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Assessment of Tourism Impact on the Socio-Economic Spheres of the Issyk-Kul Region (Kyrgyzstan)

Sadyrbek Kozhokulov ^{1,2}, Xi Chen ^{1,2,*}, Degang Yang ^{1,2} , Gulnura Issanova ^{3,4},
Kanat Samarkhanov ^{1,2}  and Selvina Aliyeva ^{1,2} 

¹ State Key Laboratory of Desert and Oasis Ecology, Xinjiang Institute of Ecology and Geography, Chinese Academy of Sciences, Urumqi 830011, China

² University of Chinese Academy of Sciences, Beijing 100049, China

³ Faculty of Geography and Environmental Sciences, Al-Farabi Kazakh National University, Almaty 050040, Kazakhstan

⁴ Research Centre for Ecology and Environment of Central Asia (Almaty), Almaty 050060, Kazakhstan

* Correspondence: chenxi@ms.xjb.ac.cn; Tel.: +86-991-3835953

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Abstract: Based on the quantitative assessment methodology, the study examined the socio-economic impact of tourism in the region. The study proposed and tested on the example of the Issyk-Kul region, as it is the most visited region of Kyrgyzstan. Accordingly, economic and social efficiency was estimated by the integral indicators formed at the use of the weight coefficients calculated on the statistical data, and the forecast for tourism development in the region. The study showed that the impact of tourism on economic and social growth in the Issyk-Kul region is positive. Tourism in the region as a whole supports the growth of the economy, and the economic sphere of tourism has a strong impact on the social. According to forecasts, tourism will have a stable growth trend. Unlike previous studies, this study promotes a new understanding of the socio-economic impacts of tourism in the region.

Keywords: tourism; economic and social impacts; Issyk-Kul region; correlation; regression

1. Introduction

The tourism and recreation industry is one of the most dynamically developing sectors of the world economy, and an important factor in the social and economic development of regions and countries. Annual revenues from international tourism are estimated to be about 1.5 trillion USD. Tourism is as an export category, and it takes the fourth place in the world after the exports of chemicals, fuel and foodstuffs [1]. Tourism is considered as one of the options for economic growth in developing countries, and is an important source of income and a source of employment, not only for developing countries, but also for developed countries.

As a result, the governments of small countries give priority to the tourism industry more than in large countries to achieve socio-economic development [2], which helps to cultivate a culture of respect for the environment and the preservation of environmental stability. The government of Kyrgyzstan should adopt this trend in order to avoid environmental consequences and maintain stable socio-economic growth both in the Issyk-Kul region and in the country as a whole.

In countries with developed market economies, the tourism industry is increasingly seen as an important component of social progress and economic development of the country. It is an important sector of export specialization, which plays a certain role in balancing foreign economic calculations [3].

International tourism accounts for 6–7% of international trade. However, the development of world tourism is uneven due to the uneven socio-economic development of the regions, regional features of

natural conditions. Tourism has received the greatest development in Europe, where diverse natural conditions in combination with rich cultural and historical resources form the greatest favorable zone for tourism and resort recreation. This region accounts for over 60% of the global tourist flow [1].

The breadth of the functions in tourism allows it to be used as an effective tool to stimulate socio-economic growth at the regional and national levels. The functions of tourism are manifested primarily in the territories of specific regions, and the possibilities for its development are determined by the natural resource conditions of the regions [4]. Therefore, the use of tourism as a tool for socio-economic development is especially important at the regional level. Ensuring the increasing impact of tourism on the socio-economic conditions of the region requires the solution of a number of specific tasks, among which the priorities are: identifying and evaluating the social and economic impact of tourism in the region, developing effective management methods and determining the direction of tourism development to achieve the desired socio-economic result [5].

Kyrgyzstan has low rates in the tourism industry in comparison with the advanced countries. An important aspect for finding the path of development of the tourism industry is the study and identification of experiences that have contributed to the success of other countries [6]. Therefore, there is a lack of scientifically based generalization studies and researches, qualitative and quantitative assessment of the impact of tourism for development of economy in Kyrgyzstan, as well as protection of tourist and recreational resources and its potential. The most visited tourist region of the country is the Issyk-Kul lake.

The analysis of social and economic influence was conducted in the Issyk-Kul region. Evaluation of the socio-economic impact of tourism is relevant and it gives the opportunity to resolve the growing contradiction in the Issyk-Kul region between the need to meet the growing needs of tourists, which leads to the rapid development of tourism, and a limited number of natural, social and economic resources of the region in a deteriorating environment. Ensuring the sustainable development of tourism is at the front of a number of priority problems of the country as a whole and the Issyk-Kul region, separately.

The tourism industry is an important sector of the economy and a significant factor in the socio-economic development of the Issyk-Kul region and the country as a whole. Therefore, a comprehensive study of the socio-economic impact of tourism on the country's economy is relevant, as it allows us to assess the role of tourism in the development of the country and the people as a whole.

The purpose of this research is to study the impact of tourism on the socio-economic sphere in the Issyk-Kul region and present a basis and approach for determining the main priorities in the development of tourism.

The scientific novelty of the research is as follows: there is a lack of research on the socio-economic impact of tourism in the region; therefore, comprehensive research has been done, focusing on the social and economic impact of tourism in the region; it has been established that political and environmental instability in the country has a direct impact on the social and economic sphere of tourism; tourism is one of the main factors accelerating socio-economic processes in the region; the methodology for assessing the impact of tourism in the region has been tested; lastly, we developed recommendations and suggestions.

This work is organized as follows: Section 1 contains an introduction. Section 2 contains a review of the literature. Section 3 contains a methodological approach and materials. Section 4 is devoted to the main results of applying the methodology and discusses these results. Finally, the conclusion presents the strengths and limitations of the study to provide suggestions for further research.

2. Literature Review

Sustainable development of tourism can rationally meet economic, social, and aesthetic needs without adversely affecting cultural integrity and ecology [7]. According to [8,9] and others, the goals of tourism development contain economic, social and environmental aspects. In addition, the development of tourism affects the improvement of living standards, and has a role in reducing poverty and developing social support of the region [10,11]. Therefore, [12] argues that a sustainable tourism

industry requires the achievement of long-term integration of social and economic goals, which leads to an awareness of the close relationship between these indicators in the development of tourism in the region.

The impact of tourism on the socio-economic sphere has also been studied, since the increase in expenditures by tourists leads to changes in the expenditures of tourist facilities to increase the service of the region [13,14]. Tourism has an impact on the rational distribution of economic resources in order to reduce excess costs in the sectors related to tourism, which has a beneficial effect on the socio-economic sphere of the regions [15–17].

The impact of international tourism on the country's economy is widely studied in tourism literature from different points of view [18]. Economic effects have been studied [19–26], social and cultural implications [27–29], as well as the environmental impact of international tourism [30,31]. The tourism sector has been widely studied in countries such as Greece [32,33], Kenya [34,35] and Turkey [36]. Most of the existing publications are devoted to the impact between tourism and socio-economic growth [25,37–40] where socio-economic growth was identified based on tourism. Also, most previous studies have concluded that the tourism sector plays an important role in the economic growth of any tourist destination. The results of other studies on the impact of tourism have revealed that tourism has a lasting effect on economic development [41–45], scientists also found a direct interaction between tourism development and socio-economic growth [46–48].

Socio-economic consequences of tourism are the result of influence and costs of tourists, which stimulate economic activity and create additional business turnover, employment and government revenues in the tourist region [49]. The development of tourism in the region, which primarily pursues economic growth should be regulated by the state through the control of the negative social and environmental impact of tourism.

The economic impact of the potential contribution of various types of tourism includes: ethnic tourism [50], sports tourism [51], congress and exhibition tourism [52], festival tourism [53] and cultural tourism [54], which were investigated as well.

In the study, it is important to take into account the conditions under which tourism has a negative effect on the socio-economic sphere. For example, an outbreak of an epidemic [55], terrorist attacks [56], political events [57], and others have a negative impact on economic development. The social and economic implications of tourism are clearly significant. However, the impact of environmental and political impacts should also be considered when assessing the overall impact of tourism on the region's sustainable development.

3. Materials and Methods

3.1. Study Area

The Issyk-Kul region is located in the eastern part of Kyrgyzstan. Tourism and recreation has existed on a significant scale since the 1950s [58]. The region was formed on 21st November 1939, after several reorganizations in this form were approved on 14th December, 1990. From the north and north-east the region borders with Kazakhstan, from the east and from the south-east with China, from the west and from the south-west with the Naryn region, from the north-west with the Chui region. The area of the region is 43,100 square kilometers (21.6% of the total area of the republic). The population is 413,100 (8.6% of the total number). There are three cities; Balykchy, Karakol and Cholpon-Ata, in the region. Karakol is the regional center [59]. There are 132 boarding houses, resorts, children's sanatoriums, and 212 travel agencies and other recreational facilities in Issyk-Kul lake region [60].

Within the entire region borders the famous drainage and resort Issyk-Kul lake, the largest lake in Kyrgyzstan, as well as one of the 30 largest lakes in the world and sixth in the list of the deepest lakes. The lake is located in the north-eastern part of the country between the ridges of the Northern Tien-Shan: Küngöy-Ala-Too and Terskey Ala-Too at an altitude of 1609 m above sea level [61]. The water level in Issyk-Kul varies cyclically (it rises or falls); the cycle takes place over several decades.

The lake water is brackish (mineralization of water is 5.90%). The average depth is 278 m, the greatest depth is almost 2.5 times larger and it is equal to 702 m. The length of Issyk-Kul from west to east is 182 km, and from the south to the north is 58 km. The lake has four gulfs: Rybachiy, Djergalansky (Przhevalsky), Tyupsky and Pokrovsky [58].

3.2. Methods of the Research

A statistical collection book on Tourism in Kyrgyzstan for periods of 2002–2006, 2006–2010, 2011–2015, 2013–2017 by National Statistical Committee of the Kyrgyz Republic [62–65], was used to analyze social and economic impacts of tourism in the Issyk-Kul region.

The method of quantitative assessment of the socio-economic impact of tourism in the region was proposed and tested in the Issyk-Kul region, as the most visited region in Kyrgyzstan by tourists. Economic and social efficiency was estimated by integral indicators calculated from statistical data. Our proposed methodology considers not just individual indicators of the socio-economic efficiency of tourism, but also their combination in interrelation and interdependence and includes three stages (Figure 1):

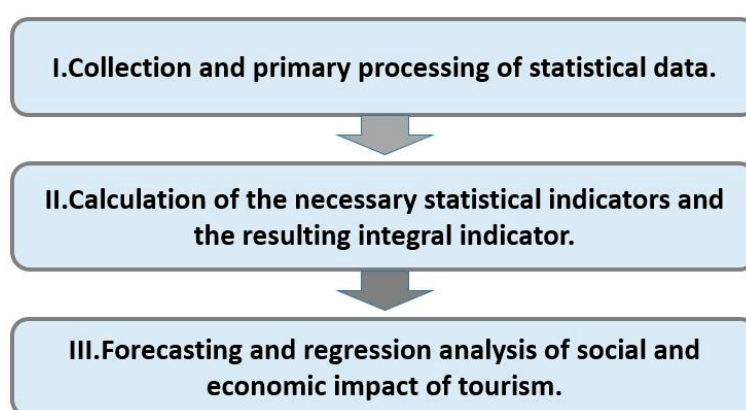


Figure 1. Study stages.

The collection of statistical data is carried out in two blocks of indicators (Table 1).

Table 1. Cost and social efficiency unit (block).

Indicator		
No	Cost Efficiency Unit	Social Efficiency Unit
1	The number of tourists (1000 people) arriving in the Issyk-Kul region	Average monthly salary of employees in the field of tourism, hotels (KGS soms)
2	Foreign direct investment in the tourism sector KR (thousands of US dollars)	Number of hotels
3	Number of persons accommodated, 1000 people in hotels	Revenue (gross income) of hotels in the territory (millions of soms)
4	The volume of services provided by restaurants, bars, canteens and other enterprises for the supply of ready-made food to tourists (millions of soms)	Number of permanent population (1000 people)
5	Revenue (gross income) of recreation and tourism organizations (millions of soms)	External migration of the population, the number of departures (people)
6	Existing collective means of accommodation and tourism enterprises (at the end of the year, units)	

Most of the formed indicators have a reliable statistical base. The analysis of their numerical values allowed us to obtain objective information about the level of socio-economic impact of tourism in the Issyk-Kul region. According to these indicators, it is possible to conduct a comparative assessment of the socio-economic impact of tourism in different territories. For convenience of further calculations, it is necessary to normalize the values of the considered indicators by the following formula [66]:

$$k = \frac{(k - k_{min})}{(k_{max} - k_{min})}, \quad (1)$$

where k is the actual value of the indicator for a given period, k_{min} is the minimum value, and k_{max} is the maximum value of the indicator for all compared periods. After calculating the statistical indicators, we calculate the integral indicator of economic and social influence separately for each block or unit [67]:

$$y_t = \sum_{i=1}^n a_i k_{ti}, \quad (2)$$

where $t = 1$ or $t = 2$, y_1 is an integral indicator of economic efficiency, y_2 is an integral indicator of social efficiency, k_{ti} is the i th normalized indicator from the t block, a_i is the weight with which the i th indicator of the t th block enters in the integral indicator, n is the number of indicators of the t th block. To determine a_i , we use an approach based on calculating the weights of the indicators from the pair-correlation coefficients between them. If r_{ij} is the pair correlation coefficient between the i th and j th indices, then the weights are determined by the following formula:

$$a_i = \frac{\sum_{j=1}^n r_{ij}}{\sum_{j=1}^n \sum_{i=1}^n r_{ij}}, \quad (3)$$

Thus, the sum of the paired correlation coefficients of each indicator with the others correlates with the total sum of the coefficients over the whole matrix of the paired correlation coefficients. The latter characterizes the relationship between all indicators, the obtained values a_i reflect the proportion of the i th indicator in the integral efficiency indicator for the t th block. Such an approach in this case is justified, since each block contains indicators characterizing the same component of the influence of tourism from the economic or social side [68]. The integral indicator of the socio-economic impact of tourism z was calculated by the formula:

$$z = y_1 + y_2, \quad (4)$$

Assuming the equivalence of the economic and social impact of domestic tourism.

The formula for the pair correlation coefficient:

$$r_{xy} = \frac{\sum (x_i - \bar{x}) \times (y_i - \bar{y})}{\sqrt{\sum (x_i - \bar{x})^2 \times \sum (y_i - \bar{y})^2}}, \quad (5)$$

The next stage is forecasting and regression analysis of the socio-economic impact of tourism in the region based on integral indicators.

The equation for Forecast is $a + bx$, where:

$$a = \bar{y} - b\bar{x}, \quad (6)$$

and:

$$b = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sum (x - \bar{x})^2}, \quad (7)$$

where $\bar{x}$ and $\bar{y}$ are the sample means and calculated by average (x values) and average (y values).

This methodology for assessing the socio-economic impacts of tourism can be used for other regions of Kyrgyzstan. The presented model is universal and has the advantage of allowing comparisons between regions of Kyrgyzstan, and as well as allows comparisons over time. The model is proposed as an identification of the aggregate economic and social impacts on the region by tourism indicators.

4. Results and Discussion

4.1. The Economic Impact of Tourism

We will test the methodology for assessing the socio-economic impacts of tourism in the Issyk-Kul region. According to the selected indicators of the economic impact of tourism, the original, normalized data from 2002 to 2017 are presented in Table 2.

Table 2. Normalized data on indicators of economic impact of tourism on Issyk-Kul lake. Calculated by the Formula: (1).

Indicator	1 *	2	3	4	5	6
2002	0.2558	0.2331	0.2299	0	0.0036	0.1500
2003	0.7305	0.0757	0.1954	0.0165	0.0016	0.1167
2004	0.1296	0.1108	0.0805	0.0458	0.0167	0.1500
2005	0.0297	0.0958	0.1379	0.0743	0	0
2006	0.4643	0.1945	0.4023	0.0520	0.0376	0.4167
Average growth	0.3220	0.1420	0.2092	0.0377	0.0119	0.1667
2007	0.4716	0.3170	0.5057	0.1072	0.0675	0.3833
2008	0.4421	0.4107	0.3333	0.3846	0.0813	0.5167
2009	0.3163	0.5888	0.3333	0.3980	0.2334	0.5500
2010	0	0.4426	0	0.1783	0.1881	0.3833
2011	0.2616	1	0.0575	0.3673	0.3945	0.3167
Average growth	0.2983	0.5518	0.2460	0.2871	0.1929	0.4300
2012	0.5570	0.1845	0.2759	0.4353	0.5792	0.1667
2013	0.6310	0.2489	1	0.5785	0.6157	0.1333
2014	0.8376	0.3967	0.0805	0.7177	0.6720	0.4333
2015	0.9895	0.1216	0.6552	0.8333	0.6123	0.6167
2016	0.4647	0	0.1724	0.9449	0.6831	0.7833
2017	1	0.3439	0.5862	1	1	1
Average growth	0.7466	0.2159	0.4617	0.7516	0.6937	0.5222

* Numbers in columns are: 1. The number of tourists (1000 people) arriving in the Issyk-Kul region; 2. Foreign direct investment in the tourism sector of KR (thousands of US dollars); 3. Number of persons accommodated 1000 people in hotels; 4. The volume of services provided by restaurants, bars, canteens and other enterprises for the supply of ready-made food to tourists (millions of soms); 5. Revenue (gross income) of recreation and tourism organizations (millions of soms); 6. Existing collective means of accommodation and tourism enterprises (at the end of the year. units).

In general, there is a tendency to increase in the economic block, and special growth was shown: indicators 4 and 5 (Table 2). The increase by 626% and 998%, respectively, from 2002 to 2017.

For a more detailed analysis, the study period 2002–2017 is divided into three periods to show the five-year trend of changes: the first period from 2002–2006; the second period 2007–2011; and the third period 2012–2017. For each period, the average development rate is calculated. Indicators 4 (Table 2): for the first period showed an average increase of 0.0377; for the second period an average increase of 0.2871 and for the third period the average increase was 0.7516. Compared with the first period, the average growth rate for the third period increased by 0.7139. In comparing the second and third periods, the average growth rate increased by 0.4645. In general, this indicates a progressive growth of this indicator of tourism for the studied period.

Indicators 5 (Table 2): for the first period showed an average increase of 0.0199, for the second period an average increase of 0.1929 and for the third period the average increase was 0.6937. Compared with the first period, the average growth rate for the third period increased by 0.6818. In comparing the second and third periods, the average growth rate increased by 0.5008. The analysis of this indicator of tourism showed steady growth in tourism.

The remaining normalized indicators 1 and 3 (Table 2) of the economic block also have a stable average growth rate between periods. Based on this we can discuss the developmental trend of the economic sphere of tourism in Kyrgyzstan.

The reason for the growth of the economic sphere of tourism is that after the collapse of the USSR, Kyrgyzstan faced an acute question of finding sources of foreign exchange replenishment. The generally accepted fact for Kyrgyzstan, with its rich and diverse nature, is that one of the factors for its economic growth was the development of tourism in various forms [69].

The development of market relations in Kyrgyzstan stimulated the rapid process of creating travel companies and the tourism market [70]. In the country, the travel industry has adapted more quickly than other industries to market changes. The results achieved in the field of tourism are modest, however, there is a growth trend.

Ref [71] used the method of inter-sectoral balance and estimated the economic impact of tourism in the post-Soviet countries of Russia and Kazakhstan. The results showed a slow but steady increase in the impact of the tourism economy.

This industry based on the main indicators of the development of the tourism industry in Kyrgyzstan belongs to the priority sectors of the country's economy and has a development trend [72]. However, the state uses the tourist potential of no more than 15%.

In addition to indicators 2 (Table 2): where, in comparing the differences in the average growth, rates of the third and first periods increased by 0.0740. Regarding the difference between the indicators of the third and second periods -0.3359 , a sharp decline in the development of this economic indicator of tourism is revealed. A similar situation of the decline in the average growth parameters can be seen in indicator 6 (Table 2), where a decline in the parameters of two indicators between periods was caused by political events in the country in 2010. This confirms how sensitive the investment attractiveness of the country's tourism is to different types of instability in the state. This affects the country's tourism for a whole period of time, and not just a short period.

In order to show the economic impact on the region, the pair-correlation coefficients were calculated using the Formula (5) and its Table 3 matrix was formed. Correlation was performed in order to identify the relationship between the parameters of the economic unit.

Table 3. Elements of the pair correlation coefficient matrix for indicators of economic impact of tourism on Issyk-Kul lake. Calculated by the Formula: (5).

Number of Indicator	1	2	3	4	5	6	Total
1	1	−0.18	0.56	0.66	0.67	0.50	3.21
2	−0.18	1	−0.17	0.02	0.07	0.12	0.86
3	0.56	−0.17	1	0.36	0.37	0.20	2.31
4	0.66	0.02	0.36	1	0.94	0.75	3.73
5	0.67	0.07	0.37	0.94	1	0.62	3.66
6	0.50	0.12	0.20	0.75	0.62	1	3.19
Total	3.21	0.86	2.31	3.73	3.66	3.19	16.96

To assess the dynamics of the economic impact of tourism in the Issyk-Kul region from 2012 to 2017, Formula (2) was applied and weighting factors were calculated using Formula (3) to obtain the integral indicator of the economic unit (Table 4). According to our calculations of indicators, there is an increase in the economic impact of tourism in the Issyk-Kul region as the integral indicators are greater than zero. The absolute values of the integral indicator for the period under consideration

(2012 to 2017) show a stable growth trend (Table 4). It should be noted that a sharp drop in indicators of economic influence occurred in 2005 and 2010. This is caused by political instability in these years, as the country's internal political stability has an important role in the development of tourism [73].

Table 4. Dynamics of the integral indicator of the economic impact of tourism on Issyk-Kul lake. Calculated by the Formulas: (2) and (3).

Indicator	1	2	3	4	5	6	Integral Indicator
2002	0.0484	0.0118	0.0314	0	0.0008	0.0282	0.1205
2003	0.1381	0.0038	0.0267	0.0036	0.0003	0.0219	0.1945
2004	0.0245	0.0056	0.0110	0.0101	0.0036	0.0282	0.0830
2005	0.0056	0.0048	0.0188	0.0163	0	0	0.0456
2006	0.0878	0.0098	0.0549	0.0114	0.0081	0.0784	0.2504
2007	0.0892	0.0160	0.0690	0.0236	0.0146	0.0721	0.2844
2008	0.0836	0.0207	0.0455	0.0846	0.0175	0.0972	0.3491
2009	0.0598	0.0297	0.0455	0.0875	0.0504	0.1034	0.3764
2010	0	0.0223	0.0000	0.0392	0.0406	0.0721	0.1743
2011	0.0495	0.0504	0.0078	0.0808	0.0852	0.0596	0.3333
2012	0.1053	0.0093	0.0376	0.0958	0.1251	0.0313	0.4045
2013	0.1193	0.0126	0.1364	0.1273	0.1330	0.0251	0.5536
2014	0.1584	0.0200	0.0110	0.1579	0.1451	0.0815	0.5739
2015	0.1871	0.0061	0.0894	0.1833	0.1322	0.1160	0.7141
2016	0.0879	0	0.0235	0.2078	0.1475	0.1473	0.6141
2017	0.1891	0.0173	0.0800	0.2200	0.2160	0.1881	0.9104
Weighting coefficient	0.1891	0.0504	0.1364	0.2200	0.2160	0.1881	

It also noted that the consequences of natural, social disasters and political instability affect political security in democratic countries and have a role in the development of tourism. Accordingly, a politically unstable country is unattractive for potential tourists, so they can cancel their trips or choose other destinations for rest and recreation. Thus, a stable political, legal and financial system of the country is needed for the progressive functioning and development of the tourism industry [74].

Consequently, tourism is one of the main factors for stable long-term economic growth, both in the region and in the country as a whole [42], as tourism shows a stimulating effect on many sectors of the country's economy in the form of direct and indirect impacts [75]. In the case of Kyrgyzstan, tourism is practically the only means of rational stimulation and development of the country's economy. According to the World Tourism Organization, by 2025, with effective use of its enormous potential, Kyrgyzstan can receive up to 2.5 million tourists a year, which should have a positive impact on socio-economic indicators of tourism [72].

4.2. The Social Impact of Tourism

Analyzed normalized data on the social impact of tourism from 2002 to 2017 (Table 5). An increase was observed in the social and economic blocks as a whole. A special trend of increase in the social unit: indicator 1 (Table 5), which increased by 209% and indicator 3 (Table 5), which increased by 2050%. The external migration of the population, the number of departures (people), decreased by 76% (Table 5), which indicates an improvement in the standard of living in the region, as external migration is mainly done in search of jobs.

Since external migration both in the Issyk-Kul region and in Kyrgyzstan is mainly carried out in search of work. Overseas, over a million migrants are looking for jobs. The negative side of external labor migration for Kyrgyzstan is expressed in the constant outflow of the male population of the country up to 40%, this blocks the revival and functioning of the real production sector of the economy [76] and as well as, migration causes many other social imbalances in society. The development of tourism once again serves as a method for solving social problems in the region. In addition, the National Sustainable Development Strategy of the Kyrgyz Republic for the period

2013–2017 notes the important role of tourism in solving social problems, creating additional jobs and improving the well-being of the population, particularly in rural areas [77].

Table 5. Normalized data on indicators of social impact of tourism on the Issyk-Kul lake. Calculated by the Formula: (1).

Indicator	1	2	3	4	5
2002	0.0471	0	0.0007	0	0.3392
2003	0.1185	0	0.0055	0.0345	0.3934
2004	0	0.3529	0.0060	0.0772	0.4187
2005	0.1705	0.6471	0	0.1166	0.5921
2006	0.1406	0.8824	0.0600	0.1593	0.6105
Average growth	0.0954	0.3765	0.0144	0.0775	0.4708
2007	0.3026	0.9412	0.1048	0.1970	0.9238
2008	0.3726	1	0.2298	0.2348	0.8797
2009	0.5027	0.6471	0.2600	0.2857	0.7670
2010	0.3799	0.6471	0.2060	0.3153	1
2011	0.4786	0.6471	0.2553	0.3678	0.8667
Average growth	0.4073	0.7765	0.2112	0.2801	0.8874
2012	0.5885	0.4706	0.3401	0.4253	0.2005
2013	0.6316	0.4118	0.2762	0.5140	0.1550
2014	0.6089	0.2941	0.7384	0.5977	0.1416
2015	0.4990	0.5294	1	0.6864	0.0589
2016	0.8239	0.5294	0.7444	0.8982	0.0253
2017	1	0.5294	0.7748	1	0
Average growth	0.6920	0.4608	0.6457	0.6869	0.0969

As well as in the economic block for a broad analysis, the study period 2002–2017 was divided into three periods to show the five-year trend of changes: the first period from 2002–2006; the second period 2007–2011; and the third period 2012–2017. For each period the average development rate was calculated. Indicators 1 (Table 5): for the first period showed an average increase of 0.0954, for the second period an average increase of 0.4073 and for the third period the average increase is 0.6920. Compared with the first period, the average growth rate for the third period increased by 0.5966. In comparing the second and third periods, the average growth rate increased by 0.2847. The difference parameters of the average growth of the indicator of the third and second periods, relative to the third and first indicates a decrease in the pace of the average development rate. In general, we can conclude that this indicator for 2012–2017 has a developmental trend.

Parameters of the Indicators 3 (Table 5): for the first period showed an average increase of 0.0144, for the second period the average increase of 0.2112 and for the third period the average increase is 0.6457. Compared with the first period, the average growth rate for the third period increased by 0.6312. In comparing the second and third periods, the average growth rate increased by 0.4345. This indicator of social tourism shows a steady rise over the entire study period.

The remaining normalized indicators 4 and 5 (Table 5) also have a stable average growth rate between periods. Based on this, the development trend of the social sphere of tourism in Kyrgyzstan can be observed.

With the exception of indicator 2 (Table 5), where in comparing the differences in the average growth of the third and first periods were 0.0843. Regarding the difference (−0.3157) between the indicators of the third and second periods, a sharp decline in the development of this social indicator of tourism is manifested. The decline in indicators between the periods as already mentioned above, is caused by political events in the country. In general, the analysis of the social block of tourism also showed sustainable development throughout the study period.

In addition, the pair-correlation coefficients were calculated using Formula (5) and the matrix of pair-correlation coefficients for indicators of social influence was formed (Table 6).

Table 6. Elements of the pair correlation coefficient matrix for indicators of social impact of tourism on Issyk-Kul lake. Calculated by Formula (5).

Number of Indicator	1	2	3	4	5	Total
1	1	0.14	0.79	0.94	−0.46	2.41
2	0.14	1	0.01	0.07	0.56	1.77
3	0.79	0.01	1	0.91	−0.62	2.09
4	0.94	0.07	0.91	1	−0.61	2.32
5	−0.46	0.56	−0.62	−0.61	1	−0.13
Total	2.41	1.77	2.09	2.32	−0.13	8.46

Tourism occupies a leading position in the Kyrgyz Republic in the number of employment and thus it has a direct impact on the social sphere [74]. In addition, based on tourism indicators, the dynamic development of the tourism industry in Kyrgyzstan was proven, which together has a positive effect on the socio-economic sphere. To improve the quality of services as a decisive factor in attracting tourists and developing the tourism industry in the region was the key point for the growth of the social sphere of tourism. This confirms the close relationship of each element of tourism [78].

Formulas (2) and (3) are applied, the calculation is carried out analogously to the section of economic influence. The integral indicator of the social impact of tourism in the study period has positive values (Table 7). Consequently, the social impact of tourism increased every year, and the absolute value of the integral index has an increased level. The only difference is the drop in the indicator in 2010, which is explained by political instability in the country. It should be noted that the political events of 2005 did not have a significant impact on the social indicators of tourism, compared with the economic ones. During the study period, the social impact of tourism in the Issyk-Kul region increased more rapidly than the economic one. From this we can conclude that the social side of tourism responds more slowly to any negative external factors. At the same time, the indicators of the economic block react sharply to negative external factors and they are expressed in sharp drops.

Table 7. Dynamics of the integral indicator of the social impact of tourism on Issyk-Kul lake. Calculated by the Formulas: (2) and (3).

Indicator	1	2	3	4	5	Integral Indicator
2002	0.0134	0	0.0002	0	−0.0052	0.0084
2003	0.0337	0	0.0013	0.0094	−0.0060	0.0384
2004	0	0.0740	0.0015	0.0211	−0.0064	0.0902
2005	0.0485	0.1356	0	0.0319	−0.0091	0.2070
2006	0.0400	0.1850	0.0148	0.0436	−0.0094	0.2740
2007	0.0861	0.1973	0.0259	0.0539	−0.0142	0.3491
2008	0.1060	0.2096	0.0569	0.0643	−0.0135	0.4233
2009	0.1430	0.1356	0.0643	0.0782	−0.0118	0.4094
2010	0.1081	0.1356	0.0510	0.0863	−0.0154	0.3656
2011	0.1362	0.1356	0.0632	0.1007	−0.0133	0.4223
2012	0.1674	0.0986	0.0842	0.1164	−0.0031	0.4636
2013	0.1797	0.0863	0.0683	0.1407	−0.0024	0.4727
2014	0.1732	0.0617	0.1827	0.1636	−0.0022	0.5791
2015	0.1420	0.1110	0.2475	0.1879	−0.0009	0.6874
2016	0.2344	0.1110	0.1842	0.2459	−0.0004	0.7751
2017	0.2845	0.1110	0.1918	0.2737	0	0.8610
Weighting coefficient	0.2845	0.2096	0.2475	0.2737	−0.0154	

The dynamics of the economic and social impacts of tourism in the Issyk-Kul region from 2002 to 2017 was analyzed. The integral indicator of socio-economic influence was calculated using Formula

(4). In general, the integral indicator tends to increase and is greater than zero, however, in 2010 it decreased compared to 2009, the reason is the political April and Osh events in this period (Figure 2).

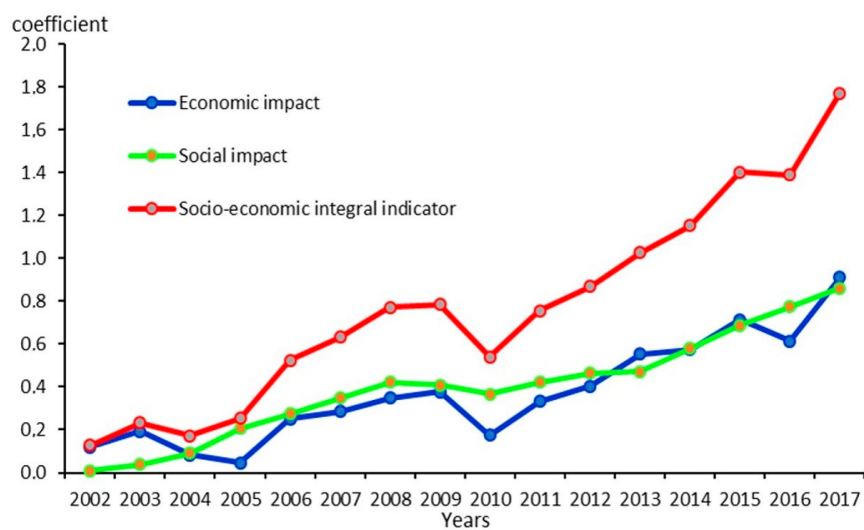


Figure 2. Dynamics of socio-economic impacts of tourism on Issyk-Kul lake.

The country with a different type of economy and with different levels of development of the tourism industry was analyzed by [79]. To determine the socio-economic impact of tourism, a correlation analysis was carried out in the work, which revealed a close relationship between the indicators. With an increase in national income per capita in direct proportion increases the income of the tourism industry, so the increase in tourism income directly affects the increase in gross domestic product. This work once again confirms the close interaction of elements of tourism.

4.3. Forecasting the Socio-Economic Impacts of Tourism

A forecasting and regression analysis by quantitative assessment of the socio-economic impacts of tourism in the region was carried out based on integral indicators (Figures 3–5).

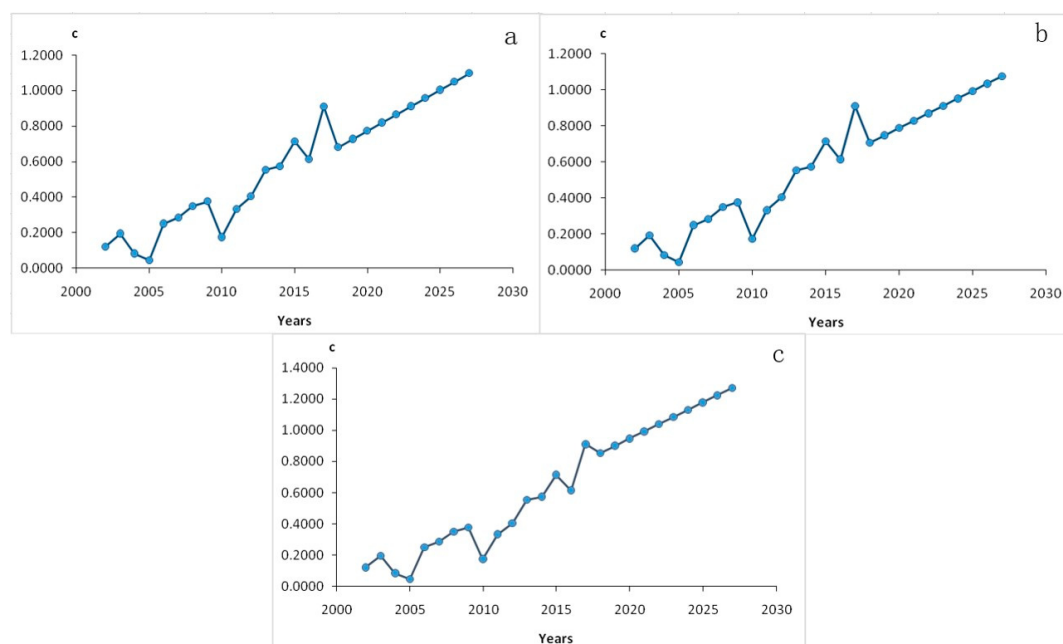


Figure 3. Forecast of different economics impacts: (a) standard; (b) pessimistic; (c) optimistic.

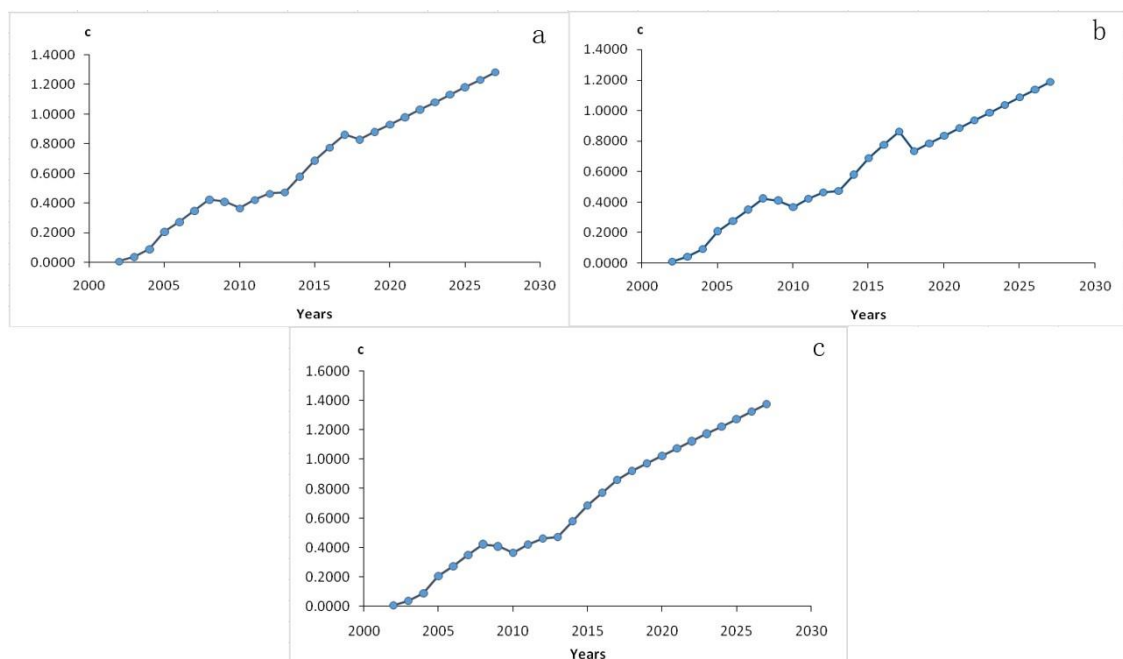


Figure 4. Forecast of different social impacts: (a) standard; (b) pessimistic; (c) optimistic.

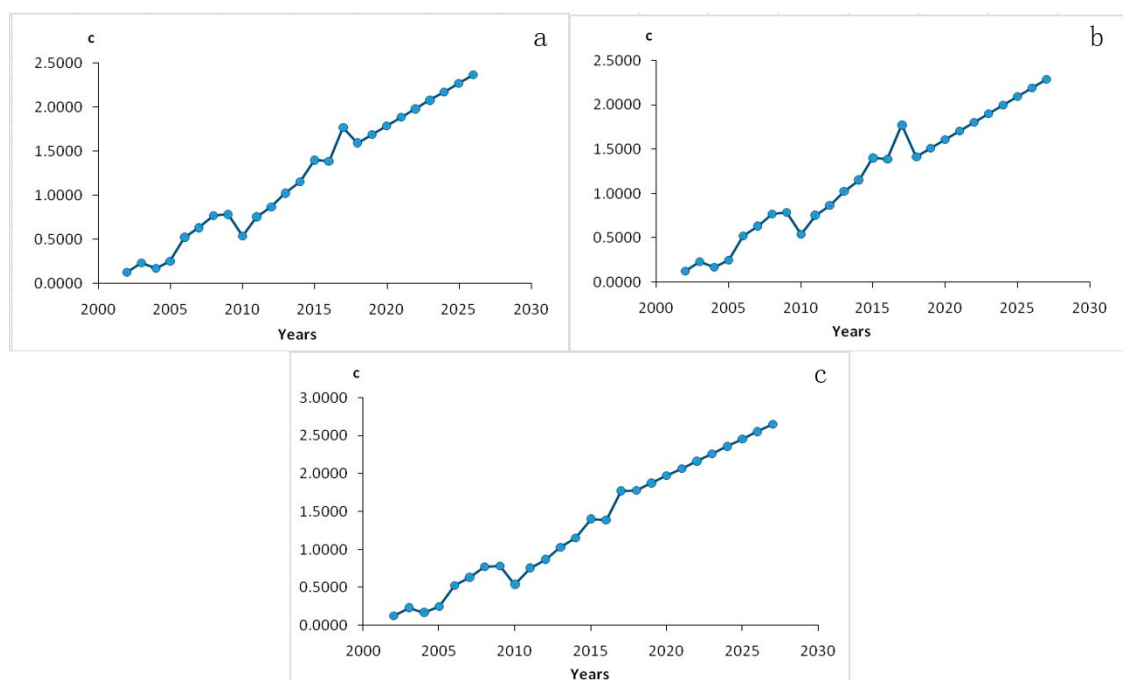


Figure 5. Forecast of different socio-economic impacts: (a) standard; (b) pessimistic; (c) optimistic.

According to the data of the forecast, the three parameters of economic influence from 2018–2027 were made: the first standard, the second pessimistic and the third optimistic forecasts. Each forecast parameter showed further stable growth of the economic impact of tourism in the Issyk-Kul region (Table 8 and Figure 3).

Table 8. Forecast of economic impact. Calculated by Formulas (6) and (7).

	2002	2006	2010	2014	2018	2022	2026	2027
Forecast of economic impact	0.1205	0.2504	0.1743	0.5739	0.7673	0.9524	1.1376	1.1839
Forecast of social impact	0.0084	0.2740	0.3656	0.5791	0.8292	1.0304	1.2316	1.2819
Forecast of socio-economic integral indicator	0.1289	0.5245	0.5399	1.1530	1.5965	1.9828	2.3691	2.4657

The results of the forecast scenarios economics impacts were analyzed. According to the standard forecast scenario, from 2018–2027 the integral indicator of the dynamics of the economic impact of tourism in the Issyk-Kul region will grow by 0.27c (c—coefficient) (Figure 3a), in the pessimistic scenario by 0.19 (Figure 3b) and in the optimistic scenario by 0.36 (Figure 3c).

The forecast of social impact was similar to the economic. All forecast parameters showed a further steady increase in the social impact of tourism in the Issyk-Kul region (Table 8 and Figure 4). As well as the analysis of the results on forecast scenarios carried out. According to the standard forecast scenario, from 2018–2027 the integral indicator of the dynamics of social impact of tourism in the Issyk-Kul region will grow by 0.45c (Figure 4a), in the pessimistic scenario by 0.33c (Figure 4b) and by the optimistic scenario by 0.52c (Figure 4c).

The prediction of the integral indicator of socio-economic impacts is similar to the economic one. All forecast parameters showed further stable growth of tourism in the Issyk-Kul region (Table 8 and Figure 5). The results of forecast scenarios were analyzed (Figure 5). According to the standard forecast scenario from 2018–2027, the integral indicator of the dynamics of the socio-economic impact of tourism will grow by 0.69c (Figure 5a), by the pessimistic scenario by 0.51c (Figure 5b) and by the optimistic scenario by 0.88c (Figure 5c).

A general optimal trend in the development of tourism for the period up to 2027 can be observed based on forecasts of socio-economic impact. Tourism by 2027, as a highly profitable economy, should become one of the priority sectors of the national economy, bringing a stable income, contributing to economic growth and the development of the social and economic sphere. It should be noted here that tourism would have a steady growth trend; therefore, the indicators can be much higher than predicted.

Kyrgyzstan can significantly expand the scope of tourist activity, which will ensure the inflow of foreign currency. This will not only have a positive effect in the creation of national income, but there is also an opportunity to improve the quality of tourist resources. There are also real opportunities for carrying out direct environmental protection measures (recultivation, creation of specially protected areas, construction of treatment facilities, etc.), the scale of which is greatly reduced in the context of lack of financial resources. In general, tourism is developing in Kyrgyzstan, but there is a specificity in the development of tourism. First of all, it is a strong dependence of the tourist flow on the factors of natural-geographical, socio-economic and political nature.

In addition, a regression analysis was carried out in order to identify and evaluate the mutual influence of social (SP) and economic spheres (EP) of tourism in the Issyk-Kul region (Figure 6).

The results of this analysis showed a strong influence of the economic sphere of tourism on the social ($R^2 = 0.9582$). Consequently, tourism has a direct impact on both the economic and social situation in the region.

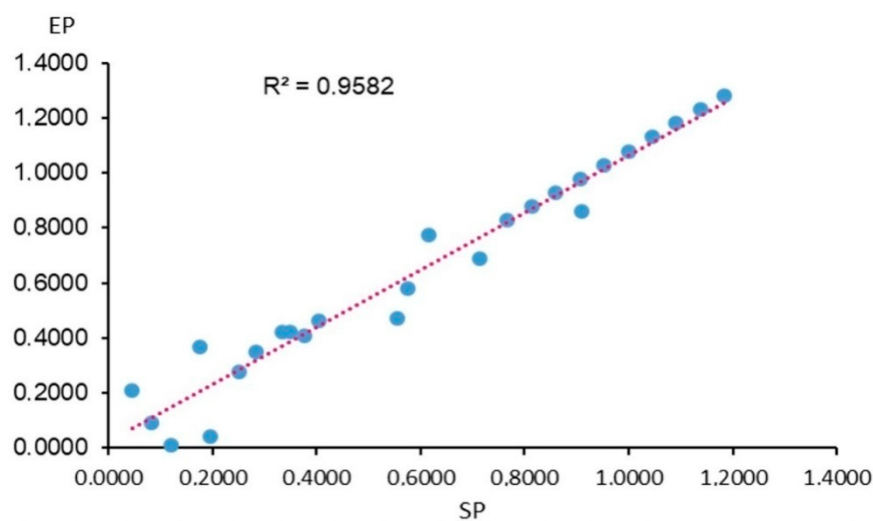


Figure 6. Regression analysis of the mutual influence of the economic and social spheres of tourism.

5. Conclusions

The study results show that the growth of the economic and social impacts of tourism in the Issyk-Kul region from 2002–2017 increased significantly every year. However, there has been a sharp drop in the indicators of economic impact on the development of the region in 2005 and 2010, which are caused by political instability in these years. According to forecasts obtained before 2027, it will have a stable growth trend. Therefore, the impact of tourism on economic and social growth is positive. Tourism of the Issyk-Kul region as a whole supports the growth of the economy, and the economic sphere of tourism has a strong influence on the social one.

In the study, the presented model is universal and has the advantage of allowing comparisons between regions of Kyrgyz Republic, as well as comparisons over time. Another advantage lies in the availability of the information used and the ease of reproduction of the technique. The model is proposed as an improvement in the understanding of how tourism indicators together have an economic and social impact on the region.

Summing up the study, in the conditions of formation and functioning of the tourism industry in the Issyk-Kul region, it is necessary to emphasize its socio-economic function, which is due to the following reasons:

- First, tourism, as a labor-intensive industry, has a positive impact on unemployment and thereby reduces the migration outflow among the local population.
- Secondly, natural-geographical resources and conditions of the Issyk-Kul region determine the location of tourism enterprises in mountainous and rural areas, which, in turn, provides for the solution of socio-economic problems in these places (construction of social facilities, employment of the rural population, etc.).
- Thirdly, the importance of tourism has grown due to the decline in the export opportunities of the republic, due to the economic crisis. Issyk-Kul tourist product with unique properties and national color is an important element of service exports.
- Fourth, with rational development, tourism does not deplete natural resources, but, on the contrary, is interested in preserving the environment.

The practical significance of the work results is that the study made it possible to determine the role of tourism in the socio-economic processes of the Issyk-Kul region and identify the impact of tourism on the development of the region.

The results can be used by the State Committee on Tourism. Sport and Youth Policy and other interested departments, and ministries, local governments. In the adoption of management decisions

and the development of measures to improve the development of tourism business, the creation and implementation of strategic and program documents. Also, the results of this study can be used for a deeper study by other scientists in the field of socio-economic impact of tourism.

In the work, there are some limitations: 1. Previously published statistics until 2002 had other indicators that do not coincide with those used in this work, thereby limiting the study period compared with other literature reviews, from 2002 to 2017; 2. In SCI (Science Citation Index) and in other journals there are few works on this topic devoted to tourism in the area of our research. Despite these limitations, the article makes sense in a systematic and comprehensive study of tourism as an important incentive in promoting social and economic growth. This article is likely to pave the way for future research on the analysis of issues related to tourism in the socio-economic sphere.

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