# ASSESSMENT OF THE ECOTOURISM POTENTIAL OF THE SIX WESTERN BALKAN (WB6) COUNTRIES CONSIDERING TOURISM, TRANSPORT, AGRICULTURE AND ENVIRONMENT POLICIES WITH MOORA METHOD

**Research Assistant Bilge Nur GÜNEŞ (ORCID: 0009-0004-5699-3643)**
Marmara University, Faculty of Engineering, Department of Industrial Engineering, İstanbul-Türkiye
**Email:** bilge.gunes@marmara.edu.tr
**Orcid:** https://orcid.org/0009-0004-5699-3643

**Professor Doctor Bahar SENNAROĞLU (ORCID: 0000-0002-6809-634X)**
Marmara University, Faculty of Engineering, Department of Industrial Engineering, İstanbul-Türkiye
**Email:** bsennar@marmara.edu.tr
**Orcid:** https://orcid.org/0000-0002-6809-634X

**Abstract**
Afterwards COVID-19 pandemic, ecotourism has become more prominent. While an increase in studies on ecotourism has been observed after pandemic, literature review reveals that there are limited number of studies combining Balkan countries, Multi-Criteria Decision Making (MCDM) methods, and ecotourism. This study aims to contribute literature by providing a guide policymakers in strategic decision-making. Land characteristics, eco-cultural heritage, existence of water resources, wildlife, hiking trails, canyons, deltas, national parks, diving tourism, farm tourism, education level and awareness of local population are among factors contributing to region's attractiveness for ecotourism. Furthermore, availability of roads and infrastructure supports development of ecotourism since ecotourism locations can often be physically difficult to access due to mountainous, rugged and high altitudes. Policies are constituted by countries have influence on these factors and affect ecotourism potential of countries. This study assesses ecotourism potential of Six Western Balkan (WB6) countries which are Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia, and Serbia considering policies that affect ecotourism. In this study, Organization for Economic Cooperation and Development (OECD) Western Balkans Competitiveness Data Hub which structures competitiveness level of WB6 countries under 15 key policies is utilized while determining indicators and building dataset. Tourism, transport, agriculture, and environmental policies are among these policies that directly affect ecotourism. Sub-categories of these policies which are “sustainable and competitive tourism”, “regulation and connectivity”, “rural development and infrastructure” and “ecosystem protection”, were considered as indicators. In this study, while building unique dataset, up-to-date data which belongs to 2024 were collected regarding four indicators from OECD Western Balkans Competitiveness Data Hub. By assigning equal weight to each indicator, WB6 countries were ranked according to their ecotourism potential with applying MOORA method and were ranked from highest to lowest ecotourism potential as follows: Montenegro, Albania, Serbia, Kosovo, North Macedonia, Bosnia and Herzegovina.

**Keywords:** Ecotourism, Western Balkan (WB6) Countries, Multi-criteria Decision Making (MCDM), Multi-Objective Optimization on the basis of Ratio Analysis (MOORA)

## 1. Introduction

Ecotourism centres around the natural resources and also includes the preservation of local culture and values, and authentic experiences. National parks, existence of water resources, waterfalls, lakes and landscape beauties, land characteristics, biological and ecosystem diversity create an environment for the spread of ecotourism. Ecotourism supports economic development by providing income for local people, while contributing the environmental protection, natural beauty and resources (Cvetković et al, 2023). Hiking, camping, diving, picnic, sports, off-road driving, protection of wildlife (ex. sea turtles), boat tours and botanic tours some of the ecotourism activities. These activities must be carried out while protecting the natural environment and landscapes, without disturbing living creatures, and without damaging vegetation such as coral reefs. Otherwise, the ecosystem will be harmed, and there may be irreversible consequences (Alrawaf et al., 2023; Fadliyanti et al., 2024).

There are different metrics such as land characteristics, eco-cultural heritage, existence of water resources, wildlife, hiking trails, canyons, deltas, national parks, diving tourism, farm tourism, education level and awareness of local population which affects the attractiveness of the one region for ecotourism. For example, mountainous, rugged and high altitudes are among the metrics which have an effect on the ecotourism potential of countries (Jovanović et al, 2022). In this study three research questions are considered and they are provided below.

- Research Question1: Has the interest in ecotourism increased in the post-pandemic era?
- Research Question 2: What are the indicators for ecotourism?
- Research Question 3: What is the ranking of the Six Western Balkan countries from highest to lowest in terms of ecotourism potential considering tourism, transport, agriculture and environment policies?

By considering following two queries which are “Balkan countries + ecotourism" and “Balkan countries + ecotourism + multi-criteria decision making” it is tried to find answer for the Research Question 1 in database of Google Scholar was searched for studies published in 2019 and afterwards, considering the post-COVID-19 period. In the in the literature review process, Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) methodology is utilized and only journal articles were considered.

**Table 1.** Number of articles published after COVID-19

| | Query 1 | Query 2 |
|---|---|---|
| Query | "Balkan countries + ecotourism" | “Balkan countries + ecotourism + multi-criteria decision making" |
| Year | Number of Articles Published | Number of Articles Published |
| 2019 | 11 | 1 |
| 2020 | 12 | 0 |
| 2021 | 12 | 2 |
| 2022 | 20 | 1 |
| 2023 | 19 | 1 |
| 2024 | 15 | 2 |
| 2025 | 37 | 4 |
| Total | 126 | 11 |

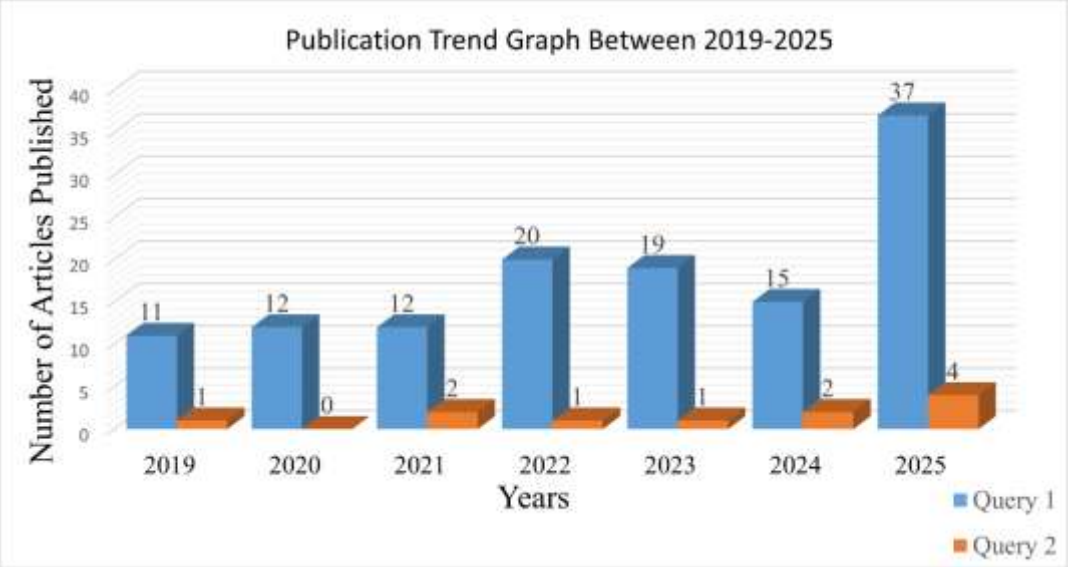


**Figure 1.** Publication trend graph of ecotourism (2019-2025)

Ecotourism is getting more popular and known, there is an increase in the number of studies on ecotourism has been observed after COVID-19. However, ecotourism is an understudied field in the literature in terms of Balkan countries, Multi-Criteria Decision Making (MCDM) methods, and ecotourism together (Lamçe & Braimllari, 2025). This study aims to contribute literature by considering guiding policymakers in strategic decision-making for countries.

This study evaluates the ecotourism potential of Six Western Balkan (WB6) countries which are Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia, and Serbia considering policies that affect ecotourism. In this study, Organization for Economic Cooperation and Development (OECD) Western Balkans Competitiveness Data Hub which structures competitiveness level of WB6 countries under 15 key policies is utilized while determining indicators and building original dataset.

## 2. Materials and Methods

Tourism, transportation, agriculture, and environmental policies are among these policies that directly affect ecotourism. Sub-dimensions of these policies which are “sustainable and competitive tourism”, “regulation and connectivity”, “rural development and infrastructure” and “ecosystem protection”, were considered as indicators (OECD, 2026). In this study, while building unique dataset, up-to-date data which belongs to 2024 were collected regarding four indicators from OECD Western Balkans Competitiveness Data Hub.

**Table 1.** Indicators for Digital Society (OECD Western Balkans Competitiveness Data Hub, 2026)

| No | Main Dimension | Sub-Dimension | Explanation |
|---|---|---|---|
| Indicator 1 | Tourism Policy | Sustainable and competitive tourism | The extent to which a place utilizes its cultural and natural resources is an indicator of how well-known it becomes a brand in tourism in terms of economic, social and environmental aspects. |

**Table 2.** continued

| | | | |
|---|---|---|---|
| Indicator 2 | Transport Policy | Regulation and connectivity | The measure of the planning, functioning, integration, convenience and quality of transportation networks. |
| Indicator 3 | Agriculture Policy | Rural development and infrastructure | The measure of rural infrastructure and irrigation systems. |
| Indicator 4 | Environment Policy | Protection of ecosystems | The environmental measure that encompasses water quality and productivity, biodiversity, ecosystem conservation, sustainable forestry, and land management policies. |

Multi-Objective Optimization by Ratio Analysis (MOORA) was introduced in the study of Brauers & Zavadskas (2006) as a Multi-Criteria Decision Making (MCDM) method to solve various complex MCDM problems (Karakoç et al., 2023). Multi-attribute optimization is considered under predetermined constraints with using ratio analysis. The implementation steps of the MOORA are given as follows (Chakraborty, 2011; Güneş & Sennaroğlu, 2026; Schmohl et al. 2025):

**Step 1.** Construct the decision matrix which is $X = [x_{ij}]_{m\times n}$.

$m$ represents the number of alternatives while $n$ represents the number of indicators. The performance of the $i^{th}$ alternative on the $j^{th}$ indicator is represented as $x_{ij}$.

**Step 2.** The normalized values are expressed as $x_{ij}$ which are dimensionless in a range between zero and 1 and are calculated via Equation (1) and the normalized decision matrix is constructed which is represented as $N = [n_{ij}]_{m\times n}$.

$$n_{ij} = \frac{x_{ij}}{\left[\sum_{i=1}^{m} x_{ij}^2\right]^{1/2}} \quad (1)$$

**Step 3.** Construct the weighted normalized decision matrix which is represented as $W = [w_{ij}]_{m\times n}$. The weighted normalized matrix is gathered by multiplying the indicator weights ($w_j$) with the normalized decision matrix.

**Step 4.** Transform multi-attribute optimization problem into the form of Equation (2):

$$y_i = \sum_{j=1}^{g} w_j\, n_{ij} - \sum_{j=g+1}^{n} w_j\, n_{ij} \quad (2)$$

## 3. Findings and Discussion

The results of implementation steps of MOORA method are given in Table 3, Table 4, Table 5 and Table 6 respectively.

**Step 1.**

**Table 3.** The decision matrix

| Weights | 0.250 | 0.250 | 0.250 | 0.250 |
|---|---|---|---|---|
| Criterion | Indicator 1 | Indicator 2 | Indicator 3 | Indicator 4 |
| Unit of measure | Proportion (%) | Proportion (%) | Proportion (%) | Proportion (%) |
| Min/Max | max | max | max | max |
| Albania | 40.00 | 48.00 | 70.00 | 54.00 |
| Bosnia and Herzegovina | 16.00 | 20.00 | 46.00 | 36.00 |
| Kosovo | 30.00 | 40.00 | 76.00 | 36.00 |
| Montenegro | 84.00 | 46.00 | 54.00 | 40.00 |
| North Macedonia | 28.00 | 32.00 | 60.00 | 46.00 |
| Serbia | 46.00 | 46.00 | 76.00 | 40.00 |
| $\left[\sum_{i=1}^{m} x_{ij}^2\right]^{1/2}$ | 112.75 | 97.78 | 158.38 | 104.04 |

**Step 2.**

**Table 4.** The normalized decision matrix

| Criterion | Indicator 1 | Indicator 2 | Indicator 3 | Indicator 4 |
|---|---|---|---|---|
| Min/Max | max | max | max | max |
| Albania | 0.355 | 0.491 | 0.442 | 0.519 |
| Bosnia and Herzegovina | 0.142 | 0.205 | 0.290 | 0.346 |
| Kosovo | 0.266 | 0.409 | 0.480 | 0.346 |
| Montenegro | 0.745 | 0.470 | 0.341 | 0.384 |
| North Macedonia | 0.248 | 0.327 | 0.379 | 0.442 |
| Serbia | 0.408 | 0.470 | 0.480 | 0.384 |

**Step 3.**

**Table 5.** The weighted normalized decision matrix

| Criterion | Indicator 1 | Indicator 2 | Indicator 3 | Indicator 4 |
|---|---|---|---|---|
| Min/Max | max | max | max | max |
| Albania | 0.089 | 0.123 | 0.110 | 0.130 |
| Bosnia and Herzegovina | 0.035 | 0.051 | 0.073 | 0.087 |
| Kosovo | 0.067 | 0.102 | 0.120 | 0.087 |
| Montenegro | 0.186 | 0.118 | 0.085 | 0.096 |
| North Macedonia | 0.062 | 0.082 | 0.095 | 0.111 |
| Serbia | 0.102 | 0.118 | 0.120 | 0.096 |

**Step 4.**

**Table 6.** Assessment results of alternatives

| | sum of max | sum of min | assessment of alternative | rank |
|---|---|---|---|---|
| Albania | 0.4517 | 0.0000 | 0.4517 | 2 |
| Bosnia and Herzegovina | 0.2457 | 0.0000 | 0.2457 | 6 |
| Kosovo | 0.3753 | 0.0000 | 0.3753 | 4 |

**Table 7.** continued

| | | | | |
|---|---|---|---|---|
| Montenegro | 0.4852 | 0.0000 | 0.4852 | 1 |
| North Macedonia | 0.3492 | 0.0000 | 0.3492 | 5 |
| Serbia | 0.4357 | 0.0000 | 0.4357 | 3 |

As a result of MOORA method final rankings are given in Table 7.

**Table 8.** Final ranking results of alternatives

| No | Country |
|---|---|
| 1 | Montenegro |
| 2 | Albania |
| 3 | Serbia |
| 4 | Kosovo |
| 5 | North Macedonia |
| 6 | Bosnia and Herzegovina |

According to Şengöz's study (2018), in response to the question "Would you prefer this type of holiday in ecotourism?", hiking was the most popular choice with 55.5%, while sea-sand-sun tourism was the second most preferred type of ecotourism with 44.1%. The presence of the coastal side is important in terms of ecotourism potential, and the proximity to the coastline has an impact on the ranking results in Montenegro and Albania.

## 4. Conclusion and Recommendations

Ecotourism is a sustainable tourism which is shaped by natural, cultural and local values, contributes economy and increase the socio-economic levels of countries. Nowadays, it has become an increasingly popular and preferred way of tourism especially after COVID-19. Ecotourism is also affected by established policies and adopted management approaches. Evaluating the level of ecotourism potential will be beneficial for future strategic moves for countries.

In this study, by assigning equal weight to each indicator (0.250), WB6 countries were ranked according to their ecotourism potential with implementing MOORA and were ranked from highest to lowest according to the ecotourism potential as follows: Montenegro, Albania, Serbia, Kosovo, North Macedonia, Bosnia and Herzegovina.

For further studies, indicators and alternatives can be enhanced. MOORA and various MCDM methods can be applied to the country groups such as OECD, EU member countries and etc. Correlation analysis can be conducted between ecotourism ranking results and metrics such as tourism income or gross domestic product (GDP) per capita for forthcoming studies. Although the issue of ecotourism, when considered together with MCDM methods, allows important analyses and results to be obtained for countries, it is still a very untouched area in the literature, there seems to be a great need for studies in this field. As a summary, ecotourism is a vast field in itself, and its openness to innovation means that new studies contributing to the literature will be beneficial for policymakers and strategy makers.

**References**

Alrawaf, T. I., Abubakar, I. R., Alshabibi, N. M., Al-Matar, K. M., Dano, U. L., Elhadi, E. M. A., ... & Al-Odah, M. A. (2023). The distribution of ecotourism activities and potential consequences for the Saudi desert ecosystem. Journal of Arid Environments, 213, 104950. https://doi.org/10.1016/j.jaridenv.2023.104950

Brauers, W. K., & Zavadskas, E. K. (2006). The MOORA method and its application to privatization in a transition economy. Control and cybernetics, 35(2), 445-469.

Chakraborty, S. (2011). Applications of the MOORA method for decision making in manufacturing environment. The International Journal of Advanced Manufacturing Technology, 54(9), 1155-1166. https://doi.org/10.1007/s00170-010-2972-0

Cvetković, M., Brankov, J., Ćurčić, N., Pavlović, S., Dobričić, M., & Tretiakova, T. N. (2023). Protected natural areas and ecotourism—priority strategies for future development in selected serbian case studies. Sustainability, 15(21), 15621. https://doi.org/10.3390/su152115621

Güneş, B. N., & Sennaroğlu, B. (2026). Assessment of the digitalization level of the six founding members of the European Union (EU) with MOORA method. In Proceedings of the 16th International Mardin Artuklu Scientific Researches Conference (pp. 105–110). Mardin, Türkiye.

Fadliyanti, L., Diswandi, D., Fadlli, M. D., Handalusia, V., Hak, M. B. U., Ferdaus, N. N., ... & Jannah, W. (2024). Empowering Coastal Communities Through Ecotourism: Enhancing Economic Livelihoods And Turtle Conservation Efforts. International Journal Of Community Service, 4(4), 435-440. https://doi.org/10.51601/ijcs.v4i4.768

Jovanović, R., Almedia Garcia, F., & Cortes-Macias, R. (2022). Evaluation of suitability areas for ecotourism using multi-criteria analysis. The case of central Serbian viticultural region. European Journal of Geography, 13(3), 19-41. https://doi.org/10.48088/ejg.r.jov.13.3.019.041

Karakoç, Ö., Memiş, S., & Sennaroglu, B. (2023). A review of sustainable supplier selection with decision-making methods from 2018 to 2022. Sustainability, 16(1), 125. https://doi.org/10.3390/su16010125

Lamçe, E., & Braimllari, A. (2025). An Overview of Applications of Multi-Criteria Decision-Making Methods in Tourism Industry: Insights from the Balkan Region. Journal of Tourism and Development Studies, 11(1), 45-59.

OECD Western Balkans Competitiveness Data Hub (2026). https://co-westernbalkans-competitiveness.oecd.org/ Accessed on 18.04.2026.

Schmohl, M., Gunes, B. N., Turkan, G., & Sennaroglu, B. (2025). Ranking the organisation for economic co-operation and development (OECD) countries according to compatibility to sustainable development goal 6. Sustainable Water Resources Management, 11(6), 130. https://doi.org/10.1007/s40899-025-01308-2

Şengöz, Ş. (2018). Sürdürülebilir turizm kapsamında Dikili'nin ekoturizm potansiyelinin incelenmesi (Order No. 31063761). Available from ProQuest Dissertations & Theses Global. (2918171331). https://www.proquest.com/dissertations-theses/sürdürülebilir-turizm-kapsamında-dikili-nin/docview/2918171331/se-2?accountid=12251