

Original Research Article

Assessment of Sustainable Rural Tourism Development Indicators (A Case Study of Liqvan Village in East Azerbaijan Province)

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Abstract | Rural tourism, as one of the strategies for sustainable development, requires continuous assessment of the capacities, services, infrastructure, and management systems of tourism destinations. Liqvan Village in East Azerbaijan Province, Iran, possesses considerable potential for tourism development due to its natural, cultural, historical, and local-product attractions; however, a comprehensive assessment of its sustainable tourism development has not yet been conducted. The aim of this study was to assess the status of sustainable tourism development in Liqvan Village based on 31 indicators across five dimensions, including tourism potentials, service quality, facilities and infrastructure, the management system, and the impacts of tourism development. The study was applied in terms of purpose and descriptive-analytical in terms of nature. Data were collected through a questionnaire based on a five-point Likert scale, involving 20 participants, including 10 tourism experts and stakeholders and 10 tourists visiting the village. The data were analyzed using a standardized scoring method and the Sustainable Tourism Index (STI). The results showed that the Tourism Potentials dimension received the highest score (+65), whereas the Quality of Services dimension received the lowest score (−15.83). The calculated STI value was +14.78, indicating a moderate-to-low level of sustainable tourism development in Liqvan Village. These findings can serve as a strategic tool for planning and guiding sustainable tourism development in Liqvan Village.

Keywords | Rural tourism, Sustainable development, Tourism management, Liqvan, Economic development.

Introduction | In recent decades, rural tourism has attracted considerable attention from planners and researchers as an effective strategy for promoting the sustainable development of rural areas, while also contributing to regional economic growth (Tremblay, 2006; Mutlu Danacı & Gülten, 2013; Cason & Koster, 2015; Korani & Shafiei, 2021; Çiftçioglu & Sokhanvar, 2022; Ding et al., 2025). The concept of rural tourism is broader and more comprehensive than that of agritourism (Choo & Park, 2022; Lin et al., 2025). This is because, in addition to agricultural activities, rural tourism encompasses a wide range of cultural, economic, and social activities undertaken in rural areas (Bramwell & Lane 1994; Lane 1994; Pechlaner et al., 2015). In the rural tourism industry, infrastructure should be appropriately designed and developed in terms of both structural facilities and accommodation, in accordance with the rural scale and context (Pulido-Fernández et al., 2023). Also, it should be

grounded in the characteristics of the rural community and reflect its traditional and indigenous identity (Roknaddin & Mahdavi 2006; Parra-Sánchez, 2025). Long-term planning is also essential for sustainable development allowing tourism to grow gradually and organically (Roknaddin & Mahdavi 2006) while providing opportunities to identify and address its shortcomings and deficiencies. In the pursuit of sustainable rural tourism, one of the fundamental principles is to maximize tourist satisfaction (Slabbert et al., 2021; Wang et al., 2025), as well as local residents' satisfaction with the presence of tourists. Implementing specialized training programs for rural residents can increase their awareness of the positive economic and social impacts of tourism and create the conditions for their more effective participation in tourism development (Wahyuningrat & Harsanto 2025). Sustainable rural tourism requires small-scale regional and local tourism enterprises that are managed by local people in coordination with indigenous communities and

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in accordance with traditional practices commonly found in rural open spaces (Turnock 2002; Zhong et al., 2008; Anderson et al., 2015; Özgeris & Karahan 2021; Giampiccoli et al., 2020; Gohori & van der Merwe 2024; Zu et al., 2025; Chen et al., 2025).

Sustainable rural tourism contributes to preserving the rural identity of the region. Therefore, it should be regarded as a potential tool for sustainability and conservation (Su et al. 2021; Han et al., 2025; Zhu et al., 2025). Since the natural and cultural resources available in the region are utilized for tourism activities, rural tourism cannot be considered independently of the preservation of cultural and natural heritage. Rather, it should be regarded as an evolving phenomenon that can contribute to the economic, social, cultural, and ecological sustainability of the region (Zahedi 2003; Clark & Chabrel 2007; Lepp, 2007; Yun, 2014; Yun, 2014; Davardoust & Karahan 2021; Nepal et al., 2021; Jeong, 2022; Siow et al., 2024; Tang et al., 2025).

In this context, the role of women in the development of rural tourism is of great importance. The development of rural tourism in local communities can be facilitated through women's participation in social interactions without traditional constraints, as well as through collaboration between women, men, and tourism managers. This is because rural communities possess a positive yet often hidden form of social capital that can be mobilized to support tourism development (White et al., 2005; Brouder, 2012; Foley et al., 2018; Uduji, et al., 2020). In rural tourism, changes in women's roles, particularly through the creation of direct employment and income-generating opportunities, can strengthen women's sense of self-empowerment. At this stage, however, structured training programs aimed at empowering women, along with support for vulnerable groups, are essential to facilitate the natural development of self-empowerment (Tao et al., 2025; Dewi et al., 2025).

On the other hand, rural tourism encompasses a wide range of activities and provides relatively low-cost and simple services at a high level. In this type of tourism, accommodation is often booked directly via the Internet, telephone, or fax, without the dominant involvement of large tour operators (Serra Cantallops et al., 2015). Furthermore, social media, as a marketing tool, plays an important role in tourists' decision-making and experiences, the participation of rural residents, and the growth of the tourism industry (Senyao & Ha, 2020; Joseph et al., 2022). Easy access to online information resources enables tourists to make more informed decisions when selecting their destinations (Huete-Alcocer & Valero-Tévar, 2021).

Liqvan Village is one of the largest and most populous villages in East Azerbaijan Province and is located in Meydan Chay Rural District, in the Central District of Tabriz County. The village is situated in the valley of the same name. Liqvan Valley

is one of the remarkable valleys of the Sahand Mountain Massif. Owing to its river, various cold and hot springs, and pristine natural environment, it is considered one of the most renowned recreational destinations around Tabriz and one of the province's major tourism hubs.

Despite these potentials, no comprehensive assessment of the status of sustainable tourism development in Liqvan Village has yet been conducted based on scientific indicators. The lack of an accurate understanding of sustainability indicators has made tourism development planning, decision-making, and management more challenging and has limited the optimal utilization of the existing potentials. Therefore, the main objective of the present study is to assess the status of sustainable tourism development in Liqvan Village and to identify its strengths and weaknesses across different dimensions of tourism development. Using multidimensional indicators of sustainable tourism development, this study evaluates the status of tourism development in Liqvan Village from the perspective of participants. In this regard, the study analyzes the status of indicators, existing capacities, and challenges across five main dimensions of sustainable tourism development, thereby providing a comprehensive picture of the current state of tourism in the village.

The significance of this study lies in its potential to provide a clear picture of the current state of tourism in the village and to establish a scientific basis for tourism planning, investment, and sustainable management in the region. The findings can also contribute to identifying the capacities, limitations, and needs of the local community, thereby creating opportunities to increase residents' participation in tourism activities, generate employment opportunities, improve the income of rural households, and enhance their quality of life. Furthermore, the findings of this study may be applicable to other villages with similar conditions and can contribute to the development of locally appropriate models for the assessment and management of sustainable rural tourism.

The main objective of this study is to assess the indicators of sustainable tourism development in Liqvan Village. To achieve this objective, the present study examines various dimensions of tourism development in the village, including the tourism potential of the region, the quality of services provided to tourists, existing facilities and infrastructure, the tourism-related management system, and the impacts of tourism development on the local community. Accordingly, the study seeks to provide a comprehensive picture of the current state of tourism in the village and establish the necessary basis for sustainable tourism planning and management. The present study also seeks to answer the following research questions: What is the status of sustainable tourism development in Liqvan Village based on the selected indicators across the five main dimensions? What priorities for planning and managing sustainable tourism development in Liqvan Village are identified by the results of the assessment?

Literature Review / Theoretical Framework

Several studies have been conducted on the assessment of sustainable rural tourism development. Davardoust & Karahan (2021) examined the status of tourism development in Uzundere Village, Erzurum Province, Türkiye, using sustainability indicators. Their findings showed that although some economic and social indicators were in a favorable condition, weaknesses were observed in tourism management and planning. Furthermore, Davardoust (2019), in a study of the Arasbaran region, found that local community participation and awareness were at a relatively favorable level, whereas institutional and governmental support for tourism development faced certain limitations. These studies indicate that the assessment of sustainable tourism requires the simultaneous consideration of economic, social, managerial, and environmental dimensions, and that the mere presence of tourism attractions does not guarantee sustainable development. Studies conducted in the field of sustainable rural tourism demonstrate that successful tourism development requires simultaneous attention to economic, social, managerial, and infrastructural dimensions. Pashaei Kamali & Yilmaz (2022) emphasized the importance of spatial quality in enhancing productivity and sustainability. Lov et al. (2019) and Eskandari Shahraki et al. (1402) have also confirmed the role of tourism in improving economic conditions and reducing poverty among rural households. On the other hand, Celik et al. (2025) and Huang et al. (2025) have demonstrated that local community participation, interaction with residents, and the enhancement of digital skills are among the factors that contribute to achieving sustainable tourism development. Furthermore, Gomar Mokrabai & Amadi (2025) emphasized the importance of safeguarding public interests and ensuring genuine local community participation in the decision-making process. Gias (2025), in a study of Esfahak Village, also demonstrated that tourism can contribute to the sustainable revitalization of rural areas by strengthening community participation, social cohesion, and the utilization of cultural heritage. Overall, the findings of these studies indicate that sustainable rural tourism development requires comprehensive planning, local community participation, infrastructure enhancement, and attention to the economic and social impacts of tourism.

Although no independent study has yet been conducted to assess sustainable tourism development indicators in Liqvan Village, various studies have examined the natural, economic, and cultural characteristics of the village. Research conducted by Taj Ahmadi et al. (1401), examined the physical, historical, and architectural characteristics of the village and identified its stepped settlement pattern and architectural heritage as important factors contributing to its tourism attractiveness. Furthermore, studies related to Liqvan cheese production and livestock farming activities

in the region have highlighted the role of the local economy in rural development (Forouhandeh et al., 2021). In addition, environmental studies conducted in the Liqvan Valley have emphasized the importance of biodiversity, the Liqvan Chay River, and the region's natural resources (Hashemzadeh Sagharloo et al., 2012). However, these studies have mainly focused on introducing the individual potentials of the region and have not provided a comprehensive assessment of the status of sustainable tourism in the village.

A review of the literature indicates that, although numerous studies have been conducted on sustainable rural tourism in Iran and other countries, and some studies have examined the natural, historical, and economic characteristics and potentials of Liqvan Village, no comprehensive assessment of the sustainable tourism development status of the village based on scientific indicators has yet been conducted. Most previous studies have either focused on specific aspects of rural tourism or merely introduced the region's tourism potentials. Therefore, a significant research gap remains in achieving a comprehensive understanding of the village's strengths and weaknesses in terms of tourism potentials, service quality, facilities and infrastructure, management systems, and the impacts of sustainable tourism development. Accordingly, the main research gap lies in the absence of a study that simultaneously assesses the various dimensions of sustainable tourism development in Liqvan Village, including tourism potentials, service quality, facilities and infrastructure, the tourism management system, and the impacts of tourism development. The novelty of the present study lies in applying a set of sustainable tourism development indicators within a comprehensive, multidimensional framework and incorporating the perspectives of local experts to assess the current situation. This approach enables the precise identification of tourism development potentials, limitations, and priorities and can serve as a scientific basis for planning, management, and policymaking for sustainable tourism development in Liqvan Village and other villages with similar conditions. Furthermore, the findings of this study may contribute to improving the quality of life of local residents, increasing rural community participation, and conserving the region's natural and cultural resources.

Liqvan Village

• Location of Liqvan Village

Liqvan Village is one of the largest and most populous villages in East Azerbaijan Province and is administratively located in Meydan Chay Rural District of Tabriz County. The village is situated in the Liqvan Valley, on the northern slopes of the Sahand Mountain Range, approximately 35 km southeast of Tabriz (Fig. 1). Located at an elevation of 2,150 m above sea level, the village has a pleasant climate and a dense, terraced architectural pattern (Fig. 2), which has developed along

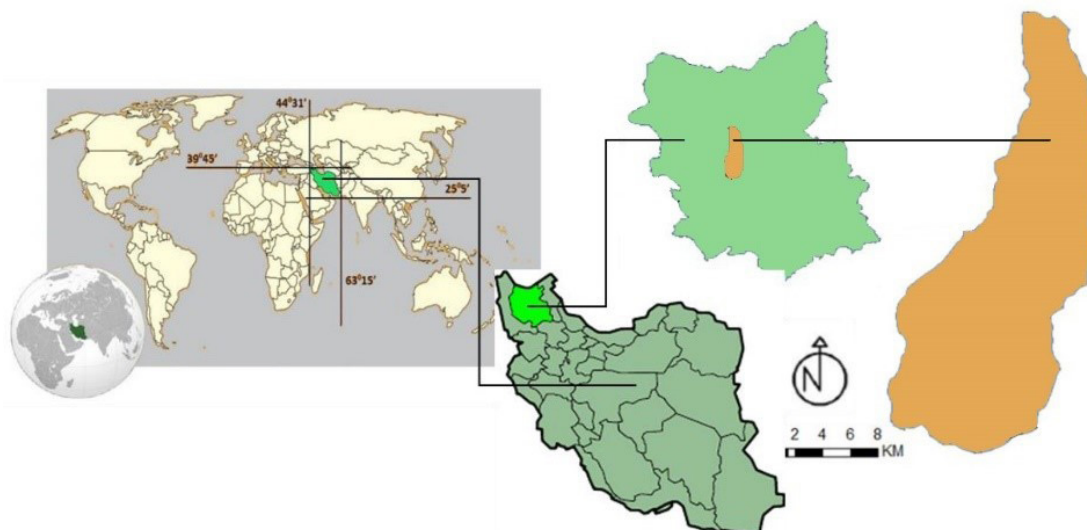


Fig. 1. Location of Liqvan Village. Source: Authors based www.wikipedia.org.

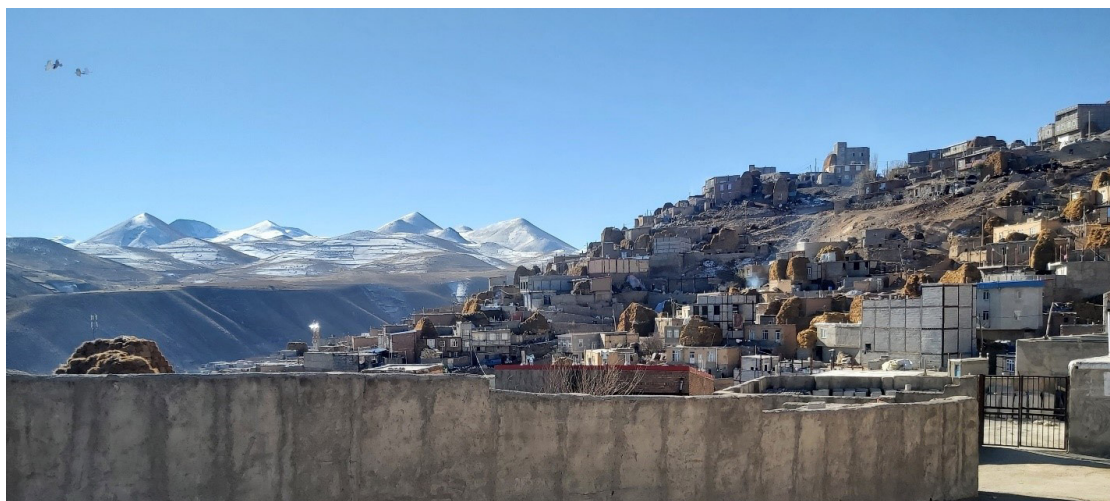


Fig. 2. General view of Liqvan Village. Source: Sanaz Davardoust, 2025.

the mountain slopes in order to preserve agricultural land and accommodate construction on the available terrain (TajAhmadietal.,2022). Approximately 1,600 households reside in the village, and the majority of the population is employed and literate (Mohandesin Moshaver-e Naghshe va Nama, 2016).

• Tourism Potentials of Liqvan Village

The Liqvan tourism area possesses considerable tourism potential due to its distinctive natural and geographical characteristics, much of which has yet to be fully identified and developed. Liqvan Valley is one of the most scenic valleys in the Sahand Mountain Range and, with its permanent river, cold and hot springs, and pristine natural environment, is regarded as one of the most important recreational destinations in the vicinity of Tabriz and East Azerbaijan Province (Fig. 3). The Liqvan Chay River flows through the valley, creating scenic natural landscapes and attracting a large number of tourists annually. The river is also a habitat for a native species of trout, which, due to its declining population, requires conservation and restoration programs (Hashemzadeh Sagharloo et al., 2012).

The economy of Liqvan Village is primarily based on

agriculture, livestock farming, dairy production, and handicrafts. Agricultural products include potatoes, cucumbers, alfalfa, clover, and damask roses, while honey, meat, and, particularly, Liqvan cheese are among the most important livestock products (Forouhandeh et al., 2021). The extensive production of Liqvan cheese, with more than 100 dairy-processing units operating in the village and an estimated daily production of approximately 136 tons of cheese, has made Liqvan one of the country's important dairy production hubs. The presence of a large natural cold-storage facility further enhances the village's potential for expanding both production and tourism. Handicrafts, including pottery, ceramics, carpets, kilims, and jajims, are also among the major traditional activities of the local population. Its scenic natural setting, proximity to Tabriz, and rich historical background make Liqvan a suitable destination for the development of rural tourism (Pashaei Kamali, 2024).

Among the architectural, historical, and natural attractions of the village are the Haj Salar Liqvan Bridge (Fig. 4), the Liqvan Stone Mansion (Fig. 5), the Liqvan mineral springs, the Liqvan natural hot spring, the natural caves of Liqvan



Fig. 3. View of Liqvan Valley. Source: Sanaz Davardoust, 2025.

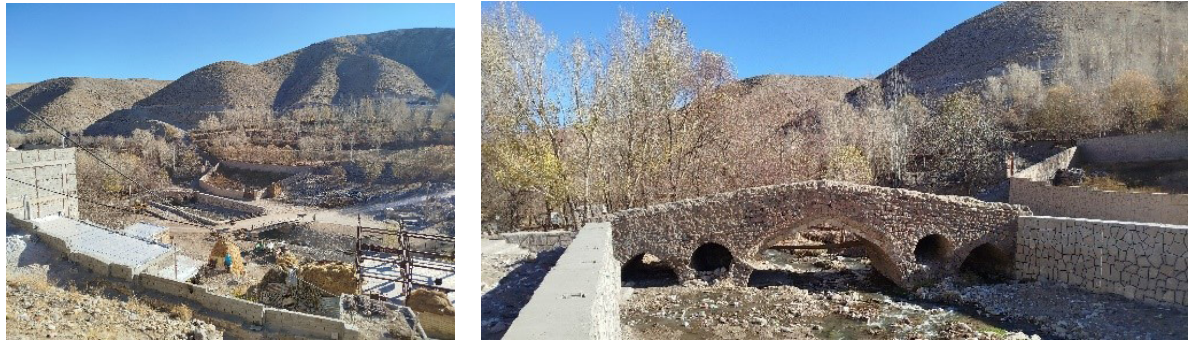


Fig. 4. Close-up and distant views of the Haj Salar Liqvan Bridge. Source: Sanaz Davardoust, 2025.



Fig. 5. General views of the Stone Mansion. Source: Fereshteh Pashaei Kamali, 2025.

(Fig. 7), the Naghim Lar or Naghmeh Lar archaeological site (Fig. 6), the forested and recreational Liqvan Valley, the historic Liqvan cemetery (Fig. 8), the historic bathhouse (Fig. 9), and the Liqvan River. Another notable attraction is a statue of two stone lions, which is currently preserved in the courtyard of the Liqvan Girls' School and was registered as one of Iran's national heritage sites on December 31, 2002 (Taj Ahmadi et al., 2022). The Cultural Heritage, Handicrafts, and Tourism Organization of East Azerbaijan Province has pursued programs aimed at strengthening the region's economic structures and utilizing its existing potentials to promote tourism development. In this context, Liqvan Village, as one of the province's prominent destinations, has gradually



Fig. 6. A view of the Naghmeh Lar caves. Source: www.ligvan.com.



Fig. 7. Interior view of a natural storage cave in Liqvan.
Source: www.ligvan.com



Fig. 8. A view of the tombstones in the historical cemetery of Liqvan.
Source: www.ligvan.com.

moved toward integrating its economic activities with the tourism sector, creating opportunities for the development of rural tourism and the sustainable utilization of its natural, cultural, and economic resources.

Research Methodology/ Materials and Methods

• Research approach and development of indicators for assessing sustainable tourism development

This study was conducted to assess the status of sustainable tourism development in Liqvan Village. In terms of its purpose, the study is applied, while in terms of its nature and methodology, it is descriptive-analytical. To assess the status of sustainable tourism development in Liqvan Village, the theoretical framework of the study was developed based on the indicators proposed by Park & Yun (2011). In the aforementioned study, the sustainable tourism development indicators were extracted and validated using the Delphi method through consultation with experts.

In the present study, these validated indicators were used as the initial framework and were subsequently reviewed and adapted

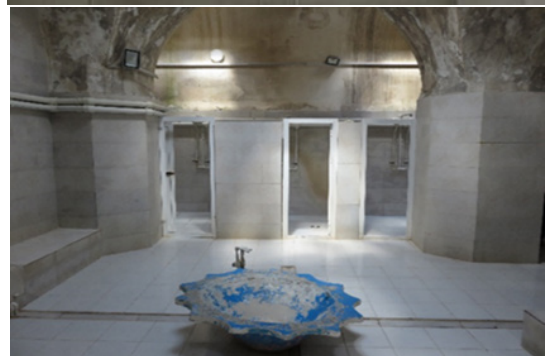


Fig. 9. Interior view of the Liqvan historical bathhouse.
Source: Fereshteh Pashaei Kamali, 2022.

to the specific environmental, social, economic, and managerial characteristics of Liqvan Village. To localize the indicators, in addition to the study by (Park & Yun, 2011), the findings of previous studies by (Hong, 1998; Rome 1999; Bellamy, 2001; Jiang 2007; Davardoust, 2019; Davardoust & Karahan, 2021) were also reviewed. By integrating the findings of these studies and considering the environmental, social, economic, and managerial characteristics of Liqvan Village, some indicators were revised, modified, or removed. Conversely, indicators that were more consistent with the specific conditions of the destination were added to the research framework.

Ultimately, 31 indicators were selected across five main dimensions, including tourism potentials, service quality, facilities and infrastructure, the management system, and the impacts of tourism development. These indicators formed the basis for designing the research questionnaire (Table 1). They were employed to assess the current status of sustainable tourism development, identify the strengths and weaknesses of the village, and provide a basis for developing managerial strategies and planning for sustainable tourism development in Liqvan Village.

Following the finalization of the indicators, the research questionnaire was developed based on a five-point Likert scale and administered to 20 participants, including the village head, experts and managers from the Cultural Heritage sector, tourism consultants, faculty members, local tourism practitioners, and tourists. The questionnaire was used to assess the status of each sustainable tourism development indicator in Liqvan Village.

• Samples and sampling method

To assess the status of sustainable tourism development indicators in Liqvan Village, the questionnaire was administered to 20 knowledgeable individuals and stakeholders involved in tourism-related activities, who were selected through purposive sampling. The selection criteria included familiarity with the tourism conditions of the village, professional or managerial experience in the tourism sector, or direct experience of using tourism services in Liqvan Village. The sample consisted of the head of Liqvan Village; the head and deputy head of the General Department of Cultural Heritage, Tourism and Handicrafts of East Azerbaijan

Table 1. Indicators for assessing sustainable rural tourism development. Source: Authors.

Dimensions	Sub-dimensions	Indicators
Tourism Potentials of the Region	Natural	- The natural environment is utilized for camping, hiking, horseback riding, fishing, and other recreational activities. - The therapeutic use of natural resources, such as hot springs and medicinal plants, is available.
	Historical	- Existing historical buildings and sites are highly effective in attracting tourists. - Restored historical buildings are available to provide tourism services and attract tourists.
	Economic	- Locally produced rural products are offered to promote the tourism industry. - The provision of agricultural and natural products from the region contributes to the growth of the tourism industry.
Quality of Services Provided to Tourists	Ease of Access to Accommodation	- Accommodation reservations can be made online. - Tourists have access to guidebooks and maps. - Directional signs to the village are available from a distance of 5 km. - Rural houses are available for rent to tourists. - Sufficient recreational, tourist, and accommodation complexes are available in the area. - Conferences on rural tourism are held to introduce and promote the region.
Village Facilities	Accommodation Facilities	- Sufficient rental accommodation units are available for tourists in the village.
	Ancillary Facilities	- Suitable space with a capacity of at least 20 people is available for holding meetings with local residents. - Parking facilities with a capacity of at least 20 vehicles are available for tourists in the village.
	Environment	- The village has a waste disposal system.
Management System	Planning Association	- Long-term planning is in place to develop the village into a sustainable tourism destination. - Local community support and contributions are available for the development of the tourism industry. - Specialized consultation services are available for the development of rural tourism.
	Cooperation among Relevant Businesses	- Cultural and artistic festivals are held in the region. - Rental houses are appropriately managed for tourism purposes. - Rural tourism activities contribute to an increase in value added. - Online sales of local products have increased.
	Tourism Industry	- There are individuals employed full-time in the rural tourism industry. - Public services are available for tourists. - Online advertising, guidebooks, and tourism brochures are available to promote the village.
Impacts of Tourism Development	Satisfaction	- Local residents are fully satisfied with the development of tourism in the region. - Tourists are fully satisfied with the current conditions of the region.
	Overall Sales and Income	- The number of tourists has increased in recent years. - Direct sales of local products have increased.
		- Travel companies and tour operators have direct connections with the village.

Province; one expert from the General Department of Cultural Heritage, Tourism and Handicrafts; two consulting engineers and designers involved in the Liqvan Stone Mansion project; one faculty member from Islamic Azad University, Tabriz Branch; two local individuals collaborating with the General Department of Cultural Heritage; two local tourism practitioners; and 10 tourists visiting Liqvan Village. The inclusion of tourists in the sample was justified by the fact that some of the research indicators, including service quality, facilities, accessibility, and tourism experience, can only be adequately assessed from the perspective of actual destination users. Therefore, the combination of managers, experts, local practitioners, and tourists enabled a more comprehensive assessment of the status of sustainable tourism development in the village.

• Data collection instrument and scoring method

The data collection instrument used in this study was a structured questionnaire developed based on 31 selected sustainable tourism development indicators across five main dimensions: tourism potentials, service quality, facilities and infrastructure, the management system, and the impacts of tourism development. These indicators were selected and refined through a review of the relevant literature, existing theoretical frameworks, and adaptation to the local conditions of Liqvan Village. A five-point Likert scale was used to assess the status of each indicator, with the following response categories: “Very Unsatisfactory,” “Unsatisfactory,” “No Opinion,” “Satisfactory,” and “Very Satisfactory.” The data obtained from this stage provided the basis for assessing the current status of sustainable tourism development, identifying strengths and weaknesses, and comparing the performance of different tourism dimensions in Liqvan Village.

For the quantitative analysis of the data, the questionnaire responses were coded using a standardized scoring system. Accordingly, the response options “Very Satisfactory,” “Satisfactory,” “No Opinion,” “Unsatisfactory,” and “Very Unsatisfactory” were assigned scores of +2, +1, 0, -1, and -2, respectively. The score for each indicator was then calculated based on the weighted mean of the percentage of respondents using the following equation. Using this method, the indicator scores range from -100 to +100. Positive values indicate a more favorable condition, values close to zero represent a moderate or average condition, and negative values indicate an unfavorable condition for the assessed indicator. The final scores for all indicators were calculated using this method, and the results are presented in Table 2.

$$\text{Score} = \sum_i \frac{w_i P_i}{2}$$

- w_i is the weight assigned to each response option, which ranges between -2 and 2.
- P_i is the percentage of respondents.
- Since the weights range between -2 and +2, dividing by the number 2 causes the final score to be in the range of -100 and +100.

As an example, the indicator “Use of natural resources for camping, hiking, horseback riding, and fishing” received a score of 70. According to the questionnaire results, 10% of the respondents selected the “Unsatisfactory” option, 60% selected “Satisfactory,” and 30% selected “Very Satisfactory.” By assigning weights of +2, +1, 0, -1, and -2 to the response options and applying the percentage of respondents to the equation presented above, the score for this indicator was calculated as follows:

$$\text{Score} = \frac{(30 \times 2) + (60 \times 1) + (10 \times (-1))}{2} = 70$$

Therefore, the final score for this indicator was 70, indicating a favorable status from the respondents’ perspective. The scores for the remaining indicators were calculated using the same method, and the results are presented in Table 2.

Analysis of Sustainable Tourism Indicators in Liqvan Village

• Analysis of sustainable tourism development indicators in Liqvan Village

Following the collection of the questionnaires, the participants’ responses were coded according to the scoring system described in the methodology section, and the scores of each of the 31 sustainable tourism development indicators were calculated using the aforementioned equation. The indicator scores range from -100 to +100; positive values indicate more favorable conditions, values close to zero represent moderate conditions, and negative values indicate weaknesses or deficiencies in the assessed indicator. The results of the indicator scoring are presented in Table 2. Furthermore, to facilitate comparison among the indicators and different dimensions of sustainable tourism development, the results are graphically illustrated in Fig. 10.

- Tourism Potentials of the Region

The tourism potentials of Liqvan Village were assessed across three sub-dimensions: natural, historical, and economic potentials.

Natural Potential: The indicator “Use of natural resources for camping, hiking, horseback riding, and fishing” received a score of 70, representing one of the highest scores among the tourism potential indicators. Similarly, the indicator “Therapeutic use of natural resources (hot springs and medicinal plants)” received a score of 55, indicating a favorable assessment of this potential from the perspective of the study participants. These findings suggest that the natural resources of Liqvan Village have considerable potential for the development of nature-based and health tourism.

Historical Potential: The indicators “Existing historical buildings and sites for attracting tourists” and “Restored historical buildings” received scores of 65 and 45, respectively, indicating a moderate status from the perspective of the study participants. These findings demonstrate that the cultural heritage and historical buildings of Liqvan Village

Table 2. Assessment of sustainable tourism development indicators in Liqvan Village based on questionnaire data. Source: Authors.

Dimensions	Sub-dimensions	Indicators	Final Score	Mean				
				Very Unsatisfactory (wi = -2)	Unsatisfactory (wi = -1)	No Opinion (wi = 0)	Satisfactory (wi = +1)	Very Satisfactory (wi = +2)
Tourism Potentials of the Region	Natural	The natural environment is utilized for camping, hiking, horseback riding, fishing, and other recreational activities.	70	0	10	0	30	60
		The therapeutic use of natural resources, such as hot springs and medicinal plants, is available.	55	0	10	0	60	30
	Historical	Existing historical buildings and sites are highly effective in attracting tourists.	65	0	10	10	30	60
		Restored historical buildings are available to provide tourism services and attract tourists.	45	0	10	10	60	20
	Economic	Locally produced rural products are offered to promote the tourism industry.	85	0	10	0	60	60
		The provision of agricultural and natural products from the region contributes to the growth of the tourism industry.	70	0	0	10	40	50
Quality of Services Provided to Tourists	Ease of Access to Accommodation	Accommodation reservations can be made online.	45	30	30	40	0	0
		Tourists have access to guidebooks and maps.	15	0	50	30	20	0
		Directional signs to the village are available from a distance of 5 km.	70	0	20	0	60	60
		Rural houses are available for rent to tourists.	-25	20	20	50	10	0
		Sufficient recreational, tourist, and accommodation complexes are available in the area.	-15	10	30	40	20	0
		Conferences on rural tourism are held to introduce and promote the region.	-65	40	50	10	0	0
Village Facilities	Accommodation Facilities	Sufficient rental accommodation units are available for tourists in the village.	-25	20	20	50	10	0
	Ancillary Facilities	Suitable space with a capacity of at least 20 people is available for holding meetings with local residents.	30	40	20	20	40	20
		Parking facilities with a capacity of at least 20 vehicles are available for tourists in the village.	0	10	20	40	20	10
	Environment	The village has a waste disposal system.	60	0	0	20	40	40

Rest of Table 2.

Dimensions	Sub-dimensions	Indicators	Final Score	Mean				
				Very Unsatisfactory (wi = -2)	Unsatisfactory (wi = -1)	No Opinion (wi = 0)	Satisfactory (wi = +1)	Very Satisfactory (wi = +2)
Management System	Planning Association	Long-term planning is in place to develop the village into a sustainable tourism destination.	-15	10	30	40	20	0
		Local community support and contributions are available for the development of the tourism industry.	-10	10	40	20	20	10
		Specialized consultation services are available for the development of rural tourism.	-35	30	20	40	10	0
	Cooperation among Relevant Businesses	Cultural and artistic festivals are held in the region.	5	10	30	30	20	10
		Rental houses are appropriately managed for tourism purposes.	-25	10	30	60	0	0
		Rural tourism activities contribute to an increase in value added.	-15	10	10	40	20	20
		Online sales of local products have increased.	25	10	10	20	40	10
	Tourism Industry	There are individuals employed full-time in the rural tourism industry.	-20	20	30	30	10	10
		Public services are available for tourists.	-5	20	0	60	10	10
		Online advertising, guidebooks, and tourism brochures are available to promote the village.	50	10	20	20	40	60
Impacts of Tourism Development	Satisfaction	Local residents are fully satisfied with the development of tourism in the region.	50	0	10	10	50	30
		Tourists are fully satisfied with the current conditions of the region.	-30	30	30	10	30	0
	Overall Sales and Income	The number of tourists has increased in recent years.	25	0	40	0	30	30
		Direct sales of local products have increased.	45	0	10	20	40	30
		Travel companies and tour operators have direct connections with the village.	-20	20	30	10	30	0

have considerable potential for the development of cultural tourism; however, realizing this potential requires the restoration, rehabilitation, and adaptive reuse of historical buildings. In this regard, the restoration project of the Liqvan Stone Mansion, undertaken by the General Department of Cultural Heritage, Tourism and Handicrafts of East Azerbaijan Province, with proposed uses such as a traditional restaurant, café, and rural exhibition space, could contribute to more effective utilization of this potential.

Economic Potential: The indicators “Locally produced products contributing to the development of tourism” and

“Provision of agricultural and natural products of the region” received scores of 85 and 70, respectively, representing some of the highest scores within this dimension. These findings indicate that, from the perspective of the study participants, products such as Liqvan cheese, honey, agricultural products, and handicrafts constitute important economic potentials for tourism development in the village. In contrast, the lower scores of the indicators related to historical heritage suggest that, compared with the natural and economic potentials, this sector requires greater attention to conservation, rehabilitation, and the development of related infrastructure.

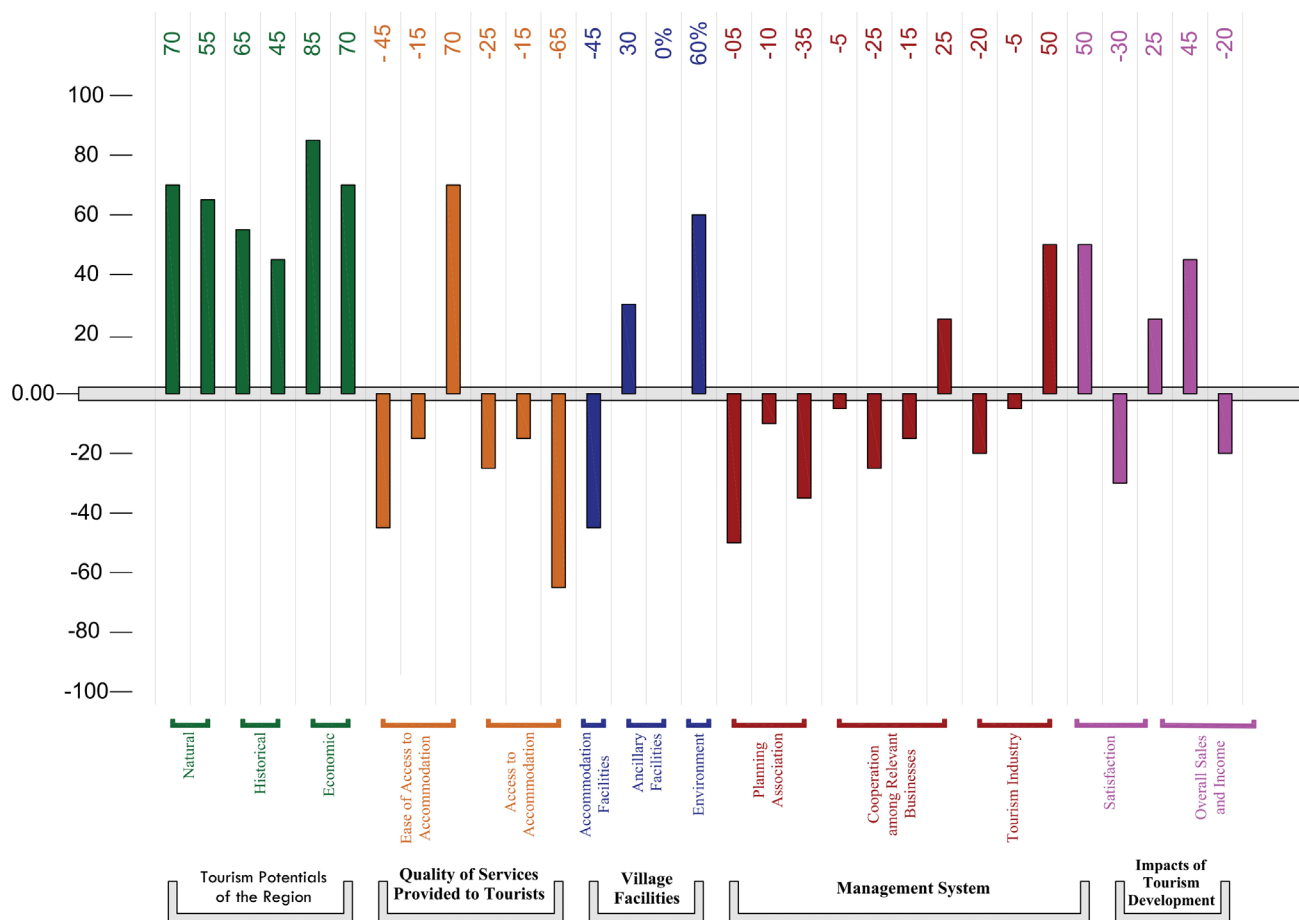


Fig. 10. Graphical representation of the assessment of sustainable rural tourism indicators in Liqvan Village. Source: Authors.

- Quality of services provided to tourists

Ease of Access to Accommodation Facilities: The indicators “Access to accommodation facilities and online reservation” and “Access to guidebooks and maps” received scores of -45 and -15 , respectively, indicating an unfavorable status of digital infrastructure and tourism information services from the perspective of the participants. The indicator “Installation of guide signs” received a score of 70 , representing the most favorable condition within this dimension, although improvements in information provision and sign design could further enhance this condition. The indicators “Availability of rural accommodation facilities” (-25), “Availability of recreational and tourist complexes” (-15), and “Provision of tourism training programs” (-65) all received low scores, indicating limitations in accommodation services, tourism facilities, and educational activities in the village.

Overall, the findings indicate that the quality of tourism services is less favorable than the natural and economic potentials of Liqvan Village. Accordingly, the development of accommodation infrastructure, strengthening of information and educational services, and improvement of tourism management could contribute to enhancing the quality of tourism services.

- Village facilities

Village facilities comprise three sub-dimensions:

accommodation facilities, complementary facilities, and the environment.

Accommodation Facilities: The indicator “Accommodation facilities” received a score of 25 , indicating that, from the participants’ perspective, the existing accommodation facilities do not fully meet tourists’ needs.

Complementary Facilities: The indicator “Adequate space for holding meetings with local residents” received a score of 30 , indicating a relatively favorable condition from the perspective of the study participants.

The indicator “Adequate parking space with a capacity of at least 20 vehicles for tourists” received a score of zero. This finding indicates that, from the participants’ perspective, suitable parking facilities for tourists are either unavailable or highly limited. Therefore, the provision and organization of parking spaces could improve complementary facilities and enhance tourism services in the village.

Environment: The indicator “Waste disposal system” received a score of 60 , indicating a relatively favorable condition from the perspective of the study participants. This finding suggests that waste management is in a better condition compared with other indicators within this dimension.

Overall, the findings indicate that the development of accommodation facilities and complementary services,

together with the implementation of educational and awareness-raising programs for local residents, could facilitate more effective utilization of the tourism potentials of Liqvan Village.

- Management system

The management system of the village comprises three sub-dimensions: “Planning Association,” “Cooperation among Related Businesses,” and “Tourism Industry.” All three areas received negative scores in the expert assessment. These results indicate that the village’s management performance in these areas faces significant weaknesses and requires structural reconsideration and strengthening.

Planning Association: The indicators “Long-term planning for sustainable tourism development” (–15), “Public participation in tourism development” (–10), and “Availability of specialized consulting services in rural tourism” (–35) all received low scores. These findings indicate unfavorable conditions in planning, stakeholder participation, and the use of specialized expertise in managing tourism development in Liqvan Village.

Cooperation among Related Businesses: The indicators “Organization of festivals” (–5), “Compatibility of rental houses with tourism management” (–25), and “Growth in value added resulting from rural tourism activities” (–15) all received low scores, indicating unfavorable conditions from the perspective of the study participants. In contrast, the indicator “Increase in online sales of local products” received a score of 25, making it the only positively assessed indicator in this section and indicating a relatively favorable evaluation of this capacity.

Tourism Industry: The indicators “Availability of full-time employees in the rural tourism industry” (–20) and “Availability of public services for tourists” (–5) received low scores, indicating unfavorable conditions from the perspective of the study participants. In contrast, the indicator “Online tourism advertising and information dissemination tools” received a score of 50, indicating a relatively favorable assessment and greater use of tourism information and promotional tools in the village.

Overall, the findings indicate that the management system indicators of Liqvan Village are in a relatively unfavorable condition from the participants’ perspective. In contrast, the indicators related to “tourism advertising and information dissemination” and “online sales of local products” received more favorable scores.

- Impacts of tourism development

Satisfaction: The score of 50 for the indicator “Residents’ satisfaction with tourists” indicates the expansion of economic activities and local businesses in Liqvan Village. This increased satisfaction can be attributed to the provision of locally produced agricultural, livestock, and plant-based products by residents and the income generated from their

sales. These factors have contributed both to attracting tourists and to strengthening local community satisfaction. In contrast, the indicator “Tourists’ satisfaction” received a score of –30. This difference can be attributed to deficiencies in tourism infrastructure and weaknesses in service provision for tourists.

Overall Sales and Income: The indicator “Number of tourists in recent years” received a score of 25, indicating a relatively favorable assessment from the perspective of the study participants. In contrast, the indicator “Level of engagement between travel companies and tour operators and the village” received a score of –15, indicating an unfavorable condition and limited cooperation with professional tourism operators. Overall, it can be concluded that tourism development in Liqvan Village has had considerable positive effects on the local economy and the satisfaction of the local community. However, achieving sustainable tourism development requires improvements in infrastructure, enhancement of tourism service quality, and stronger institutional interactions with tourism companies and tour operators. These measures could increase tourist satisfaction, attract greater investment, and contribute to sustainable tourism development in the region.

• Integrated analysis of sustainable tourism development dimensions

In the previous section, the 31 indicators related to sustainable rural tourism development in Liqvan Village were examined and analyzed individually. In this section, to provide a more comprehensive picture, the mean scores of these indicators were calculated across the five main dimensions of sustainable tourism. This approach enables an integrated assessment of the status of sustainable tourism development in the village (Fig. 11 & Table 3).

The results show that the Tourism Potentials dimension received the highest mean score of +65, indicating the most favorable condition from the participants’ perspective. This dimension was followed by Facilities and Infrastructure, with a mean score of +16.25, and Tourism Development Impacts, with a mean score of +14, which ranked second and third, respectively. Although some indicators within the Facilities and Infrastructure dimension received negative scores, its positive mean score indicates that the favorable performance of several indicators has raised the overall status of this dimension to a relatively desirable level. In contrast, the Management System dimension, with a mean score of –5.5, and particularly the Quality of Services dimension, with a mean score of –15.83, received the lowest scores. A comparison of the mean scores across the five dimensions indicates that, although Liqvan Village possesses considerable tourism potential, the quality of services and certain aspects of tourism management are not in a favorable condition from the participants’ perspective. This disparity reflects an imbalance among the different dimensions of sustainable

Table 3. Integrated analysis of sustainable tourism development dimensions. Source: Authors.

Dimension	Mean Score	Performance Level	Analytical Interpretation
Tourism Potentials	+65	High	Strong natural and economic advantages, but incomplete utilization
Quality of Tourism Services	-15.83	Weak	Serious weaknesses in tourism services and visitor experience
Facilities and Infrastructure	+16.25	Moderate	Shortage of accommodation and supporting facilities
Management System	-5.5	Weak	Lack of integrated governance and planning
Impacts of Tourism Development	+14	Weak to Moderate	Positive impacts exist, but they remain unstable

tourism development in the village and suggests that improving service quality and strengthening the management system could play a significant role in enhancing the overall tourism conditions of Liqvan Village.

• Sustainable tourism index (STI)

To provide an overall assessment of the status of sustainable tourism development, the Sustainable Tourism Index (STI) was calculated. This composite index was derived from the mean score of the five main dimensions: tourism potentials, service quality, facilities and infrastructure, the management system, and the impacts of tourism development (Fig. 12).

The final STI value was +14.78, indicating a moderate-to-low level of tourism sustainability in the village. This value suggests that although Liqvan possesses considerable natural, economic, and cultural tourism potential, weaknesses in management, services, and infrastructure have hindered the full realization of sustainable tourism development. Based on the findings, the primary priority for tourism development in Liqvan is not the creation of new attractions, but rather the strengthening of tourism governance, development of supporting infrastructure, improvement of service quality, and active participation of the local community in destination management.

Conclusion

The results of this study indicate that sustainable tourism development in Liqvan Village is not sufficiently balanced across its different dimensions. The assessment of 31 indicators across five main dimensions showed that the Tourism Potentials dimension achieved the highest mean score of +65, reflecting the village's considerable potential in terms of natural, cultural, and economic attractions. In contrast, the Quality of Services (-15.83) and Management System (-5.5) dimensions received the lowest scores, indicating weaknesses in tourism service provision, planning, institutional coordination, and destination management. Meanwhile, the Facilities and Infrastructure (+16.25) and Tourism Development Impacts (+14) dimensions were assessed as relatively favorable. The Sustainable Tourism Index (STI), with a final value of +14.78, further indicates that the overall status of sustainable tourism development in Liqvan Village can be classified as moderate to low.

The findings indicate that the main challenge to tourism

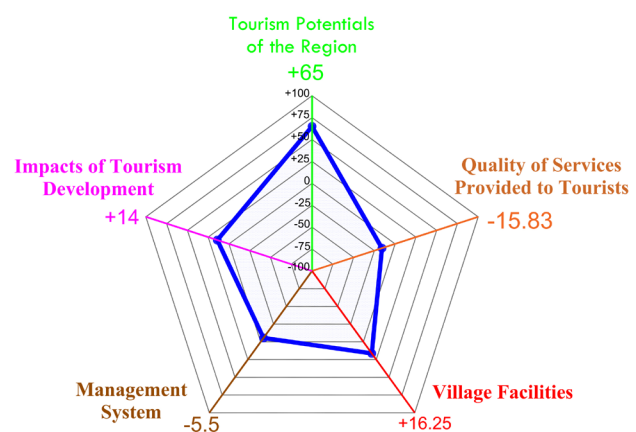


Fig. 11. Graphical Representation of the Integrated Analysis of Sustainable Tourism Development Dimensions. Source: Authors.

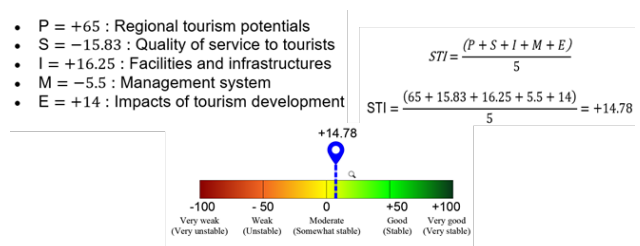


Fig. 12. Sustainable Tourism Composite Index (STI).

Source: Authors.

development in Liqvan Village is not the lack of natural resources or tourist attractions, but rather weaknesses in the tourism management and governance system. The low scores obtained for indicators such as service quality, accommodation facilities, management planning, training, stakeholder participation, and certain welfare services demonstrate that the valuable natural, historical, and economic potentials of the village have not yet been effectively transformed into sustainable tourism development through efficient management and coherent planning. Therefore, tourism development in the region requires not so much the creation of new attractions as the improvement of management quality, enhanced coordination among responsible institutions, and more effective utilization of existing potentials. Accordingly, it is recommended that tourism management in Liqvan Village be organized through an integrated approach involving the village municipality, the General Department of Cultural Heritage, Tourism and Handicrafts, the private sector,

and representatives of the local community. Developing a strategic tourism development plan, strengthening accommodation and recreational infrastructure, improving tourism information services, organizing training programs for tourism operators, supporting private-sector investment, and expanding digital marketing are among the measures that could enhance both tourist and resident satisfaction. These measures can also facilitate more effective utilization of existing tourism potentials and contribute to improving the sustainable tourism development indicators of Liqvan Village. Finally, the assessment framework based on the 31 indicators and the Sustainable Tourism Index (STI) proposed in this study can serve as a practical tool for monitoring tourism conditions, identifying strengths and weaknesses, prioritizing management interventions, and comparing the status of sustainable tourism development across other rural tourism destinations.

It should be noted that this study was conducted using

a cross-sectional approach and assessed the status of sustainable tourism development at the time of the research. Therefore, potential changes in the indicators over time were not examined. Furthermore, the findings should be interpreted within the specific context and conditions of Liqvan Village, and their generalization to other rural tourism destinations requires similar studies to be conducted in those destinations. Future research is recommended to apply this assessment framework to other rural tourism destinations and conduct comparative analyses of the results. In addition, longitudinal studies and the application of inferential statistical methods could provide a more comprehensive understanding of trends in sustainable tourism development and the factors influencing its evolution.

Conflict of Interest

The authors declare no conflict of interest regarding this study.

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