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ENHANCING ENVIRONMENTAL SUSTAINABILITY THROUGH THE SUSTAINABLE URBAN TOURISM: CASE STUDY OF NORTHERN TEHRAN, IRAN

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Abstract: Environmental degradation has emerged as a critical global challenge, demanding urgent research into effective strategies for mitigation and sustainable development. This study investigates the intricate relationship between tourism and environmental sustainability in North Tehran, Iran, a region renowned for its natural attractions yet facing significant ecological pressures. By integrating Landsat satellite imagery with comprehensive field surveys, the research employs a mixed-method approach, combining descriptive and analytical techniques, SWOT analysis, and inferential statistics to assess the environmental impact of tourism activities. The findings reveal a troubling trend: while tourism-driven economic activities and improved amenities have bolstered the region's appeal, they have also exacerbated environmental degradation. Notably, the conversion of agricultural lands into commercial developments has led to a dramatic decline in vegetation cover, with satellite data indicating a loss of over 130 square kilometers of green space between 1985 and 2022. This transformation has resulted in soil erosion, deforestation, and biodiversity loss, threatening the region's ecological balance. The study underscores the dual role of tourism as both an economic driver and an environmental stressor, highlighting the need for sustainable practices that balance economic growth with ecological preservation. By identifying key factors contributing to environmental degradation, such as unregulated construction and land-use changes, the research provides actionable insights for policymakers. Strategic recommendations include the implementation of sustainable tourism policies, enhanced community involvement, and the promotion of eco-friendly infrastructure. The findings emphasize the importance of integrating environmental conservation into tourism planning to mitigate resource depletion, protect biodiversity, and ensure long-term socio-economic benefits. This study not only contributes to the growing body of knowledge on sustainable tourism but also offers a tailored framework for addressing the unique ecological and socio-economic challenges of North Tehran, serving as a model for other regions grappling with similar issues. The research also highlights the potential of ecotourism as a sustainable alternative, emphasizing the need for strategic planning, stakeholder collaboration, and community engagement to preserve natural resources while fostering economic growth. By leveraging tools like the CAMP model and SWOT analysis, the study proposes actionable strategies to mitigate environmental risks and enhance tourism resilience.

Keywords: tourism, sustainability, environmental stability, preservation, development, human activities, SWOT, Landsat data

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INTRODUCTION

Tourism is a powerful catalyst for travel, offering opportunities to explore nature, embark on adventures, and engage with diverse cultures. It fosters cultural exchange, social engagement, and participation in new traditions, making it essential for developing a sustainable tourism industry (Baloch et al., 2022). Environmental sustainability plays a key role in this context, focusing on preserving socio-cultural heritage and natural resources to protect ecosystems while benefiting individuals and the economy (Ziari et al., 2015). This sustainability is reflected in various natural landscapes, biodiversity, and cultural sites that showcase local hospitality toward tourists. The relationship between tourism growth and environmental sustainability is crucial, as increased tourism can affect eco-friendly practices (Azam et al., 2018; Hassan et al., 2020; Sun et al., 2021; Ziari & Vansan, 2024). Notably, the World Tourism Organization (UNWTO) highlights that tourism contributes over 10% to the global GDP (UNWTO, 2017). International tourism has grown significantly, increasing from 25 million tourists in 1950 to 1.442 billion in 2018, with projections estimating 1.8 billion by 2030. While tourism generates employment and economic benefits, it also causes environmental pollution, including air and noise pollution, waste accumulation, and depletion of natural resources. Overcrowding can lead to serious ecological issues such as soil erosion, resource depletion, and threats to biodiversity and cultural environments (Shaheen et al., 2019; Andlib & Salcedo-Castro, 2021). Sustainable tourism aims to use natural and human resources responsibly, preventing their exploitation and ensuring the protection of the environment and cultural heritage. Effective sustainable tourism development requires clear policies and principles, including sustainable resource use, waste reduction, diversity preservation, strategic planning, local community involvement, stakeholder engagement, and responsible marketing in the tourism industry.

The growth of tourism has notable ecological costs that often outweigh the socio-economic benefits for local communities (Pulido-Fernández et al., 2019; Simo-Kengne, 2022). Ecotourism, which aims to develop infrastructure while

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conserving natural resources, holds potential for economic development in such regions. The Lashkark-Dizin axis in northern Tehran, Iran, is a prominent ecotourism destination, featuring a mix of historical, cultural, and natural attractions that attract visitors year-round. However, this area faces significant environmental degradation, which poses challenges for sustainable tourism development. Addressing infrastructural issues - such as road conditions and facility maintenance - alongside environmental preservation efforts is vital for enhancing the tourism experience and supporting growth. Strategically establishing tourist-recreational complexes can significantly increase tourist numbers and benefits while prioritizing environmental sustainability. In light of recent environmental disruptions in northern Tehran, a comprehensive strategy is necessary to mitigate further damage and foster sustainable tourism practices.

Environmental degradation, intensified by human activities, is a critical concern, especially in relation to tourism in sensitive ecological areas. Research highlights the complex relationship between tourism and economic development; for instance, Gupta et al. (2024) points out that tourism can boost local economies but also threatens environmental integrity without sustainable practices. Rimba et al. (2021) discuss how increased tourism often leads to harmful land-use changes, worsening environmental decline. Dwyer (2023) emphasizes the need for integrated policies that balance economic growth and ecological sustainability but notes that assumptions about stakeholder cooperation may not hold in practice. Mustafa & Prasad (2024) focus on biodiversity loss from land-use changes but overlook crucial elements like water management and climate resilience. While these studies provide valuable insights, significant gaps persist, particularly regarding local case studies linking tourism to environmental degradation specifically in North Tehran.

Most existing research tends to focus on established tourist destinations, frequently ignoring emerging markets like North Tehran and lacking longitudinal data to assess environmental changes over time. Furthermore, in light of this, the present study aims to critically assess the natural attractions in North Tehran and analyze the effects of human activities, particularly tourism, on the local environment. By combining Landsat data with field surveys and employing both descriptive and analytical methods alongside SWOT analysis, this research seeks to evaluate environmental sustainability and tourism indicators specifically in the context of North Tehran. The goals are to identify effective mitigation strategies that balance economic benefits and environmental protection, outlining pathways for sustainable tourism development tailored to the unique ecological and socio-economic conditions of the area.

MATERIALS AND METHODS

Study area

Tehran province covers approximately 18,909 square kilometers and is divided into 15 cities, with Shemiran city accounting for around 1.1 thousand square kilometers. The Lashkarak-Dizin axis is vital for tourism activities, necessitating a geographical study of the Lavasan region, whose administrative center is Lavasanat. Located in northeast Tehran, Lavasan shares a similar summer climate with the city and features numerous natural attractions that attract visitors year-round from Tehran and Alborz provinces (Tehran Province Management and Planning Organization, 2020). However, environmental diversity poses challenges for tourism planning, including poor road conditions, insufficient facilities, and significant environmental degradation, which hinder tourism. Establishing tourist-recreational complexes could enhance the area's appeal and provide necessary services such as accommodations and catering. Addressing recent environmental issues is essential for sustainable tourism development and the well-being of local communities. This research emphasizes the need to tackle these challenges to ensure a sustainable future for tourism in the Lavasan region. Figure 1 shows the location of Lashkarak-Dizin axis.

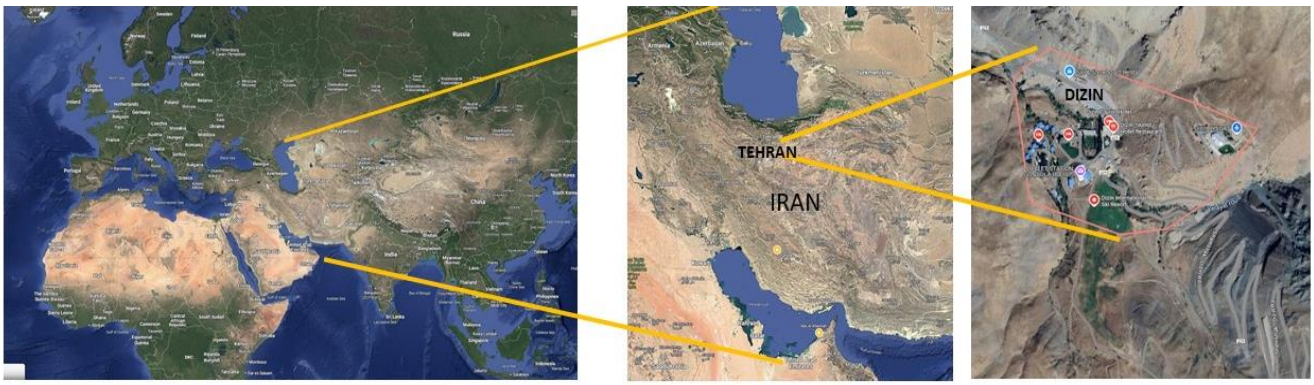

Figure 1. Study area - Iran, Tehran, Lashkarak-Dizin axis

Research methodology

This study employs a descriptive and analytical research methodology (Figure 2) to explore tourist attractions and facilities in the Lashkar-Dizin area, focusing on the environmental state and the impact of tourism on physical-spatial development and resource sustainability. It aims to establish relationships between independent and dependent variables using correlation methods and combines quantitative and qualitative approaches. Satellite data from Landsat 8 and Landsat 1-5, along with NDVI analysis, are utilized to assess vegetation cover changes up to 2022 and evaluate the environmental impact of tourism, particularly concerning unregulated constructions.

The research involves field surveys targeting three groups: tourism experts from Tehran and Alborz, residents of the study area, and visiting tourists, with sample sizes of 30, 200, and 150, respectively. The validity and reliability of the

questionnaires will be assessed using the Cronbach's alpha method. The Pralong method is used in 2022 to evaluate tourism expansion indicators, while SWOT analysis assesses the current environmental and tourism situation.

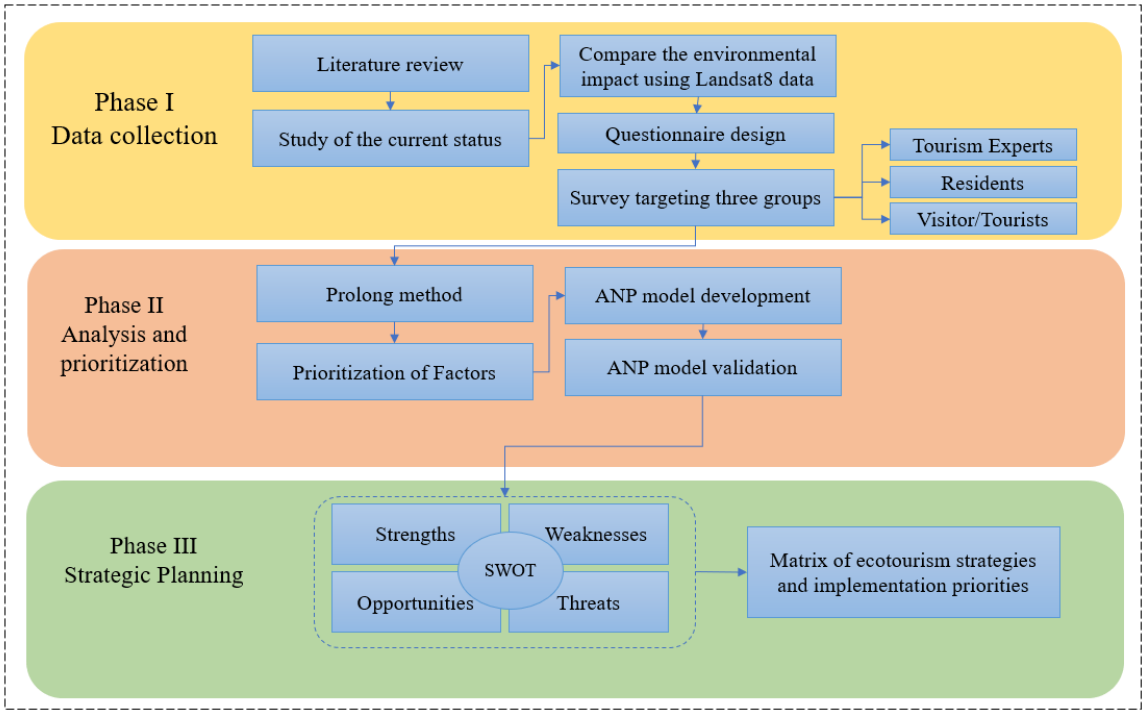

Figure 2. Research Methodology flowchart

Inferential statistical analyses, including correlation and regression coefficients, will examine the relationships between variables. The study also incorporates network analysis techniques to evaluate criteria related to tourism, justified by the model's ability to incorporate control hierarchies and interrelationships among components (Higgs, 2006). By analyzing research objectives and relevant literature, the study operationalizes key variables for experimental testing.

RESULTS AND DISCUSSION

The analysis of instability and destruction of the natural environment

The analysis of instability and environmental degradation of natural habitats is conducted using satellite data analysis from Landsat 8 and the utilization of the analytical tool, NDVI vegetation coverage index, in the landviewer system. The preparation of vegetation coverage charts for the years 2013 to 2022 demonstrates the time series data based on the spectral index values of satellite images with a minimum percentage of cloud cover in the designated area. Additionally, the display of charts divided by year allows for the comparison and evaluation of temporal dynamics using the available data for the selected period. The results of this analysis indicate the destruction of natural landscapes, deforestation, and a decrease in vegetation coverage in the study area (Figure 3).

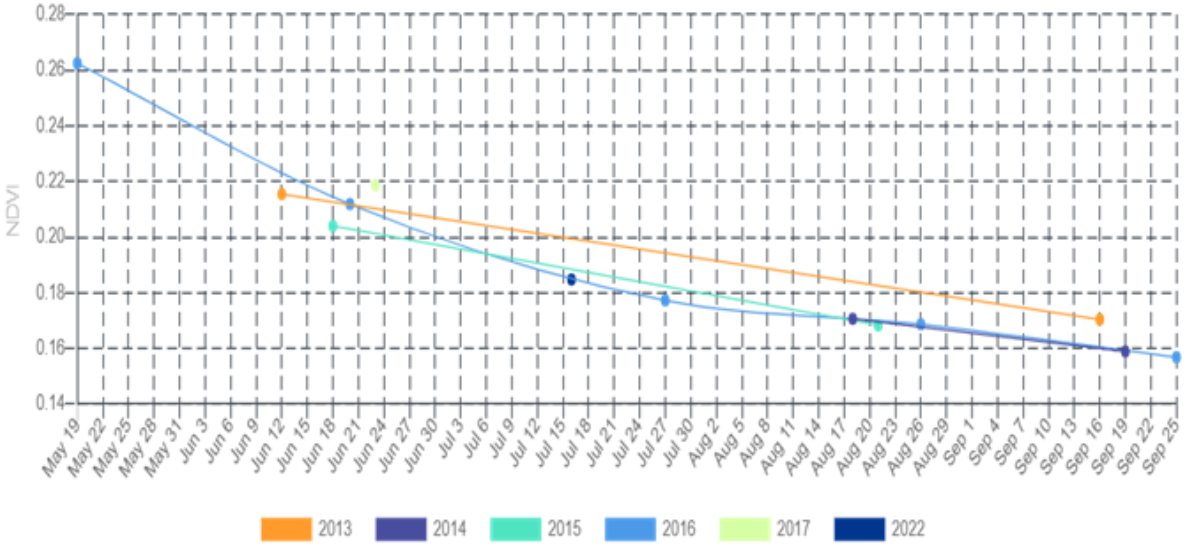

Figure 3. The decrease in vegetation coverage index NDVI (Source: Landviewer)

Over the past few decades, uncontrolled spatial and physical development, as well as construction, have caused irreparable damages, including soil erosion, landslides, deforestation, floods, and more. These issues will be further elaborated on in the following sections. By utilizing Landsat 1-5 MSS and Landsat 8 images in the time intervals of 1985 and 2022, processed in Google Earth Engine using the NDVI (Normalized Difference Vegetation Index) index for assessing and analyzing vegetation cover changes, it was evident that in the 1985 image, the total area of green spaces amounted to over 192.5 square kilometers, a figure that decreased to 62.5 in the same selected area in 2022 (Figure 3). This indicates a significant environmental disaster and destruction of over 130 square kilometers of vegetation cover in the selected area, namely Lavasan County. The images clearly depict how, over the span of 37 years, a decrease of 130 square kilometers in vegetation cover in the region has occurred due to deforestation, spatial development, urbanization, and other factors (Figure 4).

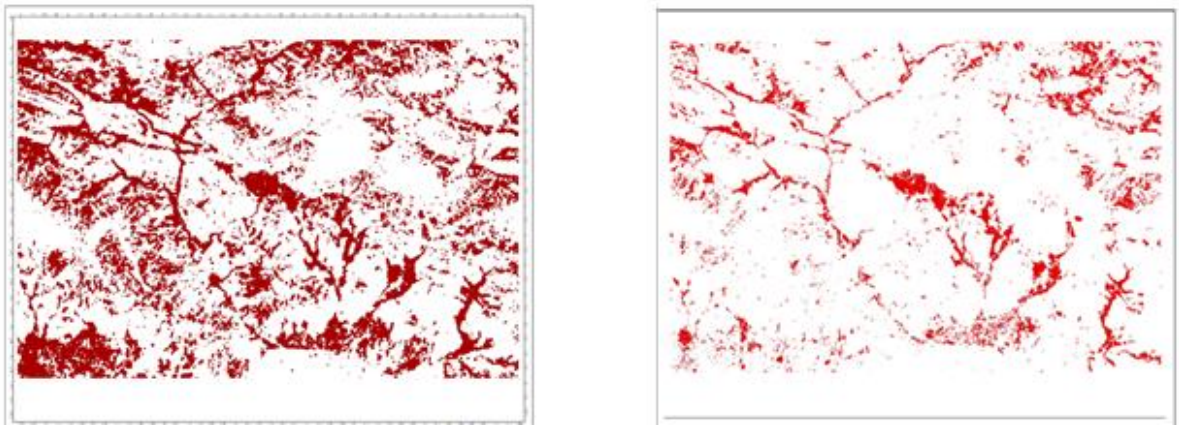

Figure 4. Vegetation coverage in 1985 (left) vs. 2022 (right) showing loss of vegetation over time in Lashkarak-Dizin axis in North Tehran. Data (Source: Landsat8 data)

Evaluation of the worth of the tourist attractions and competences of Lashkark-Dizin axis

We used Prolong method to identify the worth of the waterfalls along the route, green tourism paths and athletic places of the Lashkark-Dizin axis as the most visited ecotourism spatial elements in the axis (Table 1).

Table 1. Evaluation of criteria for determining the value of ecotourism elements using the Prolong method (Source: Survey and results of the current study)

Value	Criterion-score		0	0.25	0.5	0.75	1
Attractiveness	V1	Age of Elements	50	100	150	200	>200
	V2	Climate	Dry	Cold and dry	Mild	Mild and hot	Mild and humid
	V3	Area	-	Small	Average	Large	Very large
	V4	Water Resources	Very low	Low	Moderate	High	Very high
	V5	Soil Resources	Very low	Low	Moderate	High	Very high
	V6	Vegetation	Very low	Low	Moderate	High	Very high
Facilities, services, and environment	V1	Water and sanitation	-	No	Well	Spring	Pipe
	V2	Parking and guarding	No	-	-	-	Yes
	V3	Accommodation	-	No	-	-	Yes
	V4	Security	Very low	low	Average	High	Very high
	V5	Access routes	-	Earthy	Cobblestone	Sand	Asphalt
	V6	Perception of environment	Very low	Low	Average	High	Very high
	V7	Natural resources protection encouragement	Very low	Low	Average	High	Very high
Social standards	V1	As a health base	Zero	Weak	Medium	Intense	Very intense
	V2	Respect for local culture	Zero	Weak	Medium	Intense	Very intense
	V3	The right behavior with the environment	Zero	Weak	Medium	Intense	Very intense
	V4	Space of interaction	Zero	Weak	Medium	Intense	Very intense
	V5	Recreational base	Zero	Weak	Medium	Intense	Very intense
Economic	V1	Number of tourists per year	<100	100-200	200-500	500-1000	>1000
	V2	Daily accommodation	Zero	Less than 3	3-6	6-9	More than 9
	V3	Creating service employment	Zero	Low	Medium	High	Very high
	V4	As a sport base	Very low	Low	Medium	High	Very high

We obtained the average indicators of attractiveness, facilities and services, social and economic, which are scored from 5 different levels - Likert scale. In this method, the current productivity value of spatial elements has been evaluated. In other words, the amount and quality of productivity evaluates the productivity value of ecotourism-oriented elements in order to determine the potential and actual abilities of these elements in the sustainable development of tourism. Ecotourism includes all the natural phenomena that exist on the planet and people are interested in seeing them, getting to know them and getting information about their existence and characteristics.

The final assessment and examination of the waterfalls, green tourist paths, and athletic amenities along the Lashkark-Dizin axis reveal that the economic index stands at 0.859, and the welfare and service facilities criterion is at 0.842. These factors have significantly contributed to attracting tourists and meeting investment objectives. This suggests a potential for expanding financial events linked to ecotourism expansion in the area. However, without proper environmental protection planning, the transformation of agricultural and garden lands into economic ventures could alter the pristine natural setting and trigger weather variations in the area. Overall, the Lashkark-Dizin tourism axis is highly valued by tourists and requires increased investment to ensure the preservation of the natural environment through a sustainable approach.

Based on the research findings, it is evident that a two-way association between nature tourism and environmental preservation is beneficial and offers hope for its sustainability. Moreover, it is crucial to anticipate the present and forthcoming needs of the host population, ensuring that future generations also reap the benefits. Hence, for the persistence of ecotourism in the Lashkark-Dizin route, certain conditions must be met. These include the support of residents, the engagement of local societies in managing this movement, and the reasonable spreading of profits amongst individuals.

Prioritization of the important factors using the ANP model

This study pinpoints the key factors that contribute to the depletion of environmental resources in the Lashkark-Dizin axis due to tourism development. Various criteria and indicators have been taken into account when examining the impact of tourism activities on the environment in Lashkar-Dizin. By establishing intra-group and out-group relationships between elements and indicators, the influence of each factor on the environmental degradation of the Lashkark-Dizin axis is determined. The study categorizes the criteria into four clusters: economic activity development, land use change, tourist attraction, and tourist behavior characteristics. Each cluster comprises several key elements that not only facilitate communication within the group but also demonstrate inter-cluster interdependence (Table 2).

Table 2. Pairwise comparison matrix and weight of clusters (Source: Authors)

Title	Economic activities	Land uses change	Tourist attraction	Behavioral characteristics	Relative weight	Final weight
Economic activities	1	1.38	3	2	0.637	0.184
Land uses change	3	1	0.81	0.95	0.748	0.131
Tourist attraction	3	1.41	1	2	0.804	0.217
Behavioral characteristics	0.034	0.46	3	1	0.412	0.103

Pairwise comparisons and matrices are utilized to determine the relationships between all criteria and clusters. These comparisons are made using scales of preference or importance, with each judgment being assigned a number from 1 to 9. It is important to note that pairwise comparisons are conducted for both criteria and options. The results of these pairwise comparisons aim to identify the factors that influence the destruction of environmental resources (Table 2).

Table 3 specifically highlights the inconsistency rate of the judgments, which is calculated to be 0.03101. It is worth mentioning that in this method, the inconsistency value should not exceed 1. However, considering the large number of judgments and the potential error caused by the survey, this level of error is deemed acceptable.

Table 3. Rate of inconsistency in ANP network model (Source: Authors)

Indicators	Economic activities	Land uses change	Tourist attraction	Behavioral characteristics	Average rate of inconsistency
Rate of inconsistency	0.0535	0.0228	0.01067	0.01067	0.03101

Based on Table (4), the clusters' relative weight is determined by comparing the even matrix. The even matrix assigns a score that represents the relative importance of a component in row i compared to column j. Specifically, the ratio wj/wi=aij indicates equal importance when the score is one. If a component is 9 times more important than component j, it is reflected in the score. Subsequently, the network analysis process involves comparing the elements within one cluster, calculating the relative weight of the matrix elements, and normalizing the table's elements. It is important to note that clusters can depend on elements from other clusters. In such cases, a pairwise comparison matrix is created based on control criteria, and the matrix elements are compared in pairs to obtain the weight of the matrix. This result is then incorporated into the primary supermatrix, which ensures that the sum of each column's elements in the supermatrix exceeds one.

Table 4. Final weight of study indicators in environmental resources destruction

Indicators	General weight	Cluster weight	Final Weight
Economic activities	0.854	0.184	0.157
Land uses change	0.749	0.131	0.098
Tourist attraction	0.405	0.217	0.087
Behavioral characteristics	0.281	0.103	0.028

The network analysis model indicates that factors promoting economic activities, such as the establishment of inns and motels, business facilities, highway centers, tourist campsites, and urban amenities, significantly impact environmental resource degradation along the Lashkar-Dizin axis, with a coefficient of 0.157.

Additionally, changes in land use patterns—such as converting agricultural land to commercial use and transforming green spaces into housing and tourism hubs—also significantly contribute to environmental degradation, with a coefficient of 0.098. These land use changes can lead to considerable weather variations in the region. The influx of tourists attracted by local amenities and natural attractions correlates with the depletion of environmental resources, as increased services risk the ecological capacities of densely populated areas. Furthermore, tourists' behaviors that neglect environmental health and preservation can exacerbate the destruction of biological resources in the region.

Strategic planning to empower ecotourism boom in Lashkark-Dizin axis

The initial phase of developing a strategic plan to enhance ecotourism in the Lashkark-Dizin axis involves identifying the key factors that impact the expansion of this particular form of tourism. It is essential to begin by extracting the strengths, weaknesses, opportunities, and threats associated with ecotourism in this region.

A. Strengths: 1. Beautiful and unique views; - 2 sports and entertainment attractions; 3- Being close to Tehran; 4 sample tourism areas along this axis, the closest summer climate areas to Tehran; 5- increasing the income of rural households along the axis; - 6 creating job opportunities; 7- Changes in the traditional educational model of children; 8- Increasing trade between residents and tourists; 9- Increasing the level of literacy and awareness of the people; -10 having a calm environment to relax; 11. The existence of heights and high peaks for mountain sports, especially in the Dizin area (the presence of an international track);

B. Weaknesses: 14. Inadequate health facilities and services along the axis. - 15 - Conflict between the culture of tourists and residents, especially in the villages in the axis - 16 - Improper environmental and physical infrastructure in the study axis - 17 - Increase in garbage and accumulation in the existing environment - 18 - Pollution of water sources - 19 - Soil erosion. 20- Acquaintance of local people with new ideas and wrong ways of behavior. - 21 - Unauthorized construction in agricultural and agricultural lands along axis - 22 - Spread of environmental pollution. 23 - People's unwillingness to invest in the tourism sector. -24 changing the natural landscape. 25- Loss of quality lands due to expansion without tourism plan. - 26 Lack of trained and specialized forces - 27 Construction of a new villa and house in the gardens along the axis

C. Opportunities: 28 - Increasing the motivation for travel and recreation in the villages along the axis. 29- Increasing private incentives to invest. 30- Relative improvement of communication roads in the region. 31- Generating income through uses suitable for tourism. 32- Increasing the attractiveness of entering and staying in the city. 33- Creating new uses that suit the needs of tourists. 34- The existence of a large pole of the population opened near these areas. 35-Decreasing the migration rate of young people from surrounding villages to Tehran. 36- The existence of expert and experienced forces in the vicinity of these areas. - 37 - The possibility of using local crossings to promote pedestrian movement - 38 - Improving the quality of life in the region. - 39 - Increasing the area's vegetation to attract more population - 40 - Preventing soil erosion by increasing the area's vegetation. 41- Raising the level of awareness of the natives of the region. 42- Improving the conditions of the public transportation system in the region due to the increase in traffic and the increase in the level of tourism in the region

D. Threats: 43- Increase in social violations with the arrival of tourists in these areas. 44 - Destruction of trees and vegetation. 45- Disappearance of local culture and tradition. 46-Destruction of agricultural lands and longitudinal farms. 47- Contamination of water and soil resources, in this axis. - 48 Construction in the lands of gardens and farms - 49 Risk of earthquakes due to the existence of faults. - 50. Abandoning the virgin space and green paths in the axis as a place of accumulation of pollution. 51- Increasing environmental problems due to tourism activity. 52- Low social status of some social jobs. 53 - Misrecognition of environmental resources. 54- Overpopulation and overcrowding of this area in certain seasons. 55- Lashgarak road is one of the most dangerous roads. 56- Local landslides are in the form of small and large blocks. 57- Change of agricultural land use.

Based on the research data regarding ecotourism and environmental capabilities in the Lashkar-Dizin axis, 57 variables were standardized on a scale of 1 to 10 to assess strengths, weaknesses, opportunities, and threats (SWOT). The analysis revealed that weaknesses and threats in ecotourism development had the highest coefficients, at 41.8 and 36.8, respectively, while strengths and opportunities were lower, at 12.6 and 54.7. These coefficients helped identify the internal (strengths and weaknesses) and external (opportunities and threats) factors affecting the area's environmental capabilities for ecotourism development. The results, shown in Table (5), summarize the percentages assigned to each SWOT component based on expert opinions. Ultimately, these findings inform strategies for developing ecotourism while ensuring environmental protection and enhancing environmental capabilities in the Lashkar-Dizin area.

Table 5. Calculating the percentage of strength and weakness, opportunities and threats (Source: Authors)

Type of strategy	SWOT									
	SWOT	Negative	Positive	Internal	External	T	O	W	S	Subject
		W/T	S/O	O/T	S/W					
Second and third	71.32	50.8	49.1	52.6	47.3	26.3	26.3	24.5	22.8	Lashkarak-Dizin

Based on the data presented in Table (5), Lashkar-Dizin is currently facing a number of threats to its environmental state and capabilities, accounting for 26.3 percent. In the realm of tourism, it is imperative to prioritize environmental conservation and prevent the resurgence of detrimental activities in order to safeguard the existing resources and maintain environmental integrity. By addressing these weaknesses and threats, strategic measures can be implemented to promote the growth and advancement of tourism while upholding environmental preservation in the pivotal Lashkar-

Dizin region. This is crucial for Tehran province as it contributes to sustainable job creation and revenue generation within the tourism sector of the province and the city of Shemiranat. The research identifies several strategies for enhancing ecotourism in the Lashkar-Dizin axis, categorized into five types. (1) Strengthening Positive Aspects Strategy: Aimed at reinforcing both internal and external strengths of tourism areas. (2) Overcoming Strategy: A conservative approach designed to align internal strengths with existing opportunities to address we aknesses.

Environmental Control Strategy: Implemented when facing significant external threats, leveraging strengths and opportunities to mitigate their impact. (3) Control of Negative Factors: This combines elements of both the overcoming and environmental control strategies to address multiple challenges. (4) Internal and External Factors Control Strategy: Applied in situations where strengths and opportunities are abundant (Mousavi et al., 2013). For strategic planning in ecotourism on the Lashkar-Dizin axis, the second and third strategies are emphasized. This approach utilizes internal and external positive factors to minimize internal weaknesses.

The strategy matrix establishes thresholds for evaluating internal and external factors. For internal factors, scores range from 1 to 1.99 indicating weakness, 2 to 2.99 indicating average status, and 3 to 4 indicating strength. Similarly, external factors are evaluated on a scale where a score of 1 to 1.99 signifies weakness, 2 to 2.99 indicates average conditions, and 3 to 4 indicates a strong system (Modiri et al., 2012). The SWOT analysis results suggest that, along with leveraging strengths to overcome weaknesses, a competitive strategy should be adopted to enhance tourism attractions. This strategy aims to attract both domestic and foreign tourists while ensuring the preservation of environmental resources for future generations (Figure 5).

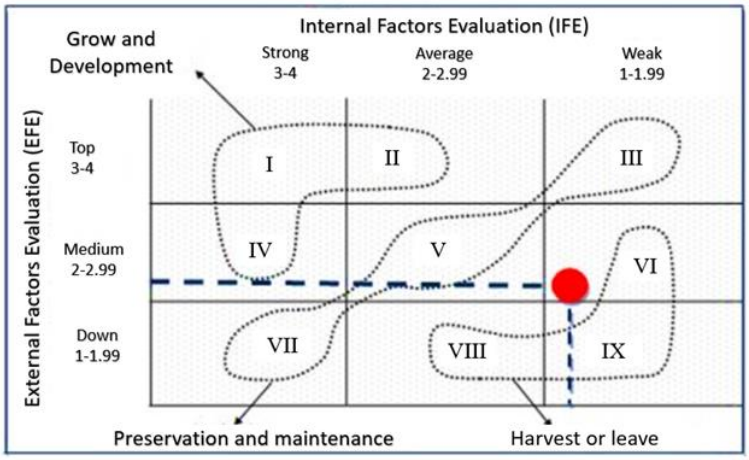

Figure 5. Matrix of Lashkark-Dizin ecotourism strategies and implementation priorities

The development of tourism through natural resource and environmental management has superseded industrial growth, emphasizing the need for sustainable natural landscapes and ecotourism. Ecotourism focuses on leveraging natural tourism to develop infrastructure while preserving environmental resources, fostering economic growth in regions. The Lashkark-Dizin axis in northern Tehran, Iran, exemplifies this approach. This research investigates ecological challenges, their harmful impacts, and potential tourist attractions in the area. Analysis using the Pralong model highlights the importance of integrating sustainable ecotourism concepts into development plans while considering its economic, social, and environmental impacts. Additionally, the preservation of natural and cultural heritage, promotion of local benefits, involvement of local communities as investors, and efforts to increase education and awareness for better resource maintenance are crucial. Prioritizing these aspects is essential for effectively developing ecotourism in the Lashkark-Dizin axis.

Economic viability continues to be a challenge for ecotourism, particularly for small businesses, despite its benefits. The development of various infrastructures can boost tourism growth (Baker, 2024; Alsahafi et al., 2023), but sustainable practices need financial support mechanisms to encourage broader adoption (Saarinen, 2013). The study indicates a high economic index of 0.859, suggesting robust potential for attracting tourists and investment, but wa rns that this growth may threaten natural landscapes and alter the local climate. Key indicators for financial development include the construction of lodging, businesses, road facilities, tourist campsites, and urban amenities.

However, issues like overtourism and land use changes, such as converting agricultural land to commercial use, significantly impact ecological resources and may lead to climate alterations. To mitigate these challenges, successful strategies include promoting green transportation, renewable energy, and sustainable tourism practices, as seen in initiatives like the "Copenhagenize" cycling campaign and Barcelona's management of visitor numbers.

The CAMP model (Competitive Advantage, Attraction, Management, and Partnerships) can be employed to develop and sustain tourism strategies by addressing these key components (Baker, 2019).

Figure 6 shows strategies for tourism development in lashkarak -Dizin Based on the CAMP model approach.

According to the SWOT methodology used in this study, several strategies for sustainable ecotourism in the Lashkar-Dizin axis are recommended. Competitive and offensive strategies include developing attractions and facilities, collaborating with experts for community organizations, coordinating institutions for integrated tourism functions, focusing on natural attractions for employment, and encouraging private sector investment in tourism. To address internal weaknesses while leveraging external opportunities, strategies involve enhancing planning and government support for

tourism, optimizing the distribution of tourism facilities and services, revising land laws for tourism development, increasing community participation in tourism initiatives, and reforming educational institutions regarding tourism benefits.

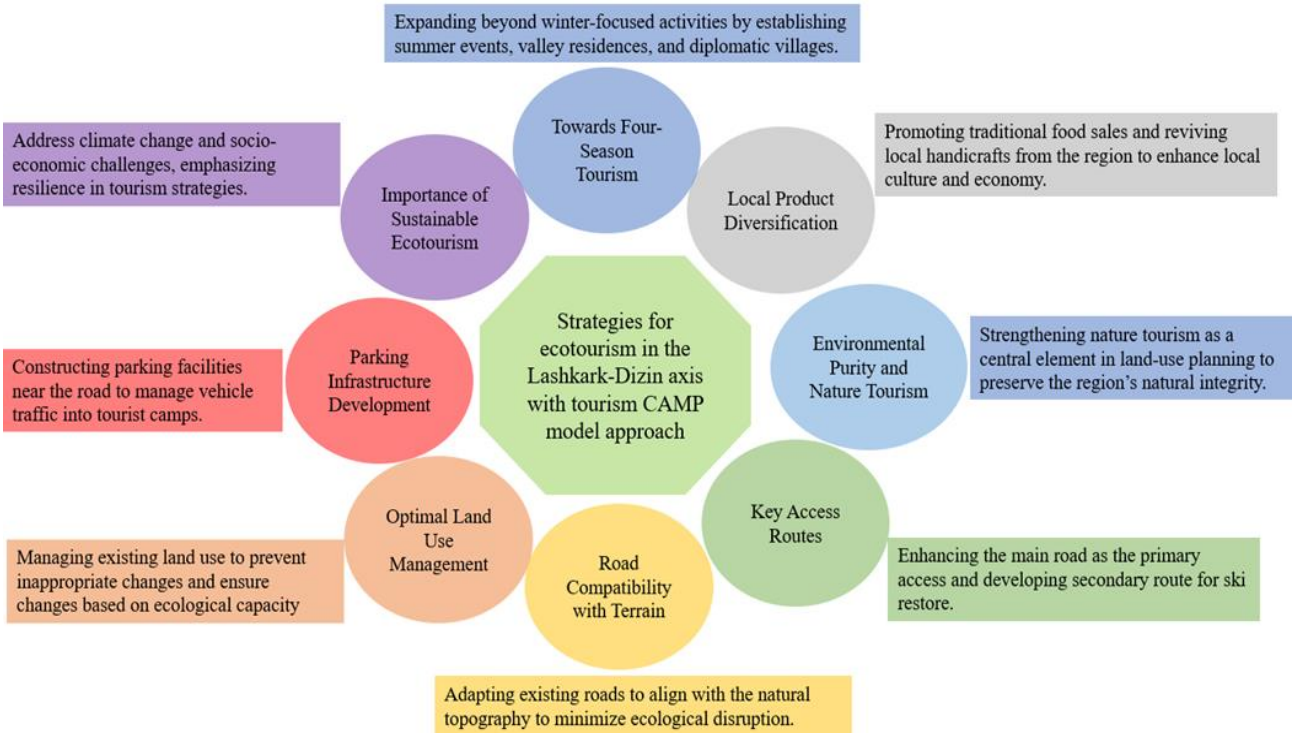

Figure 6. Strategies for tourism development in lashkarak -Dizin Based on the CAMP model approach

The analysis highlights the importance of diversifying tourist activities and services, enhancing tourist routes with signage and guidebooks, implementing innovative advertising strategies, ensuring security in tourist destinations, managing crowd density in entertainment venues, and using regulations to mitigate environmental risks. Defensive strategies include investing in tourism, engaging stakeholders through seminars, promoting community participation in tourism development, providing cultural education for locals and tourists, and legislating for the sustainable use of tourist attractions.

CONCLUSION

The development of tourism through the channel of natural resources and environmental management has taken the place of industrial development, and the world is supposed to be viewed not from the point of view of industry and machine hardware, but from the perspective of natural landscapes, sustainable natural resources, and ultimately sustainable ecotourism. One of the ecotourism axes in North Tehran is the Lashkark-Dizin.

The aim of this study is to explore ecological matters, its critical impacts, abilities in fascinating tourists. In this study, we used the Prolong method and the network examination model to examine the efficiency of several indicators in the expansion of Lashkark-Dizin center. Incidentally, the concluding assessment of the value of the waterfalls along the route and the green tourist paths and athletic points in this area, demonstrate that the financial index and the standard of facilities have played the greatest part in appealing tourists. The lack of ecological preservation causes extensive land use changes that affects the area. It can alter the face of pristine and natural settings and cause the climatic alteration in the area. The outcomes of the network examination model similarly demonstrate that the indicators of the expansion of financial actions had a great impact on the demolition of the ecological resources of the area.

The impact of these land use alteration is so important that it can cause climate alteration in the area. Using CAMP model and SWOT can bring opportunities to come up with strategies helping decision-making and strategic planning to preserve such unique environment as well as enhancing the tourism industry benefits.

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