

Original Research Article

Pre-Crisis Management in Social, Economic, Physical, and Environmental Aspects of Tourism Complexes

(Case Study: Jihad-e Daneshgahi Tourism Complex in Kermanshah, Iran)

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Received: 25/06/2023

Accepted: 04/02/2024

Available online: 20/04/2024

Abstract | Crisis management in tourism complexes can play a crucial role in increasing tourist attraction and mitigating damages resulting from natural hazards. The Jihad-e Dāneshgāhi of Tourism Complex in Kermanshah is a tourist destination, and this study aims to present a crisis management model for this complex. What crisis management model needs to be developed for the Jihad-e Dāneshgāhi Tourism Complex in Kermanshah? This study aimed to propose a crisis management model for the Jihad-e Daneshgāhi Tourism Complex in Kermanshah. A questionnaire was used to collect research data. 50 individuals were recruited as the subjects of the study of whom 33 individuals were selected as the sample, considering the specified community characteristics. The results revealed that the economic recession indicator, with a value of 70.2%, was the most important of the economic indicators in the opinion of the respondents. Analyzing pairwise comparisons of social indicators showed that social participation recorded the highest significance among social indicators (0.158), ranking first in social indicators' importance. Since environmental hazards are one of the most critical factors contributing to crises in any environment, vulnerability to earthquakes was reported by respondents to be of the highest importance among the examined physical-environmental indicators in the Kermanshah Tourism Complex.

Keywords | Crisis Management, Tourism Complexes, Jihad-e Daneshgāhi Tourism Complex, Kermanshah Province.

Introduction | The rapid growth of the tourism industry in the last half-century has resulted in increasing environmental pressures. Studies indicate that prioritizing economic interests stemming from the unchecked expansion of the tourism industry has compromised the principles of sustainable development in various regions and exposed the environment to escalating risks. In this context, tourism, now recognized as one of the most important economic sectors in the world, stands out not only economically, but also for its role in presenting and promoting the history and culture of different cities

(Zandieh & Goodarzi, 2014). Unlike other natural tourist destinations, urban destinations benefit from human population interaction (Hall & Page, 1999), making the management of tourist destination crises an increasingly important topic.

Therefore, in a situation where the foundation of economic systems is based on creating comparative advantage through specialization and generating economic value through trade and specialized services, crises such as floods, earthquakes, and political crises such as sanctions can disrupt or sever economic networks. This has the potential to threaten the foundation of the economic

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system. Naturally, among businesses, those with small and diverse transactions involving a wide range of individuals in society are most affected by these crises. The factors of “timing of occurrence” and “geographical and social location of the crisis” significantly impact crisis management. Natural disasters such as earthquakes, floods, hurricanes, and similar events typically result in detrimental effects on human settlements, causing heavy casualties and destroying buildings and infrastructure in affected areas. The social and economic repercussions extend broadly to societies and countries. Earthquakes, volcanoes, floods, and similar natural events have historically brought human life from inception to destruction (Ebrahimi et al., 2019).

In recent years, the province of Kermanshah has been under the influence of various natural hazards. The earthquake in Sarpol-e Zahab in this province has particularly affected the region. Besides, tourism expansion and the subsequent development of tourism complexes have been evident in the province of Kermanshah. Accordingly, crisis management in Kermanshah province, especially in tourism complexes, is of significant importance. Based on this, the main question of this research is: What crisis management model needs to be developed for the Jahad-e Daneshgahi Tourism Complex in Kermanshah?

Research Background

Ahmadi et al. (2023), argued that farmers in flood-affected villages of Pol-e Dokhtar County are more economically vulnerable compared to Chegni and Khorramabad counties in a study titled “Assessing Livelihood Vulnerability of Farmers to Floods (Case Study: Lorestan Province)”. Pol-e Dokhtar County showed higher levels in livelihood strategic indicators, social networks, knowledge information, and health compared to the other two counties, indicating higher vulnerability in these aspects.

Furthermore, Ghadermarzi et al., (2023) in an article titled “Assessing the Vulnerability of Villages to Water Scarcity Crises; Case Study: Qorveh And Dehgolan Counties),” noted that the mentioned villages differ in terms of vulnerability in the indicators of income from main and secondary livelihoods, access to agricultural water resources, household livelihood diversity related to the second occupation, and changes in the area under irrigation.

Akhgari and Ghasemian Moghadam, (2023) published “Prioritizing Factors Affecting the Economic Resilience of Rural Households to Drought: A Case Study of Dastgerdan District of Tabas County,”. They argued that, according to rural residents, the most influential factors in their resilience to drought and enhancing their

adaptability to drought conditions are strengthening local rural participation.

Nazir, (2023) examined tourism indicators and natural hazards in Siba. Findings indicated that tourist destinations are heavily influenced by natural hazards. Furthermore, experiences demonstrate that natural events have extensive impacts on tourism.

In their article on the “Evolution of Tourism Risk Communication: A Bibliometric Analysis And Meta-Analysis Of The Antecedents Of Communicating Risk To Tourists,” Liu et al., (2023) argue that factors such as gender, nationality, tourist experiences, local tourism boards, local governments, organizational resource allocation, and assessment influence how risks are dealt with in sensitive tourism areas.

Theoretical Foundations

The term “natural hazards” refers to the occurrence of a phenomenon or natural conditions that pose a threat and become hazardous at a specific time and place. Various concepts define natural hazards as destructive elements in the physical environment for humans, emphasizing the potential occurrence of a harmful phenomenon (Alavi et al., 2015).

Most current crisis management models in tourism are forward-thinking, considering solutions when a crisis occurs or when warning signs are observed. However, they lack predefined plans to prevent crises. Even process-oriented models address the identification of warning signs before a crisis (Yavari Gohar & Mansouri Moeid, 2018). Such an approach can be found in manufacturing industries, where various diverse methods have been presented over several decades to cope with crises (Safipour Toghayy et al., 2018). Various studies in the associated area have examined the effects of climate on the tourism industry, considering geographical space, supply and demand factors, and market influences (Martin & Gomez, 2005). It was noted that climatic conditions and their variations are essential criteria for evaluating the suitability of tourism activities and ultimately determining destination choices. Weather and its moderation increase the acceptance and appeal of tourists. While tourism has numerous positive effects and is continuously expanding, it is not immune to threats and crises. What is crucial in this context is the need for a cohesive system to support, plan, and manage tourism during crises and before their occurrence. Especially considering that tourism is dependent on various elements, each of which can bring about both beneficial and irreversible.

The social impacts of natural hazards reflect the resilience of societies in the face of external shocks based on their

social infrastructure (Poodineh et al., 2019). Physical and environmental effects assess the community's response and recovery capacity after disasters, including shelters, residential units, and infrastructures such as pipelines, roads, and their dependencies on other infrastructures. In the physical dimension, attention is given not only to providing shelters for the affected individuals post-crisis but also to principles for designing structures before the occurrence of a crisis and disaster (Rafieeian et al., 2011). While livelihood strategies and economic and social planning are essential resources for improving household resilience to natural hazards, in many less developed countries around the world their high vulnerability is exacerbated by economic activities, particularly in rural areas (Jinado, 2013). Several studies have established the relationship between community vulnerability to hazards and access to resources or economic livelihood (Brooks, 2003).

Materials and Method

The current research employed an applied and analytical descriptive approach with a primary goal, quantitative nature, and exploratory and survey methods. The study collected descriptive data (theoretical studies in this context) through documentary research, utilizing library studies and reference sources on the study topic. Additionally, survey methods using a questionnaire tool were employed to gather analytical data (vulnerability indices, information layers, and weighting processes). Accordingly, a researcher-developed paired comparison questionnaire was designed to weigh the criteria and was then provided to experts. Ultimately, paired comparisons in Expert Choice software were analyzed and synthesized using the Analytic Hierarchy Process (AHP) for analysis in the TOPSIS model. In the Expert Choice software, the vulnerability of the Academic Tourism Complex

of Jahad-e Daneshgahi was prioritized based on expert opinions.

The statistical population of this research comprised tourism specialists and crisis management officials in Kermanshah province. Due to time and cost efficiency and the nature of the study, researcher-developed questionnaires were utilized. The sample was selected because of the cooperation of the experts and their willingness to participate in the study. The selected sample was representative of the statistical population.

After examining various study environments, reviewing documents and upper plans, studying functions and common uses in tourist villages, and considering the opinions of stakeholders, the following land uses are proposed for the construction phase: Tourist-residential, sports-recreational, agricultural, human and animal, health, service-commercial, cultural-exhibition, and educational-research-technological (complementary and supportive uses for training in solar panels, organic farming techniques, and modern agricultural equipment) (Fig. 1). Table 1, shows the research indicators.

Discussion

The Analytic Hierarchy Process (AHP) was employed to assess the validity and reliability of the measurement tool through exploratory factor analysis. To examine the model, statistics related to the KMO index and Bartlett's test statistic (an approximation of the Kaiser-Meyer-Olkin index) were initially measured. With a KMO index value of 0.879 (approximately close to one), the sample size was deemed sufficient for analysis, indicating adequate sampling adequacy. Additionally, the significance level of Bartlett's test, being less than 5%, indicates that the matrix is not an identity matrix, and factor analysis is suitable for identifying the appropriate structure. Based on Cronbach's alpha coefficient, which is 0.856, the questionnaire has good reliability.

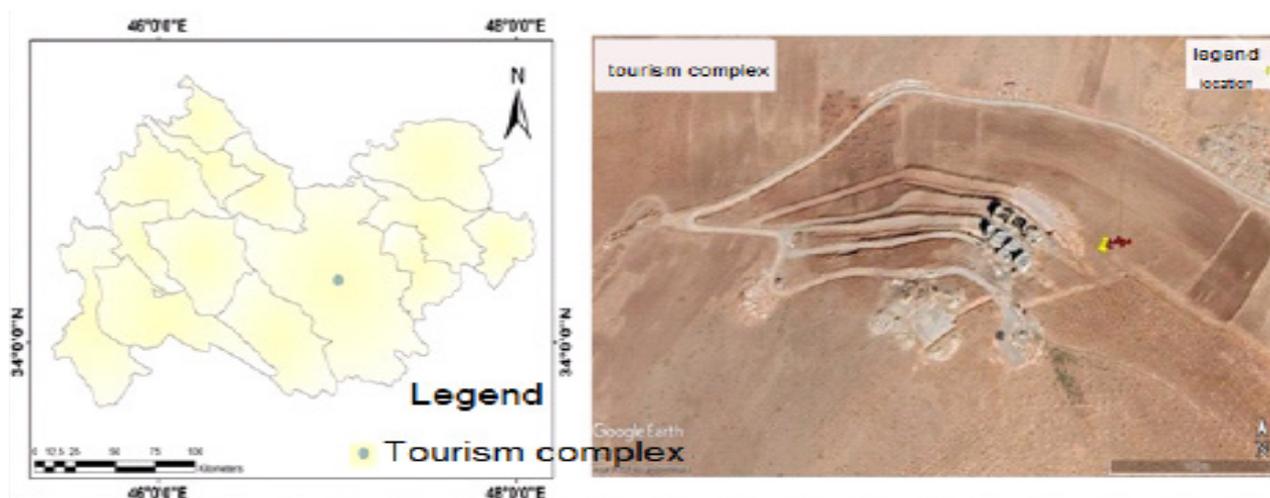


Fig. 1. Study area. Source: Authors.

Table 1. Indexes of research. Source: Authors.

Component	Variable
Economic	Economic recession, exchange rate fluctuations, taxes and levies, laws and regulations, insurance, savings, income, severity of losses, and recovery capability.
Social	Social participation, feelings of tranquility and peace of mind, appropriate interaction and hospitality of citizens, crime, disorder, social support, cultural promotion, crisis management skills, public concern, social justice, social harmony, and social skills.
Physical- environmental	Earthquake, flood, accessibility levels, building density, infrastructure, firefighting station equipment, open spaces, adherence to safety standards, incompatible land uses, timely emergency response, information centers, fire incidents, accommodation and welfare facilities, pollutants, and environmental health.
Institutional	Establishment of optimal management, pre-crisis, during-crisis, and post-crisis management, government intervention, internal and external organizational coordination, relationships, performance, and infrastructure.

First, the importance coefficients of the indicators and sub-indicators for the predetermined target were determined. Furthermore, the importance coefficients of the options were calculated in relation to each sub-indicator. At this stage, the final score of each option will be determined by combining these importance coefficients using the principle of hierarchical combination, leading to a priority vector considering all judgments at all hierarchical levels. Therefore, given the application of the AHP method, this section presents the corresponding results analyzed by the respondents. Initially, the used components were compared, and ultimately, the indicators of each component were evaluated (Fig. 2).

Fig. 3 revealed that according to respondents, the most important component in reducing the vulnerability level of Jahad-e Daneshgahi Tourism Complex, is the economic component. In other words, the economic component plays a more influential role compared to other components in this context. When economic indicators improve and economic conditions are favorable, it will be easier to take measures to reduce vulnerability in the Jahad-e Daneshgahi tourism complex.

The Physical-Environmental components also hold importance with a weight of 0.212, ranking third. Indicators of this component, mainly related to environmental structure, risks, and infrastructures, can play a crucial role



Fig. 2. A pairwise comparison of effective components in reducing the vulnerability level of Jahād-e Dāneshgāhi Tourism Complex. Source: Authors.

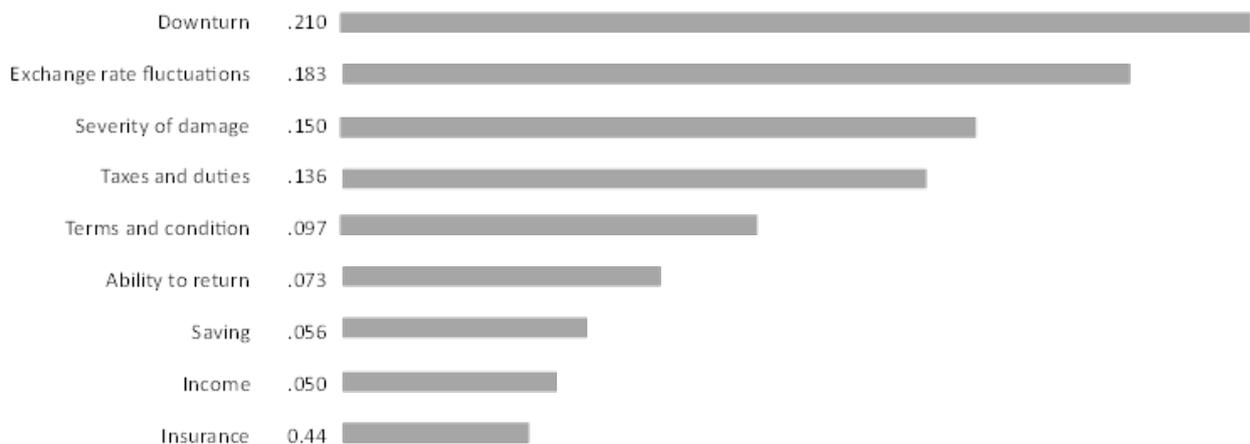


Fig. 3. A pairwise comparison of effective economic indicators in reducing the vulnerability level of Jahād-e Dāneshgāhi Tourism Complex. Source: Authors.

in the development of the Jahād-e Dāneshgāhi Tourism Complex on one hand and pose constraints such as environmental risks on the other. Given the geographical location of the complex, experts consider this component less important in comparison to other components.

Lastly, the Institutional components are placed with the least value among the examined components, assigning the lowest importance according to both experts and respondents, with a weight of 0.101.

This section examined the economic indicators in the complex.

As mentioned earlier, nine economic indicators are assessed in the economic component, and the pairwise comparisons of these indicators are illustrated in Fig. 3.

Exchange rate fluctuations are another crucial indicator in the growth, development, and vulnerability level of the Tourist Complex of Jihad University (Fig. 4).

One of the crucial and influential components in crisis management in tourist complexes is social issues. Furthermore, a Pairwise comparison of social indicators revealed that social participation, according to respondents, has been assigned the highest importance among the social indicators. This indicator, with an importance level of 0.158, is ranked first in importance among the social indicators. Considering the current high importance of social participation in all affairs, its presence is expected to reduce the vulnerability level of Jahād-e Dāneshgāhi Tourism Complex. Conversely, lower levels of social participation are associated with increased vulnerability in the tourist complex.

The sense of tranquility and peace of mind in the complex is one of the most crucial social indicators.

On the other hand, tourists prefer to experience appropriate behavior from the host community. Wherever

this interaction is more favorable, the number of users and visitors to the complex will increase (Fig. 4).

Finally, the social skills index is included, allocating the least importance among the eleven examined indices in the Jahad-e Daneshgahi. This index, with an importance score of 0.50, ranks last in importance.

As mentioned earlier, environmental-structural indices are related to environmental structure, environmental risks, and infrastructure. Considering that environmental risks are among the most significant factors leading to crises in any environment, earthquakes, among the examined environmental-structural indices in the Jahād-e Dāneshgāhi Tourism Complex have been assigned the highest importance according to respondents.

The accessibility of the Jahad-e Daneshgahi Jahad-e Daneshgahi Tourism Complex is the third most important index in reducing vulnerability, according to respondents. This index, focusing on how accessibility is addressed, can play a vital role in reducing vulnerability in the. The ease and speed of access, both before the crisis for users and during and after the crisis, have a significant impact and contribute to reducing vulnerability.

Another crucial index in the physical-environmental component is the Building Density Index. This index holds an importance level of 0.097, ranking fourth in importance among the physical-environmental indices (Fig. 5).

The presence of open spaces in any complex can play a crucial role during and after a crisis. Given that crises, especially environmental crises, occur suddenly and simultaneously affect the environment, the open spaces in such communities can particularly contribute to reducing vulnerability, especially in terms of human casualties. Therefore, it holds significant importance in vulnerability reduction.

Among the examined indices in the physical-

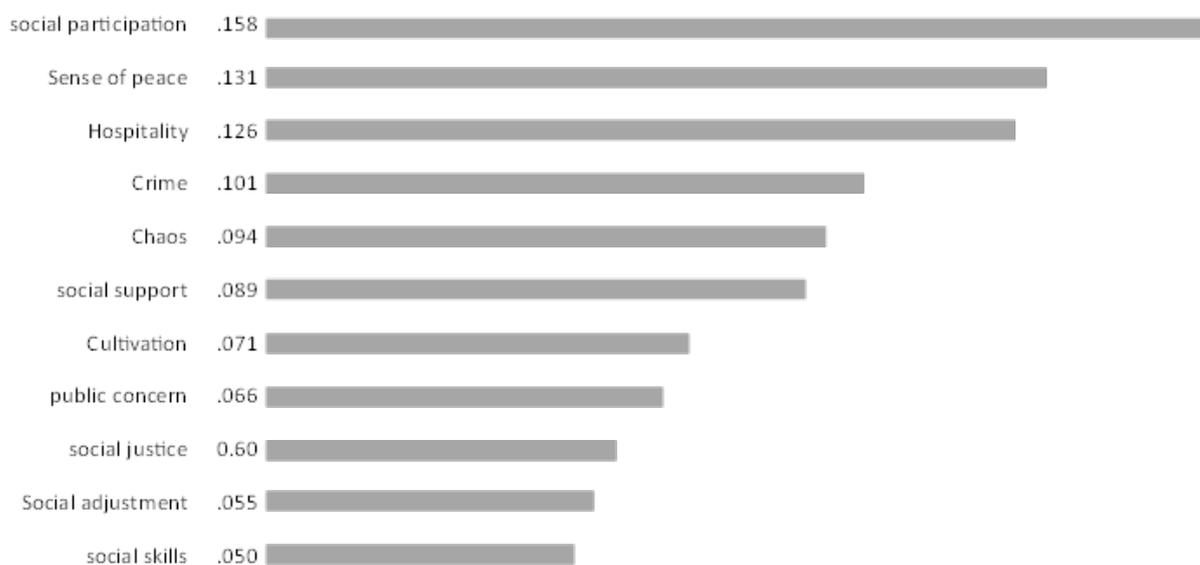


Fig. 4. A pairwise comparison of social indices affecting the reduction of vulnerability level of Jahād-e Dāneshgāhi Tourism Complex. Source: Authors.

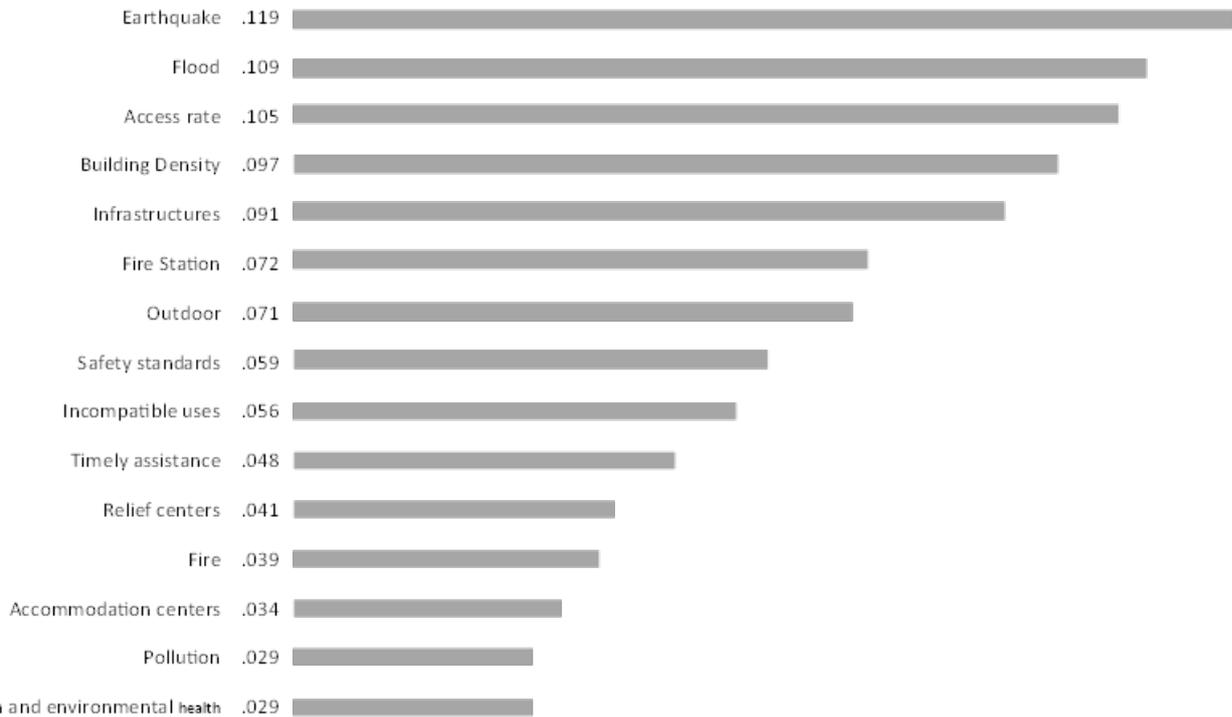


Fig. 5. A pairwise comparison of effective physical-environmental indices in reducing vulnerability level of Jahad-e Daneshgahi Tourism Complex. Source: Authors.

environmental component, the Environmental Health and Safety index has allocated the least importance. According to the pairwise comparison of indices, this index, with a weight of 0.029, ranks last in importance among the physical-environmental indices.

In crisis management, institutions and organizations can have a significant impact in each region, contributing to the acceleration and effectiveness of crisis management when a crisis occurs. Hence, seven institutional indices, include optimal management deployment, pre-crisis management, during and post-crisis management, government intervention, intra and inter-organizational coordination, and relationships.

Government intervention is another essential index in the institutional component. It is known that significant damages occur to the complex and residents of the tourism complex during and after a crisis. Furthermore, the government can, to some extent, alleviate these damages through its intervention.

One of the influential indicators during and after a crisis that has been examined is internal and external organizational coordination. Given the considerable turmoil observed among various organizations and entities, even within organizations, during recent crises such as floods and earthquakes in the country, it is essential to establish comprehensive coordination to achieve optimal performance in reducing vulnerability. Other indicators, such as relationships, performance, and infrastructure, have also been investigated in the Jahād-e

Dāneshgāhi Tourism Complex. These indices have been prioritized in the final considerations based on individuals' responses. Fig. 6 illustrates the pairwise comparison of the effective institutional indicators in reducing the vulnerability of Jahad-e Daneshgahi Tourism Complex.

As noted earlier, each decision-making problem is confronted with multiple indicators, so understanding the relative importance of indicators is essential. Therefore, a weight is assigned to each indicator in a way that the sum of the weights of the indicators equals one. Various methods, including entropy, linmap, least squares method, and eigenvector methods can be used. In Table 2, considering the nature of the TOPSIS method, the entropy approach was utilized, whereby calculating the entropy related to each indicator and then the deviation from its standard, the weight of each indicator is determined. This can be calculated through the following Equations (1& 2) (Table 3).

$$E_j = -k \sum_{i=1}^m P_{ij} \times \ln P_{ij} \quad i = 1, 2, \dots, m \quad \text{Eq. (1)}$$

$$D_j = 1 - E_j \quad w_j = d_j / \sum d_j \quad \text{Eq. (2)}$$

Where K is a constant number that keeps the entropy between 0 and 1. Pij is the normalized weight (Equation 2). Then, the determination of the positive and negative ideals was addressed (the maximum and minimum values in each indicator). To form the positive ideal option (A+), the best value should be chosen in each column of the V matrix. Conversely, for the formation of the negative

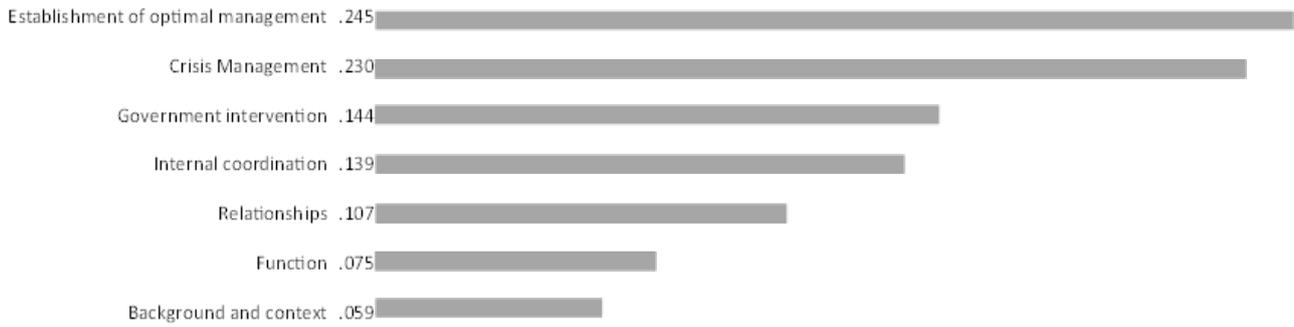


Fig. 6. A pairwise Comparison of Effective Institutional Indicators in Reducing Vulnerability in the Jahād-e Dāneshgāhi Tourism Complex. Source: Authors.

Table 2. Normalized weight matrix for each investigated indicator in the vulnerability reduction in Jahad-e Daneshgahi of Tourism Complex. Source: Authors.

Unscaled Normalized N	Economic component	Social component	Physical-environmental component	Institutional component
Taxes and duties received	0.28	0.25	0.015	0.015
Building density	0.23	0.19	0.22	0.22
Flood	0.23	0.25	0.22	0.29
Infrastructure	0.17	0.19	0.22	0.15
Fire station equipment	0.17	0.19	0.15	0.15
Internal and external coordination	0.28	0.25	0.22	0.22
Crime	0.25	0.19	0.22	0.22
Earthquake	0.23	0.31	0.30	0.22
Appropriate treatment and hospitality of citizens	0.28	0.31	0.22	0.22
Access rate	0.23	0.19	0.22	0.29
open spaces	0.23	0.19	0.15	0.18
Exchange rate fluctuations	0.28	0.19	0.30	0.29
Downturn	0.28	0.25	0.30	0.29
Establishment of optimal management	0.28	0.19	0.30	0.29
Severity of damage	0.23	0.19	0.22	0.22
Social participation	0.17	0.25	0.22	0.22
Management pre, during, and post-the crisis	0.17	0.25	0.22	0.22
Feeling calm and relaxed	0.17	0.25	0.22	0.22
Government intervention	0.17	0.19	0.15	0.22

Table 3. Entropy calculation of the components' importance. Source: Authors.

Indices	Indice entropy E_j	Deviation degree d_j	Normalized weight W_j	RANK
Institutional component	0.940	0.060	0.222	4
Physical-environmental component	0.936	0.064	0.236	3
Social component	0.932	0.068	0.0251	2
Economic component	0.922	0.078	0.0291	1

ideal solution, the minimum value in the columns of the indicators was selected (Table 4).

Subsequently, the relative proximity of each option to the ideal solution was calculated. The Euclidean distance of each option from the positive and negative ideals was computed using the following Equation (3& 4). The final step was to calculate the ideal solution. In this step, the relative proximity of each option to the ideal solution was determined. Then, the distance of each option to the positive and negative ideals was calculated, as shown in the matrix below. The distance of option I to the positive ideal was represented by the symbol d_i^+ and to the negative ideal by the symbol d_i^- . The calculation method for each of the indicators from the positive and negative ideal limits is provided Equation (3 & 4).

The Index of Closeness to the Ideal Option (CLi) was calculated through the following Equation (5).

$$d_i^+ = \sqrt{\sum_{j=1}^n (V_{ij} - V_j^+)^2} \tag{Eq. (3)}$$

$$d_i^- = \sqrt{\sum_{j=1}^n (V_{ij} - V_j^-)^2} \tag{Eq. (4)}$$

$$CL_i^* = \frac{d_i^-}{d_i^- + d_i^+} \tag{Eq. (5)}$$

The value of the similarity index ranges between zero and one. The closer this value is to one, the closer the solution is to the ideal answer, indicating a better solution (Tables 5 & 6).

Based on Table 6, the earthquake and flood risks were ranked first and second among all indicators. The economic indicator of economic recession is considered next in importance. Among all the studied indicators in this section, open spaces ranked last.

Conclusion

According to the results, it is noted that the economic recession indicator has allocated the highest importance among economic indicators. Considering that economic recession can adversely affect other sectors in any society, in this case, if an economic recession occurs, tourism and tourism complexes will also be affected. Therefore, economic growth and development can play a significant role in the growth and development of the tourism

complex in Kermanshah. Accordingly, in comparison with other indicators, the economic recession indicator has assigned the highest impact in terms of vulnerability in the tourism complex in Kermanshah according to the respondents' perspectives.

Foreign exchange rate fluctuations are another important indicator of the growth, development, and vulnerability level of the Kermanshah tourism complex. Iran's currency has experienced significant fluctuations in recent years, mostly related to the increase in the exchange rate, which can impact increased costs, reduced consumer purchasing power, and decreased utilization of the Kermanshah tourism complex. Therefore, economically, the Kermanshah tourism complex may face significant challenges in such scenarios.

The findings of this study affirm the validation of the first hypothesis. Despite the exploration and valuation of additional components in this research, the primary indicators highlighted in the initial hypothesis retain their paramount importance according to the obtained results.

From the pairwise comparison of social indicators, it is observed that social participation showed the highest importance according to respondents. Considering that social participation is currently of high importance in all matters, and in the presence of high social participation, the vulnerability of the Kermanshah tourism complex will decrease, and vice versa.

The sense of tranquility and peace of mind in the Kermanshah tourism complex is one of the most important social indicators. Since tourists in tourism environments seek relaxation and enjoyment during leisure time, the higher the sense of tranquility in the tourism complex, the lower the vulnerability of the complex.

On the other hand, tourists prefer to experience appropriate interactions from the host community, and wherever these interactions were more suitable, the number of users and visitors to this complex increased. Therefore, this indicator holds significant importance among social indicators and ranks third in importance among the 11 indicators.

Since environmental risks are one of the most crucial factors leading to crises in any environment, earthquake response stands out as the most important among the examined physical-environmental indicators in the Kermanshah tourism complex, according to respondents. The vulnerability of the Kermanshah Jahād-e Dāneshgāhi Complex to earthquakes has been assigned the highest

Table 4. Positive and negative ideals of each component. Source: Authors.

Positive and negative ideals	Economic component	Social component	Physical- environmental component	Institutional component
V +	0.0398	0.0790	0.0665	0.0853
V -	0.0663	0.0474	0.0333	0.427

Table 5. Distance between options and ideals and their relative proximity to the final solution. Source: Authors.

Distance	d +	d -
Taxes and duties received	0.0623	0.0158
Building Density	0.0437	0.0301
Flood	0.0265	0.0502
Infrastructure	0.0556	0.0313
Fire station equipment	0.0627	0.0265
Internal and external coordination	0.410	0.0131
Crime	0.437	0.0301
Earthquake	0.0251	0.0523
Appropriate treatment and hospitality of citizens	0.379	0.416
Access rate	0.0381	0.0477
Open spaces	0.0640	0.0133
Exchange rate fluctuations	0.0413	0.0541
Downturn	0.0309	0.0564
Establishment of optimal management	0.0413	0.0541
Severity of damage	0.0437	0.0301
Social participation	0.0313	0.0410
Management before, during, and after the crisis	0.0313	0.0410
Feeling calm and relaxed	0.0313	0.0410
Government intervention	0.516	0.0340

Table 6. Final prioritization of indicators based on their relative distance from the ideal. Source: Authors.

Importance order	Indices	Final score
1	Earthquake	0.676
2	Flood	0.655
3	Downturn	0.646
4	Establishment of optimal management	0.567
4	Exchange rate fluctuations	0.567
5	Social participation	0.567
5	Management before, during, and after the crisis	0.567
5	Feeling calm and relaxed	0.567
6	Access rate	0.566
7	Appropriate treatment and hospitality of citizens	0.523
8	Internal and external coordination	0.433
9	Crime	0.408
9	Severity of damage	0.408
9	Building Density	0.408
10	Government intervention	0.402
11	Infrastructure	0.360
12	Fire station equipment	0.297
13	Taxes and duties received	0.202
14	Open spaces	0.172

importance, with a significance level of 0.119, ranking first among the physical-environmental indicators.

The most important point regarding physical-environmental indicators is the high importance of natural hazards from the perspective of respondents. In other words, the two indicators that have the highest importance among the fifteen physical-environmental indicators are those related to environmental hazards.

As mentioned above, natural hazards and access to

roads, along with the equipped firefighting stations, were important indicators in reducing the vulnerability of the Kermanshah Jahād-e Dāneshgāhi Complex.

Regarding the institutional component, seven indicators have been examined based on previous studies, including performance, infrastructure, relationships, optimal management deployment, pre-, during, and post-crisis management, intra- and inter-organizational coordination, and government intervention.

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HOW TO CITE THIS ARTICLE

Azmi, A., Mohammadi, S., & Jaldi, M.R. (2024). Pre-Crisis Management in Social, Economic, Physical, and Environmental Aspects of Tourism Complexes (Case Study: Jahad-e Daneshgahi Tourism Complex in Kermanshah, Iran). *Tourism of Culture*, 5(16), 14-23.

DOI: 10.22034/TOC.2024.404079.1127

URL: https://www.toc-sj.com/article_194057.html?lang=en

