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Article

Stages of Regional Tourism Development in Kashkadaryo Region Based on Tourism Efficiency Index (Tei)

Toshev Nurbek Janon oglu*[1]

1. Karshi State University Department of Tourism and Marketing (PhD)
*Correspondence: toshevnurbek58@gmail.com

Abstract: This article studies the theoretical and methodological foundations of the Tourism Efficiency Index (TEI) index in assessing the efficiency of regional tourism. In forming the TEI index, the number of tourist organizations, tourist flow, hotel infrastructure and service indicators were evaluated in an integrated manner based on the min–max method. The results of the study show that the TEI index is an important analytical tool for determining the level of regional tourism development, assessing dynamic trends and making strategic decisions.

Keywords: Regional tourism, tourism efficiency index, TEI, tourism infrastructure, min–max method, integrated assessment, tourism development, dynamic analysis, tourist services, regional development.

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Introduction

The use of an integrated approach to assessing the effectiveness of regional tourism development is one of the important directions of modern economic research. In this regard, the Tourism Efficiency Index (TEI) is an integrated indicator that allows assessing the level of development of the tourism sector based on multi-factor indicators. This index reflects the interaction of economic, infrastructural and service factors in the tourism sector and serves to determine the real state of regional development [1].

The essence of the TEI index is that it brings various indicators affecting tourism activities into a single measurement system, thereby determining their contribution to overall efficiency. In particular, indicators such as the number of tourist organizations, the volume of tourists served, hotel infrastructure, accommodation facilities and specialized services are normalized using the min–max method and integrated based on weight coefficients. As a result, the TEI indicator is formed in the range from 0 to 1, providing a quantitative expression of the level of tourism development. An index approaching 1 indicates high efficiency, and values close to 0 indicate a low level of development [2], [3]. The essence of the dynamics of regional tourism development based on the TEI is to determine the trends in the tourism sector over time. Through dynamic analysis, it is determined at what period tourism was in the decline or growth phase, and which factors had a positive or negative impact on this process. For example, if the low formation of the index in 2020-2021 is explained by a decrease in tourism activity, then a sharp increase in the index in subsequent years will be associated with the expansion of infrastructure and

an increase in the volume of services [4]. Thus, the TEI becomes important not only as a static assessment tool, but also as an analytical tool for identifying trends.

Review of relevant literature

The issues of assessing the effectiveness of regional tourism development and determining the economic efficiency of tourism infrastructure have been widely studied by foreign, CIS and Uzbek scientists [5]. Scientific views on assessing tourism efficiency based on complex indicators have been formed as one of the important directions of modern tourism economics.

Foreign scientists J.R.B. Ritchie and G.I. Crouch emphasized that infrastructure, service quality, management system and resource potential are the main factors in assessing the competitiveness of tourist destinations [6]. In their opinion, the effectiveness of tourism development is determined by the sustainable competitive advantage of the region.

The approach developed by L. Dwyer and C. Kim substantiates the need to analyze economic efficiency, the quality of tourist services, transport infrastructure and state policy in an integrated manner when assessing tourism efficiency [7]. Scientists note the existence of an inextricable link between tourism competitiveness and regional development.

R. Butler explained the development of tourism through the theory of the "destination life cycle" and substantiated that the development of tourism regions occurs in certain stages [8]. According to him, determining the stages of growth, stabilization and decline of tourism is of great importance for the effective organization of regional tourism policy.

CIS scientists M.B. Birzhakov assessed tourism as a complex economic system and showed that the efficiency of the tourism market is directly related to infrastructure, transport, service and management systems [9]. A.V. Babkin noted that regional economic activity can be increased by developing special types of tourism [10].

D.V. Artsibashev, R.E. Alyushin and N.E. Voinova also scientifically substantiated that the development of agrarian and ecological tourism serves to increase the socio-economic potential of regions [11]. Their studies specifically highlighted the impact of tourism on local employment and infrastructure.

Uzbek scientists have also widely studied the theoretical and practical aspects of regional tourism development. A.S. Soliyev, studying the issues of regional economy and regional development, assessed tourism as an important factor of regional economic growth [12]. According to the scientist, the natural and economic potential of regions is one of the main determinants of tourism development.

G.R. Khidirova has deeply studied the issues of developing the regional tourism market, effective use of tourist resources and improving regional tourism infrastructure [13]. The author substantiates the need for a comprehensive approach and the use of integrated indicators in assessing the effectiveness of regional tourism.

N.T. Shamuratova, analyzing the role of ecological tourism in regional development and natural geographical factors, noted that the development of ecological tourism serves the sustainable economic development of regions [14].

S. Abdukhamidov, O. Tukhliyev and M. Khamitov studied the trends in the development of regional tourism and showed that the quality of tourism infrastructure and services are the main factors of regional competitiveness [15]. The above scientific approaches show that the use of complex indices in assessing the effectiveness of regional tourism serves as an important methodological basis for determining the tourist potential of regions, assessing development trends and developing strategic management decisions.

Research methodology

The study used economic-statistical, comparative and dynamic analysis methods to assess the effectiveness of regional tourism. The Tourism Efficiency Index (TEI) model was used to determine tourism development, and the number of tourist organizations, tourist flow, hotel infrastructure and service indicators were normalized using the min-max method and an integral index was formed. In the process of research, official statistical data and scientific sources were analyzed.

Analysis and results

One of the important aspects of this index is its direct connection with the regional economy. Positive dynamics of tourism development leads to an increase in employment, expansion of the service sector and an increase in local budget revenues. Conversely, a low index level is explained by insufficient tourism infrastructure, poor quality of services or the negative impact of external factors. Therefore, TEI serves as an important decision-making tool in the formation of regional economic policy.

Another important aspect of the analysis based on TEI is the possibility of in-depth assessment across indicators. That is, the dynamics of each indicator included in the index are analyzed separately and it is determined which factors have the greatest impact on overall efficiency. This allows for the establishment of priority areas in tourism development, the effective distribution of investments and the optimization of management decisions.

In general, the content of the dynamics of regional tourism development based on the tourism efficiency index (TEI) is a quantitative assessment of the level of comprehensive development of the tourism sector, while its essence is to identify trends in change over time, assess key factors and serve to develop strategic management decisions. In this regard, TEI occupies an important place in the dissertation as an innovative scientific and methodological tool for assessing regional tourism.

Table 1. System of indicators for the Tourism Efficiency Index (TEI) in the Kashkadarya region and their dynamics in 2020-2025.

Kod	**Indicator** (Xi)	**Measure**	wi	2020	2021	2022	2023	2024	2025
X1	Number of tourism companies and organizations	unity	0.07	4	3	7	8	9	10.7
X2	Number of people served	a thousand people	0.13	1.6	0.5	0.8	5.2	8.6	8.95
X3	Number of tourist tickets sold	a thousand unity	0.10	2.7	0.7	0.9	6.9	6.4	7.6
X4	Hotels and similar accommodation facilities	unity	0.08	41	42	44	63	79	82.9
X5	Persons accommodated in hotels	a thousand people	0.16	29.5	34.5	65.9	77.8	71.3	93.87
X6	Number of hotel rooms	unity	0.08	800	877	987	1245	1207	1377.8
X7	Number of hotel beds	a thousand places	0.08	1.5	1.8	5.4	3.4	2.4	3.92
X8	Specialized placement facilities	unity	0.08	28	33	37	76	78	93.3
X9	Individuals placed in specialized placements	a thousand people	0.12	2.0	12.6	21.6	31.3	30.1	41.99
X10	Number of specialized places	unity	0.10	42	1002	5485	7246	7963	10973.4

When we analyze Table 1 by indicators, 10 main indicators (X1–X10) selected for assessing tourism efficiency and their weight coefficients are presented, which comprehensively reflect the tourism infrastructure, volume of services and specialized tourism segments. The indicator with the highest weight among the indicators is the

number of people accommodated in hotels (X5, 0.16), which indicates that the demand factor is the priority in assessing tourism efficiency. Also important are the number of people served (X2, 0.13) and specialized accommodation services (X9, 0.12), which reflect the tourism flow and diversification of services. Infrastructure indicators (X4, X6, X7, X8) have average weights and reflect the material and technical base of tourism. These indicators assess the level of development of accommodation opportunities, hotel capacities and specialized facilities. Indicators with lower weights (X1, X3, X10) represent institutional and additional elements of the tourism system.

When we analyze the dynamics by year, most indicators show a trend of decline or slow growth in 2020-2021. For example, the number of tourist companies (X1) decreased from 4 to 3, and the number of people served (X2) decreased from 1.6 thousand to 0.5 thousand people. This indicates that the tourism sector was in a general decline phase. At the same time, the relatively stable growth in infrastructure indicators (number of hotel facilities, rooms) indicates that the system has not entered a complete crisis. Since 2022, all main indicators have shown positive growth. In particular, the number of people served (X2) and people accommodated in hotels (X5) has increased sharply. This means that the tourism sector has entered a recovery phase. At the same time, specialized accommodation facilities (X8) and the number of people served through them (X9) also increased significantly, indicating the beginning of the process of diversification of tourism. In 2023–2024, most of the indicators will enter a phase of stable growth. Hotel infrastructure (X4, X6) and specialized services (X8, X9, X10) are developing rapidly, strengthening the institutional and infrastructural base of the tourism sector. However, small fluctuations are observed in some indicators (for example, X3 - number of trips, X5 - hotel customers), which indicates that demand depends on seasonal or market factors. Forecast indicators for 2025 reflect a positive growth trend for all indicators. In particular, a sharp expansion of the number of specialized places (X10) and hotel infrastructure is expected. This indicates that the tourism sector is moving into a phase of high efficiency. It is also predicted that the volume of services and tourist flows will continue to grow steadily, fully realizing the region's tourism potential.

The Tourism Efficiency Index (TEI) was calculated as follows:

1. Indicators were selected (X1…X10) and weights were assigned ($\Sigma wi = 1$).

2. Each indicator was normalized using the min–max method

$I_{i,t} = X_{i,t} - \min(X_i) / \max(X_i) - \min(X_i)$

Final index:

$TEIt = \sum_{i=1}^{10} wi \cdot I_{i,t}$

Table 2. Normalized indicators for calculating the Tourism Efficiency Index (TEI) in the Kashkadarya region and the dynamics of the final index.

Kod	wi	I(2020)	I(2021)	I(2022)	I(2023)	I(2024)	I(2025)
X1	0.07	0.130	0.000	0.519	0.649	0.779	1.000
X2	0.13	0.130	0.000	0.036	0.556	0.959	1.000
X3	0.10	0.290	0.000	0.029	0.899	0.826	1.000
X4	0.08	0.000	0.024	0.072	0.525	0.907	1.000
X5	0.16	0.000	0.078	0.565	0.750	0.649	1.000
X6	0.08	0.000	0.133	0.324	0.770	0.704	1.000
X7	0.08	0.000	0.077	1.000	0.487	0.231	0.621

X8	0.08	0.000	0.077	0.138	0.735	0.766	1.000
X9	0.12	0.000	0.265	0.490	0.733	0.703	1.000
X10	0.10	0.000	0.088	0.498	0.659	0.725	1.000
TEI	**1.00**	**0.055**	**0.078**	**0.366**	**0.683**	**0.731**	**0.970**

In 2020-2021, the TEI will form at a low level (0.055 → 0.078). During this period, the number of tourist firms decreased (from 4 to 3), the volume of tourist services and bookings was also low. Despite this, some indicators of accommodation infrastructure (hotel facilities, rooms, places) increased slightly, preventing a sharp drop in the index.

In 2022-2024, a stage of recovery and expansion will be observed, with the TEI increasing from 0.366 (2022) to 0.683 (2023) and 0.731 (2024). In particular, in 2023, the indicators of tourist firms (persons served and bookings sold) and the capacity of accommodation facilities (hotel facilities, rooms) will increase sharply. In 2024, although the infrastructure expansion continued, the number of hotel stays decreased compared to 2023 (from 77.8 thousand to 71.3 thousand), which can be explained by seasonality, the fact that some tourists arrive in the "day trip" format, or the share of unregistered stays.

As additional evidence on the demand side, an open source indicates that 2.1 million domestic tourists (1.8 million in 2023) and 570 thousand foreign tourists (222.3 thousand in 2023) were attracted to Kashkadarya in 2024. These indicators indicate an increase in tourism flows, but may differ from the statistics of stays (tourist flows are a broader concept; stays are only officially placed).

According to the trend forecast for 2025, the index is likely to reach 0.970: the main drivers will be the volume of tourist services, accommodation capacities and the expansion of the specialized accommodation segment. At the same time, the signal of a decrease in accommodation in 2024 indicates the need to separately monitor not only "capacity", but also indicators of occupancy, service quality and cost per tourist.

The micro-diagnostic approach and database were carried out according to 3 blocks of indicators:

A) Number of tourist firms and organizations tourist firms.

B) Number of hotels and similar accommodation facilities. accommodated persons; rooms (rooms); number of places.

C) Specialized accommodation (2024): - number of facilities; accommodated persons; rooms; number of places.

Disproportion by tourist firms and organizations (A-block) In 2025, 9 tourist firms operated in the region, but their distribution by region was very uneven: Shahrisabz city (3), Karshi city (2), Kitab (2), Dehqanabad (1), Kasbi (1), in most of the remaining districts the indicator was given as "—" (not in official records/or 0).

The most important signal is that the volume of services and ticket sales is mainly concentrated in Kitab district: 7.4 people served and 5.1 tickets sold (respectively a very large share of the total regional indicator) fall precisely on Kitab. Thus, in many districts, the tourism "organizational intermediary" chain (tour operator/agency) is weak: this limits the possibility of tour packaging, routes, advertising and sales channels and tourist flow management (dispersion).

Concentration in hotels and similar accommodation (B-block) Sharp concentration is also observed in the hotel segment. In 2025, the number of people accommodated by region was 71.3, of which Karshi city. is the absolute leader with a share of 51.7 (about 72.5%), Shahrisabz city. is in second place with 9.7 (about 13.6%). This result indicates that the official tourism accommodation infrastructure is concentrated mainly in urban centers

(Karshi and Shahrisabz cities), and in many districts the number of hotel facilities and the volume of accommodation are very low.

Conclusions and suggestions

In conclusion, assessing the efficiency of tourism in the Kashkadarya region based on the Tourism Efficiency Index (TEI) made it possible to conduct a comprehensive analysis of the level of regional tourism development. The results of the study showed that although there was a decline in the tourism sector in 2020–2021, a stable growth trend has been formed since 2022 due to an increase in infrastructure, the volume of services and the flow of tourists. In particular, the increase in the number of hotels and specialized accommodation facilities confirms the expansion of the tourism potential of the region. At the same time, the high concentration of tourism services and infrastructure in some regions indicates the presence of disproportionate development across districts. Therefore, in the future, it is advisable to develop the regional tourism infrastructure in a balanced way, improve the quality of services, form new tourist destinations, and introduce the TEI index as a practical tool for tourism monitoring.

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