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Research Article

MCDA for evaluating the competitiveness of tourist destinations in Albania

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Abstract – The global economy is changing at a great pace, and the tourism industry cannot be different in this regard. It needs to change and improve constantly to maintain competitiveness in the international market. The competitive ability of any tourism service depends on its capacity to innovate, but only a few companies are able to do this with some consistency and coherence, improving their competitive advantage. The purpose of this article is to analyse some popular tourist destinations in Albania and compare and rank them from the best to the worst regarding their performance and the quality of their services. An important aspect of assessing competitiveness is defining indicators and factors according to a multi-criteria decision-making approach. A suitable framework will rank the tourism destinations according to their competitiveness based on the selected indicators and criteria defined by the decision-makers. The use of multi-criteria decision analysis (MCDA) is motivated by the fact that real-world decision-making problems have become much more complex and multi-factorial and cannot be accurately measured using only one-dimensional approaches. Defining such criteria would help in the overall assessment of the competitiveness of tourism services in Albania and would help in attracting new visitors and investors.

Keywords: MCDA, Competitiveness, Tourism, Services, Albania

I. INTRODUCTION

The tourism industry is a key factor in economic development, creating jobs, increasing income, and improving infrastructure in tourist destinations. It also has a great influence on the culture and identity of a country.

The development of tourism has a tremendous impact on the local economy and on creating opportunities for sustainable development [1]. Competition in the tourism sector is an important part of tourism growth and the promotion of new destinations. The competition brings a good range of results, encouraging the development of infrastructure, investments in innovation, and the creation of new experiences for visitors.

In the context of tourism, competitiveness is defined as the capacity of tourist destinations to attract travellers and investments, which results in an increase in the number of tourists, average of expenses, and thus increasing employment and income [2].

An important part of competitiveness is promoting the country's destinations on the international stage. Proper marketing of tourist attractions, the use of technology to advertise and present destinations, and the use of social networks are important approaches to attracting new visitors [3].

Another key element of competitiveness is the development of sustainable tourism. Preserving the environment, involving local communities in the benefits, and respecting the cultural heritage are essential to building a positive image of the destination.

Competitiveness in the tourism sector is extremely important to promote economic development, attract investment, create jobs, and raise the standard of living for local communities [4].

To compete successfully at the international level, investing in tourism infrastructure is needed. This includes the development of roads, airports, high-quality accommodation, local transport systems, etc.

Satisfactory and quality services are provided to affect the visitor's experience in order to attract more visitors in the future [5].

Tourist destinations in Albania have great potential to attract visitors from all over the world due to their natural wealth, history, culture, and numerous tourist attraction [6].

Some of the main elements that affect the competitiveness of tourist destinations in Albania are:

1. Natural Resources and Attractions:

Albania offers a wide range of natural resources, including a beautiful coastline, mountains, rivers, national parks, and clean and attractive beaches.

2. Cultural and Historical Heritage:

Cultural and historical assets, such as ancient cities, forts, archaeological sites, and ancient heritage, are an essential part of tourist attractions [7-9].

3. Tourism Infrastructure:

The development of tourism infrastructure, including accommodation, restaurants, transport, and other tourism services, is crucial to ensuring a suitable experience for visitors [10].

4. Accessibility and Transportation:

The ease of reaching tourist destinations and the availability of transportation are important factors that influence the establishment of a destination as competitive [11-12]].

5. Development of New Attractions:

Investing in the development of new tourist attractions, sports activities, outdoor adventures, and special events for tourists has the potential to increase competitiveness.

6. Marketing and Promotion:

A good marketing and promotion strategy at the local and international level helps to increase awareness and interest in tourist destinations [13].

The implementation of Multi-Criteria Decision Analysis (MCDA) in tourism competitions involves using various criteria to evaluate and make decisions about tourism-related matters, such as selecting destinations, assessing projects, or determining the viability of tourism initiatives [14].

MCDA helps in considering multiple factors, like economic impact, environmental sustainability, cultural significance, and social benefits, to make informed decisions in the tourism industry.

MCDA can also be applied to evaluate and rank regions or cities' urban resilience, or particular areas, such as of cities and communalities and municipalities located near rivers, lakes, or other vulnerable areas [15-17].

MCDA can be implemented for the evaluation of projects and helping select the most suitable in terms of respecting a set of criteria and restrictions, such as urban landfill sites, infrastructure, urban transport services, airports, roads [18].

Smart Cities projects of today and tomorrow have to face big social, ecological, and technological challenges such as digitalization, pollution, democratic aspirations, and security issues [19-21].

The dynamic and multiple natures of stakeholders can be addressed successfully by engaging the methods of MCDA or fuzzy MCDA [21-24].

The use of multi-criteria decision analysis can encourage the involvement of interested participants and various stakeholders in the decision-making process. This increases the transparency and legitimacy of the procedures [22-25].

In the realm of tourism, this can encompass a wide range of factors, including economic feasibility, environmental impact, cultural significance, infrastructure, accessibility, and visitor experience [26-27].

Benefits of MCDA implementation in tourism competitions:

1. Holistic Decision-Making: MCDA considers multiple dimensions simultaneously, allowing for a comprehensive evaluation that goes beyond single-factor decision-making [28].

2. Transparency and Consistency: The methodology brings transparency to decision-making processes by explicitly defining criteria and their weights, ensuring consistency, and minimizing bias [29-30].
3. Stakeholder Engagement: Involving stakeholders in the criteria definition and weighting process fosters engagement and ensures that diverse perspectives are considered.
4. Data management: selecting the best data storage method, determining data quality standards, optimizing quantity of necessary data .
Optimizing data management strategies by considering multiple conflicting objectives [31-32].
5. Industry production data: MCDA allows for the simultaneous consideration of diverse data criteria (accuracy, relevance, completeness, etc) to select the most suitable data management strategy [33-34].
6. Ranking and Optimisation, assessing methods of learning and teaching by implementing surveys, criteria and results [35-36].
Risk mitigation and Optimisation: By considering various criteria, MCDA helps in identifying potential risks and optimizing decisions to achieve desired outcomes.
Despite its advantages, MCDA in tourism competitions isn't without challenges. Determining accurate weights for criteria can be subjective and sensitive to individual biases.

II. MATERIALS AND METHODS.

Multi-Criteria Decision Analysis (MCDA) employs various tools to facilitate decision-making process.
1. Analytic Hierarchy Process (AHP) structures decision problems hierarchically, allowing for pairwise comparisons of criteria and assessing alternatives [37].
2. Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) evaluates alternatives based on their proximity to an ideal and a worst-case solution [38].
3. Elimination Et Choix Traduisant la Realité (ELECTRE) ranks alternatives by considering the relations between criteria and identifies acceptable or unacceptable options based on set thresholds [39].
4. Weighted Sum Model assigns weights to criteria and score alternatives based on these weights. The alternative with the highest overall score is favoured [40].
5. Measuring Attractiveness by a Categorical Based Evaluation Technique (MACBETH) assesses alternatives using a categorical system to determine the attractiveness of each option [40].
6. Preference Ranking Organization Method for Enrichment Evaluations (PROMETHEE) ranks alternatives-based preferences and potential benefits of each option.
Each tool has its specialized applications, depending on the nature of the problem and the study's requirements. In our case AHP is considered and implemented to continue with the study.
Analytic Hierarchy Process (AHP) is developed by Thomas Saaty in the 1970s. AHP is particularly useful when the decision problem involves both qualitative and quantitative criteria, and there is a need to systematically compare and prioritize these criteria [27]. The method involves:
1. Identify the decision problem and the criteria that are relevant to the decision.
2. Create a hierarchical structure for the decision problem, with the main objective at the top, and the criteria and sub-criteria below.
3. Pairwise comparison: For each pair of criteria, the decision maker is asked to determine which criterion is more important, using a scale of values ranging from 1 (equal importance) to 9 (extreme importance).
4. Calculation of weights: The pairwise comparison results are used to calculate the relative weights of each criterion using a mathematical formula.
5. Consistency check: The pairwise comparisons are checked using a mathematical formula to ensure that the decision-makers' judgments are coherent.
6. Evaluation of alternatives: Once the criteria weights have been determined, the alternatives are evaluated against each criterion using a scale of values. The results are combined to obtain an overall score for each alternative, figure 1.

Scale	Degree of preference	Reciprocal values
1	Equal importance of factors	1
3	Moderate importance of factors	$\frac{1}{3}$
5	Strong importance of one factor over another	$\frac{1}{5}$
7	Very strong importance of one factor over the other	$\frac{1}{7}$
9	Extreme importance of one factor over the other	$\frac{1}{9}$
2,4, 6, 8	Values for inverse comparison of factors' preference	$\frac{1}{2}, \frac{1}{4}, \frac{1}{6}, \frac{1}{8}$

Fig. 1. Saaty scale for the pair wise comparison (1994)

Decision matrix:

Let's assume n attributes/criteria:

The pairwise comparison of any attribute i with any attribute j form a square matrix $C_{n\,x\,n}$ where the term $c_{\,i,j}$ denotes the comparative importance of the attribute i concerning the other attribute j.

In the comparison matrix, we have

$$c_{i,j} = 1, for\ i = j, \text{ and } c_{i,j} = \frac{1}{c_{j,i}}, i \neq j. \quad (1)$$

$$A_{mxn} = \overbrace{\begin{pmatrix} 1 \\ 2 \\ \dots \\ \dots \\ m \end{pmatrix}}^{Attributes} \begin{bmatrix} c_{11} & c_{12} & \dots & a_{1n} \\ c_{21} & c_{22} & \dots & a_{2n} \\ \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots \\ c_{m1} & c_{m2} & \dots & a_{mn} \end{bmatrix} \quad (2)$$

Construct the normalized decision matrix,

$$d_{i,j} = \frac{c_{i,j}}{\sum_{j=1}^{n} c_{i,j}},\ i = \overline{1,n};\ j = \overline{1,n}. \quad (3)$$

Construct the weighted normalized matrix,

$$w_i = \sum_{j=1}^{n} \frac{d_{i,j}}{n},\ i = \overline{1,n} \quad (4)$$

$$W = \begin{bmatrix} w_1 \\ w_2 \\ \dots \\ \dots \\ w_n \end{bmatrix} \quad (5)$$

Calculate Eigenvectors and Row Matrix,

$$E = \frac{N^{th} rootvalue}{\sum N^{th} rootvalue} \quad (6)$$

Rawmatrix: $= \sum_{j=1}^{n} c_{ij} * e_{j1}$ (7)

Calculate the principal Eigenvalue,

$$\lambda_{max} = \frac{Rowmatrix}{E} \quad (8)$$

Calculate the Consistency Index,

$$CI = \frac{(\lambda_{max} - n)}{n-1} \quad (9)$$

Where n is the Matrix order.

The consistent ratio: $CR = \frac{CI}{RI}$ (10)

If the value of the Consistency Ratio is less than 10%, the decision matrix is consistent.

If CR> 10% then the process is repeated by revising the subjective pairwise comparisons of the criteria/factors.

The pairwise comparison matrix is completed by weighing the criteria in terms of their relative importance two by two. The relative importance of each of the two criteria is expressed using index values ranging from 1 to 9. If the relative importance of A to B is $c_{i,j}$ then the relative importance of B to A $c_{j,i} = \frac{1}{c_{i,j}}$.

Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) is another technique used in MCDA. It determines the ideal and negative-ideal solutions based on the shortest distance to the positive ideal solution and the longest distance to the negative ideal solution. Alternatives are then ranked based on their relative distance to the ideal solution. Weights mean how much a given factor should be taken into consideration (default weight = 1 for all factors). Impact of a given factor can be positive or negative. The main advantage is that it limits the subjectivity introduced by policy makers to the determining the weights of the criteria.

Procedure:

A decision-analyser/maker k rates the alternatives A_i to the criteria C_j in a matrix

$B^k = [f_{ij}]$ of dimensions $A_m x B_n$.

$$B_{mxn} = \begin{pmatrix} A1 \\ A2 \\ \dots \\ \dots \\ Am \end{pmatrix} \begin{bmatrix} \overbrace{C1 \quad C2 \quad \dots \quad ;\dots \quad Cn}^{} \\ f_{11} & f_{12} & \dots & f_{1n} \\ f_{21} & f_{22} & \dots & f_{2n} \\ \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots \\ f_{n1} & f_{n2} & \dots & f_{mn} \end{bmatrix} \quad (11)$$

where:

A_i represents the alternative i,

C_j represents the criteria j,

for $i = 1,2,\dots,m;\ j = 1,2,\dots,n$,

f_{ij} represents the performance rating of A_i under C_j,

for $k = 1,2,\dots,r$ the number of decision analyser/makers.

Normalized matrix for the above-given values is:

$$r_{i,j} = \frac{f_{i,j}}{\sqrt{\sum_{k=1}^{m} f_{kj}^2}}, i = 1,2,\dots,m; j = 1,2,\dots,n \quad (12)$$

Quantitative values are directly input into the matrix while qualitative judgements use a linguistic scale.

A 1-9 scale is used for TOPSIS, as in AHP, table 1.

Table 1. Linguistic and numeric scale for TOPSIS.

Linguistic value	Numerical value
Very low	1
Low	3
Moderate	5
High	7
Very high	9

The calculation of the weighted standardised decision matrix, the weighted normalized value defined as v_{ij} is calculated using the formula:

$v_{ij} = w_j * r_{ij}$,

Where:

w_j is the weight of the $j-th$ attribute or criterion and $\sum_{j=1}^{n} w_j = 1$;

Determination of the ideal and anti-ideal solutions according to the formulas:

$$A^* = \{v_1^* v_2^*, .., v_n^*\} = \{\left(\max_i v_{ij} | j \in I'\right), \left(\min_i v_{ij} | j \in I''\right)\} \quad (13)$$

$$A^- = \{v_1^- v_2^-, .., v_n^-\} = \{\left(\min_i v_{ij} | j \in I'\right), \left(\max_i v_{ij} | j \in I''\right)\} \quad (14)$$

where I' is related to the benefit, and I'' to the cost criteria.

Calculation of the distance measure using *n*-dimensional Euclidean;

The distance of each alternative from the ideal solution is expressed by the formula:

$$d_i^* = \sqrt{\sum_{j=1}^{n} (v_{ij} - v_j^*)^2} \quad (15)$$

Similarly, the distance from the anti-ideal solutions is calculated on the basic of:

$$d_i^- = \sqrt{\sum_{j=1}^{n} (v_{ij} - v_j^-)^2} \quad (16)$$

Calculation of the relative closeness to the ideal solution, the relative closeness of the alternative A_i in relation to A^* is defined as:

$$CC_i^* = \frac{d_i^-}{d_i^* + d_i^-} \quad (17)$$

Higher the score, better the rank is. The rating model can be used to create a ranking list of tourist sites, according to their performance making it easier for tourist agencies, or visitors to identify and choose the most suitable destinations to visit.

III. RESULTS AND DISCUSSION

In order to assess the competitiveness of tourist destinations in Albania, several key criteria are selected (C1-C9):

C1. Natural and Cultural Resources: Assessment of natural resources, such as beaches, mountains, national parks, as well as cultural heritage, ancient cities, castles, and archaeological sites.

C2. Tourist Infrastructure: The quality of accommodation, restaurants, transport infrastructure, and tourist services in the main destinations.

C3. Accessibility: How easy it is to reach the destination and how easy it is to move within it, including public transport and road infrastructure.

C4. Quality of Service: Evaluation of the visitor experience, including quality of service, friendliness and professionalism of service personnel.

C5. Innovation and Technology: Using technology to improve the visitor experience, such as mobile applications, online information, and innovations.

C6. Development of New Attractions: Development of new tourist attractions, special events, etc.

C7. Sustainability and Environmental Protection: Preserving the environment and having a positive impact on the local community and culture.

C8. Marketing and Promotion: The effectiveness of the marketing and promotion campaigns of the tourist destination at the local and international level.

C9. Economic Flows and Prices: The level of prices in relation to the quality offered and their impact on the economic income of the country and the tourist sector.

Alternatives are chosen within the county of Durres. Five alternatives are considered (A1-A5), figure 2:

A1. Durres Beach,

A2. Golem,

A3. Qerret

A4. Plazhi i Gjeneralit,

A5. Hamallaj,

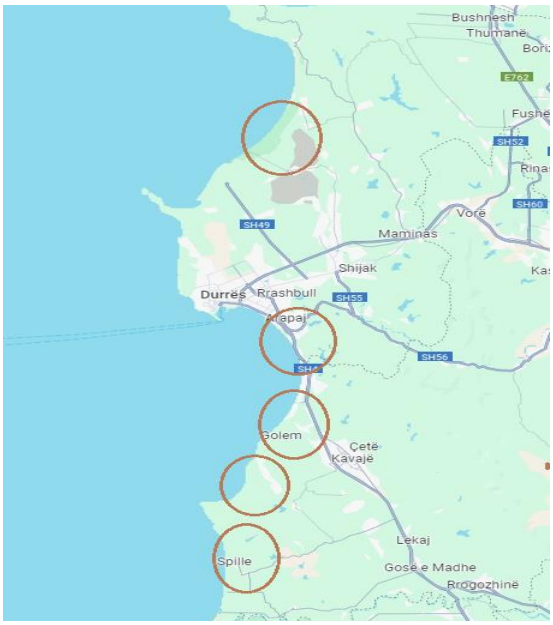

Fig. 2. Best destinations in Durrës county.

The AHP calculator is for pair-wise comparisons of all the criteria. As a result, the decision matrix is created, and the weights of each criterion are shown

in figures 3, and 4. The consistency ratio resulted in 5.9%, which is very satisfactory. To conclude the project about ranking the alternatives, a team of experts is needed to evaluate the alternatives in terms of each criterion.

	1	2	3	4	5	6	7	8	9
1	1	2.00	3.00	2.00	2.00	3.00	3.00	3.00	3.00
2	0.50	1	2.00	1.00	3.00	3.00	2.00	1.00	3.00
3	0.33	0.50	1	0.50	1.00	3.00	3.00	2.00	2.00
4	0.50	1.00	2.00	1	2.00	1.00	2.00	2.00	2.00
5	0.50	0.33	1.00	0.50	1	1.00	1.00	2.00	1.00
6	0.33	0.33	0.33	1.00	1.00	1	2.00	3.00	3.00
7	0.33	0.50	0.33	0.50	1.00	0.50	1	2.00	2.00
8	0.33	1.00	0.50	0.50	0.50	0.33	0.50	1	1.00
9	0.33	0.33	0.50	0.50	1.00	0.33	0.50	1.00	1

Fig. 3. Decision matrix.

Cat		Priority	Rank	(+)	(-)
1	C1	22.5%	1	6.7%	6.7%
2	C2	16.0%	2	6.9%	6.9%
3	C3	12.0%	4	7.2%	7.2%
4	C4	13.1%	3	4.0%	4.0%
5	C5	8.0%	6	2.6%	2.6%
6	C6	9.9%	5	4.6%	4.6%
7	C7	7.1%	7	2.3%	2.3%
8	C8	6.0%	8	3.6%	3.6%
9	C9	5.3%	9	1.5%	1.5%

Fig. 4. Priority weights of criteria.

Number of comparisons = 36
Consistency Ratio CR = 5.9%
Principal eigen value = 9.678
Eigenvector solution: 6 iterations, delta =3.7E-9

IV. CONCLUSION

Tourism is an important sector for economic and social development. Competition in this sector encourages the development of new destinations, innovation and better quality services.

In an era where sustainable and responsible tourism is gaining prominence, the utilization of MCDA in tourism competitions stands as a robust methodology which empowers decision-makers to make more informed, balanced, and encompassing choices, aligning tourism development with environmental preservation, cultural respect, and community welfare.

The use of MCDA in this process provides an objective methodology to compare and evaluate tourist sites, reinforcing efforts to ensure a low impact on the environment and provide unforgettable experiences for visitors.

The application of MCDA in evaluating and ranking tourist destinations based on their performance is a powerful tool to understand, compare, and conclude about their quality and attractiveness for visitors. Limitations of the study: For a more complete and full analysis, more data is needed for all the alternatives under study. A team of experts and stakeholders is necessary to help define the most objective way to select the criteria and "measure" the alternatives.

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