The Impacts of Covid-19 Pandemic on Tourism Industry in The Island of Crete, Greece

John Vourdoubas

ABSTRACT

The global tourism industry was badly affected during the Covid-19 pandemic. Popular tourism destinations like the island of Crete have undergone devastating shocks. The impacts of coronavirus on tourism in Crete during the period 2018-2022 have been studied in order to investigate the gradual recovery after the end of the pandemic. The current work is important for the island’s tourism industry, considering the large share of tourism in the island’s income and prosperity. The annual tourist arrivals in Crete during this period have been analyzed and compared with the tourist arrivals in Greece. The results indicated that tourist arrivals in Crete have been sharply decreased by 74.98% in 2020 compared to 2019 while in 2022 they have exceeded by 4.98% the arrivals of 2019. Tourism arrivals in Greece have been reduced by 78.22% in 2020 compared to 2019 while in 2022 they were still 9.66% lower compared to 2019. The present work is important for all stakeholders of the island’s tourism industry indicating the quick recovery and the revival of tourism in Crete in the post-pandemic period. The rapid recovery of the tourism industry in Crete can be attributed to the brand name of the island as a global tourism destination and its popularity and attractiveness to international travelers.

Keywords: Covid-19, Crete-Greece, Impacts, Recovery, Resilience, Sustainability, Tourism Industry.

I. INTRODUCTION

The Covid-19 pandemic had unexpected catastrophic impacts in the global economy. Tourism industry is highly vulnerable to contagious microbes which might be lethal to humans. The limitations imposed to traveling had devastating effects in the global tourism industry which based its survival on governmental support. Many researchers and international organizations have proposed various policies and measures in order to mitigate the impacts of the pandemic and to increase the resilience of tourism industry in such undesired circumstances (Gossling et al., 2022, Bhatia et al., 2022). Countries in which tourism industry has a major role in their economy, like Greece, are highly affected by SARS-CoV-2 (Jayanta et al., 2021). The synergy between pandemics and climate change could be catastrophic for vulnerable industries like tourism (Gossling et al., 2022). The island of Crete, Greece consists of a popular tourism destination in the Mediterranean region. Its economy is highly dependent on tourism and it has been badly affected from the pandemic (Vourdoubas, 2020, Kourgiantakis et al., 2020). The impacts of the pandemic on tourist arrivals in the island of Crete have not been studied so far.

The aims of the current research are:

a) The investigation of the impacts of Covid-19 pandemic on tourist arrivals in Crete and,

b) The investigation of the temporal recovery of tourism in the island of Crete after the shock of the coronavirus.

The current research is important for all stakeholders in the Cretan tourism industry while it is also novel and useful. The paper is structured as follows. After the literature survey the tourism industry in Crete and its characteristics are stated. Next, the impacts of Covid-19 pandemic on the global tourism industry as well as on tourism in Crete and in Greece are mentioned. In the following sections the impacts of climate change and over-tourism in Crete are presented while the text ends with discussion of the findings, the conclusions drawn and the citation of the references used.
II. LITERATURE SURVEY

The literature survey is separated in two parts. The first is related with the impacts of Covid-19 pandemic on the global tourism industry while the second part with the impacts on the island of Crete and on Greece.

A. The Impacts of Covid-19 Pandemic on the Global Tourism Industry

The opportunity of developing sustainable tourism after the Covid-19 crisis has been examined (Ioannides et al., 2020). The authors stated that the crisis offers a good opportunity for adopting a more sustainable path in global tourism. They also mentioned that public and private actors should design new pathways towards a greener and more sustainable tourism. The tourism sustainability in the era of Covid-19 has been reviewed (Bhatia et al., 2022). The authors stated that during the pandemic the tourism industry was the most affected globally. They also mentioned that several stakeholders of the tourism industry have proposed practical recommendations to rethink and revive the tourism sector in a sustainable pathway. The national tourism strategies during the Covid-19 pandemic have been studied (Collins-Kreiner et al., 2021). The authors stated that several countries have tried to implement short-term local solutions regarding their tourism policy. They also mentioned that the recommendations of the United Nations World Tourism Organization (UNWTO) regarding the “strategy for to-morrow” have not been adopted since countries are focused on short-term measures for restarting tourism. The tourism adaptation strategy during Covid-19 pandemic in Indonesia has been studied (Kristiana et al., 2021). The authors stated that employees of tourism industry have changed job during the pandemic but hopefully they will return to tourism industry after the end of the crisis. The government’s policy was focused on increasing the resilience in several tourism destinations. The tourism in protected and conserved areas during Covid-19 pandemic has been examined (Spenceley et al., 2021). The authors stated that due to coronavirus pandemic the visits of tourists in protected and conserved areas had been significantly reduced having negative impacts on finances, tourism businesses and the livelihoods of people who live and work there. They also proposed several measures to increase the resilience in these tourism destinations. The beach tourism in the era of Covid-19 pandemic has been studied (Zielinski et al., 2020). The authors stated that the importance of beach tourism in many destinations has led many governments to reopen carefully the tourist beaches. They also mentioned that an interdisciplinary approach is required to reduce the risk of contagion in the beaches. The tourism industry in India amid Covid-19 pandemic has been investigated (Kaushal et al., 2021). The authors had interviewed fifteen senior managers of the hospitality industry regarding the effects of pandemic on tourism. They stated that the interviewers highlighted the importance of a) multiskilling and professional development of employees, b) the increase sense of hygiene and sanitation, c) optimism towards revival of the industry, and d) better crisis preparedness. The tourism industry in the era of Covid-19 has been rethought (Varzaru et al., 2021). The authors have proposed various measures to increase the resilience of tourism industry in international, national and sectoral level. The proposed measures were separated in financial, economic, sanitary and measures focused on labor. The potential of virtual tourism after the end of Covid-19 pandemic has been analyzed (Lu et al., 2021). The authors stated that the tourism sector can use new technologies like virtual tourism in the future. They also mentioned that virtual tourism can be used as a marketing tool to promote destinations, as an entertainment activity, and for distant selling products and souvenirs. The resilience of the UK tourism industry during the Covid-19 pandemic has been studied (Ntounis et al., 2022). The authors have implemented an empirical survey in 1,016 businesses located in English towns including 340 tourism-dependent businesses. They assessed their resilience according to several indices concluding that tourism-related enterprises were among the most vulnerable to Covid-19 pandemic. A policy tracker to record the policies in 220 countries regarding the mitigation of Covid-19 impacts on tourism industry has been initiated (United Nations World Tourism Organization). The policy tracker includes fiscal measures, measures for jobs and skills, measures to restart tourism and promote the domestic tourism, et cetera. The impacts of coronavirus on global tourism have been studied (Pashkus et al., 2021). The authors have analyzed the impacts of the pandemic on tourism competitiveness of St. Petersburg. They stated that Covid-19 has caused significant changes in the competitive market of tourism. They also mentioned that a new approach is required in the city to become more attractive and competitive to different segments of tourism market. The impacts of Covid-19 pandemic to tourism have been studied (Jayanta et al., 2021). The authors have analyzed various economic and tourism indices in fifty countries stating that countries which are highly dependent on tourism are mostly affected. They also mentioned that countries like Georgia, Philippines, Thailand, Spain, Greece and Croatia are among the most affected countries. The reviving of tourism after Covid-19 pandemic has been investigated (Gagan et al., 2021). The authors proposed four factors for increasing resilience and sustainability in tourism industry including: a) government response, b) technology innovation, c) local belongingness, and d) consumer and employee confidence. The lessons learned after two years of Covid-19 and tourism have been analyzed (Gossling et al., 2022). The authors stated that global tourism is entering in a third year of uncertainty. They also mentioned that there is a consensus that the return to pre-pandemic over-tourism phenomena is undesirable.
Regarding climate change and tourism industry the authors proposed that the lessons learned during the pandemic should be used by the tourism sector for climate change mitigation. The effects of Covid-19 pandemic on tourism have been studied (Filep et al., 2022). The authors suggested that more data are required to assess the impacts. They also mentioned that they are needed to assess holistically the post-pandemic tourism. A charter for sustainable tourism after Covid-19 has been developed (Chang et al., 2020). The authors have proposed a 10-point charter for sustainable tourism after the pandemic which can establish a balanced and sustainable tourism, travel and hospitality industry. The impacts of coronavirus on tourism sector in Latin America and the Caribbean has been investigated (Muñoz, 2020). The author stated that tourism accounts for half of services’ exports in Latin America and the Caribbean and the pandemic may cause a GDP fall by 8% in Caribbean and 1% in Latin America. He also mentioned that tourism recovery should be combined with enhanced product diversification as well as with environmental and social sustainability. The impacts of Covid-19 on the supply and demand of tourism industry have been studied (Serife Huyuguzel Kisla et al., 2023). The authors stated that the pandemic has badly affected local tourism destinations as well as tourism enterprises. They also mentioned that the Covid-19 crisis brought some new ideas in the tourism sector. Probably in the future the global tourism system will be more oriented towards the sustainable development goals while the need for transportation might decrease due to less flights and the increasing on-line meetings. The literature related with the impacts of Covid-19 on tourism has been reviewed (Loncaric et al., 2022). The authors stated that researchers were focused in four research areas including: a) the impacts and consequences of Covid-19 on tourism, b) the tourism transformation and post-pandemic recovery strategies, c) changes in behavior from the travelers’ perspectives, and d) issues from the perspective of tourism enterprises. They also mentioned that these studies were mostly based on empirical research conducted in various countries around the world. The impacts of climate change on tourism in Northwestern Europe have been examined (Nicholls et al., 2008). The authors stated that every summer millions of northern Europeans travel south to spend their holidays in Mediterranean region. They also mentioned that climate change will enhance the suitability of Northern Europe for Summer holidays increasing its competitive advantage compared to Mediterranean tourism destinations. The relation between climate change and tourism has been studied (Scott, 2008). The author stated that there are new realities of tourism in an era of global climate change while tourism destinations undergo major undesired and harmful impacts.

B. The Impacts of Covid-19 Pandemic on Tourism Industry in the Island of Crete and in Greece

The impacts of coronavirus on tourism in Santorini island, Greece have been studied (Medova et al., 2021). The authors compared the number of visitors and flights in 2020 in the island and compared them with similar data of previous years. They mentioned that tourism arrivals in Santorini in 2020 were reduced by 65% compared to 2019 which was crucial for the local society in terms of employment and income. The impacts of Covid-19 pandemic on Greek tourism have been investigated (Tabouratzis et al., 2022). The authors have conducted empirical research, regarding the activities and sectors harmed by the virus, with 135 questionnaires distributed to managers in tourism enterprises. The results indicated that the effects of the pandemic in these tourism enterprises were severe in the fields of loan repayment, liquidity and collectability of receivables while they were less severe in areas like rent and wage payments. TUI group had announced in February 2021 that the island of Crete and the Canary-islands were the most popular tourism destinations for Europeans during summer 2021 while Crete was in the first position. The opportunity for temporal expansion of the tourism sector in Crete, Greece has been investigated (Kyriakakis et al., 2020). The authors stated that Crete heavily depends on tourism and the economic losses due to pandemic are expected to be devastating. However, they mentioned, the island has a unique opportunity to improve its comparative position as a destination, after the end of pandemic, and to prolong the duration of the tourism season. The over-tourism in the island of Crete, Greece has been studied (Vourdoubas, 2020). The author stated that Crete is an attractive and popular tourism destination in the Eastern Mediterranean basin which is ranked among the ten more overcrowded EU tourism NUTS-2 regions. He mentioned that over-tourism destroys the fragile natural eco-systems in the island threatening its prosperous tourism industry. The adaptation of tourism industry in Crete to climate change has been examined (Vourdoubas, 2023). The author stated that adaptation of the local tourism industry is a complex process which requires holistic approach. He also mentioned that all tourism-related stakeholders should collaborate and participate actively in the adaptation process. The nexus between climate change and tourism industry in Crete has been studied (Vourdoubas, 2023). The author stated that climate change alters various environmental conditions in the island while extreme weather events could destroy the local infrastructure. He also mentioned that tourism-related carbon emissions in Crete are in the same range with other tourism destinations. The impacts of coronavirus on tourists have been investigated (Kourgiantakis et al., 2020). The authors studied their current travel intentions using as a case study the island of Crete, Greece. They used online questionnaires in the beginning of the Covid-19 pandemic in April 2020 stating that the majority of the respondents (44.9%) had not made up their mind yet while approximately a third (28.7%) had
reported that they had cancelled their summer holidays. Only a small portion at 17.5% had reported that they will carry on their summer holidays.

III. THE TOURISM INDUSTRY IN CRETE

Island of Crete is a popular and well-known tourism destination worldwide. It is located in Eastern Mediterranean basin having mild climate conditions and a lot of sunshine during the most of the year. Like other Mediterranean islands Crete consists of an attractive tourism destination for visitors willing to enjoy the sun and the sea during their vacations. Tourism is the most dynamically developing sector in the island and its demand triggered important investments in hotel units, resulting in the creation of new tourist accommodations and in the qualitative and quantitative upgrading of the existing hotels. Tourism in Crete is currently facing structural problems, consisting mainly of its seasonal nature and the limited expansion of the tourist movement to the inland settlements, as tourist infrastructure is mainly gathered in the northern coast and in small centers in the south. At the same time its sustainability is largely influenced by outward, uncontrollable conditions, contributing to fluctuations in its performance. An important competitive advantage of the tourist industry is the high percentage of high standard hotels. Crete has 30.31% of the total of 5 star’s beds in Greece and 24.57% of 4 star’s beds respectively. The visitors of Crete are from all ages, look for adventure, activities, relax and spa therapies. The last years the tourists prefer, except from sea and sun, alternative tourism such as natural and botanical routes, climbing, trekking, new undiscovered places such as small traditional villages. The main elements that attract and satisfy tourists in Crete include:

- Weather and climate,
- Famous gastronomy (the well-known Cretan Nutrition),
- Tradition and Cretan way of life,
- Cultural heritage and history,
- Natural environment,
- Beaches and coasts.

Moreover, there are specific groups of tourists who are satisfied with activities such as following:

- Religious and pilgrimage sites,
- Botanical and natural routes,
- Alternative tourism of well-being and relaxation,
- Off-road activities,
- Organization of scientific and professional conferences.

Before the growth of tourism industry Cretan economy was directed towards agriculture like most of the Greek regions. Today, tourism, together with agriculture are the island’s largest earners of foreign exchange. Thus, in line with the diffusion paradigm, there was a movement from the “traditional” agricultural sector into the “modern” tourism-oriented sector. Nevertheless, in contrast with other island regions in Greece, where there is a monoculture towards tourism, Crete has a healthy balance between growth in agriculture and tourism, even if investments are currently geared more towards tourism. However, the share of Cretan tourism industry in the total regional domestic product is high, at around 47%, which increases the vulnerability of the island in crisis like the Covid-19 pandemic.

<table>
<thead>
<tr>
<th>TABLE I: SEVERAL CHARACTERISTICS OF THE TOURISM INDUSTRY IN CRETE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parameter</td>
</tr>
<tr>
<td>Number of inhabitants (2011)</td>
</tr>
<tr>
<td>Area of the island</td>
</tr>
<tr>
<td>Number of tourists (2016)</td>
</tr>
<tr>
<td>Number of tourists’ bed-nights in Crete (2017)</td>
</tr>
<tr>
<td>Tourism density</td>
</tr>
<tr>
<td>Tourism intensity</td>
</tr>
<tr>
<td>Number of Airbnb accommodation facilities</td>
</tr>
<tr>
<td>Carbon emissions per tourist</td>
</tr>
</tbody>
</table>

Sources: Vourdoubas, 2020, Vourdoubas, 2023

IV. THE COVID-19 PANDEMIC AND THE GLOBAL TOURISM INDUSTRY

The Covid-19 pandemic has created huge problems in the global economy. The coronavirus has created devastating damages both in tourism related enterprises and in tourism destinations. According to various authors (Bhatia et al., 2022, Ntounis et al., 2022) hospitality industry was probably the most affected industry worldwide together with transportation. The impacts were more severe in countries which were more dependent on tourism (Jayanta et al., 2021). Without governmental support the global tourism industry during the pandemic was going to collapse.
The governments have developed various policies and measures to increase the resilience of their own tourism industry amid the pandemic including financial, economic, sanitary measures and measures supporting the labor (Varzaru et al., 2021). Various sectors of the tourism industry were affected differently while several countries have adopted short-term local measures to achieve the rapid restart of tourism. During the pandemic many workers in hospitality industry have changed their job. It is expected that they will return to their initial jobs after the end of the crisis (Kristiana et al., 2021). The visits of tourists in protected and conserved areas have halted having negative impacts in the local societies and the income of local people (Spenceley et al., 2021). During the pandemic many workers in hospitality industry have changed their job. It is expected that they will return to their initial jobs after the end of the crisis (Kristiana et al., 2021). The visits of tourists in protected and conserved areas have halted having negative impacts in the local societies and the income of local people (Spenceley et al., 2021). The same has happened to beach tourism which is popular in many tourism destinations while governments have tried to restart it carefully avoiding virus contaminations (Zielinski et al., 2020). Covid-19 pandemic has indicated that tourism industry should become more sustainable and resilient to cope with future crisis including climate change (Gossling et al., 2022, Chang et al., 2020). Taking into account the technology advances it is probable that in the future virtual tourism will be propagated assisting many people to entertain remotely without visiting tourism destinations (Lu et al., 2021). According to hotel managers coping with the pandemic requires multiskilling and professional development of employees, increase of hygiene and sanitation in hotels and better crisis preparedness (Kaushal et al., 2021). The challenges in the tourism industry due to Covid-19 are related with the transformation of the industry in the post-pandemic era, the change in the behavior of the travelers as well as the changes in the perspective of tourism-related enterprises (Loncaric et al., 2022). It is broadly accepted that the global tourism industry should be ready in the future to cope with the synergistic effect of multiple crisis like new pandemics, the climate change and over-tourism phenomena in several tourism destinations.

V. THE IMPACTS OF COVID-19 PANDEMIC ON GREEK AND CRETAN TOURISM

Few studies have been implemented so far regarding the impacts of Covid-19 on the Greek tourism. A study focused on Santorini island, Greece has revealed a 65% drop in tourist arrivals in 2020 compared to 2019 (Medova et al., 2021). According to published data (statista.com) tourist arrivals in Greece during the period 2018-2022 have been reduced while the number of annual visitors is presented in Table II. Tourist arrivals in the first year of the pandemic, in 2020, were reduced at 78.22% compared with the previous year while the fall in arrivals between 2019 and 2022 was at 9.66%. The drop in the national tourist arrivals between 2019-2020, at 78.22%, was higher than the drop reported in Santorini island at 65%. Therefore, after two years with Covid-19 the Greek tourism has almost recovered.

<table>
<thead>
<tr>
<th>Year</th>
<th>Annual tourist arrivals</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>33,072,000</td>
</tr>
<tr>
<td>2019</td>
<td>34,005,000</td>
</tr>
<tr>
<td>2020</td>
<td>7,406,000</td>
</tr>
<tr>
<td>2021</td>
<td>15,246,000</td>
</tr>
<tr>
<td>2022</td>
<td>29,876,000</td>
</tr>
</tbody>
</table>

Source: Statista Research Department (2023)

Current data indicate that tourist arrivals in Crete in 2022 have fully recovered compared to 2019 which is the reference year before the pandemic. The tourist arrivals in the airport of Chania, Crete are presented in Table III, in airport of Heraklio, Crete in Table IV while the total tourist arrivals in both airports are in Table V. It should be mentioned that only arrivals of tourists by international flights have been taken into account.

![Fig. 1. Annual tourist arrivals in Greece during 2018-2022.](image-url)
TABLE III: ANNUAL TOURIST ARRIVALS IN THE AIRPORT OF CHANIA, CRETE DURING 2018-2022

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of tourists</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>1,165,000</td>
</tr>
<tr>
<td>2019</td>
<td>1,145,000</td>
</tr>
<tr>
<td>2020</td>
<td>201,000</td>
</tr>
<tr>
<td>2021</td>
<td>662,000</td>
</tr>
<tr>
<td>2022</td>
<td>1,296,000</td>
</tr>
</tbody>
</table>

Source: Chania Airport (CHQ) (n.d.)

Fig. 2. Annual tourist arrivals in the airport of Chania, Crete during 2018-2022.

TABLE IV: ANNUAL TOURIST ARRIVALS IN THE AIRPORT OF HERAKLIO, CRETE DURING 2018-2022

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of tourists</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>3,360,000</td>
</tr>
<tr>
<td>2019</td>
<td>3,292,000</td>
</tr>
<tr>
<td>2020</td>
<td>899,000</td>
</tr>
<tr>
<td>2021</td>
<td>2,123,000</td>
</tr>
<tr>
<td>2022</td>
<td>3,362,000</td>
</tr>
</tbody>
</table>

Source: Małgorzata Zdunkowska-Gęca, P. G. (n.d.)

Fig. 3. Annual tourist arrivals in the airport of Heraklio, Crete during 2018-2022.

TABLE V: ANNUAL TOURIST ARRIVALS IN BOTH AIRPORTS OF CRETE DURING 2018-2022

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of tourists (in both airports)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>4,525,000</td>
</tr>
<tr>
<td>2019</td>
<td>4,437,000</td>
</tr>
<tr>
<td>2020</td>
<td>1,110,000</td>
</tr>
<tr>
<td>2021</td>
<td>2,785,000</td>
</tr>
<tr>
<td>2022</td>
<td>4,658,000</td>
</tr>
</tbody>
</table>

Sources: Chania Airport (CHQ), (n.d.); Małgorzata Zdunkowska-Gęca, P. G., (n.d.)

Fig. 4. Annual tourist arrivals in the airports of Chania and Heraklio, Crete during 2018-2022.
The tourist arrivals in the airport of Chania in 2022 were higher at 13.19% than the arrivals in the year 2019 before the pandemic while in the airport of Heraklio they were higher at 2.13%. The total tourist arrivals in 2022 in Crete were higher at 4.98% compared to 2019. Therefore, the tourism industry in Crete has fully recovered from the pandemic Covid-19. The changes in the annual tourist arrivals during the Covid-19 pandemic between Greece and Crete are presented in Table VI. Although the tourist arrivals in Crete, Greece had fully recovered by 2022 and they were higher at 4.98% compared to the pre-pandemic levels the tourist arrivals in the country in 2022 are still lower than the pre-crisis arrivals.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>-78.22%</td>
<td>-55.16%</td>
<td>-37.23%</td>
<td>+4.98%</td>
</tr>
<tr>
<td>C</td>
<td>-74.98%</td>
<td>-55.16%</td>
<td>-37.23%</td>
<td>+4.98%</td>
</tr>
</tbody>
</table>

Sources: Statista Research Department (2023); Chania Airport (CHQ) (n.d.); Malgorzata Zdunkowska-Gięca, P. G. (n.d.)

VI. THE EFFECT OF CLIMATE CHANGE ON THE LOCAL TOURISM INDUSTRY

According to various studies climate change will decrease the attractiveness of Mediterranean countries to tourists (Scott, 2008; Nicholls et al., 2008). Although there is high uncertainty regarding the impacts of climate change in the island, it is probable that they will affect all aspects of the local tourism industry. Due to alteration in the local climate thermally comfortable conditions are going to occur earlier in April instead of May and later in October instead of September. It is quite probable that summers in Crete will be similar like to day in red sea, India and Persian Gulf. The traditional “sea and sun” tourism product of the island is going to be less attractive than today. Increase in thermal discomfort during summer will result in higher energy requirements and higher operating costs in hotels and other tourist accommodations. Changes in precipitation patterns and more frequent droughts will result in water shortages requiring new water resources. Higher temperatures, forest fires and more frequent droughts will result in land desertification and in extinction of various species which cannot survive under the new climate conditions. Agriculture is also going to be affected by higher air temperatures. The local agricultural production in Crete will probably decrease making necessary the import of food stuff for tourists’ catering. Higher sea water temperatures are going to favor various invading species which are going to migrate from southern regions to eastern Mediterranean-sea competing with the indigenous species. It is foreseen that climate change will enhance the competitive advantage of central and northern European countries compared to Mediterranean countries for summer holidays (Nicholls et al., 2008). Therefore, a number of tourists who currently visit Greece during the summer will prefer to stay in their countries or to visit other more attractive destinations due to the uncomfortable environmental conditions in Crete. Additionally, climate change will affect island’s infrastructure. It will be necessary to create a climate-resilient infrastructure to cope with future extreme weather events. These events like flooding will be more frequent threatening and causing disasters in the local infrastructure like roads, bridges, electric grid et cetera which are necessary for tourists as well as for the locals. Sea level rise will damage the attractive but vulnerable beaches of the island having high economic impacts to various hotels and tourism resorts which are currently developed near the beach front. This, will require the construction of coastal protection systems including beach stabilization and creation of sea walls. The main impacts of climate change to tourism industry in Crete are presented in Table VII.

TABLE VII: IMPACTS OF CLIMATE CHANGE ON CRETE

- Average annual temperature rise
- More frequent droughts
- More frequent flooding
- More frequent heat waves
- More hot days and nights every year
- Erosion of the sea front and the beaches
- Extinction of several species
- Soil erosion and increase of land desertification
- Increasing risk of forest fires
- Change in precipitation patterns
- Invasion of several species from other climate zones competing with indigenous species
- Less water availability

Source: Author’s own estimations

VII. THE EFFECT OF OVER-TOURISM IN CRETE

The island of Crete together with Cyclades islands, Ionian islands and the South Aegean islands are the four most popular tourism destinations in Greece which during the summer are over-crowded. Tourism density and tourism intensity in Crete are well above the average EU and global values (Vourdoubas, 2020).
The tourism industry in the island has both positive and negative effects to many stakeholders while the positive impacts prevail. It will not be always easy to find a compromise among them to cope with the undesired and harmful consequences of over-tourism. In any case, the transition from over-tourism to sustainable and responsible tourism in Crete is the only viable option for the future in order to avoid its decline. The vulnerability of the insular and coastal ecosystems in the Mediterranean basin necessitates the adoption of better management practices in tourism industry, avoiding undesired and devastating economic, social and environmental impacts. The effects of over-tourism on the fragile natural ecosystems in the island are catastrophic. Many local natural ecosystems of extreme beauty in Crete are threatened from the large number of visitors and the local authorities are limiting the traffic in these locations. Additionally, excess tourism has undesired social consequences to local residents. It is quite probable that the synergistic effects of climate change, over-tourism and a new pandemic like Covid-19 could have devastating impacts on the flourishing tourism industry in Crete threatening the prosperity of the local population. A study on the social and environmental carrying capacity of tourism in Crete indicating the limits of its growth and the ways to increase its resilience is urgently required.

VIII. DISCUSSION

Our research indicates that the tourism industry in Crete has recovered from the coronavirus pandemic in 2022 with reference the tourist arrivals in the island. The recovery was gradual after the sharp reduction of the arrivals in the first year of the pandemic. However, tourist arrivals in Greece have not recovered in 2022 being around 10% less compared to 2019 indicating that the island of Crete is an attractive and popular tourism destination worldwide. However, tourism recovery in Crete has not been combined with the necessary transformations which will increase the resilience of tourism industry allowing it to cope with future shocks and unforeseen crisis. The sharp reduction of tourist arrivals in 2020 was painful to all stakeholders of the local tourism industry as well as to local societies taking into account the importance of tourism industry in the local economy. The main reason for the rapid tourism recovery after the pandemic in Crete seems to be its excellent brand name as an international tourism destination as well as its popularity among visitors globally. Although there are not many published studies regarding tourism recovery in other tourism destinations in Mediterranean region in the post-pandemic era it seems that Crete has outperformed compared with other tourism destinations. Our study uses only data for tourist arrivals to assess the tourism recovery in Crete. However, the use of additional data related with tourism expenses in the island could offer more reliable and elaborate information about tourism recovery in Crete. Further research should be focused on the necessary policies and measures that should be taken in Crete in order to make the local tourism industry less vulnerable and more resilient in future shocks and crisis.

IX. CONCLUSION

The island of Crete, Greece has a flourishing tourism industry which has a major contribution in the regional income and the prosperity of the island. The impacts of coronavirus on the tourism industry in Crete, Greece have been investigated and compared with the corresponding impacts on the tourism industry in Greece during the period 2018-2022. Tourism arrivals in Crete have been sharply decreased by 74.98% in 2020 compared to 2019. They have been partly recovered by 2021 while in 2022 they have exceeded by 4.98% the arrivals in 2019. Tourism arrivals in Greece have been also reduced by 78.22% in 2020 compared to 2019 while in 2022 they were still less at 9.66% compared with the arrivals in 2019. Therefore, the tourism industry in Crete has better performance compared to Greek tourism industry. However, the necessary transformations which are required in order to increase its future resilience and sustainability have not been implemented so far. After the end of the coronavirus crisis the tourism industry in Crete faces new challenges which are related with the problems of climate change and over-tourism. The lessons learnt during the Covid-19 pandemic could be used by the local tourism industry to design and implement the necessary measures and policies in order to reduce its vulnerability and increase its preparedness to cope with future unpredicted and undesired shocks. Although there is not clear evidence regarding the reasons for the quick recovery of the local tourism industry it could be attributed in its excellent brand name as well as in its popularity among international travelers as an exciting and attractive tourism destination which covers the expectations of many target groups of tourists.
REFERENCES


