Improving methods for assessing the effectiveness of tourism infrastructure development

Nurali Arabov[1], *Nataliya* Belotserkovskaya[2*], *Dilmurod* Nasimov[3], *Gulnarakhan* Utemuratova[4], *Dilshod* Abduraimov[5], and *Mokhinur* Makhmudova[1]

[1]Samarkand State University, University blv. 15, 140104 Samarkand, Uzbekistan
[2]Skovoroda Kharkiv National Pedagogical University, 29, Alchevskyh (Artema) Str., 61002, Kharkiv, Ukraine
[3]Samarkand regional branch of Academy of Public Administration, University blv. 15, 140104 Samarkand, Uzbekistan
[4]Karakalpak State University, Abridov street, 1, 742012 Nukus, Republic of Karakalpakstan, Uzbekistan
[5]Samarkand Institute of Economics and Service, 9 Amir Temur St, Samarkand, 140100 Uzbekistan

Abstract. The article identifies indicators for the development of tourism infrastructure and assessment of the potential of tourist and recreational resources, the organizational and economic mechanism of the regional tourist and recreational system in the country and the cost of individual resources and their combinations and factors.

1 Introduction

Tourism sphere has particular importance as one of the strategic sectors that ensure the diversification of the national economy and its stability, the creation of new jobs, the socio-economic development of regions, the increase of the population's income and the improvement of the quality of life, and the increase of investment attractiveness.

The lack of accommodation facilities and infrastructure facilities, especially during the tourist season, insufficient coordination of the passenger transportation system in different modes of transport, as well as the low level of organization of providing tourists with information about the existing tourism potential, marketing for the promotion of domestic tourism, cultural heritage objects in the country's regions, and the peculiarities of pilgrimage ineffectiveness of campaigns has a negative impact on the rapid development of tourism.

The importance of increasing the effectiveness of regional tourism infrastructure development during the transition of the Republic of Uzbekistan to the digital economy is incomparable. As a result taking into account the specific aspects of increasing the effectiveness of regional tourism infrastructure development is urgent to research the scientific, methodological and practical aspects of the effective development of this field.

* Corresponding author: nataliya_belotserkovskaya@ukr.net

2 Literature review

The nature and content of tourism market and its infrastructure, functions, subjects of tourism industry, principles of tourism development, mechanisms of regulation of tourism market, restaurant and hotel companies, scientific basis of problems related to the policy implemented in the field of tourism are studied by Zorin I.V, Kvartalnov V.A. [10], Pardaev M.Q. [9], Birzhakov M.B. [3], Beklaryan L.A., Pshennikov A.S. [4], Morozov M.A. [7], Tukhliev I.S., Hayitboev R., Safarov B.Sh., Tursunova G.R. [11] and others.

The socio-economic essence of the tourism market, elements of its components, main tasks and functions, tourist objects, tour operators and travel agents, legal, organizational and socio-economic mechanisms of regulating the development of the tourism market, the main directions of state policy in the field of tourism, methods of evaluating the effectiveness of tourist services, tourism production infrastructure, state support measures for the tourism industry is explained in the scientific works of Zhukova M.A. [5], Alimova M.T. [1], Mamatkulov H.M. [6].

Also, the nature and content of tourism infrastructure, the activities of tourism infrastructure at different levels in the economy and management, the role of the state in the development of tourism infrastructure, organizational elements of regional tourism infrastructure, indicators of the development of the tourism sector and the levels of development of infrastructural elements are expressed in the researches of Mamatkulov H.M. [6], Morozov M.A. [7], A.N. Norchaev [8], D.Nasimov [12] and others considered influence of increasing effectiveness of tourism infrastructure development to the employment of the population.

3 Research methodology

The research methodology is a dialectical and systematic approach to the study of economic systems and ratios, comprehensive assessment, comparative and comparative analysis, statistical and dynamic approach, and grouping methods were used to improve the methods of evaluating the development efficiency of tourism infrastructure, and the need to use optimal methods of resource potential assessment during the implementation of tourist activities was justified.

4 Analysis and results

The socio-economic development of a certain area often determines its attractiveness, competitiveness, development opportunities and prospects. In order to accurately assess the prospects of tourism and recreation development in the regions, it is necessary to conduct an analysis of the potential of tourism and recreation resources.

The approaches to the evaluation of the potential of tourist and recreational resources have been researched by the authors in different ways. Economists' approaches to the assessment of the potential of tourist and recreational resources became the basis for conducting research in this area.

In order to research the potential of tourist and recreational resources, it is important to take into account its main elements, that is, the laws and characteristics of the development of certain regions, as well as the set of economic development opportunities.

Information about such elements forms only a rough idea of the potential of tourist and recreational resources in the country, but it is not possible to determine the possibilities of the regions to provide specific tourist flows based on this information. For a general assessment, it is necessary to determine the tourist-economic potential of the regions in the

interrelationship and unity of the formation of separate elements of the economy.

In the general evaluation of the potential of tourist and recreational resources, it is necessary to have sufficient analytical information not only about its main elements, but also about the description of future tourist flows, demand for special forms of tourist travel, and demand for certain types of services. Having the necessary information is necessary to determine the proportionality in the distribution of material and labor resources within the territory.

Therefore, in our opinion, from a methodological point of view, it is possible to include touristic and recreational resources of the region in the indicators (Table 1).

Table 1. Indicators of evaluation of tourist and recreational resources

The name of the resource	Significance of the indicator
1. Availability of transportation	
On highways	4 points
By the river	2 points
By rail	3 points
By air	1 point
On highways	5 points
2. Proximity to the center of the area by roads (from the settlement to the hospital, shops and developed infrastructure)	
up to 10 km	5 points
From 10 km to 30 km	4 points
From 30 km to 100 km	2 points
More than 100 km	0 points
3. Neighborhood with other tourist facilities	
up to 5 km	5 points
From 5 to 20 km	4 points
From 15 km to 50 km	3 points
From 50 km to 200 km	2 points
More than 200 km	1 point

Therefore, the indicator of transport availability allows to project the number of tourists to visit a particular object and to determine the number of hotel facilities and entertainment infrastructure.

The indicator of the distance to the nearest district center (any settlement with a hospital, shops and developed infrastructure) by roads is defined as the number of tourists who can reach the tourist object by a specific means of transport or on foot.

Additionally it reduces the risk for tourists in reaching the designated objects in case of accident, illness, and also increases the attractiveness of visiting tourist objects.

The indicator of proximity to other objects of tourist and recreational resources means determining the possibility of tourists coming to a number of objects on the same day. Therefore, one object 5 km away from another can visit 2 to 7 objects in 1 day, while at a distance of up to 200 km, tourists may refuse to visit, or the tourist period may take a long time. Also, the adjacency indicator allows tourists to see more objects in a short period of time, and to create a network map for the placement of infrastructure and in other cases to attract more tourists in the area.

Assessment of the potential of touristic-recreational resources of subjects in the territories of our republic is considered an important basis for optimizing the organizational-economic mechanism of the regional touristic-recreational system, determining the value of individual resources and their combination.

Obtaining information about the regional touristic and recreational situation within the republic is much simplified in comparison with the popularity of information in other countries. Therefore, the following methodology is recommended to evaluate the touristic and recreational potential in the regions of our country.

The main factors of the formation of tourist and recreational potential are determined by the following formula:

$$C = v_1 M_0 + v_2 T_0 + v_3 N_0 + v_4 I_0 , \qquad (1)$$

here: C – tourist-recreational resource potential;
M_0 – relative historical and cultural potential;
T_0 – the relative potential of important natural protected areas;
N_0 – relative potential of natural conditions;
I_0 – relative infrastructural potential;
v1-v4 – weight ratios.

Regarding each administrative body.

The Administrative - territorial Tarikhi-Cultural-Cultural Institute is based on the Formula:

$$K_i = \frac{n_i \times c}{m} , \qquad (2)$$

here: K_i – density of historical and cultural resources in the administrative area;
n_i – the number of objects in the administrative area;
c – localization coefficient;
m – the number of objects in the area.

The localization coefficient represents the concentration of objects of historical and cultural potential as tourism objects in the region or in its separate areas (Fig. 1).

To determine the level of localization, make a map (geographical model) of the total historical and cultural monuments in the area, determine the distance between them, show a set of objects, minimize the distance between them (5-4 points), then separate them from the administrative center of the area, proposed tourist infrastructure objects, it is necessary to compare the distance from the places of residence of the population.

To include a structured map (geographical model) of historical and cultural objects in the administrative map, to assess the compatibility of the infrastructure of the area with the purpose of developing production programs, to allocate budget funds for this purpose, to create conditions for the interaction of authorities and business entities, and to attract entrepreneurs allows. This geographical model can be expressed in the following form. Where two-way pointers represent routes to an object, one-way pointers are only tentative access to an object.

The calculation of the potential of historical and cultural heritage objects is determined according to the following formula:

$$R = R_1 \times v + R_2 \times v + R_3 \times v , \qquad (3)$$

here:
R – historical and cultural potential;
R_1 – architectural monuments;
R_2 – historical monuments;
R_3 – archaeological monuments;
v1-3 – weighting coefficients.

The use of weight coefficients in the calculation is in the range of 1<v<5 and is determined based on the priority of resources for excursion activities. If 80% of the 45 items used in the tourism product are architectural objects, then the weight coefficient of increased relative density and architectural resources will be maximum.

R – relative historical-cultural potential (R_0) is calculated depending on the value of the integral indicator.

The relative historical and cultural potential represents the relative potential of the administrative region in relation to all regions of the republic and is calculated based on the following formula:

$$R_0 = \frac{R}{R_{\max}}, \quad (4)$$

here: R_0 – relative historical and cultural potential;
R – historical and cultural potential of the administrative territory of the republic;
R_{max} – maximum historical and cultural potential among all administrative regions of the republic.

One of the most important factors of tourism development is the presence of important natural protected areas.
The following formula is used to estimate the potential of important natural protected areas:

$$T = v \times U + v \times Q + v \times Q_p + v \times Q_m + v \times Y_t + v \times Y_m, \quad (5)$$

here:
T – the potential of important natural protected areas;
U – national park;
Q – drying room;
Q_p – national level reserve;
Q_m – reserve at the local level;
Y_t – natural monument of the national level;
Y_m – natural monument at the local level;
v1-2 – weighting coefficients.

A weight in the range of 1<v<2 was adopted in accordance with the administrative status of important protected natural areas.
As long as the visit to important protected natural areas requires a large amount of time, then the coefficient of restriction is not used in this case.

However, in our opinion, the remoteness of important natural protected areas requires a reduction in the risk of injury, illness, and visiting them in the event of accidents, therefore, we propose to include the indicator of the distance to the center of the nearest area in the system of indicators for assessing the potential of important natural protected areas. This formula is expressed as follows:

$$T = v_1 U a_1 + v_2 Q a_2 + v_3 Q_p a_3 + v_4 Q_m a_4 + v_5 Y_t a_5 + v_6 Y_m a_6, \quad (6)$$

here: a – the corrected coefficient of the distance to the center of the immediate area by road (between the hospital, shops and a settlement with developed infrastructure).

$$a = \frac{a_i}{a_{\max}}, \quad (7)$$

T – depending on the value of the integral indicator, the relative potential of important natural protected areas (T_0) is determined. This indicator is expressed as a ratio of the potential of the administrative region of the republic to all regions of the republic.

$$T_0 = \frac{T}{T_{\max}}, \tag{8}$$

here:
T_0 – the relative potential of important natural protected areas;
T – the potential of important natural protected areas on the scale of the republic;
T_{max} – the maximum potential of important natural protected areas on the republican scale.

In addition to the potential of historical and cultural resources and nationally protected natural areas, the factor of favorable natural conditions is important for the development of tourist and recreational entrepreneurship.

The assessment of climate conditions is determined by the following parameters: relief, climate, forest resources, hydrographic network, aesthetic potential of the landscape, mineral resources, level of environmental pollution.

The potential of natural conditions (S) is the sum of all evaluated parameters and is determined by the following formula:

$$S = R + I + V + L + M + Z, \tag{9}$$

where:
S - is the potential of natural conditions;
R – relief;
I - climate;
V – water component;
L - aesthetic potential of landscapes;
M – source of mineral waters;
Z is the level of radioactive contamination of the regions.

It is proposed to evaluate natural conditions according to a four-point system.

It is proposed to evaluate natural conditions according to a four-point system.

Depending on the value of the integral indicator, the relative potential of natural conditions (S0) is calculated. The relative potential of natural conditions represents the ratio of the potential of the administrative territory of the republic to all territories in the republic and is calculated according to the following formula:

$$S_0 = S / S_{\max}, \tag{10}$$

where:
S_0 - is the relative potential of natural conditions;
S - is the relative potential of natural conditions;
S_{max} - is the maximum potential of natural conditions in the republic.

To simplify the comprehensive assessment of natural conditions, a number of parameters and their corresponding scores are presented (Table 2).

One of the most important factors of tourism-recreational assessment is the availability of tourism infrastructure (N). The assessment of tourism infrastructure potential is based on the analysis of the sanatorium-resort and hotel system.

The infrastructural capacity is calculated according to the following formula:

$$N = Q_1 + Q_2, \tag{11}$$

where:
N – infrastructural capacity;
Q_1 – sanatorium-spa and wellness organizations (simultaneous capacity);
Q_2 – hotels and similar accommodation facilities (concurrent capacity).

Table 2. Rating scale of natural conditions

Characteristic	Appearance of natural conditions	Ball
Vividness of the terrain	- straight	0
	- up and down	1
	- less ups and downs	2
	- more ups and downs	3
Shallowness in waters	- there is no hydrographic network or there is only a small stream and a small lake at a significant distance from the center of the area (more than 10 km).	0
	- a small lake with little water, anchors; A large lake 2-10 km away.	1
	- a smaller river, lake directly connected to the center of the region; the distance in front of the coast is not far.	2
	- medium and large lakes and rivers directly adjacent to the center of the region.	3
Presence of forests in mountainous areas and their location	- forest thickness 1-5% (there is no forest or there are few bushes)	0
	- forest thickness 6-35% (forest thickness is lower than average).	1
	- forest thickness 36-65% (forest thickness is higher than average).	2
	- forest thickness 66-100% (high forest thickness).	3
Availability of mineral water sources	- There are 1-2 types of mineral sources.	1
	- There are 2 and more than ten mineral sources.	2
The level of radioactive contamination of the area	- the level of contamination of the area from 137 Cs to 185 kBk/m2 and higher.	- 2
	- the level of contamination of the area from 137 Cs to 185 kBk/m2 or 90 Sr from 5.5 to 11.1 kBk/m2.	- 1
	- the degree of contamination of the area from 137 Cs to 37 kBk/m2 or 90 Sr to 5.5 kBk/m2.	0

In our opinion, the assessment of infrastructure capacity requires an indicator of access to the distance to the center of the immediate area.

This formula is formed as follows:

$$N = Q_1 a_1 + Q_2 a_2, \tag{12}$$

where: a is the distance by road to the center of the area (hospital, shops and developed infrastructure of the settlement) (formula 2.7).

In addition, the availability of transport is important, which can be estimated by the

corrected coefficient. This indicator is calculated by the following formula:

$$N = Q_1 a_1 b_1 + Q_2 a_2 b_1 , \quad (13)$$

where: b is the adjusted coefficient of transport provision.

$$b = \frac{b_i}{b_{\max}} , \quad (14)$$

where:
b_0 – relative infrastructural capacity;
b – infrastructural potential of the administrative territory of the republic;
b_{max} –is the maximum infrastructural potential of the republic.

The indicators for assessing the potential of the region's touristic and recreational resources are not the same. Also, taking into account the weight coefficients of the value in the range of $0.1<v<0.4$, it is appropriate to add them.

Depending on the influence and importance of the factors for the assessment of the potential of touristic and recreational resources, taking into account the opinions of experts, the following weight coefficients were determined: historical and cultural potential - 0.4; potential of natural conditions - 0.3; natural and territorial potential - 0.15; infrastructural capacity 0.15.

The general indicator of the assessment of the important factors of the formation of the potential of touristic-recreational resources allows to determine the aggregate indicator of the potential of touristic-recreational resources for administrative regions.

5 Conclusions

Studies show that virtually every area has resources. These resources can be used for touristic and recreational purposes when there are certain social, economic and ecological conditions. However, the existing potential in each region is changed depending on the touristic-recreational resources of different individual, quantitative and qualitative description. Therefore, their assessment and research is considered a necessary condition for planning the development of touristic and recreational entrepreneurship in the regions.

Factors that have a negative impact on the development of tourism-recreational entrepreneurship are the high cost of rental vehicles, energy resources and logistics, the low level of personnel qualification and the lack of high efficiency of personnel training for service activities, the underdevelopment of telecommunication infrastructure in remote areas, the insufficient level of roads and social infrastructure in remote districts.

Elimination of negative situations in the development of tourism-recreational entrepreneurship implies the formation of cooperative relations in government and business relations, as well as the creation of favorable conditions for entrepreneurial structures and state support aimed at improving the business environment.

References

1. M. T. Alimova, Characteristics and trends of regional tourism market development (in the case of Samarkand region), I.f.d. diss. - Samarkand: SamISI, 25-26 (2017)
2. V. F. Arkhipova, A. S. Devizov, Ob infrastructure kak opredelyayushchem factore razvitiya turizma v regione http://www.roman.by/r-78201.html (Last accessed 15.06.2023)

3. M. B. Birzhakov, Introduction to tourism (Saint-Petersburg, Izdatelsky dom Gerda, 2004)
4. L. A. Beklaryan, A. S. Pshennikov, On some aspects of the methodology of the regional problem study, Journal Audit and financial analysis, 4 (2001)
5. M. A. Zhukova, Management in tourist business: uchebnoe posobie. – 2nd ed., ster., **14**, 193 (Moscow, Konkurs, 2006)
6. H. M. Mamatkulov, Tourism infrastructure. Study guide, Tashkent, Publishing House of the National Society of Philosophers of Uzbekistan, 4-5 (2011)
7. M. A. Morozov, Infrastrukturnoe obespechenie predprinimatelskoy deyatelnosti v turizme: monograph (Moscow, RosNOU, 2005)
8. A. N. Norchaev, Expected changes and opportunities in tourism infrastructure. Scientific electronic magazine "Economy and innovative technologies", **1** (2019)
9. M. Q. Pardaev, and others, Development of service, service and tourism industries: problems and their solutions. Study guide, Tashkent, "Economy-finance", 133 (2008)
10. I. V. Zorin, V. A. Kvartalnov, Turistsky terminologichesky slovar: spravochno-metodicheskoe posobie, Avt.-sost., Moscow, Sovetsky sport (1999)
11. I. S. Tukhliev, R. Hayitboev, B. Sh. Safarov, G. R. Tursunova, Basics of tourism. Textbook. Ministry of Higher and Secondary Special Education of the Republic of Uzbekistan, Tashkent "Science and technology", 151 (2014)
12. D. A. Nasimov, N. U. Arabov, K. Z. Khomitov, Flexible employment prospects in cis countries. International Journal of Scientific and Technology Research, **9(2)**, 2635-2641 (2020)