

The Impact of Climate Changes on Environmental Conservation in Coastal Tourism and Beach Resort

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Abstract: Coastal tourism and beach resorts are considered the most vulnerable tourism activities to climate change. This paper seeks to achieve two objectives: first, to examine climate change's impact on the value of tourists' experience in coastal tourism and beach resorts; Secondly, to identify the adaptation strategies applied to coastal tourism and beach resort hotels to reduce the negative effects of climate changes. A quantitative approach was adopted in this research to test the study hypotheses. Hurghada was selected as a case study. A convenience sample technique was chosen in this research to collect data from visitors of coastal tourism and beach resort hotel guests. A total of 250 questionnaires were distributed, and only 175 were returned and valid for analysis with a response rate of 70%. The findings showed that coastal tourism and beach resort hotels on the Red Sea are highly vulnerable to potential climate change risks such as floods, rising sea levels and rising temperatures. Also, the findings showed that climate changes negatively affect coastal tourism and beach resort hotels, affecting the value of the tourist experience. In addition, the results indicated that coastal tourism and beach resort hotels on the Red Sea coast in Hurghada are exposed to significant financial losses due to the threats of climate change. Beach resort hotels must be able to adapt to climate changes and mitigate their effects.

Keywords: climate changes, environmental conservation, tourist experience value, adaptation strategy, coastal tourism, resort, hotels

1. Introduction

Red Sea coast, specifically the city of Hurghada, is important worldwide. The world's attention is directed to climate change, especially the Red Sea coast, as the state undertakes regional development plans (Bosworth et al. 2020). This is due to its great role in attracting many tourists (Atzori et al. 2018). The Red Sea coast is an important tourist area, as it is considered a unique environment and one of the most diverse tourist places (El-Metwally et al. 2019). The length of the Red Sea is 1,930 km; therefore, its environmental and natural resources support the economy (Fahmy et al. 2016). In addition, coastal tourism is considered the driving force for sustainable tourism development (El-Masry et al. 2022). Despite the great importance of coastal tourism, climate changes cast a shadow on the tourism industry because it is considered one of the countries that will be exposed to climate changes represented by the rise in water temperature, which causes a rise in water levels in the seas, which puts coastal areas at risk (Namdar et al. 2021). In recent decades, the economic importance of coastal tourism has emerged, as it is considered one of the most developed industries in the world (Abou Kamar et al. 2023). Despite this, it is considered the industry most affected by potential climate changes.



Coastal tourism and resort hotels are closely linked to environmental and natural resources such as beaches, seas, and weather, and all of them are affected by climate change (El-Masry et al. 2022). The World Tourism Organization (WTO) believes that climate change is considered the greatest challenge to tourism development anywhere in the world because climate change has extremely serious effects on tourism activities, such as the decline of drinking water, drought, sea level rise, and property damage (Abou Kamar et al. 2023).

Not surprisingly, tourism and hospitality influence the climate and are also affected by climate change (Proebstl-Haider et al. 2021, Khairy et al. 2023). The impact of climate change is evident, such as a rise in temperature and an increase in various emissions (El-Masry et al. 2022). This warming is accompanied by increased heat stress (longer and more intense heat waves) and frequent severe drought events due to increased evaporation (Sharaan et al. 2022). Not only must there be measures to protect the climate from the various impacts resulting from various activities, which will lead to heavy rains, floods and thunderstorms, which will affect tourism activities (Hoogendoorn & Fitchett 2018). Tourism and hospitality activities caused by tourists' arrival and departure lead to increased greenhouse gas emissions, including accommodation, food and beverage services and transportation (Proebstl-Haider et al. 2021). Moreover, climate changes directly impact coastal tourism and resort hotels, so there must be strategies to deal with and adapt to these potential risks (Su et al. 2013). However, a paucity of studies explore the extent to which coastal tourism and resort hotels are prepared for climate change (Atzori et al. 2018). Until now, resort hotels and coastal tourism have not devoted much attention to the risks that will occur due to climate change (Abou Kamar et al. 2023). Also, adaptation strategies should be developed to reduce the negative effects of these changes on tourism activity (Scott 2011). To fill knowledge gap, this paper seeks to achieve two objectives:

- to examine the impact of climate changes on the tourists' experience value in coastal tourism and beach resort hotels,
- to identify the adaptation strategies applied to coastal tourism and beach resort hotels to reduce the negative effects of climate change.

Consequently, this study contributes to theory, it is considered one of the first studies that addressed the effects of climate change on coastal tourism and beach resort hotels on the Red Sea coast.

2. Literature Review

2.1. Climate change and coastal tourism

2.1.1. Influence of climate change on water temperature

Climate changes have a major impact, with temperature rising and heavy rainfall affecting tourism activity (Scott et al. 2019). As greenhouse gas concentrations rise, Earth's surface temperature rises. The last decade, 2011-2020, was the warmest on record. Since the 1980s, each decade has been warmer than the previous. Almost all land areas are experiencing more hot days and heat waves. High temperatures increase heat-related illnesses and make working outdoors more difficult. Forest fires ignite more easily and spread more quickly when conditions are hotter. Temperatures in the Arctic have risen at least twice as fast as the global average. As well as destructive storms are becoming more intense and frequent in many areas (Sharaan et al. 2022). As temperatures rise, more moisture evaporates, exacerbating heavy rainfall and flooding and thus causing more destructive storms (Gössling & Lund-Durlacher 2021). The frequency and extent of tropical storms are also affected by rising ocean temperatures, as hurricanes, hurricanes, and tropical cyclones intensify due to warm water on the ocean's surface. Such storms often destroy homes and communities, causing deaths and massive economic losses (Sebaey & Eyada 2022).

2.1.2. Influence of climate change on the attractiveness and infrastructure of the landscape

Climate change has an impact on the nature and attractiveness of tourist destinations. Climate changes affect infrastructure, including landslides, coastal erosion, and snow melting (Fahmy et al. 2016). As well as the potential effects of climate change include the decline of glacial areas due to global warming (Bristow & Jenkins 2018). In addition to the rainfall and thunderstorms that affect the tourist infrastructure, and as a result, beach areas will lose their attractiveness (Gühnemann et al. 2021). Consequently, climate change is changing water availability, making it scarcer in more areas. Global warming exacerbates water shortages in water-poor areas, increases drought risks for agriculture, and thus affects crops, and environmental drought increases the vulnerability of ecosystems (Proebstl-Haider et al. 2021). Drought can also spark devastating sand and dust storms that can transport billions of tons of sand across continents. Deserts are also expanding, reducing the land available for growing food. Many people now face the risk of not getting enough water regularly (Fitchett 2021).

2.1.3. Influence of climate change on the health risks

Climate change has a major impact on changing the year's seasons and will, therefore, greatly affect the health of tourists and guests (Pröbstl-Haider et al. 2021). Also, it helps improve environmental conditions to increase the spread of pathogens transmitted by mosquitoes and insects, as well as rising of air temperatures leading to ozone and air pollution (Gühnemann et al. 2021). Climate change is the biggest health threat facing humanity. Climate impacts are already harming health through air pollution, disease, extreme weather events, forced displacement, pressures on mental health, and increased hunger and malnutrition in places where people cannot grow crops or find enough food (Gühnemann et al. 2021). Changing weather patterns spread disease, and extreme weather events increase deaths and make it difficult for healthcare systems to keep up (Fitchett 2021).

2.1.4. Influence of climate change on the recreational activities

The study of Ruddy and Scott (2010) indicated that climate change significantly impacts recreational activities, which are the main goal of visiting a tourist destination and are considered one of the most important elements of attraction for tourists, such as hiking on the beach. Climate changes resulting from high temperatures and severe thunderstorms represent a great danger to the lives of tourists (Amelung & Moreno 2012). Also, climate change, represented by rising and falling water levels, negatively affects tourist activities such as diving, surfing, canoeing, and fishing (Falk 2015). In addition, climate change is likely to significantly impact holiday fishing activity because higher water temperatures affect the oxygen content of the water, and higher water temperatures also affect fish survival, migration, and reproduction (Fitchett 2021).

2.2. Climate change and beach resort hotels

Actually, the interest in climate's impact on tourism began in the 1990s, although several studies on the relationship between tourism/hospitality and climate began in the 1960s (Scott et al. 2005). Climate change is important in attracting officials and decision-makers attention in tourism and hotel institutions (Saarinen & Tervo 2006, Olkiewicz 2023). The study of (Abou Kamar et al. 2023) showed a relationship between tourism and climate; tourism activities are affected by climate, and tourism activities also affect climate change. On the other hand, hotel activities contribute a large proportion to carbon dioxide emissions, which has exacerbated global climate change (Simpson et al. 2008). In addition, in 2008, tourism affected climate change by 5% due to global warming and the rise in the carbon footprint of tourism worldwide from 2009 to 2013 (Lenzen et al. 2018).

Moreover, climate change directly or indirectly affects tourism, represented by rising temperatures, drought, floods, hurricanes, rising water levels, disturbance of biodiversity, and decreased attractiveness of tourist destinations (Knowles & Scott 2021). Hotel activity does not differ much from other tourism activities. The intensive use of energy leads to an increase in carbon emissions, representing 21% of the total emissions of the tourism industry, which significantly impacts climate change (Simpson et al. 2008). Moreover, the rapid development of hotels is expected to increase their carbon emissions (Abou Kamar et al. 2023). Therefore, climate change negatively impacts hotels' performance, profitability and competitiveness (Leyva & Parra 2021). Hotels are intensive in investment, human resources, management, and operations, and thus there is great difficulty in responding to climate change (Becken & Wilson 2016). Despite this, scientific studies and research have focused on the social responsibility of hotels with regard to the environment and society (Leyva & Parra 2021). Some studies also addressed the determinants of energy use in hotels (Bohdanowicz 2006), the assessment of carbon emissions (Hu et al. 2015), the use of renewable energy sources in hotels and the effects of climate change on hotel activity (Best & Thapa 2013).

Hotels are adopting initiatives to increase environmental awareness and implement environmentally friendly practices (Bohdanowicz 2006, Agina et al. 2017). In addition, it is important to follow sustainability practices and green marketing strategies (Best & Thapa 2013). Some hotels have moved towards environmental and green hotels to reduce the hotel industry's negative impacts on climate change (Abou Kamar et al. 2023).

2.3. Tourists experience value and climate change

Tourists' perceived value and their level of satisfaction with tourism and hotel services are among the most important components of tourists' experience, as they are used as measures of the success or failure of tourism and hotel services (Coghlan 2012, Alsetoohy et al. 2022). Therefore, tourists' perceived value of the overall travel experience is represented by the quality of services and price (Han et al. 2016). Therefore, it is considered an additional determinant of the environmentally responsible behaviour of tourists and plays an important role in preserving the environment and protected areas (Buzinde et al. 2010, Chiu et al. 2014, Elshaer et al. 2022). Additionally, Lee and Jan (2015) reported that tourists' positive experiences that expose them to the natural environment improve tourists' understanding of nature, which may increase environmentally responsible behaviour. The study of (Han et al. 2016, Ahmed et al. 2023) suggests that a good experience helps tourists

develop a value for their travel experience and a higher level of satisfaction, both of which influence tourists' environmentally responsible behaviour in nature-based tourism destinations.

Consequently, climate changes significantly impact the value of the tourist experience and pose multiple risks to tourist destinations (Gössling & Lund-Durlacher 2021). The increasing erosion of the beach surface due to sea level rise and the increased energy of seawater hitting the coastline reduces the competitiveness of tourist destinations (Knowles & Scott 2021). Potential climate changes affect different types of marine and terrestrial environments (Pröbstl-Haider et al. 2021). In addition, the potential risks of both heat stress and changes in susceptibility to emerging diseases affect the comfort and health of guests (Leyva & Parra 2021). Climate change is a major threat to tourist destinations as well as the infrastructure and services in tourist destinations (Scott et al. 2019). Previous studies have indicated that rising temperatures, droughts, floods and storms severely impact biodiversity, society and infrastructure due to their direct destructive impacts (Gühne-mann et al. 2021). Other climate risks, such as increases in average temperatures, changes in rainfall and wind patterns, and sea level rise, have a significant impact on ecosystems and thus have an impact on the value of the tourism experience (Arabadzhyan et al. 2021, Basok et al. 2021).

2.4. Climate change and adaptation strategies

Climate change is defined as a process of disruption that occurs in climatic conditions, such as temperature, wind, and rainfall, that is characteristic of every place on the planet's surface (Pröbstl-Haider et al. 2021). On the other hand, climate change is defined as detectable changes in climate, according to statistical analysis, that continue for long periods or decades, whether these climate changes result from natural fluctuations or human activities (Abou Kamar et al. 2023). In addition, recurring long-term climate changes have serious consequences for ecosystems (Scott et al. 2019). Rising temperatures will also lead to changes in weather types, such as wind patterns and rainfall, in addition to the occurrence of many potential extreme weather events. This will lead to environmental, social and economic problems (Vijayavenkataraman et al. 2012, Boyacı et al. 2023). On the other hand, the expected effects of climate change are divided into effects that have not been felt, such as sea level rise and temperature. Secondly, impacts that were not felt, such as heavy rain, drought, saltwater intrusion, and storms (Nassar et al. 2018). These climate changes are considered devastating, as they lead to erosion of beaches and the destruction of tourism activities. Therefore, tourism and hotel institutions must develop strategies to adapt to these changes (Refaat et al. 2016).

The study conducted by Abou Kamar et al. (2023) indicated that the process of climate adaptation refers to adaptation to the current situation and expected climate impacts through modifications to environmental and cultural systems in response to climate changes. Therefore, plans must be implemented to mitigate potential disturbances or take advantage of climate change-related benefits (Lenzen et al. 2018). On the other hand, some literature reviews indicated that climate change in the Caribbean region will increase sea levels by one meter, destroying 29% of beach resorts (Scott 2011).

Adaptation practices to climate change in tourist resorts are divided into structural and behavioural measures. Structural adaptation measures include infrastructure safety, water and energy savings, waste management, and noise and pollutant reduction (Parsons et al. 2018). Behavioural adaptation measures refer to raising the awareness of guests and tourists about climate change, protecting marine organisms, and evacuation plans in case of emergency (Agina 2020, Abou Kamar et al. 2023). Moreover, Weaver (2011) and Agina & Abdelhakim (2021) believes that tourism and hotel establishments must adopt strategies to adapt to climate change in order to achieve real and tangible benefits in the short term. In addition, these establishments must pay attention to sustainability, such as maintaining air quality and protecting biodiversity. Consequently, three main dimensions affect adaptation strategies to climate change: physical, technological, and economic environmental (Barnett et al. 2013). Until now, previous studies have indicated that most of the research on climate change and its threats is directed only to developed countries. However, there is a need for more research and studies related to climate change and its impact on the tourism sector in African countries (Hoogendoorn & Fitchett 2018).

In the context of Red Sea, the study of Sharaan et al. (2022) reported that the governments have developed some strategies to adapt to climate changes in coastal areas, namely building sea walls, artificial dunes, and sand mats to trap sand. In addition, the governments have implemented some defence initiatives such as fish farming using new technologies, draining coastal lagoons, and maintaining and developing coastal roads (Abou Kamar et al. 2023).

3. Conceptual Framework and Hypotheses Development

The research conceptual framework illustrates the research variables (see Figure 1). It shows that there is a relationship between the climate change variables (increased temperature, loss of landscape attractiveness & infrastructure, reduced recreational activities, sea level rise, health risks) and tourist experience value in coastal tourism and resort hotels. It also shows the relationship between adaptation strategies and tourist experience value. This research developed and tested the following hypotheses;

1. Climate change (increased temperature) will positively influence the value of the tourist experience.
2. Climate change (loss of landscape attractiveness & infrastructure) will positively influence tourist experience value.
3. Climate change (reduced recreational activities) will positively influence the value of the tourist experience.
4. Climate change (sea-level rise) will positively influence the value of the tourist experience.
5. Climate change (health risks) will positively influence the value of the tourist experience.
6. Adaptation strategies will positively influence the value of the tourist experience.

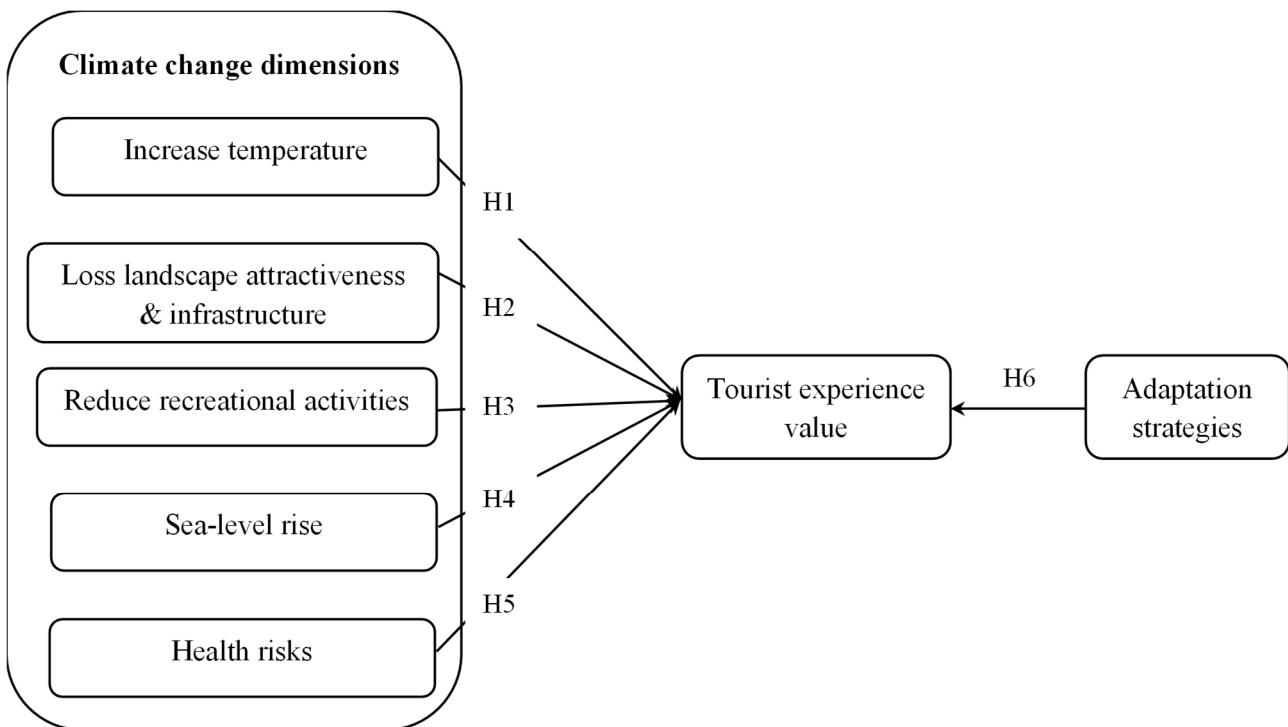


Fig. 1. Research model of climate changes and tourist experience value

4. Research Methodology

4.1. Data collection

A quantitative approach was adopted in this research to test the study hypotheses. Data was collected by distributing a questionnaire to examine the impact of climate changes on the tourists' experience value in coastal tourism and beach resort hotels in particularly Hurghada City and to identify the adaptation strategies applied to coastal tourism and resort hotels to reduce the negative effects of climate changes. The research selected Hurghada as a case study because it is considered a global tourist destination that attracts many tourists from different countries. The city of Hurghada is located on the western side of the Red Sea Riviera, and it is a beach resort that extends for 40 kilometres along the Red Sea coast. It is also the second largest city on the Red Sea and is famous for its beautiful natural scenery (Ibrahim 2022). A convenience sample technique was chosen for this research to collect data from visitors of coastal tourism and resort hotel guests in Hurghada. A total of 250 questionnaires were distributed, and only 175 were returned and valid for analysis with a response rate of 70%.

4.2. Measurement development

A pilot study was conducted among 30 visitors to ensure the reliability of the initial questionnaire and to explore any misunderstandings among respondents regarding the wording of attributes or the length of the questionnaire. The questionnaire involved 4 sections, including respondents' demographic profiles, the effect

of climate change on coastal and resort hotels (10 items), tourist experience value (12 items), and climate change and adaptation strategies (15 items). The questionnaire items were developed and validated from the literature reviews (see Table 1). A Five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree for all the questionnaire items was used to measure the level of the constructs.

Table 1. The measurements of research variables

Variables	Items	Authors
Effect of climate change on coastal and resort hotels	10 items	Arabadzhyan et al. (2021), Proebstl-Haider et al. (2021), Sebaey & Eyada, (2022)
Tourist experience value	12 items	Han et al. (2016), Arabadzhyan et al. (2021), El-Masry et al. (2022)
Climate change and adaptation strategies	15 items	Proebstl-Haider et al. (2021), Sebaey & Eyada (2022), Abou Kamar et al. (2023)

4.3. Data analysis

The study data were analysed using the SPSS AMOS 21 software program. In addition, validity and reliability analysis was conducted, and the study hypotheses were tested. Confirmatory Factor Analysis (CFA) was conducted to verify the appropriateness of all measurements. As well as, composite reliability (CR) was used for testing the internal reliability, and Average Variance Extracted (AVE) was used as indicators of the convergent validity for the internal construct.

5. Results

5.1. Descriptive analysis

The results of the respondents' profiles in Table (2) showed that, of the 175 tourists, 100 (57.1%) were males where and 75 (42.9%) were females. In terms of age, most participants ranged from 26-35 years old, presenting 40%, followed by a age group 36-45 years, presenting 25.7%. The lowest age groups were 18-25 years and 46-55 years, presenting 20% and 14.3% respectively. In terms of educational level, (40.6%) of the participant's higher education, postgraduate (36.5%), and secondary (22.9%).

Table 2. Profiles of respondents (n = 175)

Variable	Category	Frequency (s)	Percentage (%)
Gender	Male	100	57.1
	Female	75	42.9
Age	18-25	35	20.0
	26-35	70	40.0
	36-45	45	25.7
	46-55	25	14.3
Education level	Secondary	40	22.9
	Higher education	71	40.6
	Postgraduate	64	36.5

Table 3. Descriptive Analysis of Mean, Standard Deviation and Correlations

	Model Variables	Mean	SD	1	2	3
1	Effect of climate change on coastal tourism & resort hotels (ECC)	4.01	0.782	1		
2	Tourist experience value (TEV)	4.05	0.821	0.74**	1	
3	Climate change & adaptation strategy (CCAS)	4.10	0.710		0.94**	1

Note: ** (P < 0.001) the correlation coefficient

The results in Table (3) showed that the mean scores for the study variables ranged from 4.01 to 4.10 and standard deviations ranged from 0.710 to 0.821, displaying a reasonable level of variability. The results mentioned that climate change & adaptation strategy achieved the highest mean value (4.10), followed by tourist experience value (4.05), and the lowest mean value of the effect of climate change on coastal tourism & resort hotels was 4.01. Additionally, the correlation analysis for these variables showed well-accepted convergent validity.

5.2. Structural Equation Model measurement

The finding showed that the internal consistency of the study constructs (Cronbach's alpha) ranges from 0.791 to 0.870. This refers to the fact that Cronbach's alpha is more than 0.70, meaning that the research variables are appropriately reliable. As well, the results in Table (4) reported that standardised factor loadings, Average Variance Extracted (AVE) and Composite Reliability (CR) results as convergent validity indicators for the study. The results showed that Standardised factor loadings should be above 0.60 (Gefen & Straub 2005), the results showed that the Confirmatory Factor Analysis (CFA) ($p < 0.001$) was above 0.60 and the construct loading ranged from 0.717 to 0.875. Also, Composite Reliability (CR) for the value of the construct was above 0.70, ranging from 0.791 to 0.870. Consequently, these results confirmed the convergent validity of the current study model (see Table 4). The outcomes of Table 4 showed that the Average Variance Extracted (AVE) value was higher than 0.5, indicating the acceptability of the measurement of the study model (Henseler et al. 2016). The results showed that the square root of the AVE value was significantly higher than the correlation of the internal constructs, which indicates an appropriate satisfactory level of convergent validity (see Figure 2).

Table 4. Results of the measurement model

Constructs	Indicators	factor loadings	S.E	<i>t</i> -value	Cronbach α	AVE	CR
Effect of climate change on coastal & resort hotels (ECC)	ECC1	0.875	0.031	33.50 ***	0.768	0.604	0.791
	ECC2	0.832	0.029	22.41 ***			
	ECC3	0.751	0.042	20.88 ***			
	ECC4	0.780	0.054	15.36 ***			
	ECC5	0.741	0.035	14.36 ***			
	ECC6	0.732	0.043	17.90 ***			
	ECC7	0.735	0.047	16.77 ***			
	ECC8	0.766	0.051	15.58 ***			
	ECC9	0.755	0.057	15.89 ***			
	ECC10	0.794	0.049	17.39 ***			
Tourist experience value (TEV)	TEV1	0.872	0.058	16.74 ***	0.810	0.625	0.870
	TEV2	0.824	0.046	16.40 ***			
	TEV3	0.837	0.059	15.60 ***			
	TEV4	0.765	0.039	16.49 ***			
	TEV5	0.801	0.041	16.76 ***			
	TEV6	0.790	0.044	13.70 ***			
	TEV7	0.773	0.055	14.70 ***			
	TEV8	0.796	0.038	12.90 ***			
	TEV9	0.782	0.047	13.63 ***			
	TEV10	0.754	0.048	17.33 ***			
	TEV11	0.749	0.050	15.22 ***			
	TEV12	0.775	0.054	12.85 ***			

Table 4. cont.

Constructs	Indicators	factor loadings	S.E	t-value	Cronbach α	AVE	CR
Climate change & adaptation strategy (CCAS)	CCAS1	0.853	0.038	16.70 ***	0.756	0.589	0.831
	CCAS2	0.717	0.054	15.75 ***			
	CCAS3	0.738	0.046	17.46 ***			
	CCAS4	0.813	0.040	18.30 ***			
	CCAS5	0.821	0.033	17.67 ***			
	CCAS6	0.803	0.036	19.25 ***			
	CCAS7	0.781	0.042	16.89 ***			
	CCAS8	0.737	0.049	15.90 ***			
	CCAS9	0.745	0.057	14.62 ***			
	CCAS10	0.719	0.053	15.69 ***			
	CCAS11	0.723	0.041	13.49 ***			
	CCAS12	0.763	0.043	14.56 ***			
	CCAS13	0.747	0.054	13.80 ***			
	CCAS14	0.772	0.057	16.23 ***			
	CCAS15	0.769	0.055	15.40 ***			

Note 1: *** Significant at the 0.001; AVE= average variance extracted, CR= composite reliability

Note 2: ECC, Effect of climate change on coastal tourism & beach resort hotels; TEV, tourist experience value; CCAS, climate change & adaptation strategy.

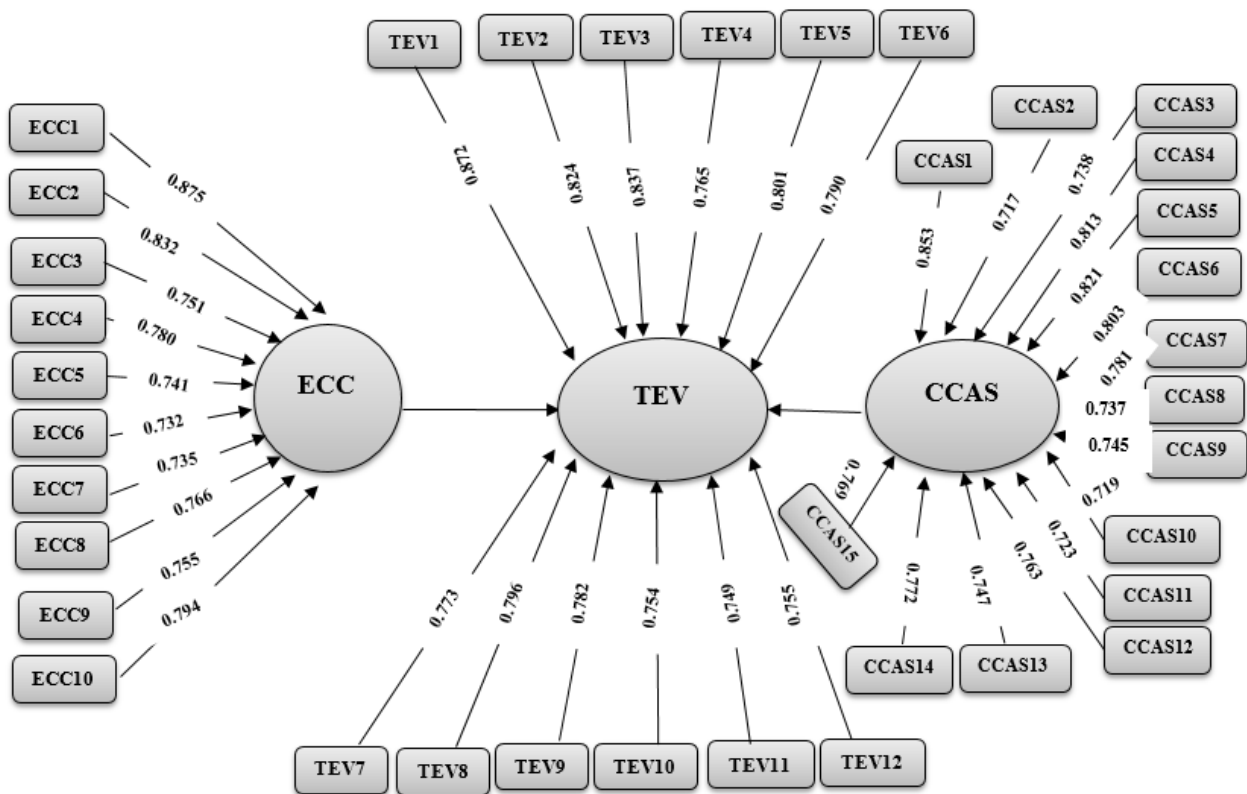


Fig. 2. Results of standardised factor loadings

5.3. Testing study hypotheses

Structural Equation Modeling (SEM) was used to test the study hypotheses. The results in Table (5) showed that climate changes have a significant effect on tourist experience value, which includes: firstly, an increase in temperature has a positive influence on tourist experience value ($\beta = 0.013$, $t = 6.430$, $P < 0.001$), this result supporting hypothesis no. 1. secondly, loss landscape attractiveness & infrastructure have a positively influences on tourist experience value ($\beta = 0.020$, $t = 5.724$, $P < 0.001$), this result supporting hypothesis no. 2. Thirdly, reduced recreational activities have a positive influence on tourist experience value ($\beta = 0.001$, $t = 4.580$,

$P < 0.001$), this result supporting hypothesis no. 3. Fourthly, sea-level rise has a positive influence on tourist experience value ($\beta = 0.022$, $t = 3.780$, $P < 0.001$), this result supporting hypothesis no. 4. fifth, health risks have a positively influences on tourist experience value ($\beta = 0.001$, $t = 6.530$, $P < 0.001$), this result supporting hypothesis no. 5. The six hypothesis was supported, adaptation strategies have a positively influences on tourist experience value ($\beta = 0.031$, $t = 4.930$, $P < 0.001$). Consequently, SEM results supported all six hypotheses in the study. This means that the current study accepted the alternative hypothesis, which refers to the fact that climate changes and adaptation strategies significantly affect tourist experience value and reject the null hypothesis (there is no relationship/ no effect).

Table 5. Testing study hypotheses

Hypothesis	Standardised estimates	SE	<i>t</i> -value	<i>P</i> -value	Results
H1: ECC1 ---> TEV	0.432	0.056	6.430	0.013	Supported
H2: ECC2 ---> TEV	0.521	0.061	5.724	0.020	Supported
H3: ECC3 ---> TEV	0.375	0.073	4.580	0.001	Supported
H4: ECC4 ---> TEV	0.481	0.052	3.780	0.022	Supported
H5: ECC5 ---> TEV	0.536	0.072	6.530	0.001	Supported
H6: CCAS ---> TEV	0.461	0.067	4.930	0.031	Supported

6. Discussion

The current research empirically used an SEM to examine the impact of climate changes on the tourists' experience value in coastal and beach resort hotels and to identify the adaptation strategies applied to coastal and resort hotels to reduce the negative effects of climate change. The results showed that climate change variables (increased temperature, loss of landscape attractiveness & infrastructure, reduced recreational activities, sea-level rise and health risks) negatively affect coastal tourism and resorts. The finding indicated that coral reefs would be exposed to destruction and rapid disappearance, in addition to many marine organisms that have escaped from the Red Sea due to the impact of the changing season of movement due to negative climate changes. It also showed that the season of tourist movement in the sea would change due to the disappearance, decrease, and erosion of some beaches suitable for coastal tourism, resulting from negative climate changes. The study results also indicated that tourism projects such as hotels and resorts near the beach line will be affected by negative climate changes in terms of their loss of sandy beaches. It indicated that there is a decrease in the degree of safety of tourist destinations affected by negative climate changes. This is confirmed with the study of (Knowles & Scott 2021) reported that tourism is directly or indirectly affected by climate change, represented by rising temperatures, drought, floods, hurricanes, rising water levels, disturbance of biodiversity, and decreased attractiveness of tourist destinations. As well, literature reviews matched these results that there is a very serious impact due to negative climate changes on the sustainability of coastal tourism and resort hotels (Fitchett 2021, Günemann et al. 2021, Pröbstl-Haider et al. 2021, Sharaan et al. 2022).

On the other hand, the results showed that climate changes have a negative effect on tourist experience value through loss of the value of the tourist experience at the destination, which include; changes in environmental features, changes in human comfort (or health), and changes in the quality of infrastructure and facilities. These results matched with the study of (Gössling & Lund-Durlacher 2021), which reported that climate changes significantly impact the value of the tourist experience and pose multiple risks to tourist destinations. The increasing erosion of the beach surface due to sea level rise and the increased energy of seawater hitting the coastline reduces the competitiveness of tourist destinations (Knowles & Scott 2021). Potential climate changes affect different types of marine and terrestrial environments (Pröbstl-Haider et al. 2021).

Overall, the results showed that coastal tourism and beach resort hotels have adaptation strategies to reduce the negative effects of climate change, such as increasing awareness of tourists or staff about the negative effects of human activities on the environment, improving building materials to withstand severe storms or heavy rains during the winter; and reinforcing beaches and coastal areas. These results are reflected in the literature review, which highlighted that tourism and hotel establishments must adopt strategies to adapt to climate change to achieve real and tangible benefits in the short term. In addition, these establishments must pay attention to sustainability, such as maintaining air quality and protecting biodiversity (Weaver 2011, Abou Kamar et al. 2023). Also, the study of Sharaan et al. (2022) reported that the government had developed some strategies to adapt to climate changes in coastal areas, namely building sea walls, artificial dunes, and sand mats to trap sand.

7. Conclusion

Generally, there is still a lack of scientific research focusing on the potential climate impacts on resort hotels. However, the effects of climate change on coastal tourism have been addressed by many studies (Abou Kamar et al. 2023). Coastal tourism and beach resort hotels on the Red Sea are highly vulnerable to potential climate change risks such as floods, rising sea levels and rising temperatures. Therefore, this study is considered one of the first studies that addressed the effects of climate change on coastal tourism and resort hotels on the Red Sea coast.

Consequently, the results showed that climate changes have a negative effect on coastal tourism and resort hotels, which affects tourist experience value, such as loss of attractiveness of marine environments due to loss of species, increase of alien invasive species, or degradation of landscapes; loss of comfort due to increased heat stress and heat waves; increased health problems due to emerging diseases; increased damage to infrastructure; and loss of attractiveness due to loss of cultural heritage. In addition, the study results indicated that coastal tourism and resort hotels on the Red Sea coast in Hurghada are exposed to significant financial losses due to the threats of climate change. Resort hotels must be able to adapt to climate changes and mitigate their effects.

Additionally, this study provides some recommendations for officials at the Ministry of Tourism and Antiquities and the Ministry of Environment, as well as hotel managers, which include strategies that must be built to adapt to expected climate changes and deduce their consequences, increasing awareness of the importance of preserving the coastal environment among tourists, and the local community for the sustainability of the marine environment; expanding sewage networks to adapt to heavy rainfall during the winter; plant a green belt of trees and other plants to reduce wind force; improving water use efficiency and building additional water storage capacity; reinforcing beaches and coastal areas using natural or artificial barriers. It is also necessary to develop and activate clear policies and regulations to implement environmental tourism initiatives in the Red Sea to work to reduce carbon dioxide emissions that affect coral reefs and many types of marine life.

8. Theoretical and Practical Implications

First of all, this research is considered one of the first studies that addressed the effects of climate change on coastal tourism and beach resort hotels on the Red Sea coast. In addition, the present research contributes to the theory by providing more details about the effect of climate changes on environmental conservation in coastal tourism and beach resort hotels. Also, this research added to the growing literature reviews on climate change and coastal tourism, climate change and beach resort hotels, tourist experience value and climate change and adaptation strategies through its review of previous studies that dealt with the research topic were discussed.

This research also contributes to practice by adding some adaptation strategies which help coastal tourism and beach resort hotels to reduce the negative effects of climate change, such as increasing awareness of tourists or staff about the negative effects of human activities on the environment, improving building materials to withstand severe storms or heavy rains during the winter; and reinforcing beaches and coastal areas. These results are reflected in the literature review, which highlighted that tourism and hotel establishments must adopt strategies to adapt to climate change to achieve real and tangible benefits in the short term.

9. Limitations and Future Research

Climate change has a major impact on coastal tourism and beach resort hotels and is an important issue to address. Future studies should highlight the importance of conducting studies on the impact of climate changes on coastal tourism and beach resort hotels in other areas on the Red Sea beach or other countries bordering the Red Sea to verify the validity of the results and to generalise it. The present research has some limitations. Firstly, there is a lack of research and studies focusing on the potential climate impacts on coastal tourism resort hotels. Secondly, this research recruited visitors as the sample, so collecting data was difficult because they were busy and did not have time.

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