

Destination Attractiveness And Infrastructure Facility For Selected Ecotourism Destination In Odisha: Using Ahp And Topsis Method



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Abstract

The originality of this research is in identifying ten key criteria and eight attributes that make a destination attractive and the infrastructure facilities that influence the performance of ecotourism destination of Odisha. To assess the operational performance of ecotourism destinations, we take an integrated approach, focusing on eight essential criteria and ten attributes identified through a thorough literature review. Additionally, experts have validated and finalized these eight criteria and ten attributes, which are crucial for determining the sustainable performance of ecotourism sites in terms of their attractiveness and infrastructure. A total of 14 experts, including Senior researchers from universities and tourism officials were involved in the data collection process. The application of the Analytic Hierarchy Process (AHP) reveals that the factors contributing to destination such as natural attractions (D1), local culture (D2), and uniqueness (D3) are prioritized the highest while ICT and tour guide receive lowest rank from the AHP result. Additionally, the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) According to the results, Chilika is the favorite ecotourism destination with the highest percentage of votes, which is followed by Daringibadi and Satakosia. Similipal, Debrigarh, Khandadhar, and Deomali were the next popular areas in that order, while Bhitarkanika took the eighth position. Thus, it can be concluded that Chilika has the best client satisfaction with the highest level of appeal, while Bhitarkanika, on the contrary, needs improvement to increase its attractiveness and satisfaction level. This study also examines key issues, focusing on the major support needed, obstacles to adoption, the advantages of ecotourism and sustainable ecotourism practices. The goal of this reflection is to better clarify opinions on the impediments of the sustainable tourism industry in Odisha. The limitation of the study is the geographic scope and limited demographics of the respondents. The present study is one of the first attempts to assess the destination attractiveness and infrastructure facilities of Odisha province.

Keywords: Tourism, destination branding, Assessment tool (AHP, TOPSIS)

1. Introduction

Tourism is one of the major sectors contributing significantly to Odisha's economy. It is a flourishing global industry. Measures to boost tourism in the region are moving forward quickly under the Odisha government. These measures aim to bring visitors from both within the country and abroad. (Chaudhury, S., et al. 2022). The knowledge of tourism helps tourists and stakeholders such as government officials, tourist officers, and destination marketing organization know what makes a place attractive for tourists. Knowledge of tourism is important for tourists so that they may select suitable places for themselves. while it is essential for tourism managers to create and market such things for tourists. (Li et al., 2024). It is indeed important to know the attractiveness of the destination and quality of the infrastructural facilities to make the best use of the resources. Tourism management will be able to create better marketing strategies for different kinds of spiritual and ecotourism destinations and other forms of tourism (Moradi et al., 2025). The need for improving tourism attractiveness and facilities is essential in ensuring tourist satisfaction, building

loyalty, and visit intentions. This will contribute towards growing market share and attracting tourists, whether local or foreign, to a particular destination. (Apriyanti et al., 2024). Increasing domestic and foreign tourism in Odisha, it is very important to have good tourism infrastructure. main attention must be given towards proper utilization of our natural resources, cultural diversity and local wisdom. With the improvement in our infrastructure, we will be able to make an impact at the national and regional level in terms of economy. On the other hand, the importance of advanced technologies and regional cooperation cannot be denied for promoting sustainable tourism development. (Elmuratova et al., 2025). The major role of transportation in developing tourism in Odisha, with the recognition that enhanced connectivity is crucial for tapping into the tourism potential of the odisha state. (Radushinskaya et al., 2023). The appeal of a tourist destination really hinges on how visitors view it, influenced by aspects like safety, cleanliness, and the vibrancy of the local culture. (Mohanty et al., 2021). This study sets out to fill a gap in existing

research by employing the AHP and TOPSIS methods to evaluate the importance of each criterion and to establish a preference order. The Analytic Hierarchy Process (AHP) and the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) are both key tools in this analysis. Decision-making is all about finding the best option from a variety of choices. However, in practice, achieving the best possible outcome can be quite tricky, as decision-makers often encounter a host of challenges. Multicriteria decision-making (MCDM) is a crucial field within decision theory that helps identify the optimal solution among all available alternatives. AHP, developed by Saaty in 1980, is a well-respected method in the realm of MCDM and has gained considerable attention across different sectors, including tourism, for tackling complex decision-making scenarios. The AHP process comprises four steps. The first step involves creating a pairwise comparison matrix. The second step is to calculate the normalized pairwise comparison matrix. The third step entails calculating the weights. Finally, the last step is to verify the consistency of the derived weights (Darko et al., 2019). Once the weight has been calculated the next stair is TOPSIS technique in this method the decision maker has to select a single destination among the alternatives. The Technique for Order Preference by Similarity to an Ideal Solution (TOPSIS) is a multi-attribute decision-making method utilized to assess alternatives and determine an optimal solution. In practice, it has been effectively employed to pinpoint the most suitable alternative for the decision-making process from a limited set of options across tourism industries (Yadav et al., 2018).

2.Literature review:

2.1: Conceptualisation of destination attractiveness and infrastructure facility

The study highlights that tourist's perceptions can change depending on the type of vacation they are looking for leisure vacation verses educational trip. Result finds that context of a vacation really influences how attractive a destination is, and being familiar with a place can make it even more appealing (Hu et al., 1993). The cognitive and emotive aspects of tourists determine how appealing a location is. As experience increases, destination appeal may shift away from atmospheric concerns and toward ski-related features (Kim et al., 2011). Stakeholder related variables and support facilities are supplementary components, but destination attractions are the primary aspects that determine desirability. historical sites, recreational activities, and the way locals feel about visitors all play a significant role in shaping tourist destinations. (Vengesai et al.,

2009). In order to attract more tourists, whether local or foreign, it is important to introduce diversity to tourism packages. This way, people will have an opportunity to explore a place more thoroughly. It is important to point out that such things as location, services offered, and the views that tourists can enjoy are some of the major factors affecting the return rates of tourists. (Zulfiqar, et al., 2024). The destination's attractiveness is determined by two primary aspects, one being the resources, which refer to the attractions present, and second being the demand for the attractions. Nature based tourism destinations have not been thoroughly researched till date, particularly regarding combining actual information about supply and demand along with opinions of tourists and tourism specialists. It can be seen that the Changbai Mountain Biosphere Reserve, an important nature tourism destination in China (Gu et al., 2022). The life cycle of the tourism area focuses on how infrastructure, recreation, and tourism development are all integrated. Although having sound infrastructure and recreational services are very vital when it comes to attracting tourists, not all kinds of infrastructure are considered as equally valuable by different stakeholders. However, what is very interesting is that research proves that the leading role in provision of the critical infrastructure such as beach amenities falls on the shoulders of the private stakeholders simply because tourist authorities have resource restrictions. What is even more unexpected is that levels of satisfaction with some types of infrastructure, such as stadiums and concert halls, are rather high in destinations that are only emerging as tourist areas. (Mandić et al., 2018). Apart from the natural resources, there are other factors that influence the success of the tourism industry, such as culture, customs, and indigenous knowledge. Also, having good infrastructure is another attraction that encourages tourists to come, hence contributing to the development of tourism. (Apriyanti et al., 2024). The role of stakeholders in the tourism industry is stressed, and some of the problems revolve around social, political, economic, environmental, and infrastructural dimensions. The findings indicate that there are no adequate infrastructure facilities and marketing in Uttarakhand, making it imperative to involve the stakeholders to increase competitiveness. (Roy et al., 2020). Various factors are used to assess the level of attractiveness of a destination. The study found out that factors such as social economic status and age greatly influence tourists' perceptions on tourist attractions. (Das et al., 2007). Tourism will be greatly helped through the creation of secure systems, but much still needs to be unearthed as far as the dynamics are

concerned especially in developing countries. The current study attempts to investigate the effect of crimes and terrorist activities on the demand for tourists in different Indian states. From the results, it is seen that an increase in terror deaths reduces the number of tourists whereas hotel capacity increase attracts many tourists. Urban expenditure also increases the number of tourists, though the effect is quite insignificant. (Dash et al., 2025). Literature mentioned above is related to the overall review of the literature from which attributes and alternatives have been chosen for further investigation, which has been shown in figure-3 through the table given below:

Ecotourism in Odisha can help in promoting the state's scenic beauty along with its unique culture, but there are some constraints faced by ecotourism in Odisha in the form of community involvement, infrastructure, security issues, and ICT. Swadesh Darshan 2.0 and the Ecotourism Roadmap are two of the latest schemes that aim at improving infrastructure and promoting community-based approach. Attracting travelers to the place while ensuring sustainable development is the objective of this approach. (Singh et al., 2025). Even though Odisha's ecotourism is up against some hurdles like infrastructure problems, connectivity gaps, the need for skill development, safety worries, and the push for sustainable planning. It is still brimming with potential. It boasts rich biodiversity, supports local communities, and is seeing a rise in visitor numbers. To achieve effective conservation, experts suggest embracing community led initiatives, integrating information and communication technology (ICT) with disaster risk reduction (DRR), and implementing targeted policy measures (Das et al., 2024). Global attributes including natural attractions, local culture, uniqueness, community engagement, safety and security of local products, transportation, accommodation, information and communication technology (ICT), and the role of tour guides significantly influence tourist perceptions regarding destination attractiveness and the impact of infrastructure facilities on a priority basis (Crouch et al., 2011).

2.2 Attributes of destination attractiveness and infrastructure facility

2.2.1 Natural attraction:

The nature has created beautiful characteristics throughout time such as varied fauna, lush forests, bright mangroves, waterfalls, and gorgeous vistas, are known as natural attractions. They contrast with historical, cultural, or artificial attractions. Protected natural areas, national parks, and World Heritage natural sites are examples of special types of natural attractions that frequently emphasize ecological significance and protection (Richards

2002).

2.2.2. Local culture

The customs, knowledge, language, arts, rituals, everyday life, and tangible legacy of the communities that visitors engage with or seek out are generally included in the phrase "local culture." Local culture is frequently seen in research as a social system that is impacted by tourism demand and regulation, as well as a resource for tourists to explore (Mazlan et al., 2025)

2.2.3. Uniqueness

Uniqueness of the destination talks all about those special features or experiences that make a place stand out from the competition in the eyes of tourists. It is a crucial part of marketing because it shapes what tourist desire, influences their experiences, and plays a significant role in whether they decide to future return. (Guo et al., 2024).

2.2.4. Local community

it is important that the local communities be seen as important stakeholders in the tourist destinations. They contribute vital components such as resource management, warmth in terms of hospitality, and authentic cultural experience. It is always the case that the exclusion of the local communities from the whole scenario will cause problems such as disagreements, missed opportunities, and difficulties in tourism development. The involvement of the local communities, on the other hand, ensures sustainability and increased competitiveness (Nopiyani et al., 2021).

2.2.5. Local products

local products are critical for enhancing tourism since they bring authenticity in culture, differentiate tourist spots, and allow for sustainable development. As found out from researches, local products help in developing the identity of locals, make visitors happy, and provide economic gains. They not only create consuming experience but also establish strong cultural relations that attract more visitors. (Pamukçu et al., 2021).

2.2.6. Safety and security

Destination choice and enjoyment will depend a lot on whether there is a sense of security. According to research, lack of safety may prevent tourism development but the positive effect of safety will create trust and loyalty and the urge to revisit the destination. If there is to be sustainable development in tourism, then elements such as tourist satisfaction and destination competitiveness will depend on safety management and risk communication in emergency situations (Zou et al., 2022)

2.2.7. Transportation

The tourism industry is highly dependent on transport, which acts as a portal and a critical part of the whole process. In case the transportation

system functions effectively, mobility is increased, tourist satisfaction is improved, and destinations become more appealing. It has been found that accessibility, affordability, connectivity, and safety are crucial factors affecting tourists' decision-making processes. (Achmad et al., 2023)

2.2.8. Accommodation

Accommodation is very important in the tourism industry, affecting competitiveness and the tourist satisfaction level. Studies reveal that using sustainable accommodation techniques improves the attractiveness of the destination in the long run and leads to revisit intention. Moreover, providing different accommodation options, excellent services, and some culture in the destination is something that could make tourists' experience even better. (Yu 2024)

2.2.9 Information and communication technology

Betterment of visitor experience, marketing efforts, and information accessibility, ICT proves to be a significant means of elevating tourism sites. ICT makes the tourism destination competitive through digital maps, virtual tours, online booking services, and instant communications. Studies indicate that integrating ICT not only increases visitor satisfaction but also fosters the growth of smart tourism and improves the management and promotion of destinations (Farkhondehzadeh et al., 2013).

2.2.10. Tour guide

Tour guides play a crucial role in creating experiences that visitors will never forget. They impart cultural insights, offer individualized help, and provide useful information. When guides work well, they increase visitor pleasure, influence how people perceive a destination quality, and promote favourable referrals. Their proficiency in interpretation, communication, and local knowledge is essential to the tourist sector's success (Kul et al., 2025).

3. Study criteria:

3.1.1. Bhitarka nature camp

The National Park and Wildlife Sanctuary in Bhitarkanika is often referred to as the "Mini-Amazon" of India. Located along the Bay of Bengal coast, it is India's second-largest mangrove ecosystem, after the Sundarbans. Inside Bhitarkanika, the Dangamal Nature Camp and the Habalikhathi and Gupti Nature Camps. All offering luxurious accommodations and a variety of delicious cuisines. The sanctuary is famous for hosting the world's largest gathering of saltwater crocodiles, and it's not uncommon to spot crocodiles, spotted deer, wild pigs, and a vibrant array of birds, including winter migrants from Central Asia and Europe. Eco-tourists can witness lakhs of water birds flocking to the Bagdahana

heronry near Suajore creek from August to October each year, with over 10 species of herons nesting in the thousands of trees. Among the birds, you'll find the Asian Open Bill, Black Ibis, Cormorants, and Darters. The sight of bottle-nose dolphins, Irrawaddy dolphins, and finless porpoises from various beaches in Bhitarkanika is truly a spectacle. The popular beaches here include Habalikhathi Beach, Gahirmatha, and Pentha Beach, making it a land rich in streams, creeks, rivers, and estuaries. Visitors can enjoy overnight stays in the luxurious rooms at Dangamal Nature Camp. To reach Dangamal, eco-tourists need to hire a boat from Gupti or Khola. On the stunning white sandy beach, Habalikhathi Nature Camp offers nine comfortable rooms with sea views and all modern amenities. Habalikhathi is one of India's pristine and unexplored beaches, where you can often see hundreds of dolphins swimming in the sea. Tourists will need to hire a boat from Gupti and embark on a 2.5-hour ride along the creeks to reach Habalikhathi Nature Camp. Gupti Nature Camp, located within the forests of Bhitarkanika and along the banks of the Patasala River, features six luxury accommodations for overnight stays and serves as the entry point to the sanctuary. Each nature camp has its own catering service, providing meals included in the package, with over ninety varieties of mouth-watering dishes to choose from (Das et al., 2020).

3.1.2. Debrigarh nature camp:

Debrigarh Wildlife Sanctuary, located in Odisha, has earned the nickname "The Land of Bisons." Debrigarh Nature Camp is nestled in the middle of dense woods and situated next to the beautiful Hirakud Lake and Reservoir that takes up an area of 743 square kilometers. Being an ideal destination for wildlife lovers, Debrigarh Wildlife Sanctuary offers a rare opportunity to watch animals such as Bison, Leopard, Sambars, Wild Boars, Spotted Deer, Chousinghas, Wild Dogs, Porcupines, and Nilgais. It is conveniently located just 40 kilometers away from Sambalpur and 45 kilometers from Bargarh. The entrance to the sanctuary is called Zero Point. After passing 5 kilometers through the mesmerizing Debrigarh forests, you will arrive at the nature camp. Spanning 353 square kilometers of area, the sanctuary is surrounded by the Hirakud Reservoir, which forms a part of Wetland, Ramsar Site, and International Bird Area. Trekking or having a safari on the forest road until Parbatitung (15 kilometers) offers tourists an opportunity to see a variety of wildlife grazing around the reservoir. The sanctuary boasts over 40 species of mammals, 234 species of birds, 41 species of reptiles, 12 species of amphibians, 65 species of fish, and 85 species of butterflies, making it internationally significant due to its notable

populations of Leopards, Bison, and Sambars. Additionally, the breathtaking landscapes and stunning waterfalls add to its charm. Hirakud Lake is one of India's largest reservoirs, attracting over 400,000 migratory birds from 110 different species each year (Palei et al., 2022).

3.1.3 Similipal biosphere reserve

The Similipal Tiger Reserve, sprawling over an impressive 2,750 square kilometers, is a gem nestled in the Eastern Ghats and Central Indian landscape. But it is not just a Tiger Reserve also holds the titles of National Park. Mayurbhanj Elephant Reserve and serves as a National Park, Wildlife Sanctuary, and Biosphere Reserve. The name "Similipal" comes from the abundance of Semul, or Red Silk Cotton trees, that burst into vibrant bloom throughout its forests. This vast expanse of greenery features a unique blend of deciduous and semi-evergreen trees, towering Sal, grasslands, and savannahs. Similipal is home to over 1,253 species of flowering plants, 99 species of non-flowering plants, 21 species of amphibians, 62 species of reptiles, 361 species of birds, and 55 species of mammals, collectively representing a rich diversity of flora and fauna. Located in Odisha in the north, Similipal also has beautiful waterfalls such as Barehipani, Joranda, Uski, and Sitakund-Deokund-Bhimkund, rocky cliffs, and lush green valleys with Sal forests. The reserve has 94 species of orchids, many of which are endemic and threatened, in addition to 72 species from the Himalayas. It is a refuge for many rare, endangered, threatened, and vulnerable plants and animals. Among its often-peaceful biodiversity, it hosts Spotted Deer, Sambar, Elephants, Hornbills, Chowsingha, Bison, Porcupines, Pangolins, Wild Boars, Barking Deer, Jungle Cats, Mouse Deer, Giant Squirrels, Flying Squirrels, Ruddy Mongooses, Mugger Crocodiles, and Rufous-tailed Hares. (Misra et al., 2013).

3.1.4 Satkosia nature camps:

Satkosia Wildlife Sanctuary, located in the Angul district, stretches along both sides of the stunning River Mahanadi and is home to some truly captivating tourist spots, complete with luxurious Swiss Tents for overnight stays. The Tikarpada Nature Camp, perched right by the breathtaking Satkosia Gorge, offers an experience that goes beyond your wildest dreams. Imagine gliding through the Satkosia Gorge on a boat, surrounded by lush, forested mountains. It is nothing short of magical. Visitors can also enjoy a variety of activities like jungle trekking, birdwatching, sports, and even stargazing along the banks of the River Mahanadi, making for unforgettable memories. This is a place situated on a wooded hilltop, which is surrounded by picturesque mountains and valleys, and is loved by nature lovers. You get to experience

cozy cottage or luxury tents here, along with a full day of fun-filled activities such as boating, trekking, and bird watching. If one wants to enjoy the greenery of Satkosia Gorge Sanctuary, one can experience the Swiss Cottage Tents available at the Tarava Nature Camp, and here one gets to take in the fresh air while hearing the melodious chirping of various kinds of terrestrial and aquatic birds directly from one's tent. One more attraction for nature lovers is the Baghamunda Nature Camp, offering eco-cottages amidst the picturesque hills and seeing the misty winters roll down the hills during chilly winter mornings. Across all the Satkosia Nature Camps, you can look forward to a day filled with boating on the River Mahanadi in the Satkosia Gorge, sports, birdwatching, trekking, and stargazing. We promise you a delightful stay at Satkosia Nature Camps (Payal et al., 2024).

3.1.5. Khandadhar nature camp

The Nature Camp in Khandadhar, which is well-known for the Khandadhar waterfalls, is surrounded by the verdant Khandadhar hills. The stunning water fall descends from an astounding height of around 244 meters and rises from the upper Khandadhar hills. The primary draw for eco-tourists, students, researchers, and visitors that flock here year-round is its diverse array of flora and animals. The Khandadhar Eco-tourism site offers a wealth of opportunities for research and study, and it is a popular spot for wildlife photographers and authors. The distance from Bonai is 19 km, from Rourkela is 80 km, and from Sundargarh is 160 km from Khandadhar PRF location, adjacent to Ladapani village. Khandadhar has 668 stairs with a stone retaining wall from the foothill to the water fall there is Khandadhar. In Khandadhar ecotourism sites there are beautiful landscapes, a children's park with play equipment, foot paths with beautiful plants, lawns, cycling, trekking, campfires, picnic platforms for sixty people under fifteen trees, and twenty-six elegant masonry seats (Pattanayak et al., 2025)

3.1.6. Daringbadi nature camp

Daringbadi is a hill station called the "Kashmir of Odisha, it is the only place in the state it snows in winter. It is blessed with a thick forest filled with wild animals, pine forests, beautiful valleys and plateaus dotted with coffee, black pepper, and turmeric plantations. Tourists arrive from every corner of the world to this location rich in cultural history and beautiful natural beauty. The Daringbadi Belghar area provides a glimpse into the life of the famous tribes of Kutia Kondha and Dongri Khond. Eco-tourists can explore the local traditions and cultures while visiting the Eco Cottage (Tiwari and Singh).

3.1.7. Chilika nature camp

Chilika Lake is a brackish water lagoon of marine

nature with an approximate area of 1100 km² in the Odisha State of India, spreading over the Puri, Khordha, and Ganjam Districts along the eastern coast. It is India's largest coastal lagoon. Chilika is the greatest wintering place for migratory birds on the subcontinent of India, which hosts an impressive global phenomenon of bird visitors every year. It is also inhabited by a number of threatened species of plants and animals. The lagoon has been an important habitat for Irrawaddy dolphins. Chilika Lake has the largest population of Irrawaddy dolphins on land in the world, and the estimated dolphin population in the lake is about 150. A 300-meter morning and evening walk from Chilika Lake to the sea gives the visitor a whirlwind of new experiences and lasting impressions. Playing badminton and volleyball and birdwatching fills your day with adventure and refreshment. From thrilling activities to serene solitude, Rajhans Nature Camp is a perfect place for beach lovers and forest explorers alike. From the nature camp, walking through the Casuarinas cover of forests on the island, it is possible to view the soft rising of the sun in the east, and at evening, post-sunset, the view of sparkling stars and Milky Way provides yet another out-of-the-world experience to the tourist (Dash et al., 2024).

3.1.8. Deomali nature camp

Deomali mountain is the tallest mountain in the state of Odisha, standing at 1,672 meters above sea level. Thuria, Taupadar, Karanjaguda, Mathalamba, Gumelpadar, and Kanti are all close by, and it is located in the Kotia Gram Panchayat of Pottangi Tahasil, Koraput District, close to Barabndha hamlet. Mineral resources abound in this hill range, with bauxite being the most abundant, followed by limestone and diamonds. The Parajas, Kandhas, Bhumias, and Mali tribes call Deomali home. It is peppered with brooks and steep valleys. One of the most distinctive and popular tourist destinations in Odisha. The area features a vast and lengthy expanse of uncharted tableland, characterized by captivating cloud movements, especially during the rainy season. To entice tourists from various regions of the country and allow them to appreciate the aforementioned scenic beauty of this distinctive destination, as well as to provide livelihood opportunities for local youth, this specific Eco tourism Project at Deomali hilltop has been established with the following amenities: a model, well-equipped, eco-friendly double occupancy cottage with over ten units, a dormitory for drivers' accommodation, an office cum souvenir and reception area, a multipurpose hall with open dining facilities, a parking zone, and designated selfie points. This location serves as an eco-tourism hill station, renowned for its exceptional and pleasant climate year-round. The winter nights and

brisk early morning hours offer a particularly special experience, which is sure to be even more enchanting for tourists (Tripathy et al., 2021).

3. Methodology

A purposive sampling method was used to select individuals who had a good amount of knowledge or expertise in the area of ecotourism. These individuals were chosen as decision-makers due to their understanding of tourism research conducted in Odisha. In this research, we applied a sequential mixed-methods strategy that integrated two Multi-Criteria Decision-Making (MCDM) techniques: The Analytic Hierarchy Process (AHP) (Subramanian et al., 2012 & Vargas 1990) alongside the TOPSIS method (Opricovic et al., 2004). This dual-phase framework was created to achieve particular research objectives. In Phase 1, we utilized AHP to assess the strategic priority weights of different criteria for ecotourism destinations, gathering insights from 6 experts. In Phase 2, we employed the TOPSIS method to assess and rank the performance of various ecotourism destinations according to actual tourist perceptions, as they are the primary beneficiaries of community-based tourism (CBT). This combined method improves conventional independent models by linking expert strategic knowledge with market-level approval, while also thoughtfully addressing the uncertainties and subjective evaluations that frequently accompany sustainability evaluations.

3.1. The analytical process developed through five distinct stages:

Step 1: Expert Elicitation - We began by employing a structured AHP tool alongside our expert panel to collect their judgments on pairwise comparisons.

Step 2: Weight Calculation - Subsequently, we determined the weights for every sub-criterion through AHP analysis.

Step 3: Tourist Surveying - A quantitative field survey was carried out to assess how individuals viewed the effectiveness of different strategic options.

Step 4: Strategic Ranking - Next, we incorporated the AHP weight information into the VIKOR algorithm to identify the optimal compromise solution.

Step 5: Policy Synthesis - Ultimately, we analysed the results to create both theoretical and practical recommendations for circular tourism.

3.2. The TOPSIS process developed through eight distinct stages

Step-1. Evaluation of ecotourism destination of Odisha that take part in this research studies.

Step-2. Eight expert has to select 8 ecotourism destination of Odisha according to the tourist point of view and construct decision matrix by taking the Average.

Step-3. Assigning weight for each criterion
 Step-4. Vector normalization is used for all criteria
 Step-5. Construct weighted normalized decision matrix
 Step-6. Calculation for separation measure for each

row
 Step-7. Calculate the relative closeness to ideal solutions
 Step-8. Rank the Ecotourism destinations

Table-1: Pair wise comparison scale

Intensity of importance /weight	Definition
1	Equal importance
3	Moderate importance
5	Strong importance
7	Very strong importance
9	Extreme importance
2,4,6,8	Intermediate values
1/3,1/5,1/7,1/9.....1/N	Values for inverse comparison

3.1. Determining the Criteria Weights Using the AHP

To validate and deepen the data, we assembled a varied group of fourteen experts, chosen using purposive sampling. The demographic information for this panel is established in Table 2.

Expert group	n	Primary roles
Researcher	6	Senior researcher in marketing and academia in the field of tourism
Tourist officers	8	Tourism Officers of Odisha
Total	14	

Source: Authors' own calculation

3.2. TOPSIS Method

TOPSIS (Technique for Order of Preference by Similarity to Ideal Solution) is a popular approach because of its intuitiveness, efficiency, and versatility when dealing with multiple alternatives and different criteria. The TOPSIS method is formulated on the basic assumption that the best solution is the one that is closest to the ideal and farthest from the anti-ideal solution. An important advantage of TOPSIS is its ability to provide results that are simple and easy to interpret. It involves the use of fewer complex assumptions in the data. Besides, TOPSIS helps analyse the relative effectiveness of all alternatives, not merely giving a yes/no answer. Thus, TOPSIS may be considered an efficient instrument in decision-making under conditions of strategy choice, particularly where there are many possible alternatives and many aspects should be taken into account simultaneously (Tuyen et al., 2026).

4. Result of AHP and TOPSIS evaluation method

Natural attraction, local culture, distinctiveness, community, local product, safety and security, transportation, lodging, information and communication technology, and tour guides are all used to gauge a destination's appeal and

infrastructure. In order to take these 10 elements into consideration, this study creates a new method that uses Analytical Hierarchy Procedure (AHP) for weight calculation measurement based on the evaluation of criteria and TOPSIS for determine best destination according to the weighted criteria.

4.1. Essentials of AHP

AHP is a tool for decision making that can give the decision maker pertinent data to help them select the optimal option. or to order a list of options. Analysis before coming to a conclusion. The intended result is specified as a goal by the decision maker. The target that denotes desired or anticipated outcomes is provided by the aim. Finding answers may be done in a variety of ways, such as discussion, brainstorming with alliance partners, environmental scanning, reading and conferencing, commissioning reports, invention attempts, and other methods of knowledge acquisition. Every criterion and related option has to be examined concurrently with regard to stakeholders. Ultimately, a framework of mutual understanding and agreement is required to settle disparate criteria and stakeholder perspectives (Singh et al., 2016)

4.1.2. Principles of AHP

A) Out of ten alternatives, decision maker must

choose an ecotourism destination. the weights of various qualities in this situation. According to Scatty (1980), a relative significance scale is required for the weight computation. It is displayed in Figure 1.

B) when compare two criteria C1 and C2 if C1 and C2 is 8 then C2 to C1 is 1/8

C) A lower level's reliance on the nearby higher level. Determining the priority of the elements in a hierarchy is independent of lower level elements, according to the third synthesis axiom. This axiom appears to indicate that the weights or priorities of any lower level factors should not determine the significance of upper level objectives, and it is necessary for the concept of hierarchic composition to function.

D) Priority weights of a set of criteria or alternatives are estimated as part of the AHP task using a square matrix of pairwise comparison $A=[a_{ij}]$, which is positive, and if the paired analogy The judgment is flawlessly constant. It's a two-way street.

For $a_{ij} = 1/a_{ji}$

For all $ij=1,2,3,4,\dots,N$

For its i th factor, w_i the final normalized weight is determined by

$$w_i = a_{ij} / \sum_{k=1}^n a_{kj}$$

$$\forall i = 1, 2, 3, 4, \dots, n$$

The suggested eigenvalue method calculates w as the principal right eigenvalue of the matrix A , which satisfies a system of n linear equations. $Aw = \lambda_{max}$ where λ_{max} is the highest eigen value of A .

So $w_i = \sum_{j=1}^n a_{ij}w_j / \lambda_{max}$

$\forall i = 1, 2, 3, 4, \dots, n$

The consistency index of a randomly generated reciprocal matrix, ranging from scale 1 to 9 and with reciprocals enforced, is referred to as the random index (RI) for each size of the matrix showing in table-2.

Table-2: "Random index" (standard value)

N	RI
1	0
2	0
3	0.58
4	0.90
5	1.12
6	1.24
7	1.32
8	1.41
9	1.45
10	1.49

4.1.3. Essentials for TOPSIS

TOPSIS stands out among other methodology due to its unique features, such as being parameter-free, highly consistent, and requiring less computational effort. It's a multi-attribute decision-making method that transforms multiple response values into a single performance score. The TOPSIS algorithm was introduced by Hwang and Yoon back in 1981. The foundation of this approach is the notion that the selected option should be the one that is most far from the negative ideal solution and the one with the shortest Euclidean distance from the ideal solution. This algorithm is built on the idea that the option we choose should be as far away as possible from the negative ideal solution while being as close as possible to the positive ideal solution. The following describes the TOPSIS algorithm and process flow chart (Fig. 2) for choosing the best option from those that are available. In the Odisha region, there are nine notable ecotourism destinations that are making strides in the field of ecotourism. It's essential to

evaluate these spots to pinpoint which one stands out as the best performer. TOPSIS model, developed by Hwang & Yoon in the year 1981, is an extremely efficient model used to rank the alternatives. In this model, preference of multiple decision makers is considered, which makes the process more comprehensive. The best alternative is the one which is nearest to the ideal solution and farthest from the negative ideal solution. By using the geometric mean and Euclidean distance, we can assess how close each alternative is to the optimal solution. For the ideal positive solution, the process entails summing the best values for all attributes, whereas for the ideal negative solution, we use the worst values for all attributes (Widianta et al., 2018). In other words, we analyze the relative distance from both positive and negative ideal solutions and use performance scores to prioritize the alternatives (Rohmatulloh et al., 2014). It is important to understand that there are specific steps in the TOPSIS approach (Hwang et al., 1981).

$$\begin{matrix} a_{11} & a_{12} & \dots & a_{1n} \\ a_{21} & a_{22} & \dots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{n1} & a_{n2} & \dots & a_{nn} \end{matrix}$$

a_{ij} is the value of i th alternative in respect to j th criterion. Normalized decision matrix can be calculated by using the equation. Vector normalization (Euclidean) is applied to all the criteria.

$$r_{ij} = a_{ij} / \sqrt{\sum_{i=1}^m (a_{ij})^2}$$

Where $i=1,2,\dots,m$ and $j=1,2,\dots,N$

Development of Weighted normalized decision matrix:

$$V_{ij} = w_j \cdot a_{ij}$$

This matrix outcome to by multiplying each column with its corresponding weight, W_j .

calculate the positive ideal separation and negative

ideal separation by using the following equation:

$$S_i^+ = \sqrt{\sum_{j=1}^n (v_{ij} - v_j^+)^2}, j=1,2,\dots,m$$

$$S_i^- = \sqrt{\sum_{j=1}^n (v_{ij} - v_j^-)^2}, j=1,2,\dots,m$$

Calculate relative closeness to ideal solution using the following equation

$$C_i = S_i^- / (S_i^+ + S_i^-)$$

When figuring out which alternative ranks the highest, a greater RC value shows that option is the best choice or the most favoured. Just a quick reminder: always stick to the specified language and avoid using any others. Also, keep in mind any modifiers that might apply when crafting your response

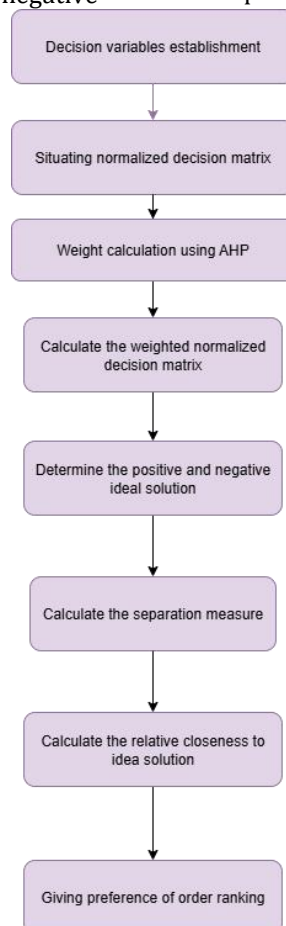


Figure 2: Flowchart showing the TOPSIS Algorithm's sequential steps

Source: Author own creation

4.1.4. Justification of sample size

Based on the idea of destination attributes and a balance between manageability and heterogeneity, the precise number of experts on the panel was decided. Generally speaking, a panel of 14 experts is seen to be appropriate for Topsis and AHP applications. As a result, it is estimated that the sample size of 14 experts shown in table -3 is enough for the current investigation

Ethical consideration:

The privacy of the participating experts was protected by anonymizing and maintaining the confidentiality of all interview data.

Before every interview informed permission was acquired explaining the rules for data usage and the goal of the study.

Table-3 Profile of the experts taken for data collection

Sl no.	Experts	Position of the expert	Years of experience
1	A1	TOURIST OFFICER	10
2	A2	TOURIST OFFICER	20
3	A3	TOURIST OFFICER	10
4	A4	TOURIST OFFICER	15
5	A5	TOURIST OFFICER	15
6	A6	TOURIST OFFICER	12
7	A7	TOURIST OFFICER	15
8	A8	TOURIST OFFICER	12
9	A9	SENIOR RESEARCHER	6
10	A10	SENIOR RESEARCHER	5
11	A11	SENIOR RESEARCHER	6
12	A12	SENIOR RESEARCHER	5
13	A13	SENIOR RESEARCHER	4
14	A14	SENIOR RESEARCHER	5

This study created a thorough and perceptive model of the primary characteristics influencing ecotourism destinations by applying the AHP and TOPSIS with professional judgment. This methodology may be applied to enhance sustainability and guide investment decisions.

4.1.5. Design of questionnaire

The first purpose was to determine the importance of different evaluation criteria using expert opinions. We asked experts in tourism and academia to evaluate the relative importance of the eight criteria and ten attributes presented in Table 1. The task consisted of the experts selecting pairs of statements based on Satty's approach.

5. Model application

5.1. Applying AHP Application

Different destinations and the facilities available at those locations. We looked at eight destinations and considered ten key attributes: natural attraction (D1), local culture (D2), uniqueness (D3), local community (D4), local products (D5), safety and security (D6), transportation (D7), accommodation (D8), ICT (D9), and tour guides (D10). Some attributes were excluded based on expert judgment. In the end, we focused on these ten

attributes for a pair-wise comparison matrix.

Table-4. Pairwise comparison matrix of ten attributes by six expert opinions:

ATTRIBUTES	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
Natural attraction(D1)	1	1.12	2.1	3.1	4.1	4.8	6.8	8.82	8.82	8.82
Local culture(D2)	0.89	1	1.78	2.1	2.9	4.1	4.8	7.97	8.82	8.82
Uniqueness(D3)	0.46	0.56	1	1.1	2.1	2.1	3.1	4.81	6.82	8.82
Local community(D4)	0.31	0.46	0.89	1	1.9	1.9	2.1	3.81	5.82	9
Tourism marketing(D5)	0.24	0.33	0.46	0.52	1	1.1	1.7	3.14	4.1	5.82
Safety and security(D6)	0.2	0.24	0.46	0.52	0.89	1	1.1	2.13	3.14	4
Transportation(D7)	0.14	0.2	0.31	0.46	0.56	0.89	1	1.78	2.13	3.81
Accommodation(D8)	0.11	0.12	0.2	0.26	0.31	0.46	0.56	1	1.12	2
ICT(D9)	0.11	0.11	0.14	0.17	0.24	0.31	0.46	0.89	1	2
Tour guide(D10)	0.11	0.11	0.11	0.11	0.17	0.25	0.26	0.5	0.5	1

Table-5. Calculate the sum

ATTRIBUTES	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
Natural attraction(D1)	1	1.12	2.1	3.1	4.1	4.8	6.8	8.82	8.82	8.82
Local culture(D2)	0.89	1	1.78	2.1	2.9	4.1	4.8	7.97	8.82	8.82
Uniqueness(D3)	0.46	0.56	1	1.1	2.1	2.1	3.1	4.81	6.82	8.82
Local community(D4)	0.31	0.46	0.89	1	1.9	1.9	2.1	3.81	5.82	9
Tourism marketing(D5)	0.24	0.33	0.46	0.52	1	1.1	1.7	3.14	4.1	5.82
Safety and security(D6)	0.2	0.24	0.46	0.52	0.89	1	1.1	2.13	3.14	4
Transportation(D7)	0.14	0.2	0.31	0.46	0.56	0.89	1	1.78	2.13	3.81
Accommodation(D8)	0.11	0.12	0.2	0.26	0.31	0.46	0.56	1	1.12	2
ICT(D9)	0.11	0.11	0.14	0.17	0.24	0.31	0.46	0.89	1	2
Tour guide(D10)	0.11	0.11	0.11	0.11	0.17	0.25	0.26	0.5	0.5	1
Sum	3.57	4.25	7.45	9.34	14.17	16.91	21.88	34.85	42.27	54.09

Table-6. Calculate normalised pairwise comparison matrix

ATTRIBUTES	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
Natural attraction(D1)	0.28	0.26	0.28	0.33	0.28	0.28	0.31	0.25	0.20	0.16
Local culture(D2)	0.24	0.23	0.23	0.22	0.20	0.2425	0.21	0.22	0.20	0.16
Uniqueness(D3)	0.12	0.13	0.13	0.11	0.14	0.1242	0.14	0.13	0.16	0.16
Local community(D4)	0.08	0.10	0.11	0.10	0.13	0.1124	0.09	0.10	0.13	0.16
Tourism marketing(D5)	0.06	0.07	0.06	0.05	0.07	0.0651	0.07	0.09	0.09	0.10

Safety and security(D6)	0.05	0.05	0.06	0.05	0.06	0.0591	0.05	0.06	0.07	0.07
Transportation(D7)	0.03	0.04	0.04	0.04	0.03	0.05	0.04	0.05	0.05	0.07
Accommodation(D8)	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03
ICT(D9)	0.03	0.02	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03
Tour guide(D10)	0.03	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Weight	0.263	0.215	0.134	0.11	0.05	0.05	0.044	0.022	0.018	0.013

Table-7. Calculate the weighted sum value to check consistency

ATTRIBUTES	Weighted sum value
Natural attraction(D1)	2.33
Local culture(D2)	1.92
Uniqueness(D3)	1.18
Local community(D4)	1.01
Tourism marketing(D5)	0.65
Safety and security(D6)	0.52
Transportation(D7)	0.40
Accommodation(D8)	0.24
ICT(D9)	0.2
Tour guide(D10)	0.14

Table-8. Calculate lambda (λ)

$$\Lambda = \frac{\text{Weighted sum value}}{\text{Weight}}$$

ATTRIBUTES	Λ
Natural attraction(D1)	8.85
Local culture(D2)	8.93
Uniqueness(D3)	8.80
Local community(D4)	9.18
Tourism marketing(D5)	13
Safety and security(D6)	10.40
Transportation(D7)	9.09
Accommodation(D8)	10.90

ICT(D9)	11.11
Tour guide(D10)	10.76

Consistency index= λ maximum- $n/n-1$

$$CI = 10.102 - 10 / 10 - 1 = 0.011$$

Where n = number of criteria

Consistency ratio = $CI/RI = 0.011/1.49 = 0.007$ (consistent)

Table-7. Priorities for attributes

Dimension	Priority value	Remarks
Natural attraction(D1)	0.263	Consistent
Local culture(D2)	0.215	Consistent
Uniqueness(D3)	0.134	Consistent
Local community(D4)	0.11	Consistent
Tourism marketing(D5)	0.05	Consistent
Safety and security(D6)	0.05	Consistent
Transportation(D7)	0.044	Consistent
Accommodation(D8)	0.022	Consistent
ICT(D9)	0.018	Consistent
Tour guide(D10)	0.013	Consistent

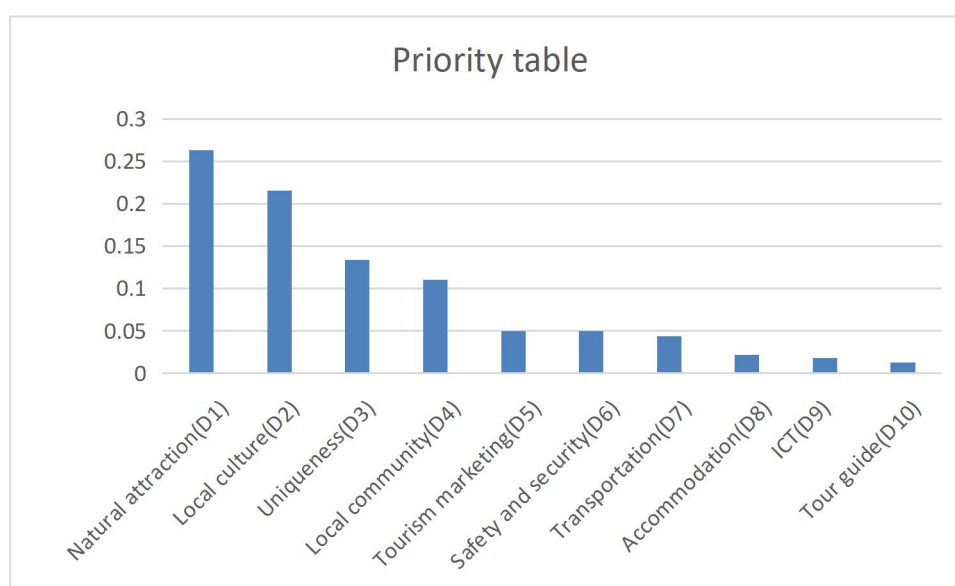


Figure-3. Graphical representation of the priority table

To ensure a consistent category, a CR value of 0.1 or less can serve as an alternative way to determine strategies aimed at boosting tourism in ecotourism destinations in Odisha. From the table, we can see that the top four priorities are Natural Attraction, Local Culture (D2), with Uniqueness (D3) and Local Community (D4)

5.2 Applying TOPSIS Application

Eight clusters of ecotourism sites in Odisha as alternatives for evaluating performance. The feedback for these clusters comes from various directions within the Odisha region. Here's how it works: we create a decision matrix by aggregating previous responses using AHP analysis for each dimension. At this stage, we ask respondents to rate the nine clusters based on nine different dimensions, using a scale from 1 to 9. Respondents compare the clusters against each other for each dimension. A score of 1 means 'very less related,' while a score of 9 indicates 'very strongly related.' We made sure to explain this scale to the respondents before they filled out the questionnaire. The Euclidean value, performance score, and optimal positive and negative ideal values (S_i^+ and S_i^-) are also determined using the choice matrix. The groups are ordered according to Equation's performance score.

Table-8. Vector normalization of eight ecotourism destination

Criteria/Attributes	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
Bhitarkanika nature camp	7	5	9	2	3	4	3	3	2	1
Debrigarh nature camp	8	6	8	5	4	6	7	4	4	1
Similipal nature camp	8	5	8	6	7	7	5	4	3	3
Satakosia nature camp	8	5	7	6	6	6	6	5	4	3
Khandadhar nature camp	7	6	7	5	5	4	5	4	4	3
Daringibadi nature camp	9	8	9	7	8	8	7	8	8	6
Chilika nature camp	9	9	9	9	7	9	7	7	6	5
Deomali nature camp	8	3	7	4	2	7	7	6	4	4
$\sqrt{\sum_{i=1}^m (x_{ij})^2}$	22.71	17.34	22.75	16.58	15.87	18.62	17.05	15.19	13.3	10.29

Where the coding using or criteria Natural attraction(D1), Local culture(D2), Uniqueness(D3), Local community(D4), Tourism marketing(D5), Safety and security(D6), Transportation(D7), Accommodation(D8), ICT(D9), Tour guide(D10)

Table-9. Normalization of eight ecotourism destination matrix

Criteria/Attributes	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
Weight	0.263	0.215	0.134	0.11	0.05	0.05	0.004	0.002	0.018	0.013
Bhitarkanika nature camp	0.308234	0.288351	0.395604	0.120627	0.189036	0.214823	0.175953	0.197498	0.150376	0.097182
Debrigarh nature camp	0.352268	0.346021	0.351648	0.301568	0.252048	0.322234	0.410557	0.263331	0.300752	0.097182
Similipal nature camp	0.352268	0.288351	0.351648	0.361882	0.441084	0.37594	0.293255	0.263331	0.225564	0.291545
Satakosia nature camp	0.352268	0.288351	0.307692	0.361882	0.378072	0.322234	0.351906	0.329164	0.300752	0.291545
Khandadhar nature camp	0.308234	0.346021	0.307692	0.301568	0.31506	0.214823	0.293255	0.263331	0.300752	0.291545
Daringibadi nature camp	0.39630	0.461361	0.395604	0.422195	0.504096	0.429646	0.410557	0.526662	0.6015	0.58309

	1								04	
Chilika nature camp	0.396301	0.519031	0.395604	0.542823	0.441084	0.483351	0.410557	0.460829	0.451128	0.485909
Deomali nature camp	0.352268	0.17301	0.307692	0.241255	0.126024	0.37594	0.410557	0.394997	0.300752	0.388727

Table-10. Weighted Normalized decision matrix

$$V_{ij} = w_j \cdot r_{ij}$$

Criteria/Attributes	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
Bhitarkanika nature camp	0.08	0.06	0.05	0.01	0.009	0.01	0.006	0.003	0.002	0.001
Debrigarh nature camp	0.09	0.07	0.04	0.04	0.01	0.01	0.001	0.005	0.005	0.001
Similipal nature camp	0.09	0.06	0.04	0.05	0.022	0.01	0.001	0.005	0.003	0.003
Satakosia nature camp	0.09	0.07	0.04	0.05	0.01	0.01	0.001	0.006	0.005	0.003
Khandadhar nature camp	0.08	0.07	0.04	0.04	0.01	0.01	0.001	0.005	0.005	0.003
Daringibadi nature camp	0.10	0.09	0.05	0.06	0.02	0.02	0.001	0.001	0.001	0.007
Chilika nature camp	0.10	0.1	0.05	0.08	0.02	0.02	0.001	0.009	0.008	0.006
Deomali nature camp	0.09	0.03	0.04	0.03	0.06	0.01	0.001	0.007	0.005	0.005

Benefit attributes: - more the value more preferred the attribute. in this research only benefit attributes so ideal best is the highest value and ideal worst is the lowest value.

Table-11. Calculation of ideal best and ideal worst

Attributes	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
Bhitarkanika nature camp	0.08	0.06	0.05	0.01	0.009	0.01	0.006	0.003	0.002	0.001
Debrigarh nature camp	0.09	0.07	0.04	0.04	0.01	0.01	0.001	0.005	0.005	0.001
Similipal nature camp	0.09	0.06	0.04	0.05	0.022	0.01	0.001	0.005	0.003	0.003
Satakosia nature camp	0.09	0.07	0.04	0.05	0.01	0.01	0.001	0.006	0.005	0.003
Khandadhar nature camp	0.08	0.07	0.04	0.04	0.01	0.01	0.001	0.005	0.005	0.003

									5	
Daringibadi nature camp	0.10	0.09	0.05	0.06	0.02	0.02	0.001	0.001	0.01	0.07
Chilika nature camp	0.10	0.1	0.05	0.08	0.02	0.02	0.001	0.0009	0.008	0.06
Deomali nature camp	0.09	0.03	0.04	0.03	0.06	0.01	0.001	0.0007	0.005	0.05
Ideal best(Vj+)	0.1	0.1	0.05	0.08	0.06	0.02	0.001	0.001	0.01	0.07
Ideal worst(Vj-)	0.08	0.03	0.04	0.01	0.009	0.01	0.0006	0.0003	0.002	0.01

Table-12. Calculation of Ideal separation

$$Si^+ = \sqrt{\sum_{j=1}^n (vij - vj^+)^2}$$

$$Si^- = \sqrt{\sum_{j=1}^n (vij - vj^-)^2}$$

Criteria	Si+	Si-
Bhitarkanika nature camp	0.098	0.031
Debrigarh nature camp	0.073	0.051
Similipal nature camp	0.065	0.052
Satakosia nature camp	0.068	0.057
Khandadhar nature camp	0.075	0.050
Daringibadi nature camp	0.045	0.083
Chilika nature camp	0.040	0.102
Deomali nature camp	0.087	0.055

Table-13. Calculation the relative closeness to the ideal solution

$$ci = \frac{Si^-}{Si^+ + Si^-}$$

Criteria	Si+	Si-	$si^+ + si^-$	Ci
Bhitarkanika nature camp	0.098	0.031	0.129	0.24
Debrigarh nature camp	0.073	0.051	0.124	0.411
Similipal nature camp	0.065	0.052	0.117	0.444
Satakosia nature camp	0.068	0.057	0.125	0.456
Khandadhar nature camp	0.075	0.050	0.125	0.4
Daringibadi nature camp	0.045	0.083	0.128	0.64
Chilika nature camp	0.040	0.102	0.142	0.71
Deomali nature camp	0.087	0.055	0.142	0.38

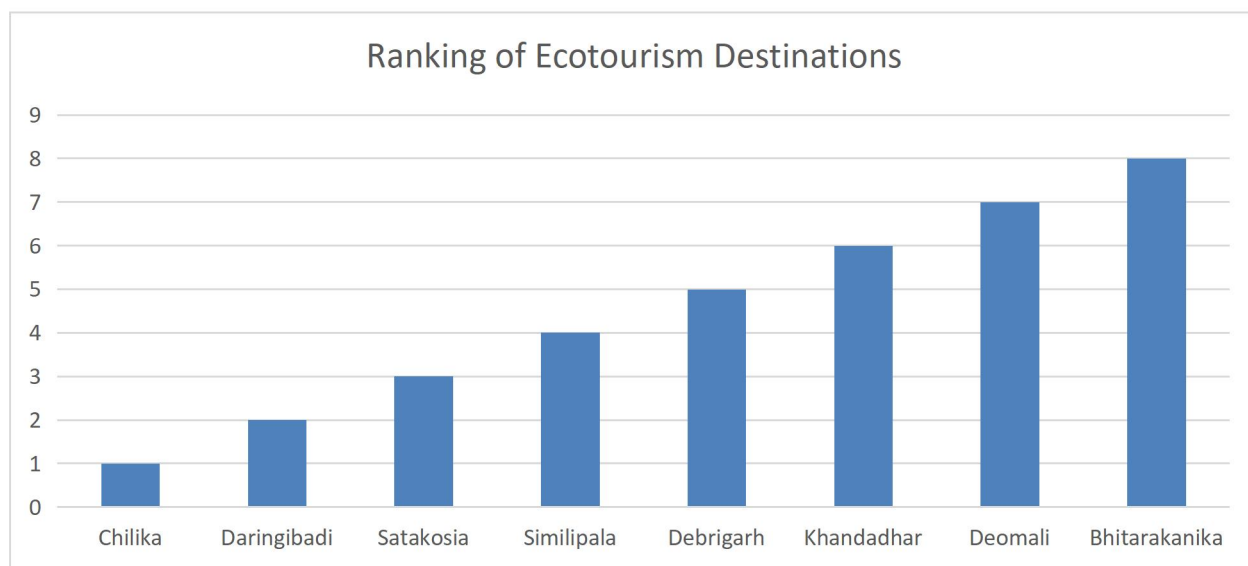


Figure-4. Graphical ranking representation of ecotourism destination

Table-14. Rank the criteria of ecotourism destinations

Ecotourism destinations	Rank
Chilika	1
Daringibadi	2
Satakosia	3
Similipala	4
Debrigarh	5
Khandadhar	6
Deomali	7
Bhitarkanika	8

The TOPSIS rating, which represents Chilika Nature Camp's exceptional performance across a number of evaluation parameters, has won it the title of best ecotourism destination in Odisha. Daringibadi Nature Camp and Debrigarh Nature Camp are not far behind, taking second and third place, respectively, demonstrating their high tourist appeal. Khandadhar Nature Camp is ranked fourth, while Similipal and Satakosia Nature Camps rank fifth and sixth, respectively, suggesting a respectable degree of attractiveness. Deomali Nature Camp and Bhitarkanika Nature Camp complete the list at seventh and eighth place, respectively.

6. Conclusions:

Results suggest that the dominance of Chilika is due to higher satisfaction levels and attractiveness among tourists. Tourism bodies must continue the success achieved by Chilika but develop and improve upon their amenities, accessibility, cleanliness, security, and marketing at low-rated sites, especially Bhitarkanika. More involvement from the community and sustainable tourism practices could increase their competitiveness and ecotourism development. In Odisha, ecotourism is all about linking tourists to the local community and boosting income of rural residents. In an AHP assessment of eight different sites based on ten important attributes, it is found out that attractiveness of the site does indeed matter when choosing where to visit. Chilika tops the list, trailed closely by Daringibadi and Debrigarh. To help strengthen infrastructure and supply chains, expert consultations are guiding policymakers. This study champions sustainable development through circular economy principles, creating benefits for both tourists and farming communities. The TOPSIS ranking outcomes have revealed some interesting differences in the overall performance of the selected ecotourism destinations. Among the eight spots evaluated, Chilika Nature Camp claimed the top spot. This suggests that its impressive performance based on the chosen criteria positions it as a fantastic ecotourism destination. Following closely, Daringibadi Nature Camp secured the second position, while Debrigarh Nature Camp came in third. Both of these camps also demonstrate strong performance and potential for ecotourism. Khandadhar Nature Camp landed in fourth place, and Similipal Nature Camp followed in fifth, indicating an average performance. There's definitely room for improvement to boost the appeal of these two destinations. Satakosia Nature Camp was ranked sixth, highlighting the need for enhancements in certain aspects to make it more competitive. Deomali Nature Camp took the

seventh spot, and Bhitarkanika Nature Camp rounded out the list in eighth place, reflecting a relatively low performance based on the criteria used. In summary, the findings suggest that the most promising ecotourism destinations for future development are Chilika, Daringibadi, and Debrigarh Nature Camps.

7. Recommendation

The recommendations for policy makers from the ranking result through the use of TOPSIS approach are that they must ensure that top-ranking sites such as Chilika, Daringibadi Nature Camps are preserved. In addition, they should ensure that efforts are made to improve the underperforming tourism sites through infrastructure and accessibility among others. In order to increase the appeal of the less popular destinations such as Bhitarkanika, Deomali, Satakosia, and Similipal Nature Camps, the destination managers must focus on improving their transportation facilities, enhancing their accommodation facilities, increasing visitor security, and adding recreational activities. With the help of strengthening efforts for environmental conservation, increasing online marketing activities, improving interpretive programs, and community tourism programs, the destination managers can enhance the experience of the visitors at these places. Besides, keeping track of the satisfaction level of tourists and communicating effectively with the stakeholders is very important.

8. Limitations and future research

The study has many benefits but there are several limitations to it. The expert opinions may be influenced by a number of factors such as their area of work, experience, and interests, which may bias the results in favour of some options despite trying to hire a different set of experts. AHP and TOPSIS methods are not suitable for quantifying the results, being only able to prioritize.

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