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Ensuring the Development of Tourism in the Regions of the Russian Federation, with Account of the Tourism Infrastructure Factors

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Abstract

Background: The article substantiates the necessity to develop the tourist market as a factor of the economic growth in the Russian regions. In this regard, the study is aimed at determining the factors that ensure the development of the regional tourism market with regard to the level of efficiency of its functioning. **Method:** To achieve the research objectives through the use of cluster analysis the regions of the Russian Federation (RF) have been differentiated according to the level of functional effectiveness of the tourism market at the current stage of development. The level of the tourism infrastructure development in the region has become a feature of clusterization. Using the method of principal components the impact of tourism infrastructure factors on the effectiveness of the tourism market functioning in the regions has been evaluated in the quantitative terms. The fundamental factors have been identified that determine the tourism market development in the regions taking into account the level of its functional effectiveness in the modern context. **Findings:** The study presents a new approach to providing development of the regional tourism market. In contrast to the modern concepts of evaluating the effectiveness of the regional tourism industry, this approach allows grouping the RF regions by the level of the tourist infrastructure effectiveness to identify the common factors of the tourism market development. The advantage of the proposed approach as to the conventional theory of the tourism development is in determining the priority of influence exerted by the primary system of the regional tourism infrastructure factors that ensures the tourism market development in view of its effectiveness in modern conditions. It enables to determine that investment and innovation factor is a basic component of tourism development in the regions with a high level of the tourism infrastructure effectiveness. The efficiency of the transport network, innovative activity, the level of investment attractiveness and provision of the fixed assets reproduction conditions the intensity of tourism development in the regions with an average level of tourism infrastructure effectiveness. The expansion of transport infrastructure, strengthening of public financing and capital asset renewal are the primary factors for ensuring the tourism market development in the regions with the low efficient tourism industry. The obtained results contribute to the optimization of the regional policy in improving the efficiency of tourism as a factor of economic development of the region. The article utilizes subjectivism and pragmatism of the qualitative approaches in the justification of areas in tourism development. **Improvements:** The presented approach determines the primary factors of the tourist market development, which can serve as a guide in the process of formation and implementation of the regional tourism policy. It can be used to design a long term strategy for the development of the regional tourism market.

Keywords: Regional Tourism Market, Tourism, Tourism Infrastructure, Tourist Market Development Factors

1. Introduction

The deterioration of the economic condition of the country's regions is observed in the circumstances of a geopolitical crisis and current economic sanctions to the detriment of the Russia's economy. The weakening capacity of the federal budget for subsidizing regions has predetermined the increase of the deficit of regional budgets (at the beginning of 2015, the deficit of regions was 489 billion rubles) and the decreasing business

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activity in the economy[1]. The current situation makes it necessary to find own effective sources of accumulation of financial resources for the economic development of Russian regions. As evidenced by the international experience, tourism is the one of the fastest growing and most profitable sector of the economy. At present, the share of tourism in the world structure of GDP reaches nearly 10%[2]. Whereas the Russian Federation, in spite of its high tourism capacity, occupies an insignificant place in the global tourism market; it accounts for about 1% of the world tourist flow[3], which is only 1.5% of GDP, and in regions it does not even exceed 0.2% of GDP[1]. In the circumstances of a crisis, it is important for the Russian regions' economies to ensure the effectiveness of tourism as a form of economic activity, since it is based on the integrated use of the productive-economic and labor capacity of numerous public production and natural resource branches. Tourism has a huge impact on key sectors of the economies of regions, such as transport and communications, construction, agriculture, production of consumer goods and others. It serves the public interests; it is a productive source of income generation and acts as a catalyst for the socio-economic regional development. Moreover, the tourism industry determines the use and preservation of the cultural and historical tourism capacity of the territory. Therefore, ensuring a sustainable development of tourism seems a relevant scientific research within the framework of a regional economy, and according to the Concept of the Federal Target Program "Development of Domestic and Inbound Tourism in the Russian Federation (2011-2016)"[4], and the Strategy of Tourism Development in the Russian Federation for the Period until 202)[5] becomes of strategic national importance.

2. Literature Review

The science of tourism, as well as the research subject, is still relatively young and is in the process of its formation. The formation of theoretical views on the sustainable tourism development was preceded by the papers of D. Meadows and his co-authors, who studied the limits of the tourism growth as an economic factor[6]. Gradually, the views on tourism were expanded in terms of the transition from the research of the general state to the opportunities and potential for development[7,8], and first of all, from the point of view of availability in a particular area of tourism resources or attractive tourist sites[9]. The transformation of the tourism paradigm has become a prerequisite for the possibility to predict the development of the tourist industry or to provide for its future evolution, to evaluate the impact on the economic development of the territory[10]. In this aspect, the concept of I. Muntelier and K. Iatu became fundamental[11]. The researchers considered the development of tourism as the interaction of natural, social, cultural and historical resources supporting the potential touristic supply of the territory and contributing to its economic development. However, scientists considered the tourism development from the perspective of the tourist capacity of the region[12]. In contrast to the capacity, which is part of the supply, the development of tourism assumes interdependence between possible and existing elements and the tourist demand[13]. In other words, the development of tourism in contrast to the capacity is a function of interaction between the supply and the demand.

Current studies, as evidenced by the analysis, dedicated to the tourist development of certain territories, are carried out from a geographical perspective and largely include review of data on the availability of resources, infrastructure and services[14,15]. Scientists are focused only on the allocation of common factors of tourism development without taking into account the functional efficiency of the territory, negating the analysis of the degree of their influence and importance on the development of the tourist market[16].

Since each region has a certain potential and development specifics of the tourism industry, this study is aimed to determine the priorities of the influence of the factors on tourism infrastructure, the development of regional tourism, taking into account the level of its functional efficiency. In this regard, this study represents a qualitatively new dimension in the methodology of tourism management as a basis for the economic stability of the region.

3. Research Methods

The cluster analysis technology was used in the study with the purpose of grouping 65 regions of the Russian Federation by the tourism industry effectiveness. A cluster analysis is a method of a multivariate statistical analysis, designed to combine objects into relatively homogeneous groups[17]. The advantage of the cluster analysis is no need in a training sample, which enables to classify the previously unstructured data. In addition, a cluster analysis allows categorizing not only one dimension, but also a number of features[18].

The tourism performance per capita in the region was used as the qualitative ground for clustering, i.e. the range of paid tourist services; the number of places in collective accommodation facilities; the number of employees at travel agencies; the average number of employees in collective accommodation facilities; the range of paid services of hotels and similar accommodations; the total square of rooms of collective accommodation facilities; the number of citizens of the Russian Federation accommodated in collective accommodations; the number of foreign nationals placed in collective accommodation facilities, the scope of investment in fixed assets aimed at developing the collective accommodation facilities.

The annual values of performance indicators of tourism across 65 regions of Russia during 2014 were a statistical base for the cluster analysis.

The cluster analysis intends to find such a combination of the clustering objects, at which the value of the Euclidean distances (1) between the center of the cluster and the objects in it is the least possible one.

$$d_{ij} = \sqrt{\sum_{k}^{n} (x_{ik} - x_{jk})^2}, \quad (1)$$

wherein d_{ij} is the distance between i-th object and the center of j-th cluster;

x_{ik} is the value of k-th indicator of i-th object;

x_{jk} is the value of k-th indicator of the center of j-th cluster[17].

The indicators of the clustering quality are the indicators of the intragroup (2) and intergroup (3) variance:

$$\sigma_j^2 = \frac{\sum_{i}^{n} (x_{ik} - \overline{x_{jk}})^2}{n_j}, \quad (2)$$

$$\sigma^2 = \frac{\sum_{i}^{n} (\overline{x_{jk}} - \check{x}_k)^2 \cdot n_j}{N} \quad (3)$$

wherein σ_j^2 is the intragroup variance of j-th cluster;

σ^2 is the intergroup variance;

x_{ik} is the value of k-th indicator of i-th object;

$\overline{x_{jk}}$ is the average value of k-th indicator of j-th cluster;

$\tilde{X}_k$ is the average value of k-th sampling rate;

n_j is the number of objects of j-th cluster;

N is the sample size[17].

The lower the value of the intragroup variance and the higher the intergroup value are, the better the categorizing ability of the attribute is. The adequacy of the object clustering is also evidenced by the F-criterion, whose actual value is calculated in the Statistica8 software package and should be more than the table value, and the p-error level, whose value should tend to zero.

A factor analysis (the method of principal components) was used to determine the priority factors for the development of the tourism industry and to quantify their influence in the formed clusters of the tourist efficiency of regions.

Within the study, the performance of the tourism industry was indicated as the factors of tourism development in 65 regions of Russia for the period from 2011 to 2014: the growth rate of prices for transport, paid services to population, revenues of the consolidated regional budget, the average monthly nominal wage per employee, the density of railway traffic routes, the density of highways with a dense coating of general use, the cost of information and communication technologies, the degree of depreciation of fixed assets, innovative activity of organizations, domestic expenditure for research and development, the number of active subscribers of mobile radio telephone communication using the Internet access services, investment in fixed assets, foreign investment in the economy, gratuitous revenues to the consolidated budget, rate of residential and non-residential buildings commissioning.

The mathematical model of the method of principal components is as follows (4):

$$V_i = A_{i,1}F_1 + A_{1,2}F_2 + \ldots + A_{i,k}F_k + U \quad (4)$$

wherein V_i is the value of i-th variable, which is expressed as a linear combination of k common factors;

$A_{i,k}$ are the regression coefficients indicating the contribution of each of k factors in this variable;

$F_{1..k}$ are the factors, common to all variables;

U is the factor, typical of only variable V_i.[19]

The factor model shows that each variable can be represented as a sum of contributions of each of the common factors.

Each of the k factors is expressed as a linear combination of the observed variables (5):

$$F_j = W_{j,1}V_1 + W_{j,2}V_2 + \ldots + W_{j,p}V_p \quad (5)$$

wherein Wj, 1 are the loadings of j-th factor on i-th variable or factor loadings

p is the number of variables[19].

The result of the factor analysis is the formation of a matrix of initial factors that can be represented as follows (6):

$$||R|| = ||F|| \times ||F'|| \quad (6)$$

wherein $||R||$ is the reduced correlation matrix;

$||F||$ is the reduced matrix of factor loadings;
$||F'||$ is the transport matrix of factor loadings[19].

The influence object in the research is the intensity of development of the tourism industry in the regions. The variables, based on which the factors of influence are determined, are used as the indicators of the tourism infrastructure by regions.

3. Results

In the modern conditions, the tourism industry of the Russian Federation is stagnating. Over the past five years, the growth in the number of operating travel agencies in Russia has decreased by 30%, and the number of people employed in the tourism industry has significantly reduced (by 10%), whereas in 2010 it increased by 20% (Figure 1).

The decrease in the institutional base caused a sharp decline in the demand for travel services in the national tourism industry. The greatest reduction in demand is observed in 2015-49%, i.e. almost half of the volume of tourism services has not been rendered (Figure 2). At the beginning of 2015, a decrease in the scope of tour packages sold to the population was equal to 19%, which in terms of value is an increment of 3% of the sold tourist services, whereas this figure was 31% in 2010 (Figure 1).

The reduction in the national tourism industry takes place against the background of the tourism market recession in regions. According to official statistics, the volume of paid services sold in 2014 declined in half of the regions (in the Far Eastern, Volga, North Caucasus and Central Federal Districts). In addition, a stable decreasing trend is observed over the past five years (Figure 3).

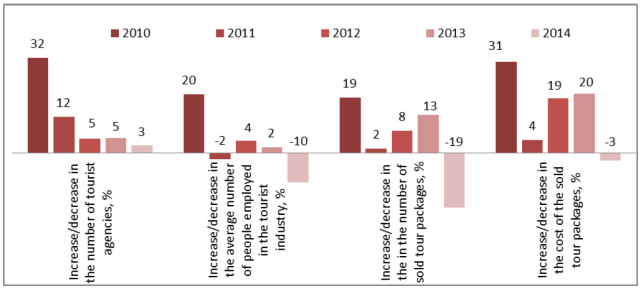

Figure 1. Key indicators of tourism development in Russia

Source: Compiled by the authors according to[25]

The stability of the negative trends in the Russian regional tourism causes the necessity of identification of primary factors for a sustainable tourism development and the most complete fulfillment of its capacity.

In the modern conditions, the level of development of the tourist industry in Russian regions is quite differentiated (Table 1). The following districts: Ural (+ 188%), Volga (+ 219%), Siberian (+265%) and the Far Eastern Federal District (+267%) are characterized by the most intensive development in 2009-2014 by the volume of paid tourist services, where the growth exceeded 150%. This increase provided a significant influx of foreign tourists in these regions within the analyzed period. In addition, these regions compared to other federal districts are distinguished by a moderate level of concentration of the tourism market, which does not exceed 70% (Table 1).

The moderate concentration of the tourism market contributes to the improvement of competitiveness, profitability and efficiency of resource use. On the contrary, the Central, North-West, North-Caucasus Federal Districts have a high concentration of the tourism industry - more than 80%.

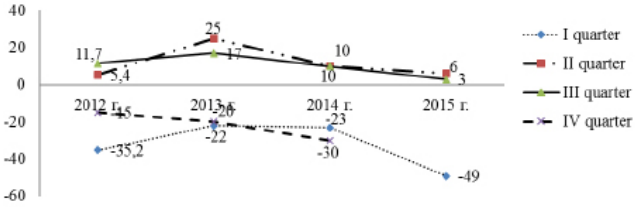

Figure 2. Indicators of the actual change in the demand for tourist services in Russia, %

Source: Compiled by the author according to[26]

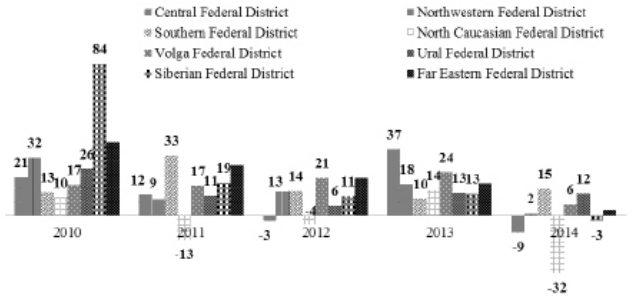

Figure 3. Increase/decrease in the volume of paid services sold by regions of Russia, %

Source: Compiled by the author according to [27]

Table 1. Performance indicators of the tourism industry by regions as of 01.01.2015.

Region	The volume of paid tourist services, million rubles.	The area of room stock, thousand sq. m.	The number of employees of travel companies	Investments in fixed capital, million rubles	The number of Russian tourists, thousand people	The number of foreign tourists, thousand people.
1	2	3	4	5	6	7
Central Federal District						
The growth rate compared to 2009, %	65	101	-6	-8	68	50
The average for the region, million rubles	2,238	174	246	412	537	123
The proportion of the volume in Russia, %	27,3	24	29	9,8	29	48
The maximum value	22204.6	1117	6760	3171	2448	1827
The minimum value	126,1	38	130	0,9	109	4,5
The level of concentration, %	83	85	87	89	84	89
Northwestern Federal District						
The growth rate compared to 2009, %	66	102	-3	71,6	37	24
The average for the region, million rubles	1628.3	114	463	650	384	102
The proportion of the volume in Russia, %	12,01	10	11	9	13	24
The maximum value	8804.1	655	1763	3257	1940	901
The minimum value	134.7	3,6	13	2,6	17	0,3
The level of concentration, %	90,6	84	88	92	80	87
Southern Federal District						
The growth rate compared to 2009, %	116.7	101	30	131	40	220
The average for the region, million rubles	1654.8	500	890	1168	802	62
The proportion of the volume in Russia, %	6.7	23	12	7	14	8
The maximum value	5290.5	2575	2379	5367	3649	289
The minimum value	72.3	11.6	22	19.7	30	2.4
The level of concentration, %	70.4	72	77	78	79	70
North Caucasian Federal District						
The growth rate compared to 2009, %	69	74	48	168	22	22
The average for the region, million rubles	658.8	93	136	100	164	6
The proportion of the volume in Russia, %	3.1	5	2	0.4	4	0.9
The maximum value	1304.4	459	95	198	803	35
The minimum value	35.4	2.1	10	2.6	8.5	0.08
The level of concentration, %	93	90	78	97	87	86
Volga Federal District						
The growth rate compared to 2009, %	219	92	27	29	35	75
The average for the region, million rubles	1885	131	557	125	408	17
The proportion of the volume in Russia, %	18	14	17	2	17	5
The maximum value	7243.8	314	1340	542	1257	54
The minimum value	522.6	35.1	147	0.2	95	1.2
The level of concentration, %	63	59	67	68	60	66

(*Continued*)

Ural Federal District						
The growth rate compared to 2009, %	188.4	97	50	16	29	92
The average for the region, million rubles	4516	154	773	235	548	35
The proportion of the volume in Russia, %	15	7	8	1.5	8	4
The maximum value	13616	326	1435	653	982	84
The minimum value	269	41.3	64	20	103	3
The level of concentration, %	64.5	66	66	68	66	69
Siberian Federal District						
The growth rate compared to 2009, %	265	92	36	278	24	90
The average for the region, million rubles	1570	94	516	291	293	17
The proportion of the volume in Russia, %	13	9	14	5	11	5
The maximum value	20.4	162	1176	1450	547	53
The minimum value	4377	9.2	34	4	42	1
The level of concentration, %	66	66	70	69	57	69
Far Eastern Federal District						
The growth rate compared to 2009, %	267	105	-4	287	6	-11
The average for the region, million rubles	186	58	256	281	169	20
The proportion of the volume in Russia, %	5	4	5	2	5	4
The maximum value	1882.5	229	609	1646	488	98
The minimum value	62.4	2.7	6	0.3	9	0.4
The level of concentration, %	66.8	67	68	67	61	64
Crimean Federal District						
The growth rate compared to 2009, %	-	-	-	-	-	-
The average for the region, million rubles	162.1	359	373	-	221	40
The proportion of the volume in Russia, %	0.2	6	2	-	1	2
The maximum value	253.7	656	540	-	413	76
The minimum value	70.5	61	205	-	29	3
The level of concentration, %	78	92	73	-	93	96

Source: Compiled by the author according to[1,26,27]

Despite the high effectiveness of tourism (as evidenced by the proportion in Russia's volume, the total square of rooms and total volume of paid tourist services) the rate of development in some of these areas is low. Thus, for example, tourism in the Central and North-Western Federal Districts is concentrated almost exclusively in Moscow and St. Petersburg, and in the North Caucasus - in the Stavropol region. The intensity of the tourism development in these regions of Russia does not exceed 70% over the past five years.

The decrease in the level of the tourism industry concentration to 70–80% evidences an increase in the pace of its development. The Southern Federal District is an example of this pattern.

Thus, the data of Table 1 give reasons to conclude that the lower the level of concentration of the tourism market in Russia's regions is, the more intensive is the pace of its development.

The fundamental factor of concentration of the tourist market is the tourism infrastructure, which reflects the tourism environment and defines the possibility of its development in the region[15,20,21]. With account of the identified characteristics of the regional tourism, it seems appropriate within the study to allocate the priority factors of the tourism infrastructure, ensuring the development of tourism with account of its efficiency level.

To determine the key factors of the tourism industry development, regions of Russia are differentiated into clusters by the indicators of functional efficiency of tourism. As a result of mathematical transformations (Formulas 1, 2, 3), three groups of clusters of Russian regions were formed (Table 2).

Table 2. Results of clustering regions of Russia by the functional effectiveness of the tourism industry

Cluster 1 (high tourism effectiveness)	Cluster 2 (average tourism effectiveness)	Cluster 3 (low tourism effectiveness)
Moscow	Vladimir Oblast	Belgorod Oblast
St. Petersburg	Moscow Oblast	Voronezh Oblast
Krasnodar Krai	Republic of Karelia	Ivanovo Oblast
Republic of Altai	Republic of Komi	Kaluga Oblast
Murmansk Oblast	Arkhangelsk Oblast	Kostroma Oblast
Sakhalin Oblast	Vologda Oblast	Kursk Oblast
	Kaliningrad Oblast	Lipetsk Oblast
	Bashkortostan	Orel Oblast
	Perm Krai	Ryazan Oblast
	Nizhny Novgorod Oblast	Smolensk Oblast
	Sverdlovsk Oblast	Tambov Oblast
	Tyumen Oblast	Tver Oblast
	Chelyabinsk Oblast	Tula Oblast
	Krasnoyarsk Krai	Yaroslavl Oblast
	Kemerovo Oblast	Leningrad Oblast
	Novosibirsk Oblast	Novgorod Oblast
	Tomsk Oblast	Pskov Oblast
	Primorsky Krai	Astrakhan Oblast
	Khabarovsk Krai	Volgograd Oblast
	Amur Oblast	Rostov Oblast
		Karachay-Cherkess Republic
		Stavropol Krai
		Mari El Republic
		Republic of Mordovia
		Republic of Tatarstan
		Udmurt Republic
		Chuvash Republic
		Kirov Oblast
		Penza Oblast
		Samara Oblast
		Saratov Oblast
		Kurgan Oblast
		Republic of Buryatia
		Tyva Republic
		Republic of Khakassia
		Altai Oblast
		Irkutsk Oblast
		Omsk Oblast
		Republic of Sakha (Yakutia)

Source: Compiled by the author according to[26]

The first cluster is formed from six territorial units. These regions are characterized by the best tourism effectiveness, as they have a well-developed tourist environment; effectively use tourism resources and have a significant impact on the economic development of the region.

The second cluster consists of 20 regions and is characterized by lower effectiveness of the tourism market in the region compared to the regions of the first cluster. It is characterized by a moderate level of tourism development, but the included regions have a sufficient potential for its progressive evolution with an effective marketing strategy.

The third cluster of the tourism efficiency includes 39 regions of Russia. These regions are characterized by the lowest level of functional effectiveness of tourism and poorly developed tourist environment.

This approach to grouping regions will allow identifying the key factors in the development of the tourism market, which is inherent in each cluster of tourist effectiveness. The adequacy and accuracy of the results obtained in the process of regions' clustering by the effectiveness of tourism indicators are confirmed through a variance analysis in the STATISTICA 8.0 software package. It was determined that the intergroup variance exceeds the intragroup one for each indicator of the tourism effectiveness. The value of the F-criterion (F) is more than the table value (the table value for Fisher's criterion of degrees of freedom (df) is equal to 2.76). The level of the r-error does not exceed 0.05. The statistical characteristics show the relevance and adequacy of the formed clusters in terms of the tourism efficiency in the regions of Russia.

To determine the key indicators of the tourism infrastructure, which predetermine the development of tourism in the region by the method of principal components (Formula 4, 5, 6), the priority factors of tourism infrastructure in the region were identified.

The sampling of indicators of the tourism infrastructure as a factor of the tourism industry development in the regions was formed by the literary communication[9,22-24]. Annexes A, B and C contain the results of factor loadings of the structural components of the tourism infrastructure on the intensity of the tourism development by the clusters of tourist effectiveness of the Russian regions.

5. Discussion

The main factors of the tourism infrastructure were identified based on the results of the principal component

analysis, determining the intensity of the tourism development in the regions of Russia, according to its functional effectiveness.

The investment and innovation factor (Factor 1), the cumulative variance of the effect of which is equal to 52.17% (Table 3; Figure 4), has a decisive meaning in ensuring a sustainable development of the tourism industry in the regions of Cluster 1. In other words, we can state that today ensuring an influx of the investment capital into the economy of the region and in particular in the tourism sector will contribute to a reduction in the concentration in the regions of Cluster 1. And active implementation of innovative technology will determine the increase of the tourism reproductive performance.

Such a component as the growth rate of revenues of the consolidated regional budget (Figure 4) was allocated in Factor 1. Since this indicator is included in the most

Table 3. The eigenvalues of the principal components of the tourism infrastructure in the regions of Cluster 1 according to the degree of their influence on the tourism development.

Eigenvalues Extraction: Principal components				
№	Eigenvalue	% Total - variance	Cumulative - Eigenvalue	Cumulative - %
1	9.39	52.17	9.39	52.17
2	2.97	16.50	12.36	68.67
3	2.44	13.56	14.80	82.23
4	1.77	9.83	16.57	92.06

Source: Calculated by the author according to[1,26,27]

Indicators	Factors	Variance factor	The total variance of factors
Expenses on information and communication technology, million rubles Domestic costs of research and development, million rubles The number of active subscribers of mobile telephone services, using Internet access services, thousand people Investment in fixed assets, million rubles Foreign investment in the economy, thousand US dollars Innovative activity of organizations, % Budget revenues, %	Factor 1	52.17 %	92.06 %
Level of prices for transport, % Paid services to population, % Monthly averaged nominal wage of an employee, %	Factor 2	16.50 %	
Density of railway lines, km per 10,000 km2 of territory The Density of hard-coated highways of general use, km per 10,000 km^2 of territory Commissioning of residential and non-residential buildings, pcs	Factor 3	13.56 %	
Depreciation of capital assets, % Gratuitous receipts in the consolidated budget, million rubles	Factor 4	9.83 %	

Figure 4. The content of factor loadings of the tourism infrastructure in Cluster 1 Russia's regions on the tourism development intensity.

Source: Compiled by the author according to[1,26,27]

significant factor influencing the development of tourism in these regions, its presence can explain the significant impact of tourism industry on the region's economic development. This statement of a fact is confirmed by the rather high level of tourism effectiveness in the regions under study, as witnessed by the results of the cluster analysis.

An important factor in the development of tourism in the regions of Cluster 1 is the pace of development of the services sector and the level of welfare of the population (Factor 2). The level of influence of Factor 2 is equal to 16.5%. These factors have a directly proportional impact on the rate of tourism development in the regions. And such an indicator as the level of prices for transportation is a limiting reverse factor. The impact of the development of a transport and institutional infrastructure (Factor 3) on the tourism development in regions with a high level of effectiveness is equal to 13.56%. In particular, the significance of this factor in modern conditions manifests itself when determining the intensity of tourism in the Altai Republic, Murmansk Oblast and Sakhalin Oblast.

An important indicator of the tourism infrastructure, influencing the tourism development in the regions of Cluster 1 (9.83%) is the level of depreciation of fixed assets of the sector and the level of its financial state support (Factor 4). Today, the depreciation of fixed assets of the tourism sector in Cluster 1 regions is much lower than in other regions, and equals to 11% approximately[25]. Besides, tourism in these regions is an attractive sector in terms of investment that diminishes its acute dependence on government subsidies.

Thus, the determined four main components of the tourism sector of Cluster 1 cumulatively determine the capacity of tourism development in these regions at 92.06% (Table 3; Figure 4). It can be noted that the priority in the reduction of the tourism market concentration, as a factor of ensuring intensive development of the tourism sector in Cluster 1 region should be the investment and innovative support of the sector and the intensification of the service sector development against the background of the growth of population welfare in the region. The cumulative variance of these factors in the development of tourism in the regions of this cluster amounts to 68.67% (Table 3).

Cluster 2, as already mentioned, is formed by regions with lower efficiency of the tourism sector, than the regions of the first cluster. As a result of a principal component analysis (factor analysis), the transport infrastructure is a key factor, determining 37.19% of the tourist industry

development in these regions. Ensuring a stable rail and road communication can unveil the tourist capacity of the regions and provide their sustainable economic development.

An important component of tourism development in the regions is the investment and innovation factor, and renewal of fixed assets of the tourism industry (Factor 2). The level of its impact on the state of tourism is 31.24%. It should be noted that Factor 2 is practically equal in significance to Factor 1; their cumulative effect on the intensity of the development of the tourism sector in the regions is equal to 68.43%.

The price level in the transport infrastructure, public funding and the level of welfare of the population in the region have a significant impact on the regional tourism. Factor 3 contributes to the development of tourism regions of Cluster 2 by 15.75 %. And this figure of the tourism sector such as the growth rate of revenues of the consolidated regional budget (factor 4) indicates a rather low influence of tourism on the revenue generation in the regions (5.03%). This is due to its weak functional effectiveness.

The cumulative variance of the selected four principal components of the tourism sector in the regions of Cluster 2 is 89.21% of the impact on the tourism development (Table 4; Figure 5).

Based on the above, it can be stated, that first and foremost, it is necessary to ensure the quality of the transport infrastructure for the intensity of the tourist development in the regions of Cluster 2. The innovative activity sector should be enhanced against the background of increasing its investment appeal and ensuring renewal of fixed assets. It is provision of an adequate level of these factors that is a priority in the development of the tourism sector in the regions of Cluster 2.

The lowest efficiency of the tourism industry is present in regions of Cluster 3, in which the priority of the impact on the tourism development of the factors of its infrastructure can be traced. Therefore, the condition and pricing of transport infrastructure, the level of population welfare and financial support of the state (Factor 1) have the greatest influence on the tourism development (40.77%). The tourism sector in these regions depends by 20.64% on the condition of the main funds of the sector (Factor 2) and by 19.26% on the investment and innovation factors (3). Only 4.51% of tourism efficiency affects the profitability of the region's budget (Factor 4), which indicates the need to ensure a high level of functionality of all the factors of the tourism infrastructure in order to provide an intensive development of tourism in the region. (Table 5; Figure 6).

Table 4. The eigenvalues of the principal components of the tourism infrastructure in the regions of Cluster 2 to the degree of their influence on the tourism development.

Eigenvalues Extraction: Principal components				
	Eigenvalue	**% Total - variance**	**Cumulative - Eigenvalue**	**Cumulative - %**
1	7.55	37.19	7.55	37.19
2	6.34	31.24	13.89	68.43
3	3.20	15.75	17.09	84.18
4	1.02	5.03	18.11	89.21

Source: Calculated by the author according to [1,26,27]

Factor 1	Factor 2	Factor 3	Factor 4
1. The density of railways, km per 10000 km^2 of territory. 2. The density of hard-coated highways of general use, km per 10000 km^2 of territory.	1. Innovative activity of organizations, % 2. Expenses on information and communication technologies, million rubles. 3. Domestic costs of research and development, million rubles 4. The number of active subscribers of mobile telephone communications, using Internet access services, thousand people 5. Investments in fixed assets, million rubles 6. Foreign investment in the economy, thousand US dollars 7. Commissioning of residential and non-residential buildings, pcs. 8. Depreciation of capital assets, %	1. The level of prices for transport, % 2. Paid services to population, % 3. Monthly averaged nominal wage per employee, % 4. Gratuitous receipts in the consolidated budget, million rubles	1. Budget revenues, %
37.19 %	31.24 %	15.75 %	5.03 %
Total variance of factors is 89.21 %			

Figure 5. The content of factor loadings of the tourism infrastructure of Russian regions of Cluster 1 on the tourism development intensity.

Source: Compiled by the author according to[1,26,27]

Table 5. The eigenvalues of the principal components of the tourism infrastructure in the regions of Cluster 3 by the degree of their influence on the tourism development.

Eigenvalues Extraction: Principal components				
	Eigenvalue	**% Total - variance**	**Cumulative - Eigenvalue**	**Cumulative - %**
1	9.79	40.77	9.79	40.77
2	4.95	20.64	14.74	61.41
3	4.62	19.26	19.36	80.67
4	1.08	4.51	20.44	85.18

Source: Calculated by the author according to[1,26,27]

Indicators	The density of railway lines, km per 10000 km^2 of territory. The density of highways with a dense coating of general use, km per 10000 km^2 of territory The level of prices for transport, % Paid services to population, % Monthly averaged nominal wage per employee, % Gratuitous receipts in the consolidated budget, million rubles	Factor 1 (40.77 %)	The total variance of factors (85.18 %)
	Commissioning of residential and non-residential buildings, pcs. Depreciation of capital assets, %	Factor 2 (20.64 %)	
	Investments in fixed assets, million rubles Foreign investment in the economy, thousand US dollars Expenses on information and communication technologies, million rubles. The number of active subscribers of mobile telephone communications, using Internet access services, thousand people Domestic costs of research and development, million rubles Innovative activity of organizations, %	Factor 3 (19.26 %)	
	Budget revenues, %	Factor 4 (4.51 %)	

Figure 6. The content of the factor loadings of the tourism infrastructure in the regions of the Russian Federation of Cluster 3 on the intensity of tourism development.

Source: Compiled by the author according to[1,26,27]

6. Conclusion

Thus, the assessment of the impact of the priority components of the tourism infrastructure is differentiated in terms of the effectiveness of tourism in regions allowing designating the determinants of the tourism development. Justification of the fact that investment and innovation factors are a basic component of the tourism development in regions with the highest level of its effectiveness, improving productivity, primarily investment and innovation, will contribute to the process of deconcentration of the tourism market in these regions. The intensity of the tourism development in the regions with a medium level of efficiency of the sector will depend on taking into account the priority of influence of factors of the transport infrastructure, innovative activity, as well as on the improvement of the investment attractiveness and the reproduction of fixed assets. Primary provisioning of an adequate level of the transport infrastructure, strengthening of public finance and total renewal of fixed assets of the tourism sector will ensure the progressive development of regions with low efficiency of the tourism market.

The ability to determine the quantitative level of priority of the impact of factors of the tourism infrastructure on the tourism development in regions is an advantage and an indicator of novelty of the presented conceptual approach. It provides an opportunity to obtain objective and reliable data regarding the tourism development in regions in view of the existing effectiveness capacity. It helps to optimize the regional policy in improving the efficiency of tourism as a factor of the economic development of the region It utilizes subjectivism and pragmatism of qualitative approaches to the substantiation of the tourism sector development trends.

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Annex A

Table A1. The values of the factor loadings of indicators affecting the development of the tourism sector in regions of Cluster 1.

Factor Loadings (Varimax raw) Extraction: Principal components (Marked loadings are >,650000)				
	Factor - 1	**Factor - 2**	**Factor - 3**	**Factor - 4**
The level of prices for transport, %	0.010253	0.735395	0.095118	0.322244
Paid services to the population, %	0.116203	0.858396	0.183306	–0.073097
Budget revenues, %	0.809942	0.002602	0.032844	0.049066
The average monthly nominal wage per employee,%	0.164559	0.842948	0.202071	0.541499
The density of railway lines, km per 10000 km^2 of territory.	0.139377	–0.192881	0.773274	0.250738
The density of highways with a dense coating of general use, km per 10000 km^2 of territory.	0.229789	–0.110815	0.741697	–0.235300
The costs of information and communication technologies, million rubles	0.949576	0.002982	0.130100	0.094336
Depreciation of fixed assets, %	–0.164294	0.032753	0.147665	0.754682
Innovative activity of organizations, %	0.772162	–0.144483	0.270114	0.088307
Gross domestic expenditure on research and development, million rubles	0.830122	–0.137998	–0.065408	0.195631
The number of active subscribers of mobile radio-telephone communication services using Internet-based access, thousand people	0.807391	0.138757	0.056825	–0.092222
Investments in fixed capital, million rubles	0.938478	0.008935	0.100742	0.036409
Foreign investment in the economy, thousand US dollars	0.701246	–0.336700	–0.246055	0.307011
Gratuitous receipts in the consolidated budget, million rubles	0.549412	0.458042	–0.132597	0.712542
Commissioning of residential and non-residential buildings, pcs.	0.175320	–0.041603	0.696455	–0.237069

Source: Calculated by author according to[1,26,27]

Annex B

Table B1. The values of the factor loadings of indicators affecting the development of the tourism sector in regions of Cluster 2

Factor Loadings (Varimax raw) Extraction: Principal components (Marked loadings are >,650000)				
	Factor - 1	**Factor - 2**	**Factor - 3**	**Factor - 4**
The level of prices for transport, %	–0.144353	–0.129530	0.682352	0.058254
Paid services to the population, %	–0.183551	0.141988	0.698275	0.095292
Budget revenues, %	–0.161219	0.034792	–0.136083	0.849879
The average monthly nominal wage per employee, %	0.295941	0.026569	0.708902	–0.317673
The density of railway lines, km per 10000 km^2 of territory	0.983147	0.019428	–0.245780	–0.098677
The density of highways with a dense coating of general use, km per 10000 km^2 of territory	0.970810	0.058483	–0.260373	–0.198756
The costs of information and communication technologies, million rubles	0.606436	0.677382	0.085767	0.375129
Depreciation of fixed assets, %	–0.055429	–0.661736	0.169037	0.073907
Innovative activity of organizations, %	0.128662	0.685716	0.157058	0.205541
Gross domestic expenditure on research and development, million rubles	0.622507	0.703709	–0.077459	0.156240
The number of active subscribers of mobile radio-telephone communication services using Internet-based access, thousand people	–0.194144	0.718729	0.174320	0.600674
Investments in fixed capital, million rubles	0.180422	0.677457	0.173620	0.150093
Foreign investment in the economy, thousand US dollars	0.444386	0.661902	–0.163796	0.007385
Gratuitous receipts in the consolidated budget, million rubles	0.554062	–0.187239	0.702023	–0.111055
Commissioning of residential and non-residential buildings, pcs.	0.519763	0.707944	0.010802	0.431931

Source: Calculated by author according to[1,26,27]

Annex C

Table C1. The values of the factor loadings of indicators affecting the development of the tourism sector in regions of Cluster 3

Factor Loadings (Biquartimax raw) Extraction: Principal components (Marked loadings are >,650000)				
	Factor - 1	**Factor - 2**	**Factor - 3**	**Factor - 4**
The level of prices for transport, %	0.910870	0.633291	0.105508	0.323781
Paid services to the population, %	0.954838	0.456268	0.194238	–0.071972
Budget revenues, %	–0.004010	0.000256	0.032892	0.949116
The average monthly nominal wage per employee,%	0.970336	0.039493	0.200637	0.540508
The density of railway lines, km per 10000 km^2 of territory	0.987082	–0.596727	0.260152	0.248089
The density of highways with a dense coating of general use, km per 10000 km^2 of territory	0.936023	–0.415692	0.028710	–0.538347
The costs of information and communication technologies, million rubles	0.051648	0.604099	0.720034	0.088795

(*Continued*)

Depreciation of fixed assets, %	–0.155131	0.961306	0.049948	0.055833
Innovative activity of organizations, %	0.272401	–0.154707	0.664785	0.086285
Gross domestic expenditure on research and development, million rubles	0.231031	–0.534358	0.677247	0.189904
The number of active subscribers of mobile radio-telephone communication services using Internet-based access, thousand people	0.306891	0.141153	0.669245	–0.097187
Investments in fixed capital, million rubles	0.539792	0.610930	0.689719	0.030302
Foreign investment in the economy, thousand US dollars	0.401452	–0.331173	0.659203	0.301686
Gratuitous receipts in the consolidated budget, million rubles	0.944757	0.462410	–0.132483	–0.215123
Commissioning of residential and non-residential buildings, pcs.	0.374981	0.979186	0.085489	–0.242868

Source: Calculated by author according to[1,26,27]