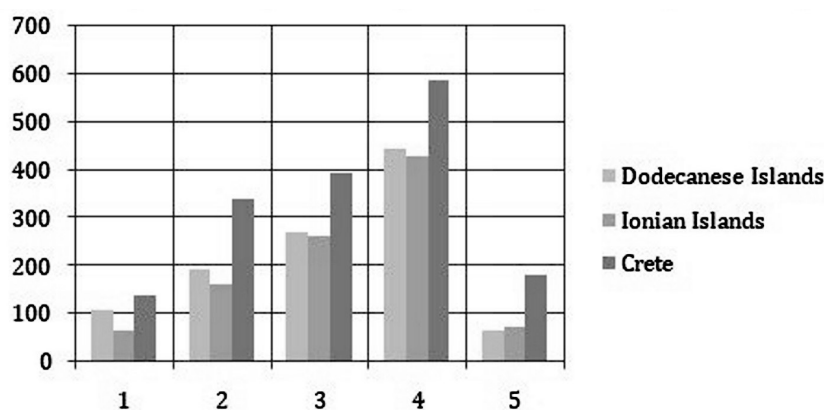
Figure 5. Number of hotels on the surveyed islands, taking into account the quality category (source: Own elaboration based on the Hellenic Tourism Organization)

one-star hotels (7%), 161 two-star hotels (16%), 262 three-star hotels (26%), 426 four-star hotels (43%) and 74 five-star hotels (7%). In Crete there are: 139 one-star hotels (9%), 338 two-star hotels (21), 392 three-star hotels (34%), 585 four-star hotels (36%) and 180 (11%) five-star hotels (Fig. 5).

3.4. Communication accessibility

There are four airports in the Dodecanese Islands. Two of them, located on the islands of Kos and Rhodes, are international. Other two, on the islands of Kalymnos and Karpathos and, are domestic.

There are four airports in the Ionian Islands. Three of them serve international flights: on the islands of Kefalonia, Corfu and Zakyntkos, while on the island of Lefkada there is a domestic airport. There are three airports in Crete: international airports in the cities of Herak-

The largest number of five-star hotels is in Crete, in the Heraklion regional unit – there are 180 of them. The smallest number of hotels of the highest standard is on the island of Lefkada – 4 hotels, while in Ithaca there are no five-star hotels. The island with the most one-star hotels is Rhodes, there are 65 such hotels.

lion and Chania, and a domestic airport in Sitia.

The places of water communication are sea ports and marinas. Sea ports enable sea transport and passenger traffic of larger ships, while marinas handle yachts and small vessels. According to the www.marinetraffic.com website, the Dodecanese Islands have 11 seaports and 3 marinas, the Ionian Islands have 16 seaports and 45 marinas, while Crete has 21 seaports and 22 marinas (Fig. 6).
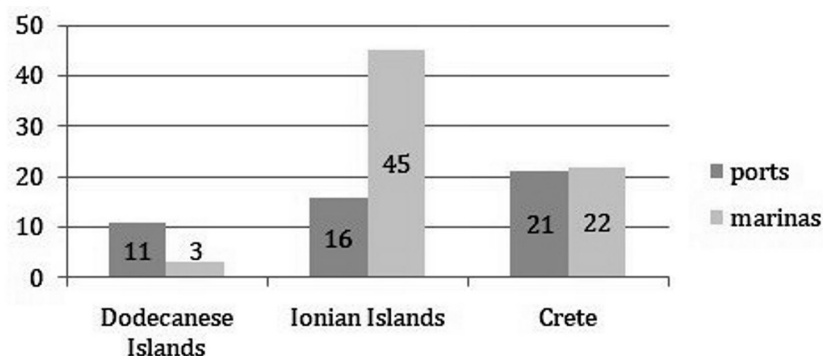
Figure 6. Number of seaports and marinas in the area of the studied islands (source: Own study based on data from www.marinetraffic.com.)

3.5. The attractiveness index

The Ionian Islands, with 452 of the most popular attractions, received 5 out of 5 possible points for the number of tourism attractions. Dodecanese Islands with 273 attractions received 3 points, while Crete gets 1 point as there were 100 most popular attractions.

The highest hotel density is in the Dodecanese Islands – 0.5 hotels per km², and in the Ionian Islands – 0.44 hotels per square kilometer. Both areas scored 3 points. In Crete, the hotel density is 0.19 hotels per square kilometer, for that it received 1 point.

Each of the surveyed areas has an average hotel quality rating, oscillating around 3 stars, so according to the scale, all surveyed areas received 4 points out of 5 possible. The Ionian Islands have an average rating of 3.28, Crete – 3.20 and the Dodecanese Islands – 3.15.

The Dodecanese Islands and the Ionian Islands each have 4 airports, for which each of these areas received 4 out of 5 possible points. Crete, with 3 seaports, obtained 3 out of 5 points. The most seaports were located in the Ionian Islands – 61, which, according to the given scale, gives 5 out of 5 possible

points. Crete received 4 points because it has 43 seaports, the Dodecanese Islands have 14 seaports, which gives 1 point.

The figure below (Fig. 7) shows the number of points received by the regions in question for each element of the indicator.
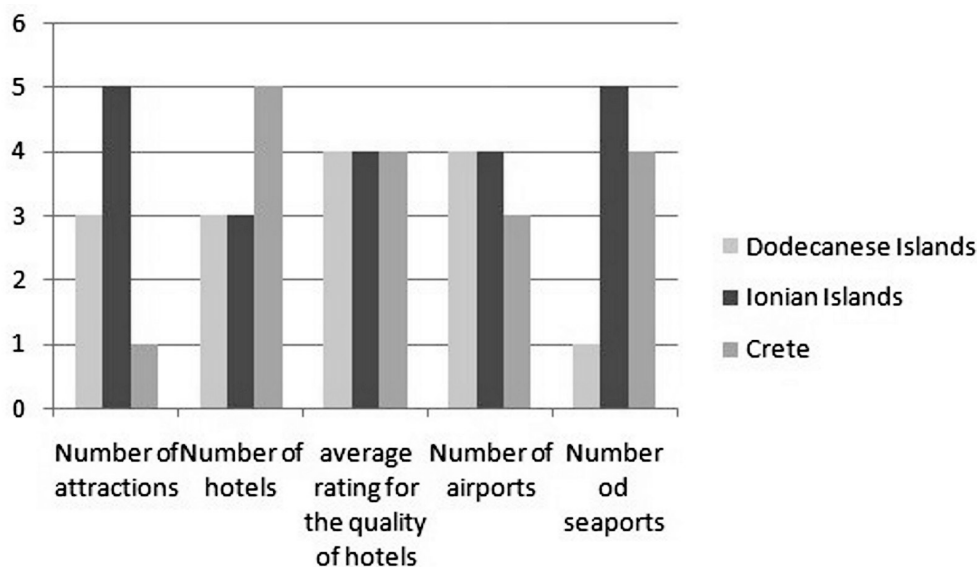
Figure 7. Number of points for individual elements for each of the regions (source: own study)

The maximum number of points that could be obtained for each area was 25. The area of Crete received 13 points, the Dodecanese Islands received a total of 15 points, and the sum of the points of the Ionian Islands for all examined elements was 21.

4. Discussion and conclusions

Greece is a country attractive for tourists due to its location, culture and climate, as well as natural and anthropogenic attractions. The developed index was aimed at selecting the most attractive area in the country, which is visited by millions of tourists every year.

Each of the studied areas has many tourist attractions, both natural and non-natural. The main natural attractions are sandy and rocky beaches, rock formations, lakes, waterfalls and coasts with bays and cliffs. The anthropogenic attractions of Greece are mainly historical cities shaped by the rich history of the country.

Due to such a large development of tourism in Greece, there are hotels on most of the islands, and their density is high. In addition, over 70% of the facilities in each of the surveyed areas have 3 or more stars, which means that the vast majority of them are of a good or high standard.

There are 15 international airports and 20 domestic airports in Greece. Additionally, there are many seaports and marinas in the country. Due to the peninsular nature of the state, Greece has connections between individual islands and the mainland and very good transport accessibility. Apart from the advantage of good transport accessibility, the presence of seaports and the shape of the coast, it supports the development of yacht tourism (Chen, 2016).

When analyzing the developed attractiveness index, it results that the area most favorable for tourists is the Ionian Islands. The archipelago has the most tourist attractions among the studied areas, the number of hotels is satisfactory, while the quality of hotels on a five-point scale is much above average. The number of seaports in the area of the Ionian Islands is the highest among the analyzed areas. The high attractiveness index of the Ionian Islands is also due to the smallest surface area studied. Due to the smaller area, the density of the assessed attractions and sea ports is higher.

Crete, although it is the largest island of Greece, is not the most attractive region in

terms of tourism, as it has less than other areas tourist attractions. However, it has the largest number of hotels among the analyzed areas, which is probably due to its area, but their density is the lowest. In addition, the island has many seaports and marinas.

The Dodecanese Islands have the smallest number of seaports and marinas among the studied areas. Additionally, the number of attractions and hotels is not sufficient to define this area as the most attractive for tourists.

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