IDENTIFYING THE MOST EFFECTIVE GEOSITE EVALUATION MODELS IN IRAN USING DELPHI AND ANALYTIC HIERARCHY PROCESS METHODS

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Abstract: Despite the large amount of information, including books, articles and pristine images of geotourism, there exists no comprehensive study on the collection and classification of them in Iran yet. In this research, for the modelling of geosite watersheds, 1000 articles were surveyed through library research and the models with the highest frequency of use were identified and analysed among a statistical sample of 451 local papers using the Meta-Analysis method, and then the most efficient ones were identified using Delphi and Analytic Hierarchy Process (AHP) methods. The results of this study showed that while the strengths, weaknesses, opportunities and threats (SWOT), Pralong, Reynard, AHP and Pereira models are in the first to fifth-ranked models with the highest frequency, however, Pralong, SWOT, Reynard, Perira and Comanescu models were considered as the most efficient ones in geosite modelling in Iran.

Keywords: geotourism, geosite, evaluation models, Delphi, AHP, Iran

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Introduction

The accumulation of knowledge within scientific research has been a permanent feature of human knowledge, causing a research crisis in modern sciences. The reason for this crisis is mainly due to the high volume and excessive dispersion of scientific publications. This crisis raises the complexity of the objective and practical knowledge of an intense amount of research information. However, the purpose of scientific research is to achieve objective knowledge and applied results through all of these studies (Glass 2000). One of the major goals of scientific research is to achieve reliable results, eliminate contradictions in various studies and discover knowledge gaps.

A Meta-Analysis is a systematic review of these goals by analysing the quantitative findings from studies related to a research problem (Nasrollahi 2013). Therefore, a permanent knowledge network will flow, and results and solutions can be solved differently by interconnecting each other. Another benefit of Meta-Analysis is the use of educational and academic systems (Sarvestani 2000). For the first time in 1976, the word Meta-Analysis was used by Jane Glass in the course of social and behavioural research. It is the first scientific source to justify this method as a complete

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set of methods for integrating research backgrounds in all fields of study (Abadi 2013).

Of course, some scholars have used other terms for this type of methodology, which includes compilation research, combined research, quantitative review, systematic review and information compilation. But none has become as user-friendly as Meta-Analysis. The Meta-Analysis method in Iran has been used in research works on medical, social and psychological sciences; however, other sciences, including physical geography and tourism, ecotourism, and geotourism, have benefited less from this method (Nasrollahi 2013). Among the least frequent Meta-Analysis studies on Geotourism in Iran, Ghanavati et al. (2012) made a review on the evolution of geotourism and its models in Iran. The results of this study indicated that among the 10 models of research, Pralong and Ecological models were the most commonly used models and the Fuzzy model was the least used model. From 2010 to 2012, the most research works related to the use of models in geotourism have been studied elaborately, which reflected the growing trend of this type of study in the country.

In recent years, a large amount of information on ecotourism and geotourism has been spread throughout the world. As one of the subcategories of the tourism industry, geotourism is considered significantly important since the diversity of geological structures in different points of Iran attracts many geologists as well as nature lovers from all over the world every year (Ranjbaran et al. 2020). Although Iran has not succeeded in establishing geoparks in the global system and has only been able to create Qeshm geopark, numerous studies on geomorphic geocaching sites have been published in Iran. Chingombe (2019) believes that evaluation of geomorphosites value types has gained popularity in geomorphological heritage research. Moreover, although a large amount of information, including books, articles, studies and pristine images of geomorphotourism and geomorphosites under various titles such as geocaching, geotourism, ecotourism, geoheritage, geolodge, ecolodge and georesort, has been produced previously, there is not yet a comprehensive study on their collection and their categorisation systematically.

There are two main approaches towards assessment of geosites and geomorphosites: the first one is based on expertise and qualitative procedures and the second one is related to the need to rank the sites numerically (Pereira and Pereira 2010). Since the 1990s various assessment methods for geosites evaluation were introduced, e.g. Panizza and Piacente (1993), Barba et al. (1997), Grandgirard (1999) or Reynolds (2001). These methods were focused mainly on the scientific value of the geosites, while some of them did not consider the added values that are important for geotourism activities which serve as a base or inspiration for more complex assessment methods.

Later, other assessment methods were presented within the concept of geomorphosites. These methods generally include both scientific and added values, so they can serve better for geotourism purposes or for assessment of the tourist potential of the sites. Coratza and Giusti (2005) not only presented a method for determining the natural and scientific values of geomorphological sites, but they also encapsulated the added values. Bruschi and Cendrero (2005) presented a method to assess or measure intangible values of geomorphosites. Pralong (2005) presented a methodology that can be used in assessing the tourist potential of the geomorphological sites. Serrano and González-Trueba (2005), Zouros (2005) and Zouros (2007) introduced an assessment methodology that can be used for the evaluation of the geomorphosites in protected areas. Reynard et al. (2007) and Pereira et al. (2007) also presented the assessment methodology for assessing scientific and added values. Later, Pereira and Pereira (2010) introduced an assessment methodology for prospective geomorphosites. All the methods mentioned earlier are numerical; the numerical assessment has an advantage of relative objectivity, but even certain parameters can be measured with difficulties, resulting in some disagreements.

Reflection in this rich history has led the authors to systematically and analytically conduct research on geosites assessment models in Iran, identifying their most efficient methods using Delphi and Analytic Hierarchy Process (AHP) methods. In this research, about 1000 titles of articles, books were identified from internal and external sources, but due to their high volume, a statistically comparable sample was selected and analysed using the Meta-Analysis method. In this way, 451 articles were evaluated from local papers. Evidently, the most relevant articles were selected and refined according to their relevance to the research objective which is geotourism site evaluation models. The main hypothesis of this research is that only frequent repetition of a model in the statistical sample is not the reason for its effectiveness. Therefore, while recognising the most frequent models in the field of optimal geosite evaluation, it is necessary to achieve their most efficient ones to achieve the modelling process with a meaningful research ground.

Literature review

Geotourism is a term that showed up, right off the bat, during the 1990s characterised by Hose (1995) as a travel industry specialty item 'geographical based' and furthermore, in 2002, by the Public Geographic Culture as a travel industry and regional methodology 'geological based'. Geotourism can be, presently, characterised by Dowling and Newsome (2018), as a type of travel industry which centres around a space's topography and scene, as the premise of cultivating sustainable tourism development to create benefits for preservation, communities and the economy. As of now, as indicated by Gordon (2018), geotourism has given a social reaction to the actual scene. Geotourism is geographically based tourism in destinations with geoheritage, upheld by translation, instruction and geoconservation that advance supportable monetary advantages for nearby communities.

Currently, individuals have been more principled and dependable in esteeming the regular legacy, to give them more advantages appeared by geoconservation and geotourism exercises (Gordon 2018). In this way, Dowling and Newsome (2018) perceive that sustainable geotourism requires great arranging and the right administration of its land highlights to give ecological, social and monetary advantages. The dynamic support of residents alluded by Ólafsdóttir and Dowling (2014), in geotourism arranging, is principal to the sustainably of the cycle with the goal that partners have an improvement and development expertise obtaining in the geotourism improvement measure. Here, the moral issue is essential in the participatory planning measure and incorporates the requirement for improvement entertainers to consider the mentalities and sensations of the neighbourhood local area, including how an unaltered nearby environment adds to the community feeling of the spot. Any advancement of geotourism ought not to limit residents' feeling of having a place with the nearby environment. As reviewed the importance of sustainable development of geotourism in potential places, the need for geosite evaluation methods is in high demand.

The evaluation models created earlier focus fundamentally on geomorphosites and their logical quality, and later extra qualities (Grandgirard 1999, Bruschi and Cendrero 2005, Coratza and Giusti 2005, Reynard 2005, Reynard and Panizza 2005, Reynard et al. 2007, Pereira et al. 2007). In light of a portion of these models, another model was created by Pralong (2005), which is explicitly used for the assessment of the traveller nature of geomorphosites and their utilisation by tourism area. As per this strategy, the traveller estimation of a site is resolved as the normal estimation of the grand, logical, social and economic qualities. In this model, as in numerous previous models, one of the principal issues concerning the assessment of a site is objectivity. None of the referenced strategies remember data for the requirements, perspectives, interests and desires of the sightseers who visit geosites which is vital particularly while assessing the vacationer capability of a site. Guest consideration in the assessment cycle is a decent method to accomplish objectivity. An illustration of this is given in a report by the Scottish Normal Legacy (George Street Research 2006). The report depicts a review led among normal guests (non-specialists) and specialists hence including the assessment of the two closures of the range rather than only one like in many past models. Nonetheless, this sort of examination can be mind boggling and tedious, which implies that the improvement of more basic models is needed for the future choice of the best destinations for geotourism.

There are two fundamental ways to deal with the evaluation of geosites and geomorphosites: the first depends on the ability and subjective methodology, and the subsequent one is identified with the need to rank the sites, survey the site numerically and identify the capability of the site (Pereira and Pereira 2010). Since the 1990s, different evaluation models for geosites were presented, e.g. Panizza and Piacente (1993), Barba et al. (1997), Grandgirard (1999) or Reynolds (2001). These strategies were centred basically around the logical estimation of the geosites, and some of them excluded the additional qualities that are significant for geotourism exercises albeit the rules filled in as a base or motivation for more complex assessment methods. Afterwards, within the idea of geomorphosites, other evaluation models were introduced. These models incorporate both logical and added values, so they can fill better for geotourism needs or evaluation of the vacationer capability of the destinations. Coratza and Giusti (2005) introduced a strategy for deciding the characteristic or logical estimations of geomorphological destinations, however, they additionally included added values. Bruschi and Cendrero (2005) introduced a model to survey or gauge theoretical estimations of geomorphosites. Pralong (2005) introduced an approach that can be utilised in evaluating a traveller capability of the geomorphological destinations. Serrano and González-Trueba (2005), Zouros (2005) and Zouros (2007) presented an appraisal strategy that can be utilised for the assessment of the geomorphosites in secured zones. Reynard et al. (2007) and Pereira et al. (2007) likewise introduced the appraisal systems for evaluating logical and added values. Afterwards, Pereira and Pereira (2010) presented an appraisal strategy for potential geomorphosites. Every one of the techniques referenced above is numerical; the numerical evaluation has a benefit of relative objectivity, however, even there are sure boundaries that can be estimated with troubles and could be the wellspring of conflicts. Another problem of the assessment process is subjectivity, especially not only in the evaluation of aesthetic and cultural aspects of the site but also in the evaluation of the scientific significance of the site.

Generally, the evaluation is partitioned into a few stages: an appraisal of logical qualities, an appraisal of added values (in some cases it incorporates an appraisal of the vacationer potential or evaluation of monetary qualities, sometimes these are surveyed freely) and the evaluation of weakness, dangers and hazard on the site. It is important to underline that appraisal must be done based on the information and existing itemised stock of the potential geosites and geomorphosites. The evaluation of logical qualities depends on standards which are associated with the inborn estimation of the site (Panizza 2009) and the surveying models are addressed, e.g. by respectability or extraordinariness. A few creators incorporate additionally exemplarity or academic worth (Pereira et al. 2007) or logical information on the site (Coratza and Giusti 2005, Bruschi and Cendrero 2005).

The evaluation of the additional qualities depends on the social/authentic/strict/stylish viewpoints that are associated with the site. These qualities are by and large less exact and rely upon the affectability of the assessor yet they are additionally fundamental for the total evaluation (Pereira and Pereira 2010). While the social/chronicled/strict standards typically comprise just the data about the degree of significance of these resources (e.g. Coratza and Giusti 2005), the appraisal of tasteful or beautiful perspective is more muddled and can be affected by subjectivity. The evaluation measures for the tasteful worth are by and large dependent on the perceivability and number of perspectives and shading diverge from encompassing (Pralong 2005, Reynard et al. 2007), vertical construction or number of tones (Pereira et al. 2007). The evaluation of the economic worth or potential for the utilisation is generally dependent on the rules such as accessibility, limitations of use and existence of infrastructure (Serrano and Gonzalez-Trueba 2005) or presence of financial and supporting items identified with the site or development of the site (Pralong 2005, Reynard et al. 2007). A few strategies incorporate the evaluation of weakness and both regular and anthropogenic dangers to the site (e.g. Pereira et al. 2007). The assessment criteria are represented by the existing legislative protection of the site or present and potential threats (Zouros 2007).

Materials and methods

Meta-Analysis means extracting information from primary sources and then combining them into a new whole set of information (Ahmadabad and Hasani 2006). In other words, the Meta-Analysis deals with secondary analysis (re-analysis of studies) through the initial analysis (a preliminary analysis of studies). Some people imagine that this method does not have any new operationality but only has a charming look; so, they believe that it repeats the same old saying (Gallo and Lynn 1981). But this is not really the case, and the Meta-Analysis involves new subjects. In general, the basic idea behind this approach is that the analysis unit is taken from the study rather than from the subject. The purpose of the Meta-Analysis is to introduce the way of thinking to create a new whole of the individual components. The basic and practical principle in this method is to combine the results of various researches, to derive new results and integrate them and to eliminate what causes the bias in the final results (Wolf 1986).

Meta-Analysis is an analysis of a set of research carried out to integrate the findings and, by combining the findings, generates new data. The main task of the Meta-Analysis method is to coordinate and harmonise the results of the research. For the implementation of the Meta-Analysis method, several steps have been proposed by Yang (2002), which are given below:

1. Definition of the studied variables and compilation of questions or research questions;
2. Finding literature and systematically identifying sufficient empirical studies;
3. Encoding previous studies and selecting appropriate index of effect size;
4. Analysis of collected data from past experimental studies;
5. Interpreting the results and extracting appropriate research findings.

Of course, these systematic stages are not steady-state and can be adjusted according to the subject or the considered field of study, the specific goals of the researcher and the procedures adopted in the analysis. For example, a researcher may only follow one or two of these steps (Abadi 2013). In this research, the Meta-Analysis steps were based on the results that the researchers expected listed in five stages in the following:

1. Identify published articles;
2. Refining the identified articles and selecting the statistical sample;
3. Monitoring the statistical sample and identifying the sources studied by the model;
4. Identification of repetitive models in the statistical sample;
5. Identifying the most efficient models among repetitive models.

Out of these five stages, the first four stages were done through studying texts and sometimes abstracts and simple mathematical counting within the statistical sample. But the fifth stage required a qualitative analysis in the context of the Meta-Analysis by conducting a mixed Delphi and AHP techniques in three strides. Therefore, in the first stage, the Delphi experts were nominated by the researchers. Then, in the second stage, the compilation and distribution of the questionnaire for evaluating the most repetitive models were done based on the Delphi method. Finally, in the third phase, the evaluation of the results of the questionnaires was accomplished using the AHP model.

Results and discussion

The research process is arranged in the following order to achieve the optimal results.

Identification of published articles

This identification was carried out by reviewing the titles of published articles in Iran with the themes of ecotourism, geotourism, geomorphotourism, geosite and other keywords relating to these concepts. More than 1000 articles have been recognised on this topic in scholarly journals or at local conferences.

Refining the identified articles and selecting the statistical sample

The articles were not considered either based on their scientific level or the study of their abstracts; however, the relevance with the subject of geotourism was measured. The result of this refinement was the selection of 451 articles that were considered content-friendly.

Monitoring the statistical sample and identifying the sources studied by the model

At this stage, the statistical sample was used for monitoring the models' repetition in the selected articles (a statistical sample) (Table 1).

Table 1. The repetition of geosite evaluation models within statistical sample.

No	The models	Number of repetitions in the selected articles	The rank of each model based on the frequency of use
1	Nabavi	2	11
2	Amri Kazemi	2	11
3	Nazeri	1	12
4	SWOT	62	1
5	Fassoulas et al.	4	9
6	GAM	3	10
7	Reynard	28	3
8	Pralong	37	2
9	Topsis	8	6
10	Dynamic	4	9
11	AHP	16	4
12	Delphi	6	7
13	ANP	4	9
14	Fuzzy	3	10
15	MCDM	3	10
16	Climate comfort	1	12
17	Ecologic	4	9
18	Tourism climate index	1	12
19	Geotourismic	1	12
20	SVM	1	12
21	Ecotourism potential index	3	10
22	Comanescu	4	9
23	Rocha	1	12
24	Nicolas	1	12
25	Pereira	11	5
26	Hybrid	1	12
27	TCL	1	12
28	CVM	4	9
29	QSPM	5	8
30	Cluster analysis	1	12
31	Citation	1	12
32	Kuchin	2	11
33	The objective function	1	12
34	SDAC	1	12
35	Bulin	1	12
36	Zanganeh Asadi et al.	1	12

Identification of the most repetitive models in the statistical sample

At this stage, the top nine models were introduced as the most repetitive models. The results of this stage are presented in Table 2.

Table 2. The most repetitive models within the statistical sample.

No	Model title	Number of repetitions in the statistical sample (451 articles)	Rank in the statistical society from the point of the number of use
1	SWOT	62	1
2	Pralong	37	2
3	Reynard	28	3
4	AHP	16	4
5	Pereira	11	5
6	Topsis	8	6
7	Delphi	6	7
8	QSPM	5	8
9	Fassoulas et al.	4	9
10	Dynamic	4	9
11	ANP	4	9
12	Ecologic	4	9
13	Comanescu	4	9
14	CVM	4	9

Identifying the most efficient models among the most repetitive models

This stage required a qualitative analysis of the Meta-Analysis, which was preferred to achieve the goals of the collective wisdom of experts, especially the specialists of the two disciplines of geomorphology and tourism. Three basic steps were needed to accomplish this stage:

1. First step: Comprehensive text formatting in which they refer to the criteria for assessing geosites evaluation models, so that the audience and experts responding to the questionnaires will be able to compare the models by studying them.
2. Second step: Compilation and distribution of the questionnaire for evaluating repetitive models, including the text obtained from the first step and the selection of efficient models by the results of their Delphi method. In the design of the questionnaire, four basic criteria for evaluating repetitive models were considered namely: 'Easy to Understand', 'Order in Structure', 'Fit with the Watershed' and 'Ability of Assessment'. There were 14 models selected for evaluation.
3. Third step: A panel of tourism experts was selected by the researchers to identify the final most efficient geosite evaluation models. The researchers selected 20 experts among the experts within the field of geomorphology and

Table 3. Paired comparison matrix for the criteria used to evaluate the efficiency of geosites evaluation models.

Criteria	Easy to understand	Order in structure	Fit with the watershed	Ability of assessment
Easy to understand	1	5	5	1
Order in structure	1/5	1	1	1/5
Fit with the watershed	1/5	1	1	1/5
Ability of assessment	1	5	5	1

tourism to reach the desired and adequate panel number while there is no clear agreement among the researchers on the number of panel members of the Delphi technique (Williams and Webb 1994), but if a combination of experts with a range of specialisations is used, it is enough to have between 5 and 10 members (Somerville 2008). Therefore, 20 questionnaires were sent to these experts under the above-mentioned guidelines, both manually delivered and sent by e-mail. The results of the experts' responses were analysed and evaluated by the researchers; so, there was no need for conducting a second round of the Delphi technique. Therefore, the Delphi panel reached the consensus on the four criteria as the vital ones in identifying the most efficient geosites evaluation models, namely: 'Easy to Understand', 'Order in Structure', 'Fit with the Watershed', and 'Ability of Assessment'. Of course, the AHP method is also integrated into this study and done as follows:

The first stage (building a hierarchy).

In this part of the study, we utilised a three-level hierarchy, including objectives, criteria and options. The purpose of this section is to identify the most efficient models among the most repetitive models. Our evaluation criteria are:

1. Easy to understand and smooth the steps of implementing the model for the researcher;
2. The order in the structure and the complexity of the method of work and the absence of additional steps;
3. Encompassing the characteristics of the representative area conditions as the typical model fit with the country's watersheds;
4. Ability to explain and evaluate geomorphic special places.

The second stage (the weighting of criteria).

As noted, the experts at this stage, weighted the four existing criteria pair wisely (Table 3). Then, we proceeded to rank the criteria according to their weight, the results of which are given in Table 4.

The third stage (determine the importance of criteria):

At this stage, the experts were asked to compare the 14 most repeated models pair wisely within the four criteria to find out the importance of each criterion and rank the models based on each criterion. The researchers applied the Expert Choice software to attain the results where the procedure is shown in Tables 5–8.

The fourth stage (ranking the efficiency of geosites evaluation models)

At this step, the total rank of 14 models is determined based on all four criteria, which shows the efficiency of these models in geosite evaluation (Table 9).

The results of the final weighting table prove the research hypothesis meaning that only the high repetition of a geotourism model within this research field is not a logical reason for its effectiveness. So, as observed, the strengths, weaknesses, opportunities and threats (SWOT), Pralong, Reynard, AHP and Pereira models ranked 1–5 in the most frequent table (Table 2). But in terms of weighting these models based on their efficiency, Pralong, SWOT, Reynard, Pereira and Comanescu models ranked as the most efficient ones in order (Table 9).

The research reviewed various geosite evaluation models in Iran to find the most efficient models for geosite evaluation purposes. The result of this research agrees with the new trends in geomorphosite evaluation models since nowadays the issue of assessment of the added values is based on the

Table 4. The weight of criteria based on AHP method.

No	Criteria	Weight
1	Easy to understand	0.417
2	Order in structure	0.083
3	Fit with the watershed	0.083
4	Ability of assessment	0.417

cultural/historical/religious/aesthetic aspects that are connected to the site. While the cultural/historical/religious criteria usually consist of only the information about the level of importance of these assets (e.g. Coratza & Giusti 2005), the assessment of aesthetic or scenic aspect is more complicated and can be influenced by subjectivity. The assessment criteria for the aesthetic value are generally

Table 5. The pairwise comparison matrix chart for 'Easy Measurement' criterion in the expert choice software environment.

	SWOT	Pralong	Reynard	AHP	Pereira	Topsis	Delphi	QSPM	Fassoulas et al.	Dynamic	ANP	Makhdoum	Comanescu	CVM
SWOT		2	2	2	2	3	4	1	3	2	3	2	4	4
Pralong			1	3	1	4	2	2	2	2	2	2	1	3
Reynard				3	1	2	3	2	2	2	2	2	1	3
AHP					2	2	3	2	2	2	1	2	2	2
Pereira						1	2	2	1	2	2	3	1	3
Topsis							1	1	2	2	1	2	2	2
Delphi								3	2	1	3	3	2	4
QSPM									2	1	2	3	3	2
Fassoulas et al.										2	2	2	2	2
Dynamic											2	2	3	2
ANP												4	2	2
Mahdoum													2	1
Comanescu														2
CVM														

Incon:0.08.

Table 6. The pairwise comparison matrix chart for 'Order in Structure' criterion in the expert choice software environment.

	SWOT	Pralong	Reynard	AHP	Pereira	Topsis	Delphi	QSPM	Fassoulas et al.	Dynamic	ANP	Makhdoum	Comanescu	CVM
SWOT		2	2	3	3	2	2	1	2	2	3	2	3	3
Pralong			2	3	3	3	3	2	4	2	2	3	2	2
Reynard				2	3	2	2	2	2	3	2	2	4	2
AHP					2	2	2	3	2	1	3	3	2	2
Pereira						2	2	3	2	2	2	3	2	2
Topsis							5	3	2	3	2	2	2	2
Delphi								3	2	2	3	2	3	2
QSPM									3	1	2	2	2	3
Fassoulas et al.										2	2	2	3	2
Dynamic											2	3	1	2
ANP												3	3	3
Makhdoum													3	1
Comanescu														3
CVM														

Incon:0.09.

based on the visibility and number of viewpoints and colour contrast with surrounding (Pralong 2005, Reynard et al. 2007), vertical structure or number of colours (Pereira et al. 2007). Hence, as mentioned in the background of research, there should be efficient models to assess these criteria as a whole such as the top five efficient evaluation models in the case of Iran's geomorphosites.

Table 7. The pairwise comparison matrix chart for 'Fit with the Watershed' criterion in the expert choice software environment.

	SWOT	Pralong	Reynard	AHP	Pereira	Topsis	Delphi	QSPM	Fassoulas et al.	Dynamic	ANP	Makhdoum	Comanescu	CVM
SWOT		2	2	2	3	3	3	2	1	2	2	3	2	4
Pralong			2	2	2	2	2	3	2	2	2	2	2	2
Reynard				2	2	2	2	2	2	2	2	2	2	3
AHP					2	3	2	2	2	1	3	2	2	3
Pereira						2	2	2	2	3	2	2	2	2
Topsis							2	2	3	1	3	2	3	1
Delphi								2	2	1	3	2	3	1
QSPM									3	2	3	2	2	2
Fassoulas et al.										2	3	2	2	2
Dynamic											2	2	2	2
ANP												2	2	2
Makhdoum													2	1
Comanescu														3
CVM														

Incon:0.06.

Table 8. The pairwise comparison matrix chart for 'Ability of Assessment' criterion in the expert choice software environment.

	SWOT	Pralong	Reynard	AHP	Pereira	Topsis	Delphi	QSPM	Fassoulas et al.	Dynamic	ANP	Makhdoum	Comanescu	CVM
SWOT		2	3	2	2	6	7	5	3	4	2	4	3	5
Pralong			1	2	2	4	4	3	3	4	2	3	3	4
Reynard				3	2	3	4	3	3	4	3	3	2	4
AHP					2	2	3	2	3	3	2	4	3	5
Pereira						3	3	3	1	2	3	2	2	3
Topsis							2	2	2	3	4	2	3	2
Delphi								2	2	2	4	3	2	2
QSPM									2	2	4	2	3	2
Fassoulas et al.										2	3	2	2	3
Dynamic											4	1	2	1
ANP												3	3	3
Makhdoum													2	1
Comanescu														2
CVM														

Incon:0.04.

Table 9. The rank of efficient geosites evaluation models based on all criteria.

No	Model title	Weight	Rank
1	Pralong	0.112	1
2	SWOT	0.109	2
3	Reynard	0.106	3
4	Pereira	0.088	4
5	Comanescu	0.086	5
6	AHP	0.083	6
7	ANP	0.081	7
8	Fassoulas et al.	0.075	8
9	Delphi	0.058	9
10	Topsiss	0.043	10
11	QSPM	0.043	11
12	Ecologic	0.043	12
13	Dynamic	0.041	13
14	CVM	0.031	14

Conclusion

According to a research done by Carrión-Mero et al. (2020) on Assessment of Geomorphosites for Geotourism in the Northern Part of the 'Ruta Escondida'; the SWOT analysis revealed that the geomorphosites could provide significant added value to the development of geotourism on the route, complementing the already known cultural and historical attractions. Moreover, Kubalíková (2013) in his research on geomorphosite assessment for geotourism purposes mentioned that it is evident that all the methods cannot be used for the geotourism purposes – some of them are not equilibrated and they are focused unilaterally, so they do not meet the principles and key features of geotourism. These methods were assessed by using the proposed criteria based on the definitions and principles of geotourism. Therefore, he found that the most suitable method for assessing the geosites and geomorphosites for the geotourism purposes were the methods introduced by Pralong (2005) and Pereira et al. (2007). Hence, the results of the current research prove similar research around the world.

However, according to the lack of accordance between the most frequent geosite evaluation models and the most efficient ones in optimal geosite evaluation in Iran, it was found that the topmost frequent geosite evaluation models are of an exclusively geotourism type. Therefore, this research suggested that more attention should be paid to the models and sub-criteria in the methodology of these models in the process of geomorphological modelling for different locations around the World.

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