



The Use of Chat GPT in Assessing the Tourism Industry in the Island of Crete, Greece. A PESTEL Analysis

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ABSTRACT: The tourism industry in Crete, Greece is well developed nowadays hosting an increasing number of visitors every year. However, it is affected from various external factors which might reduce its attractiveness as a popular tourism destination worldwide. PESTEL analysis can facilitate the development of a strategic management plan for the local tourism industry. The PESTEL methodology analyzes the political, economic, social, technological, environmental and legal factors which affect the hospitality industry in the island. Instead of using the opinion of tourism experts and tourism stakeholders the opinion of Chat GPT was used in the current study. The language model responded promptly and rapidly and its answers were further analyzed. Chat GPT identified four to five factors in each PESTEL category affecting the tourism industry in Crete. Its answers were almost similar with the opinion of several stakeholders regarding the external factors influencing the tourism in the island. The results of our study are innovative and useful while they could be used for the development of a strategic management plan for tourism in the island. This is necessary for the promotion of its sustainability and attractiveness as a global tourism destination. Our study could be useful to several stakeholders and policy makers of the tourism industry in the island in order to develop a strategic management plan for the hospitality industry in Crete.

KEYWORDS: Assessment, Chat GPT, Crete-Greece, PESTEL analysis, tourism

1. INTRODUCTION

Crete is located in eastern Mediterranean region being one of the largest islands with a flourishing hospitality industry which contributes significantly in the local economy. However, the local tourism sector faces many challenges such as climate crisis, overtourism, pandemics and the competition from other tourism destinations [1], [2], [3], [4]. PESTEL (Political, Economic, Social, Technological, Environmental, Legal) is one well-known methodological tool assisting organizations in many sectors, including tourism, to make strategic management decisions [5], [6], [7], [8]. It has six pillars which describe the future effects of the external environment on the organization [9], [10]. The use of artificial intelligence (AI) in tourism industry has been studied and its usefulness has been demonstrated [11], [12], [13], [14]. Chat GTP is language model based on AI and it is broadly used during the last two years in many sectors.

Current research aims to assess the tourism industry of Crete with PESTEL methodology using the Chat GPT.

The text is structured as follows: After the literature review, the tourist industry in Crete is shortly outlined. Next, the Chat GPT and its operation is mentioned followed by a description of PESTEL methodology. In the next section Chat GPT is used for the assessment of Crete's tourism industry analyzing the external factors affecting it including political, economic, social, technological, environmental and legal factors. The text ends with discussion of the findings, the conclusions drawn and the citation of the references used.

The present research is innovative due to limited studies in this topic so far while it fills an existing gap regarding the investigation of the external factors affecting the hospitality industry in Crete. The results could be useful to multiple stakeholders of the tourism industry in Crete in order to develop the appropriate strategies for the improvement of the local hospitality sector.

2. LITERATURE SURVEY

The perspectives of overtourism in Crete have been examined [1]. The authors stated that Crete is strongly committed in the implementation of the 2030 agenda for sustainable development balancing economic growth, environmental protection and social cohesion. They also mentioned that the lack of a clear governmental strategy regarding tourism development is one of the main obstacles in the process of developing a competitive ecotourism product in Crete. The phenomenon of overtourism in Crete has



been explored [2]. The author stated that overtourism is a multi-faced problem with severe economic, social and environmental consequences in tourism destinations. He also mentioned that Crete is categorized as an overcrowded tourism destination among EU regions. The carrying capacity of tourism in Crete has been assessed [3]. The authors stated that the environment plays a vital role for the sustainable development of tourism industry. They used environmental and tourism indices to estimate the impacts of tourism on the natural environment in the island. The tourism infrastructure and the environment in Crete have been studied [4]. The authors stated that the concept of carrying capacity in tourism destinations is related with the notion of sustainable tourism development. They also mentioned that the cultural and manmade environment in Crete can sustain a polymorphic and multi-faced tourist product in the island. The tourism industry in Braila County, Romania has been evaluated using PESTEL analysis [5]. The authors stated that PESTEL analysis for tourism in Braila County shows that tourism development is related with stimulating effects in tourism industry and in other branches of the economy that participate in the economic growth process. The role of virtual tourism in the promotion of sustainable traveling using PESTEL analysis has been studied [6]. The authors stated that virtual tourism using the technologies of virtual reality and augmented reality has emerged as a viable solution for mitigating the environmental impacts of traditional traveling. They also mentioned that by reducing the carbon footprint associated with mass tourism and providing alternative experiences to physical travel, virtual tourism has the potential to transform the industry. The PESTEL model has been used to analyze the impacts of Covid-19 on tourism industry in Enshi Prefecture, China [7]. The author recommended some improvements in the local tourism industry including: a) the increasing integration of the local culture, b) the deep knowledge of social dynamics, c) the increasing use of the local natural resources, and d) the increasing use of technological advancements. The implications of external factors in Indonesian tourism using PESTEL analysis have been studied [8]. The authors stated that the tourism sector is important for Indonesia's economic growth. Their research has identified several external factors which should be improved for the increase of the competitiveness of the Indonesian tourism industry. Two tourism destinations, Croatia and Qatar, have been analyzed using the PESTEL methodology [9]. The author mentioned that the results of its analysis could be useful to all stakeholders of hospitality industry in these two countries. The impact of good governance in the promotion of sustainable tourism development in China has been studied [10]. The authors critically reviewed 100 Journal papers. They stated that promotion of good governance offers many benefits in the sustainable tourism development in the country. The usage of Chat GPT in tourism and hospitality industry analyzing the existing literature has been studied [11]. The authors stated that six determinants regarding the use of Chat GPT have been identified including: a) experience quality, b) satisfaction, c) interaction, d) ethics, e) credibility, and f) design features. The effect of generative AI in tourism industry has been investigated [12]. The authors stated that integration of several generative AI technologies to tourism companies can assist the access to information, enhance their travel planning experience and results to more satisfying and memorable journeys. The tourists' acceptance of Chat GPT in providing travel services has been studied [13]. The authors stated that Chat GPT has revolutionized the travel industry. They also mentioned that tourists accessed positively the use of Chat GPT due to its expertise and trustworthiness. The potential of creating tourism marketing material using the Chat GPT has been investigated [14]. The authors stated that tourism marketing material which has been created by Chat GPT passes the Turing test and its quality is well accepted by tourists. They also mentioned that the use of AI enhances the marketing outcomes of tourism. The contribution of local authorities in the development of tourism in Crete has been explored [15]. The author stated that although several activities have been undertaken by local authorities regarding tourism development in the island more efforts are required in the future. He proposed that local authorities should design and implement robust strategies to support tourism development in the island. A report related with the development of sustainable tourism in Greece has been published [16]. The report explores the opportunities and challenges of sustainable tourism in Greece providing guidelines for the promotion of sustainable practices in the country's tourism industry. It states the progress made by stakeholders towards sustainability while it identifies eight key recommendations which would promote the sustainable tourism in Greece. The interrelationships among Chat GPT, tourists' satisfaction and usage intention have been explored [17]. The authors had collected and analyzed questionnaire's responses from 624 tourists. They mentioned that the use of Chat GPT from tourists who plan their holidays is beneficial facilitating them to organize their vacations. The impact of Chat GPT on tourists' trust and travel planning intention focusing on Vietnam has been investigated [18]. The authors stated that integration of advanced language models in the tourism domain empowers travelers with personalized and efficient information. It can also foster a symbiotic relationship that enhances the overall travel experience. The carbon emissions of the tourism industry due to energy use in the island of Crete, Greece have been estimated [19]. The author stated that carbon emissions are due to tourists' arrival and departure, to domestic transportation and to several other activities. He



also mentioned that emissions related with tourists' arrival and departure in Crete have a share, at 80.69%, in total carbon emissions of the local tourism industry. A report related with the development of tourism in Crete has been published [20]. The report mentions useful data regarding the characteristics in the island affecting the development of tourism in Crete. The nexus between agriculture and tourism in Crete has been studied [21]. The author stated that the use of locally produced agricultural products in tourism accommodations in the island would replace the imported low-cost foodstuff consumed currently by tourists. He also mentioned that tourism industry should promote the famous Mediterranean diet in the cuisine of hotels and other tourism accommodations. A PESTEL analysis in the city of Mugla, Turkey has been realized [22]. The research has been carried out with questionnaires distributed in top managers in 3-, 4- and 5-star's hotels in the city. The author mentioned that the most important factors were the legal factors while the least important were related with social factors. The understanding in marketing and management of trails using PESTEL analysis has been explored [23]. The author stated that trails are important resources for local communities offering multiple benefits. Their analysis was performed according to the six categories of PESTEL methodology. PESTEL framework has been used to analyze the Indonesian tourism and travelling business on Instagram [24]. The authors stated that young people prefer to travel than buying goods. Taking into account that Instagram plays an important role in their life, it can be used from tourism businesses in many ways. The business model dynamics in tourism industry has been explored [25]. The author stated that tourism industry is facing constant change after the emergence of the internet and the new information and communication technologies (ICT) technologies. The author proposed a new business model for tourism industry using the business model canvas and the PESTEL framework. The tourism development barriers in Iran using PESTEL analysis have been studied [26]. The author tried to identify and classify the barriers that hamper tourism development in Iran. He mentioned that the main barrier to tourism industry of Iran is the political tensions of the country with other countries. The situation of the tourism industry, during Covid-19 pandemic, in Queensland, Australia using PESTEL methodology has been explored [27]. The authors stated that Australia had a sharp decrease in tourism arrivals due to epidemic Covid-19. They mentioned that Queensland's tourism will gradually recover and will accelerate tourism growth. The use of PESTEL methodology for the management of tourism in the republic of Moldova has been examined [28]. The authors stated that PESTEL model is one of the best-known strategic management tools which is useful for the assessment of tourism development in several countries and tourism destinations. The perspectives of professionals using the Chat GPT have been studied [29]. The authors stated that the use of Chat GPT has advantages such as value creation in tourism enterprises and to customers as well as disadvantages such as lack of human touch and potential data security risks.

3. THE TOURISM INDUSTRY IN CRETE

Crete, the largest of the Greek islands, is renowned for its stunning landscapes, rich history, and vibrant culture, making it a cornerstone of Greece's tourism industry. Nestled in the heart of the Mediterranean, this island boasts an unparalleled blend of natural beauty, ancient heritage, and modern amenities that attract millions of visitors annually. Crete offers an extraordinary diversity of landscapes, from pristine beaches with turquoise waters to rugged mountain ranges and lush valleys. The island is home to renowned beaches such as Elafonissi, Balos, and Vai, which are consistently ranked among the most beautiful in the world. For nature enthusiasts, the Samaria Gorge and the White Mountains provide opportunities for hiking and exploration, showcasing Crete's dramatic topography.

This natural variety serves as a magnet for eco-tourists and adventure seekers, while the mild Mediterranean climate ensures a long tourist season, extending from early spring to late autumn. Crete's emphasis on sustainable tourism initiatives has also helped protect its unique ecosystems while enhancing its appeal to environmentally conscious travelers. Crete's rich history, spanning over 5,000 years, forms another pillar of its thriving tourism industry. As the cradle of the Minoan civilization, the island is dotted with archaeological sites such as the Palace of Knossos and Phaistos, offering a glimpse into Europe's earliest advanced culture. Museums like the Heraklion Archaeological Museum house treasures that narrate the island's storied past.

Beyond ancient history, Crete's Venetian harbors, Ottoman relics, and Byzantine monasteries reflect a cultural mosaic shaped by centuries of foreign influences. The charming old towns of Chania and Rethymno, with their cobblestone streets and preserved architecture, invite visitors to immerse themselves in the island's historical ambiance. Cultural tourism is further enriched by traditional Cretan music, dance, and cuisine. Local festivals and events, such as the Rethymno Renaissance Festival, provide tourists with authentic experiences, celebrating the island's unique identity. Tourism is a cornerstone of Crete's economy, contributing significantly to employment and income for local communities. The industry supports a wide range of sectors, from hospitality and



transportation to agriculture and crafts. Many Cretans are engaged in producing traditional products such as olive oil, wine, and cheese, which find a ready market among visitors seeking souvenirs or an authentic taste of the island. However, the tourism sector is not without challenges. Over-tourism during peak seasons has led to environmental strain and crowding in popular areas, prompting local authorities to adopt measures to balance growth with sustainability. Initiatives such as promoting lesser-known destinations and investing in eco-friendly infrastructure aim to ensure that Crete remains a welcoming destination for future generations.

Crete's tourism industry continues to evolve, adapting to global trends such as digital marketing and the rise of experiential travel. Visitors increasingly seek personalized, immersive experiences, which Crete's rich offerings are well-suited to provide. From wine-tasting tours and cooking classes to agrotourism and adventure sports, the island caters to a diverse array of interests. The tourism industry of the island thrives on the island's unique combination of natural beauty, historical significance, and cultural richness. By balancing growth with sustainability, Crete not only preserves its heritage but also ensures its position as one of the Mediterranean's most beloved destinations. For travelers, a visit to Crete is an unforgettable journey through the ages, surrounded by breathtaking landscapes and warm Cretan hospitality. Several characteristics of Crete and its tourism industry are presented in table 1.

Table 1. Several characteristics of Crete and its tourism industry

Surface of Crete	8,336 Km ²
Length of coastline	1,040 km
Residents in Crete (Census 2021)	617,360 residents
Tourist's beds	more than 270,000
Arrivals in Crete in 2023	6,327,366 tourists
Number of airports for tourists' arrivals	3
Number of seaports for tourists' arrivals	6
%, arrivals in Crete to arrivals in Greece in 2023	17.7 %
Overnight staying of tourists in Crete in 2023	34,342,891 (bed-nights)
%, overnight staying in Crete to overnight staying in Greece in 2023	23.3 %
Average days of staying in Crete in 2023	5.43 days
Tourism density in 2023	4,120 (bed-nights/km ²)
Tourism intensity in 2023	55.63 (Bed-nights/resident)

Source: own estimations

4. THE CHAT GPT AND ITS OPERATION

Chat GPT is an advanced AI language model, designed by OpenAI and powered by deep learning algorithms. Its primary function is to generate human-like text based on the input that receives. It processes the queries, analyzing the context, and providing relevant and coherent responses. Its "brain" consists of a neural network architecture called the Transformer, which is trained on vast amounts of text data from diverse sources. This allows recognition of patterns, understand context, and generate appropriate answers.

The operation of Chat GPT

The operation of Chat GPT includes:

- Input Processing:** When a question is asked, it converts the text into numerical data (tokens) that represent the words or phrases in a way the neural network can understand.
- Context Understanding:** The input is analyzed to understand its meaning, context, and intent. This involves identifying keywords, sentence structure, and any underlying implications or subtleties.
- Knowledge Application:** Patterns and knowledge embedded in its training data are used. The responses are based on correlations and probabilities rather than direct memory, which means that it generates answers using patterns learned during training. For newer or more specific queries, integration of tools like web search to provide up-to-date information are used.
- Output Generation:** The next most likely word or phrase to form a coherent and contextually appropriate response are predicted. This process repeats iteratively until the response is complete.



Limitations of Chat GPT

Striving for accuracy, its training data have a cutoff date (October 2023 for general knowledge). Chat GPT does not possess consciousness or real-world experiences, so its answers are based solely on patterns within its training data or external tools like web search.

Operating Principles

It prioritizes clarity, context-awareness, and ethical considerations aiming to assist users effectively while avoiding misinformation or harmful content.

In essence, Chat GPT functions as a sophisticated tool to augment human capabilities by providing intelligent, context-aware responses in a conversational format. Its design balances linguistic accuracy, technical versatility, and adaptability to ensure helpful interactions.

5. PESTEL Analysis: An Overview, Benefits, Limitations, and Disadvantages

PESTEL framework is a strategic management tool used by organizations to evaluate external factors that could impact their operations, performance, and decision-making. The acronym stands for Political, Economic, Social, Technological, Environmental, and Legal factors. By systematically analyzing these dimensions, organizations can anticipate potential risks and opportunities in their macro-environment, enabling more informed strategic planning.

5.1 Key Components of PESTEL Analysis

The six factors considered in PESTEL analysis include:

a) Political Factors

These include government policies, political stability, tax regulations, trade restrictions, and other factors influenced by the political environment. Examples include changes in government regimes, trade tariffs, or political lobbying.

b) Economic Factors

These cover aspects like inflation, unemployment rates, economic growth, interest rates, and exchange rates

c) Social Factors

Social trends, demographics, consumer behaviors, cultural norms, and lifestyle changes are considered here. For instance, a growing focus on sustainability could influence product development.

c) Technological Factors

Technological advancements, innovation, research and development (R&D) activity, and digital transformation fall into this category. The rise of artificial intelligence or cloud computing are examples of technological factors.

d) Environmental Factors

These involve ecological and environmental aspects such as climate change, carbon footprint, renewable energy trends, and environmental regulations. Companies are increasingly held accountable for their environmental impact.

e) Legal Factors

Legal considerations include employment laws, intellectual property rights, consumer protection laws, and health and safety regulations. For example, stricter data privacy laws may affect how businesses handle customer information.

5.2 Benefits of PESTEL Analysis

a) Holistic Understanding of the Macro-Environment

PESTEL analysis provides a comprehensive view of the external factors influencing an organization. By categorizing information into six domains, it ensures no critical element is overlooked.

b) Improved Strategic Planning

Organizations can use insights from PESTEL analysis to align their strategies with external realities. For example, a company considering global expansion can assess economic and political conditions in target markets.

c) Risk Management

Identifying potential threats in the external environment allows businesses to prepare contingency plans. For instance, anticipating changes in tax laws helps prevent financial surprises.



d) Opportunity Identification

Beyond risks, PESTEL helps highlight growth opportunities, such as emerging markets or technological innovations that could give a competitive edge.

e) Enhanced Decision-Making

Incorporating external factors into decision-making ensures that organizational strategies are grounded in the broader macro-environment.

f) Stakeholder Communication

PESTEL findings can be shared with stakeholders to justify strategic decisions,

5.3 Limitations of PESTEL Analysis

a) Overwhelming Amount of Data

The macro-environment encompasses vast information, making it challenging to filter and focus on the most relevant aspects. Without clear priorities, the analysis can become unfocused.

b) Lack of Depth

While PESTEL highlights external factors, it does not provide detailed solutions or strategies for addressing them. It identifies "what" but not "how."

c) Static Nature

PESTEL analysis is typically a snapshot of a specific point in time. As external conditions rapidly evolve, findings can quickly become outdated, requiring frequent updates.

d) Subjectivity and Bias

The accuracy of a PESTEL analysis depends on the researcher's judgment, which can introduce bias. Overemphasis on certain factors while neglecting others can skew outcomes.

e) Limited Internal Insight

PESTEL focuses solely on external factors and does not account for an organization's internal strengths and weaknesses, which are equally critical in strategic planning.

5.4 Disadvantages of PESTEL Analysis

a) Time-Consuming Process

Gathering data across all six dimensions can be resource-intensive, particularly for small businesses with limited capacity.

b) Ambiguity in Decision-Making

PESTEL identifies external influences but may not always clearly indicate how organizations should act. This ambiguity can complicate decision-making.

c) Lack of Predictive Power

Although it highlights trends, PESTEL analysis does not predict specific outcomes or events. For instance, identifying a potential economic downturn does not specify when or how it will impact operations.

d) Dependence on Quality of Data

The effectiveness of PESTEL relies on the quality and accuracy of the data analyzed. Poor research or unreliable sources can lead to flawed conclusions.

e) Overshadowing Other Analytical Tools

Exclusive reliance on PESTEL can ignore other valuable frameworks like SWOT (Strengths, Weaknesses, Opportunities, and Threats) or Porter's Five Forces, leading to incomplete strategic insights.

PESTEL analysis is a valuable tool for understanding the external environment, equipping organizations with insights for proactive decision-making and strategic alignment. Its comprehensive approach helps in risk identification, opportunity spotting, and effective stakeholder communication. However, it also has limitations, including its static nature, potential for subjectivity, and lack of internal focus. Organizations should use PESTEL in conjunction with other analytical tools to gain a balanced perspective and ensure robust strategic planning. With proper execution and periodic updates, PESTEL analysis can significantly enhance an organization's adaptability and competitiveness in an ever-changing world. The outline of PESTEL analysis is presented in table 2.



Table 2. Outline of PESTEL analysis

Political	Economic	Social	Technological	Environmental	Legal
Government stability	Economic growth	Income distribution	International influence	Environmental restrictions	Regional laws
Tax policy	Inflation	Demography	Technology transfer	Climate change	Court system
Regulation	Monetary policy	Education	R&D initiatives	Energy saving	Health & safety
Infrastructure	Employment rate	Lifestyle factors	Communication channels	Workforce health	Law enforcement

Source: own estimations

6. PESTEL analysis of the tourism industry in Crete using the Chat GPT

Chat GPT was asked several questions related to the political, economic, social, technological, environmental and legal factors affecting the tourism industry in Crete. The answers were analyzed and presented below.

6.1 Political factors

International and national politics affect global tourism and the tourism industry in Crete.

Political stability

The tourism industry in Crete, a key sector of the island's economy, is significantly influenced by various political factors. Greece's political stability is a crucial determinant in attracting international tourists. A stable government ensures reliable public services, safety, and infrastructure, all of which are essential for a thriving tourism sector. Conversely, periods of political instability or unrest, as witnessed during the Greek debt crisis, can deter potential visitors due to perceived risks.

European policies

European Union (EU) policies also play a vital role. Crete benefits from Greece's EU membership through funding for infrastructure development, environmental conservation, and cultural heritage preservation. These investments enhance the island's appeal to tourists. However, EU regulations on taxation and business operations can impact the cost structures of local tourism businesses, influencing pricing strategies and competitiveness.

International relations with EU and non-EU countries

International relations and visa policies are another significant political factor. Crete attracts visitors from non-EU countries, and Greece's foreign policy, along with Schengen visa regulations, affects accessibility for these tourists. Diplomatic relations with neighboring countries, such as Turkey, also influence regional tourism dynamics, including cruise and ferry travel.

National policies in several issues

Local government policies in Crete specifically target the development of sustainable tourism. Measures to regulate over-tourism, protect natural resources, and promote eco-friendly practices reflect broader political commitments to balance economic growth with environmental preservation. For example, zoning laws and regulations for constructing new tourist facilities aim to minimize ecological impact.

Global political issues including wars

Finally, global political issues, such as the war in Ukraine or international sanctions, can indirectly influence Crete's tourism by affecting global travel trends, energy prices, and airline operations. In conclusion, the interplay of domestic stability, EU policies, international relations, and local governance shapes the political landscape affecting Crete's tourism industry. The main political factors affecting the tourism industry in Crete are presented in table 3.

Table 3. Political factors affecting the tourism industry in Crete

1	The political stability in Crete attracts international tourists in the island
2	EU policies regarding environmental conservation and cultural heritage preservation play a vital role in tourists' inflow to Crete



3	EU regulations on taxation and business operations influence pricing strategies and the competitiveness of the Cretan tourism industry
4	International relations affect tourism and Greece’s foreign policy has positive impacts on tourists’ inflow to Crete
5	Diplomatic relations with neighboring countries influence regional tourism dynamics

Source: own estimations

6.2 Economic factors

The tourism industry in Crete is deeply influenced by a range of economic factors, both local and global, that shape its performance and growth. As a primary driver of the island's economy, tourism contributes significantly to employment and revenue generation.

Local Economic Factors

The cost of goods, services, and labor in Crete directly affects the affordability and attractiveness of the island for tourists. Competitive pricing on accommodation, dining, and transportation enhances its appeal, particularly for budget-conscious travelers. However, fluctuations in local inflation can increase costs for tourists and operators alike, potentially impacting demand. Additionally, Crete's reliance on tourism makes it vulnerable to seasonal economic fluctuations, with high revenue during peak seasons and reduced activity during off-peak months.

Global Economic Trends

Global economic conditions, such as recession or economic growth in source markets, significantly impact tourist inflows. For example, economic prosperity in key markets like Germany, the UK, and the USA often correlates with higher visitor numbers, as individuals have more disposable income for travel. Conversely, economic downturns can suppress demand for international tourism.

Exchange Rates

Exchange rate fluctuations also play a crucial role. A weaker Euro relative to other currencies, such as the US Dollar or British Pound, makes Crete a more affordable destination for non-Eurozone tourists, boosting arrivals and spending.

Energy Costs and Transportation

Global fuel prices directly affect transportation costs, including flights, cruises, and car rentals. Rising fuel prices can increase the cost of travel to Crete, potentially deterring visitors. Similarly, the availability and affordability of flights, often influenced by airline competition and fuel costs, are critical to the island’s accessibility.

Infrastructure and Investment

Economic policies and investments in tourism infrastructure, such as airports, ports, and cultural sites, determine Crete's capacity to accommodate tourists. Investments funded by the government or EU grants significantly enhance the island’s tourism appeal. The main economic factors affecting the tourism industry in Crete are presented in table 4.

Table 4. Economic factors affecting the tourism industry in Crete

1	The cost of goods, services and labor in Crete affects the attractiveness of the island to tourists
2	Global economic conditions significantly affect tourist inflows to Crete
3	The fluctuations in exchange rates play a crucial role in the preferences of tourists in the island
4	The global fuel prices affect transportation costs impacting the travelling of tourists to Crete
5	The investments in tourism infrastructure, such as airports, ports, cultural sites et cetera affect tourists’ preferences to Crete

Source: own estimations

6.3 Social factors

Social factors play a significant role in shaping the tourism industry in Crete, influencing both visitor preferences and the island’s capacity to deliver a compelling tourism experience. These factors include cultural heritage, demographic trends, social attitudes, and community involvement.



Cultural Heritage and Identity

Crete's rich cultural heritage is one of its most significant social assets, attracting tourists interested in history, archaeology, and traditions. Landmarks such as the Palace of Knossos and other Minoan sites draw culture-oriented travelers, while festivals celebrating local music, dance, and cuisine further enhance its appeal. The preservation and promotion of these traditions are critical to maintaining Crete's unique identity as a tourism destination.

Demographic Trends

Shifts in global demographics, such as the growing segment of millennial and Gen Z travelers, influence tourism in Crete. These groups tend to prioritize experiences like adventure activities, eco-tourism, and cultural immersion over traditional resort-style vacations. Similarly, the increasing number of retirees seeking relaxing getaways creates demand for luxury accommodations and wellness tourism.

Social Attitudes and Preferences

Tourist preferences are also shaped by broader societal trends, such as a growing focus on sustainability and ethical travel. Visitors increasingly seek eco-friendly destinations and expect operators to minimize environmental and cultural impacts. Crete's efforts to promote sustainable tourism align with this trend, enhancing its appeal to socially conscious travelers.

Community Involvement

The attitude of local communities towards tourism significantly affects the visitor experience. In Crete, the famed hospitality, or "philoxenia," of the Cretan people is a major draw. However, over-tourism can strain resources and lead to community resentment, potentially impacting this positive dynamic.

Health and Safety

Social concerns about health and safety, particularly in the post-pandemic world, have heightened the demand for clean and safe travel environments. Crete's adherence to health protocols has bolstered its reputation as a secure destination. The main social factors affecting the tourism industry in Crete are presented in table 5.

Table 5. Technological factors affecting the tourism industry in Crete

1	The cultural heritage of Crete is the most significant social asset
2	The social demographics influence tourism in Crete
3	Tourist preferences including their focus on sustainability and ethical traveling affect tourism in the island
4	The attitude of local communities towards tourism significantly affects the visitors' experience
5	Social concerns about health and safety affect tourists' preferences. Crete is considered as a safe and healthy destination

Source: own estimations

6.4 Technological factors

Technological factors significantly influence the tourism industry in Crete by shaping how destinations are marketed, services are delivered, and visitors experience their stay. Advancements in technology impact accessibility, efficiency, and customer satisfaction in the sector.

Digital Marketing and Online Platforms

Technology has revolutionized how Crete promotes its tourism offerings. Online platforms such as social media, travel websites, and apps allow local businesses and authorities to reach a global audience. High-quality digital campaigns showcasing Crete's cultural landmarks, natural beauty, and unique experiences have significantly boosted its visibility. Additionally, online reviews and user-generated content on platforms like TripAdvisor heavily influence tourist decision-making.

Booking and Payment Systems

The widespread adoption of online booking systems has streamlined travel planning. Tourists can now easily book flights, accommodations, and activities in Crete through platforms like Expedia or Airbnb. Similarly, digital payment systems, including contactless and mobile payment options, enhance convenience for travelers.



Smart Technology and Experiences

The integration of smart technologies is transforming visitor experiences in Crete. Museums and archaeological sites are increasingly using augmented reality (AR) and virtual reality (VR) to offer interactive tours, allowing visitors to visualize historical settings. Smart city initiatives, such as free public Wi-Fi in tourist hubs, further improve accessibility and visitor satisfaction.

Transportation and Accessibility

Technological advancements in transportation, including real-time tracking of buses and ferries, have made exploring Crete more convenient. Digital navigation tools like Google Maps assist tourists in discovering attractions and navigating the island efficiently.

Sustainability Technologies

Sustainability-focused technologies are also critical, as Crete seeks to balance tourism growth with environmental preservation. Solar energy, waste management systems, and eco-friendly transportation options are being adopted to reduce the ecological footprint of tourism.

Technology drives innovation in Crete's tourism industry, enhancing marketing, convenience, and sustainability while improving the overall visitor experience. The main technological factors affecting the tourism industry in Crete are presented in table 6.

Table 6. Technological factors affecting the tourism industry in Crete

1	Digital marketing and online platforms allow tourism enterprises in Crete to reach a global audience
2	Online booking systems have facilitated travel planning
3	Smart technologies are transforming visitors' experiences in Crete
4	Technology advancements in transportation and accessibility have made exploring Crete more convenient
5	Sustainable technologies are critical allowing the balance of tourism with environmental preservation

Source: own estimations

6.5 Environmental factors

Environmental factors play a pivotal role in shaping the tourism industry in Crete, as the island's natural beauty and ecological assets are central to its appeal. However, these factors also present challenges that require careful management to sustain the sector's growth.

Natural Attractions

Crete's diverse landscapes, including pristine beaches, rugged mountains, and unique ecosystems like the Samaria Gorge, are key draws for tourists. The island's Mediterranean climate, characterized by warm summers and mild winters, further enhances its appeal as a year-round destination. These natural features attract outdoor enthusiasts, hikers, and eco-tourists, contributing significantly to the local economy.

Environmental Degradation

The pressures of mass tourism can lead to environmental degradation, including pollution, habitat destruction, and strain on natural resources like water. Over-tourism in popular areas, such as Elafonissi Beach or Balos Lagoon, threatens delicate ecosystems. Managing these impacts is critical to preserving the island's attractiveness.

Climate Change

Climate change poses significant long-term risks to Crete's tourism. Rising temperatures, coastal erosion, and the increasing frequency of extreme weather events could disrupt tourist activities and damage infrastructure. Sea-level rise may also threaten low-lying coastal areas, which are crucial for beach tourism.

Sustainability Initiatives

Efforts to promote sustainable tourism are gaining momentum in Crete. Local authorities and businesses are investing in eco-friendly practices, such as waste reduction, renewable energy use, and sustainable transport options. Protected areas, including Natura 2000 sites, highlight conservation efforts aimed at preserving biodiversity and natural landscapes.

Seasonal Challenges

Crete's seasonal nature of tourism can strain resources during peak times and leave infrastructure underutilized during the off-season. Balancing these dynamics requires innovative solutions, such as promoting off-peak tourism through cultural and wellness offerings. Crete's tourism industry depends heavily on its natural environment. Sustainable management is essential to mitigate environmental



challenges and ensure the sector's long-term viability. The main environmental factors affecting the tourism industry in Crete are presented in table 7.

Table 7. Environmental factors affecting the tourism industry in Crete

1	The unique natural attractions of Crete have positive impacts on the local tourism industry
2	The environmental degradation in the island has negative impacts on the local tourism industry
3	Climate crisis poses significant undesired and harmful impacts on the local tourism industry
4	Promotion of sustainable tourism from the local and regional authorities in the island has positive impacts on the Cretan tourism industry

Source: own estimations

6.6 Legal factors

Legal factors significantly impact the tourism industry in Crete, influencing its regulatory framework, operational standards, and overall sustainability. These factors encompass international, national, and local laws that govern the sector.

Tourism Regulations

National and EU regulations play a key role in shaping the tourism landscape in Crete. Laws governing hotel classifications, licensing, and safety standards ensure the quality and reliability of tourism services. Compliance with these regulations is essential for operators to remain competitive and attract international visitors.

Environmental Legislation

Environmental laws have a direct effect on tourism activities in Crete. Regulations aimed at protecting natural resources, such as the Natura 2000 network, restrict development in ecologically sensitive areas. These laws ensure the conservation of Crete's natural beauty, which is vital to its tourism appeal. However, they also limit the expansion of tourism infrastructure in certain areas.

Employment and Labor Laws

The tourism sector in Crete is a major employer, and labor laws ensure fair wages, working conditions, and rights for workers. Seasonal employment, common in the tourism industry, is governed by specific legal provisions to protect temporary workers.

Health and Safety Regulations

Legal standards related to health and safety are particularly critical in the wake of the COVID-19 pandemic. Regulations on sanitation, social distancing, and capacity limits in tourist facilities aim to safeguard public health while maintaining visitor confidence.

Consumer Protection

Laws protecting tourists' rights, including clear pricing, refund policies, and the provision of accurate information, foster trust in the destination. EU consumer protection regulations ensure that tourists from member states enjoy a consistent and secure experience.

Legal Challenges

Issues such as illegal vacation rentals or unregulated tour operators pose challenges to the formal sector. Stricter enforcement of laws is necessary to address these concerns.

A robust legal framework ensures that tourism in Crete operates efficiently, sustainably, and fairly, benefiting both visitors and local communities. The main legal factors affecting the tourism industry in Crete are presented in table 8.

Table 8. Legal factors affecting the tourism industry in Crete

1	National and EU regulations affect the tourism industry in Crete
2	Environmental legislation has a direct effect on tourism industry
3	Employment and labor laws affect the tourism industry in Crete
4	Health and safety regulations affect the Cretan tourism industry
5	National and EU regulations related to consumers protection affect the tourism industry in Crete

Source: own estimations



7. DISCUSSION

The assessment of tourism industry in Crete using PESTEL methodology has been realized with the assistance of Chat GPT. PESTEL methodology describes the external factors affecting the tourism industry in the island. The use of Chat GPT for assessing the political, economic, social, technological, environmental and legal factors affecting Crete's tourism industry is not costly while it was able to analyze these factors in short time compared with the traditional method of taking the opinion and the view of several stakeholders of the local tourism industry. However, several issues, like the effect of climate crisis on local tourism, require further analysis and clarifications.

The results of the present study indicate that new policies should be developed in Crete to cope with the challenges and weaknesses of the local tourism in the near future. Further analysis might find additional factors which influence the local tourism industry and have not identified from AI.

The present study is qualitative and the results depend on the questions asked Chat GTP. The answers could be slightly different if different questions were asked. Taking into account that the language model has not been trained with recent data and information the answers might lack accuracy and require further elaboration. A drawback of PESTEL methodology is the fact that it does not prioritize the important factors which should be treated urgently.

Additional research should be focused on PESTEL analysis of the local tourism industry which should be made by several tourism experts and stakeholders. Their results should be compared with the present results made by AI.

8. CONCLUSIONS

The assessment of the tourism industry in Crete according to PESTEL methodology has been made with the help of Chat GPT which is already used in several sectors. With PESTEL analysis and with support from AI several political (5), economic (5), social (5), technological (5), environmental (4), and social (5) factors which affect the tourism industry in the island have been identified. Taking into account the influence of these external factors, a strategic management plan for tourism in the island should be developed. The identified, in the present study, 29 external factors affecting the local tourism industry could be useful to policy makers in Crete as well as to all tourism stakeholders who should develop a robust strategic management plan for the local tourism in the future. Based on the results of our study the local authorities should take proactive measures to avoid the harmful impacts, which might be caused from various external factors, on the flourishing tourism industry in Crete. The analysis made by Chat GPT was precise, low-cost, rapid and almost similar with the opinion of several tourism experts in Crete. Our positive experience using the Chat GPT indicates that AI could be useful in the travel and tourism industry in the future offering valuable benefits. However, the current results obtained with Chat GPT should be further analyzed by experts in hospitality industry in order to achieve the best results combining AI with the human brain.

REFERENCES

1. Saatsakis, I., Bakir, A. and Wickens, E. A local perspective on ecotourism in Crete, *Journal of Tourism and Hospitality*, 2(1), 2018, pp. 34-41. Retrieved from: <https://ontourism.academy/journal/index.php/jots/article/view/42>
2. Vourdoubas, J. An appraisal of overtourism on the island of Crete, Greece, *International Journal of Global Sustainability*, 4(1), 2020, pp. 63-77. doi:10.5296/ijgs.v4i1.17224
3. Tselentis, B.S., Prokopiou, D.G., Gyalitakis, Em. and Bouga, D. Tourism carrying capacity assessment and environment: the case of Crete, *WIT Transactions on Ecology and the Environment*, 144, 2011, pp. 177-189. doi:10.2495/ECO110161
4. Sustainable Tourism in Greece. INSETE, Considerate Group. 2023. Available at: https://insete.gr/wp-content/uploads/2023/11/23-11_Sustainable_Tourism_in_Greece_EN.pdf
5. Niculae, V. & Spanu, S. PESTEL analysis applied in tourism evaluation in Braila County, *Revista Economica*, 71(3), 2019, pp. 54-68. Retrieved from: <https://ideas.repec.org/a/blg/reveco/v71y2019i3p54-68.html>
6. Karadzhev, V. & Yuleva-Chuchulayna, R. The role of virtual tourism in promoting sustainable travel. Balancing technology, environmental impact and management strategies. A PESTEL analysis, *Yearbook of the College of Tourism, Blagoevgrad*, Year 3, Issue 3. 2024. Retrieved from: https://www.academia.edu/125600872/The_Role_of_Virtual_Tourism_in_Promoting_Sustainable_Travel_A_PESTEL_Analysis



7. Xiang, M. Using the PESTEL model to analyze the impact of the normalized epidemic on Enshi's tourism industry, *Tourism Management and Technology Economy*, 2022, pp. 119-126. DOI: 10.23977/tmte.2022.050219.
8. Berliandaldo, M., Holman Fasa, A.W., Prasetyo, A. & Kesuma, N.J. The implications of external factors on Indonesian Tourism Human resources resilience using PESTEL analysis: A preliminary mapping, *Proceedings of International Conference on Manpower and Sustainable Development*, 1, 2022, pp. 237-247. Retrieved from: <https://jurnal.polteknaker.ac.id/index.php/imside/article/view/71>
9. [9] Gregoric, M. PESTEL analysis of tourism destinations in the perspective of business tourism (MICE), *Tourism and Hospitality Industry 2014*, In the 22nd International Congress, *Tourism & Hospitality Industry 2014*, Trends in Tourism and Hospitality Management, Hrvatska, Opatija, 08-09, May, 2014, pp. 551-565. Retrieved from: <https://econpapers.repec.org/paper/thoiscthi/confpap01.htm>
10. [10] Bhuiyan, M.A., Zhang, Q., Xuan, W., Rahman, M.K. & Khare, V. Does good governance promote sustainable tourism? A systematic review of PESTEL analysis, *SN Business & Economics*. 2023. <https://doi.org/10.1007/s43546-022-00408-x>.
11. [11] Sokmen, A., Arici, H.E. & Caliskan, G. Determinants of the usage of Chat GPT in the tourism and hospitality industry: A model proposal from the technology acceptance perspective, *Journal of Tourism and Gastronomy Studies*, 12(1), 2024, pp. 626-644. DOI: 10.21325/jotags.2024.1398
12. Ilieva, G., Yankova, T. & Klisarova-Belcheva, S. Effects of Generative AI in Tourism Industry, *Information*, 15, 2024, 671. <https://doi.org/10.3390/info15110671>
13. Xu, H., Law, R., Lovett, J., Ming Luo, J. & Liu, L. Tourist acceptance of ChatGPT in travel services: the mediating role of parasocial interaction, *Journal of Travel & Tourism Marketing*, 41(7), 2024, pp. 955-972. DOI: 10.1080/10548408.2024.2364336
14. Zhang, Y. & Prebensen, N.K. Co-creating with Chat GPT for tourism marketing materials, *Annals of Tourism Research Empirical Insights*, 5(1), 2024, 100124. <https://doi.org/10.1016/j.annale.2024.100124>
15. Andriotis, K. Local authorities in Crete and the development of tourism, *The Journal of Tourism Studies*, 13(2), 2002, pp. 53-62. <https://hdl.handle.net/20.500.14279/2106>
16. Mavridoglou, G., Giantsi, Th., Tselentis, B., Anagnostelos, K. & Prokopiou, D. Tourism infrastructure, health and environment for the island of Crete, *WIT Transactions on Ecology and the Environment*, 241, 2020, pp. 3-14. doi:10.2495/SDP200011
17. Ayad, T.H. & Elsayed, R.M. Predicting the interrelationships among Chat GPT, tourist's satisfaction and usage intention: Moderating role of traditional tour operator services, *Journal of Infrastructure, Policy and Development*, 8(6), 2024, 4183. <https://doi.org/10.24294/jipd.v8i6.4183>
18. Vu, Q.N., Vu, M.H.T. & Tran, D.A. The impact of Chat GPT on tourists' trust and travel planning intention: International researches and current situation in Vietnam, *International Journal of Multidisciplinary Research and Analysis*, 7(2), 2024, pp. 2643-9875. <https://doi.org/10.47191/ijmra/v7-i02-12>
19. Vourdoubas, J. Estimation of carbon emissions due to tourism in the island of Crete, Greece, *Journal of Tourism and Hospitality Management*, 7(2), 2019, pp. 24-32. DOI: 10.15640/jthm.v7n2a3
20. Building Regional Actions for New Developments in Tourism, 2017, Region of Crete, BRANDTour Project, Interreg Europe. Retrieved from: https://projects2014-2020.interregeurope.eu/fileadmin/user_upload/tx_tevprojects/library/file_1508251948.pdf
21. Vourdoubas, J. The nexus between agriculture and tourism in the island of Crete, Greece, *Journal of Agricultural Studies*, 8(2), 2020, pp. 393-406. doi:10.5296/jas.v8i2.16602
22. Kara, E. A contemporary approach for strategic management in tourism sector: PESTEL analysis on the city of Mugla, Turkey, *Journal of Business Research Turk*, 10(2), 2018, pp. 598-608. DOI: 10.20491/isarder.2018.446. DOI: 10.20491/isarder.2018.446.
23. Fosher, Holly. Understanding the Marketing and Management of trails using PESTEL Analysis. 2018, Master's Theses and Capstones, 1183. <https://scholars.unh.edu/thesis/1183>.



24. Paramadita, S., Sasongko, A.H. & Candra, S. Using PESTEL framework to analyze user-generated content usage on social media: The case of Indonesian tourism and travelling business on Instagram, WoMELA-GG, January 26-28, 2019, Medan Indonesia. DOI 10.4108/eai.26-1-2019.2283139
25. Henne, J. Business model dynamics in the tourism industry, Bachelor Thesis. 2024, University of Twente, BMS: Behavioral Management and Social Sciences, <https://purl.utwente.nl/essays/65327>
26. Raad, N.G. A strategic approach to tourism development barriers in Iran, Journal of Tourism and Hospitality, 8(3), 410, 2019, pp. 1-8. <http://dx.doi.org/10.35248/2167-0269.19.8.410>.
27. Yang, Z. Current situation of the tourism in Queensland, Australia under the epidemic based on PESTEL analysis, Proceedings of the 4th Management Science Information and Economic Innovation Development Conference MSIEID 2022, December 9-11, 2022, Chongqing, China. <https://eudl.eu/proceedings/MSIEID/2022>
28. Nicolae, P. Use of the PESTEL model in the management of the tourism branch of the republic of Moldova, Ovidius University Annals, Economic Sciences Series, 18(1), 2018, pp. 370-375. Retrieved from: <https://ideas.repec.org/a/ovi/oviste/vxviii2018i1p370-375.html>
29. Demir, Ş.Ş. and Demir, M. Professionals' perspectives on Chat GPT in the tourism industry: Does it inspire awe or concern? Journal of Tourism Theory and Research, 9(2), 2023, pp. 61-76. <https://doi.org/10.24288/jtr.1313481>

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