

Strategic Management of Ecotourism Using AHP Method (Study Case: Qeshm Island)

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Abstract

Tourism has positive and negative impacts on its environment and bed, also the environment is effective on tourism process. So that the presence of tourists in this region is causing some positive and negative economic, social, cultural, environmental, Infrastructure and management impacts on the region. In this regard and according to the ecological characteristics of Qeshm Island, evaluation of the studied area was performed using criteria weighting by hierarchical analysis process in Expert Choice11 software environment. In this research, the criteria evaluation has been conducted by hierarchical analysis and geographic information systems; and the position of ecological potential has been shown on the map using this method and data transferring. This study has examined the determination of ecological power and potential of Qeshm Island in order to use hiking and choose the most suitable development sites for hiking by MADM method. Also the results of this study show that the lands with good potential grades with 65785.1 hectares and 43% of all lands have allocated most of the land area in Qeshm Island. 3% of the total area of the city includes 4518.5 hectares of high potential; 3392.7 hectares of city equivalent to 22% has moderate potential and; about 48074.1 hectares equivalent to 32% of that are the lands with low potential for ecotourism development.

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1. Introduction

The main task of attracting tourists is to protect the tourist resources and it should be try to preserve the area's natural features by determining necessary rules and regulations to preserve the routes of rivers, passages, and ways space and also by determining the type of land use and building regulations; and any kind of actions which would harm it, should be prevented as possible (Hallaji Sani, 1997). In the last few decades, planners, managers, and tourism executives in the worldwide have made huge investments on ecotourism due to the poverty of income resources that led to the protection of ecosystems and generate significant revenue.

2. Previous Research

Nowadays in the era of tourism, tourism with its all kinds and forms of tourism is becoming to the world's leading economic activity and most important and lucrative world's business in the first quarter of the 21st century (emodiran.com/downloads) and this is the highest level of employment resulting from the optimization of the tourism industry (www.ecotourism.explorer.economic).

The term of carrying capacity represents the maximum number of tourists accepted in one area and if this number exceeds, the frequent damage would come into the natural environment (Edington, 1995).

Matson and Wall's definition of carrying capacity (1982) is the maximum number of people who can use the space somehow that no significant change affects the natural environment and the quality of the visitors' enjoyment of nature does not decline too (Inskip, 1991).

In the first step, the hierarchical structure of this matter where the four-level hierarchy includes a goal, criteria, sub-criteria and alternatives (controls) are raised, has considered (Mau et al, 2005). In the hierarchical display of cases, goal setting, selection of important indexes, options specification, paired comparisons of matrix determination from preferable to the extraordinary preference (1-9), calculation of the relative weights of each Index, ranking options and inconsistency rate are performed separately for each of the options and indexes. In addition, this is based on a paired comparison that simplifies the estimation and the calculations. This also shows the degree of compatibility and incompatibility of the decision that is considered as the unique

advantage of this technique in the multi-criteria decision making (Ghodsi Pour and Hassan, 2009).

As already mentioned, after analyzing and the inconsistency coefficient calculation, the value should be less than 0.1. Using this factor helps to analyses the decision before the final selection of specified use (Dey and Ramcharan, 2000).

In other words, analytical hierarchy process puts complex issues into simpler forms by its conversion to minor issues as a hierarchy of interconnected and the communication of main objective with the lowest level of the hierarchy (Galij, 2008).

Amino Maisner (2007) in an article titled "Geographic information and a multi-criteria analysis for proper planning for tourism" has used AHP, MCDM, MCA, and GIS (Maisner, 2007).

3. Hypothesis

- 1- Qeshm Island has considerable potential for ecotourism activities.
- 2- The current land use of the Qeshm Island does not match its potential.
- 3AHP method is an appropriate way to select the best tourist places in the Qeshm Island.

4. Data Analysis

This research is the type of applied research and in the nature and method is the type of survey research. Requisite data collection in this research has been done using detailed questionnaires and in AHP method that we have selected the appropriate use between the Intensive and extensive promenade using AHP model for the study area. It should be noted that all of the steps above have been done in consultation with experts and professors and experts of Environment and Tourism; and the number of questionnaires obtained from the following procedure:

$$N = Z^2 / e^2 4$$

In this equation $Z = 95\%$ of the table and the e value is the error rate which has been considered to be 0.1.

In the next step, scoring each criteria and sub-criteria was done with presenting the questionnaire to experts and their polling. Scoring is between 1 and 9. The scores scale has been shown in table

(1). The raw data have been given to the Expert Choice software and the relative importance of each index has been calculated for the most appropriate ecotourism.

Preferred values	Comparison status of i to j	Explanation
1	Equal importance	Option or the index i to j has equal importance. They are not the priority.
3	Relatively more important	Option or the index i to j has relatively more importance.
5	more important	Option or the index i to j am more important.
7	Much more important	Option or the index i is much more important than j.
9	absolutely more important	Option or the index i is absolutely more important than j and this is not comparable to j.
2, 4, 6, 8		It shows intermediate values between preferred values. E.g. 8 shows more importance than 7 and less importance than 9 for i.

Table 1: Rate The Ratio Indexes In AHP Model

5. Results

Qeshm Island is the largest island in Islamic Republic of Iran and Persian Gulf at the entrance of Hormuz Strait. This island is bounded from north to Bandar abbas, the center of Khamir commune and a part of Bandar Lengeh city, from northeast to Hormuz Island, from east to Lark Island, from south to Hingam Island, and from southwest to Great Tunb and Small Tunb Islands and Abu Musa. Bandar Abbas is the nearest seaport to the Qeshm Island in the country's main port which has 10.8 nautical miles (20km) to Sarbandar of Qeshm. According to the statistics of Qeshm Island's synoptic stations, the average of annual temperature is 27.15. It also lacks the four seasons of the year and it has 6 hot months and 6 cold months without freezing. As it can be seen, the highest average of annual rainfall is 172.3 mm at Qeshm Island station. According to this table, March is the rainiest month of year with 43.1 mm rainfall. And rainfall reaches to zero during the months of June, July, and October.

The study region is a part of Persian Gulf and Oman Sea's catchment area and under the total area of Mehran. Also according to the hydrologic units' classification of the Department of Energy, the study area has not been in none of the designated hydrologic units and has not groundwater aquifer. 13653.62 hectares of forest area have been declared in Qeshm city. The origin of the vegetation of the region is the Oman Gulf that in spite of different species of acacia shrubs among

steppe growing resemble to the tropical savannahs. In study region, 7 species of mammals from 3 families have been identified. Between them, 2 species belongs to bat and 3 species belong to the tribe of mice. The large populations of birds which proliferate, especially herons' tribe such as Hindi heron, coastal egret, large egret, gray heron (*Ardea cinerea*), and green heron proliferate in this international pond. Also it is a suitable habitat for endangered species such as gray leg pelican and flat beak curlew. The largest sound population of crab eaters in the Middle East and perhaps around the world live in this pond. Little Hindi lark which has a very limited distribution in the Middle East is found in this pond. The space beneath the waters surrounding Qeshm Island is very different in each area. The beach in some areas is covered in seaweed, in other area is between muddy tide, in another area is smooth sandy beach, and beautiful marine coral and reefs in other sides have caused that wide variety of aquatic live in this region ranging from the large marine mammals such as whales and dolphins, to the rarest marine mammals such as dugongs. Also there are large fish such as whale shark, different species of large fish such as shark and stingray, commercial and edible fish such as *katsuwonus pelamis* , redmouth grouper (*aethaloperca rogae*), javelin grunter (*pomadasys kaakan*), *Scomberomorus commerson*, Karut croaker (*Johnius carutta*) , tigertooth croaker (*otolithes ruber*), other, different species of marine ornamental fish such as eel, sea horse, turkeyfish, angel fish, butterfly fish, Moon wrasse (*Thalassoma lunare*), Clownfish, blennies, mudskippers, and other .

According to the selection, 12 main criteria and 41 sub-criteria were given to the experts and specialists based on research method using Delphi method.

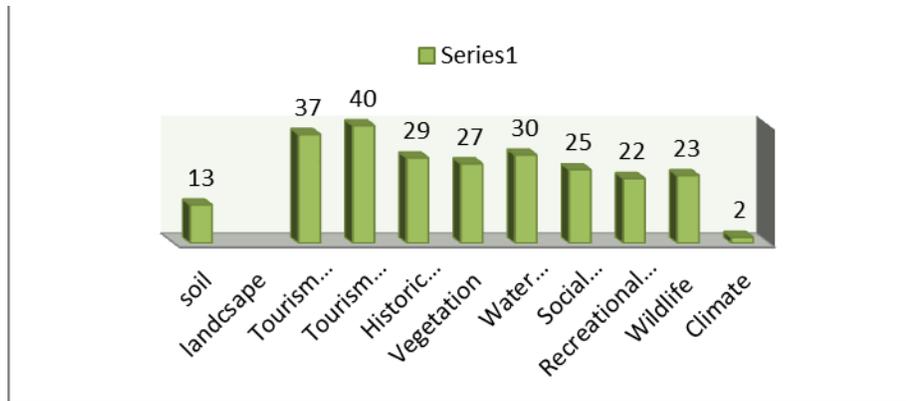


Figure 1: Diagram Of Importance Degree Of Rated Sub-Criteria Using The Delphi Questionnaire
 (The Author)

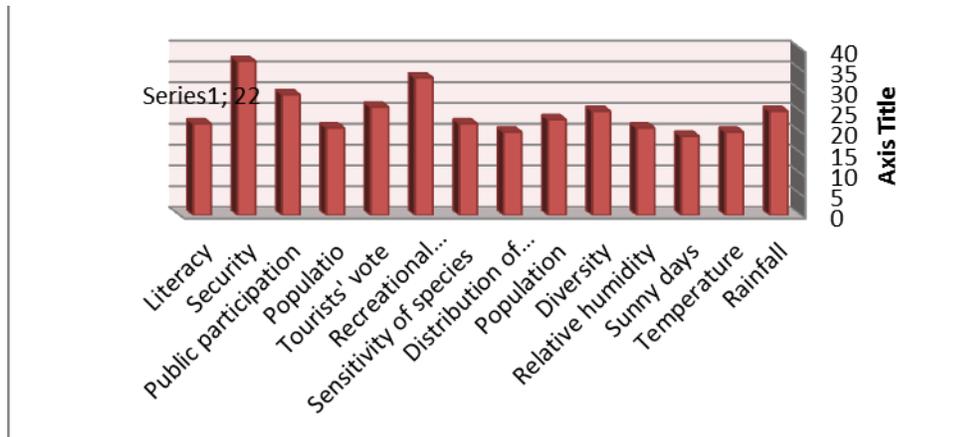


Figure 2: Diagram Of Importance Degree Of Rated Sub-Criteria Using The Delphi Questionnaire
 (The Author)

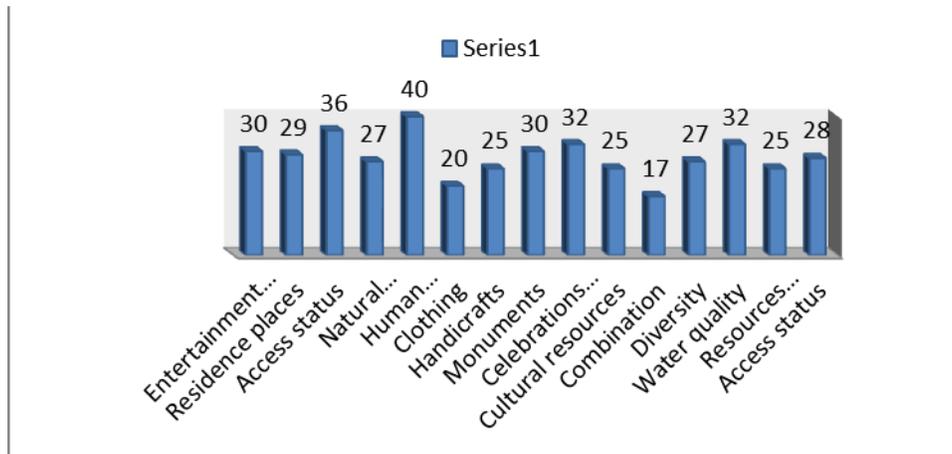


Figure 3: Diagram Of Importance Degree Of Rated Sub-Criteria Using The Delphi Questionnaire
 (The Author)

The highest level is the ultimate goal of decision maker in creating a hierarchy (identification of ecotourism development in Qeshm Island). Then the hierarchy is divided from whole to detail in order to come down the surface of component. The decision options in contrast with this level are

the lowest hierarchical level and they are evaluated. Each level is connected to its previous and higher level (Moeen Addini,

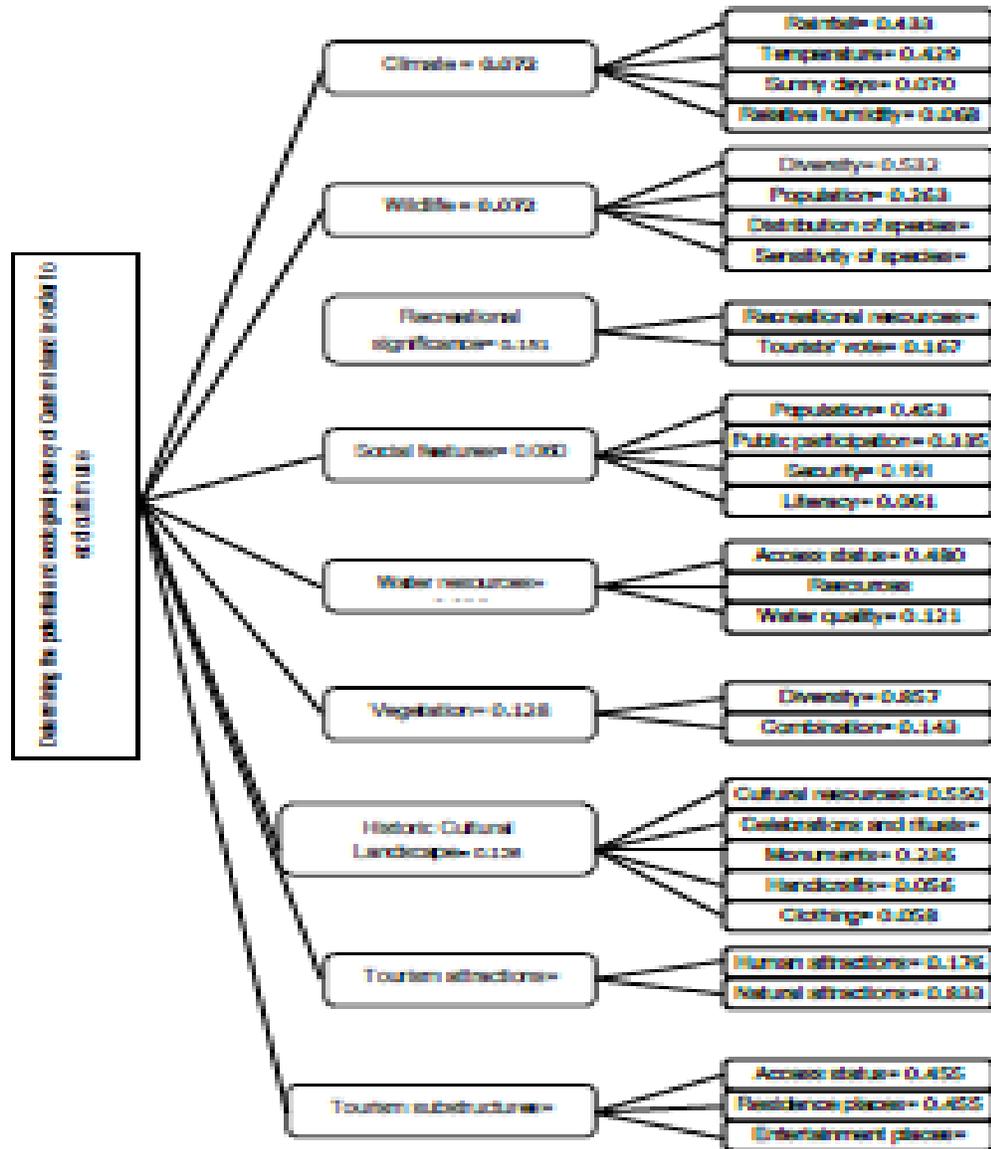


Figure 6. The hierarchical structure designed in this study, has been shown in figure.

Figure 4: The hierarchical structure designed in this study, has been shown in figure.

Discussion and conclusions

Determining the appropriate locations for tourism in natural and environmental conditions is very important. Because the effective factors are different in finding the potentiality of tourism places and also they need a capable tool to find an appropriate place for tourists considering all the factors.

Potential features of the Qeshm Island such as cultural, historical, and tourism attractions gave rise to select this region in order to assess the tourism potential for tourism use. At the end of the assessment process and after combining the maps and determining the potential of this region for use, the findings of this study showed that extracted criteria and sub-criteria from different resources for determining the prone areas of ecotourism in Qeshm Island which had been winnowed using Delphi method, consist of nine main criteria and 29 sub-criteria. Studies showed that the attractions criteria for tourism were the most important with a relative weight of 40% between all of the studied criteria and they were realized for selecting the prone regions of ecotourism among the natural ecosystems. Also the studies showed that according to the evaluation of the criteria by experts, standards of physical appearance, economic aspects, and soil had the least importance; and they were excluded from the criteria because of their low importance. So the results of the evaluation process of tourism criteria using Delphi questionnaire resulted in removing the three criteria of 12 selected criteria and the numbers of criteria for determining the research purposes was reduced to 9 criteria. Finally, weather criteria, water resources, vegetation, wildlife and habitat, social features, the recreational importance, historic cultural landscape, tourism attractions and tourism substructure have been recognized as important factors for selecting the prone areas for ecotourism; then their prioritize, weigh, and their relative importance were determined by analytical hierarchy process which is one way to evaluate multi-criteria decision making and their incompatibility coefficient were calculated. The incompatibility coefficient of their opinions was obtained about 0.04 for criteria and about 0.018 for sub-criteria which are desirable. As the result of this soundings about the priority and importance coefficient of the main criteria of this study, criterion of promenade importance and tourism attractions has the highest weight with 0.151 importance coefficient; and the criterion of social features has the lowest weight with 0.060 relative weights.

The region, practical guidelines are offered as follows:

- Identifying the features and attractions of tourism
- using the appropriate incentive solutions for attracting tourists and globe-trotters
- Development of infrastructure and amenity-travel facilities
- Establishing tourism training centers and providing tourism information system using the World Tourism Organization standards (WTO)

- Proper training of residents interact with tourists
- Determining the tourism position in overall status of the country and having determined trustee
- Coordination between the executive agencies that are working in the field of tourism
- Presence the courses at different levels of education in the field of tourism
- The staff skill of tourism department in foreign language
- Establishment of grassroots groups (NGO) in order to increase participation and to attract the public funds
- Presence of the database and service informational in the context of historical and scenic attractions
- Proper information and advertisers about the tourism potential

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