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A Cluster Analysis of Tourist Sites in the Regions of Kazakhstan

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Abstract:

Natural and cultural sites is a basic elements of tourism development in all over the world. Kazakhstan has a significant number of objects of nature reserve fund and the historical and cultural heritage, which, along with the development of health-improving, ecological, ski tourism, also contribute to the development of ethnographic, gastronomic, cultural and educational and other types of tourism. The purpose of the study is to identify traits of the most attractive tourist destinations, as well as to study the degree of importance of natural, cultural and dual (natural and cultural) sites for target consumers. In this regard, a comparative analysis of the level of tourism development in 14 regions of Kazakhstan was carried out, using a two-step cluster analysis, the degree of significance of three types of sites for target consumers was determined. The findings of the analysis suggest that the Akmola, Almaty, East Kazakhstan and Karaganda regions are in the greatest demand among tourists. Along with this, natural sites are the most important determinants of tourism, cultural sites are the least important. Thus, tourists in Kazakhstan are more attracted by regions with a rich natural reserve fund than by historical and cultural heritage. In this regard, it is proposed to pay more attention to promoting the cultural sites of Kazakhstan. To the authors' knowledge, this is the first study that analyses 14 regions of Kazakhstan according to their basic tourism characteristics, identifies attractions that are underutilized, and proposes strategies to identify opportunities for the tourism industry in Kazakhstan. In this regard, its results can be very useful in justifying the feasibility of implementing the relevant regional initiatives and making a decision to reorient the efforts of interested government agencies to develop alternative types of tourism.

Keywords: cluster analysis; tourist sites; regions of Kazakhstan; Silk Road; tourist potential; promotion of tourist destinations.

JEL Classification: C38; L83; O18.

Introduction

Over the past 6 decades, the world has seen an almost non-stop growth in tourism. Gradually, tourism in many countries is becoming a driver of socio-economic development through the creation of jobs and enterprises, the export of services and the development of infrastructure.

In 2019, in the rating of the countries of the world in terms of the competitiveness of travel and tourism of the World Economic Forum, which is published every two years, Kazakhstan took 80th place out of 140 countries of the world, improving its position in comparison with previous ratings (2017 – 81st place, 2015 – 85th place).

In terms of the components of "natural resources', the country ranks 89th (2017 – 92nd), including in terms of the number of natural World Heritage sites – 32nd (2017 – 30th), "Cultural resources and business travel – 65th place (2017 – 75th place), including by the number of objects of oral and intangible cultural heritage – 16th

place (2017 – 22nd place), in terms of the number of cultural World Heritage sites – 62nd place (2017 – 61st place) (World Economic Forum. The Travel & Tourism Competitiveness Report 2019), which indicates a high potential for tourism development in the republic.

The purpose of the study is to identify the characteristic features of the most attractive tourist destinations in Kazakhstan, as well as, using a two-step cluster analysis, to determine the degree of importance of natural, cultural and dual (natural and cultural) sites for target consumers. This will allow reorienting the efforts of national and regional tourism administrations towards additional promotion of sites that are not used to a sufficient extent, which, in turn, will open up significant opportunities for the further development of the tourism industry in Kazakhstan.

1. Literature Review

A literature review for the period from 1984 to 2021 showed the widespread use of cluster analysis in the research of the tourism and recreation industry at different levels of the economy.

The main directions of using cluster analysis are:

- classification of tourist destinations and facilities according to the level of competitiveness and development of tourist potential;
- zoning of tourist destinations based on the model of visitor behavior, segmentation of the tourist services market;
- studies of the perception of the local population (different communities) of tourism and events.

In particular, in the work of Gooroochurn and Sugiyarto (World Economic Forum. The Travel & Tourism Competitiveness Report 2019, 25-43) discusses an approach to measuring the competitiveness of tourism for more than 200 countries using eight key indicators - price, openness, technology, infrastructure, tourism, social development, environment and human resources. Cluster analysis is used to group tourist destinations according to their level of performance. Wang (2020, 1065-1069) based on cluster analysis by the method of their nearest neighbors, carried out a study of the features of tourist resources in the coastal tourism market. In another study, Vasiliadis and Kobotis (1999, 141-148) applied the nearest neighbor's method to analyze the clustering of tourist attractions in Macedonia. Based on the results worked out proposals on how best to develop tourism in the vicinity of Prespes. Lascu *et al.* (2018, 218-230) identifies the features of the most popular destinations in Spain and the relative value of natural, cultural and historical attractions for tourists. Perles-Ribes *et al.* (2020, 764-773) using cluster analysis of a wide range of indicators related to tourism activities carried out a classification of tourist destinations of 60 coastal destinations and 482 inland municipalities of the Valencia region in Spain. Rodriguez and Hernandez-Martin (2020, 2019, 185-206) reviewed the most relevant literature on the delineation of functional areas for management in the field of social sciences and proposed a methodology for application in the field of tourism. Analyzed the characteristics of motion of the leading tourist district of the Region of Spain - the Canary Islands and carried out verification of the hypothesis about the ability of a statistically methodsgive the best or other results than the consensus of experts from the point of view of internal homogeneity destinations and differences between them. Limonina (2007, 117-127) with the help of cluster analysis conducted typological study of the Leningrad region and identified intra-district variations in the level of development of the infrastructure tourist potential of this territory. Blasco *et al.* (2014, 51-67) based on historical research method analyze the effect of changing the borders between Mexico, United States, Guatemala and Belize on the development of historical and cultural tourism. Further, using cluster analysis, a number of cross-border clusters and corridors in these areas with different levels of tourism underdevelopment mainly due to political or legal constraints were identified.

In another article Blasco *et al.* (2014, 512-528) made an attempt to zonate tourist destinations based on the behavior model of visitors to the Iberian Mountain region, which, relying on the time distances between attractions, combines a geographic information system and methods of hierarchical cluster analysis. Ditton *et al.* (1975, 282-295) held two cluster analyses, using a sample of 250 people from a database describing the patterns of water recreation of 2174 the heads of households in northeastern Wisconsin. The first is based on the frequency of their participation in eight form ah physical activity, the second – on the 23 variables, type of environment combining with frequency of activity. Weaver and Lawton (2005, 211-220) studied the strengths and weaknesses of cluster analysis as a method of market segmentation using the example of the ecotourism market in Lamington (Queensland, Australia).

Derek *et al.* (2019, 509-521) based on cluster analysis and in combination with spatial and economic analysis, a typology of tourists visiting the territory of the Great Mazury Lakes in Poland according to the types of outdoor activities was carried out. Mazanec (1984, 17-21) on the visual empirical examples, taken from the inside of Austrian tourist services market, described cluster-analytical approach to segmentation benefits. The results

show that some segment-level benefits are incompatible with each other, and that the "average' resting person may only be a statistical artifact. Research of Arimond and Elfessi (2001, 391-397) is devoted to the search for the statistical method of clustering, which can use the data of a widely used qualitative (categorical) research tool in the segmentation of the tourist market. First, for the spatial display of each of the attributes, the analysis of multiple correspondence of data obtained from the results of a survey of 229 tourists placed in the bed & breakfast system was used, and then, to determine the market segments, cluster analysis was used. It is believed that this method may be more practical in the field of applied tourism research.

Research on the market for traveling friends and family, which has been growing in the past decade, has focused on the demand side (tourists) while ignoring the supply side (local community). Research by Young, Corsun, Baloglu (2007, 497-516) fills this gap in the literature, analyzing the characteristics and behavior of local people. Fredline and Faulkner (2000, 763-784) on the basis of the theory of social representations and compare results of the study with the results of the previous clusteranalysis revealssome similarity in the perception of the local population of tourism and events in different communities. Gu *et al.* (2021, 1-19) empirically assess resident perceptions of tourism development around the Changbai Mountain Biosphere Reserve (CMBR), a protected area straddling the China and North Korea border. Several theoretical approaches to the assessment of local resident attitudes towards tourism were reviewed and integrated into a novel factor-cluster assessment of residents in Erdaobaihe, the community most adjacent to CMBR.

Along with this, it is necessary to single out a separate group of studies devoted to the development of tourism from the point of view of the theory of clusters and agglomeration.

As an example, Alexandrova (2007, 51-61), Rudchenko (2016, 12-18) highlighted the problematic issues of formation and functioning of clusters in tourism, including the definition of the essence of the cluster and its types, the characteristics of the formation of clusters in tourism, classification of tourism clusters and methods of evaluation of the cluster activities. In another study Zhou *et al.* (2016, 603-616) studied the influence of agglomeration tourist sights on the regional tourism economy, using empirical data. Waits (2000, 35-50) by the example of Arizona present the practical evidence of the benefits of cluster economic analysis and strategy development and that are evidence of the fact that the form of economic policy and practice change considerably. Gurieva and Sozieva (2009, 72-80) investigated the problems and prospects of creating a macro-regional tourist and recreational cluster in the Southern Federal District. Jackson and Murphy (2006, 1018-1035) explored the applicability of cluster theory to support the movement from comparative advantage to competitive advantage in four regional cities located on the Murray River in Australia. In the article by Michael (2003, 133-145) based on the experience of Australian rural cities, the concept of clustering in a micromarket model that meets global competition requirements is explained. The focus is on creating economic and social opportunities in small communities through the development of clusters of complementary firms that can collectively provide a set of attributes to create specialized regional tourist products. In the article by Dunets (2011, 37-44), the model of the tourist cluster is presented in a combination of 5 basic complexes and their functional blocks, including tourist, service-backbone, production, social-service and natural resources and conditions. The author proposes to carry out the process of forming a tourist cluster in 7 successive stages, from determining its structure to creating conditions for effective management and self-regulation. The valley of the Katun River in the Altai region is cited as the main example of the possible creation of a tourist cluster. In the article by Kurchenkov *et al.* (2016, 7-13) describes the positive characteristics of the cluster model of the organization of the tourist complex, special attention is paid to the study of the issues of typology and classification of clusters in the field of tourism, including their basic principles, criteria and structure. Kostryukova and Karpova (2011, 374-378) proposed a methodological approach to identifying a tourist cluster based on quantitative and qualitative assessments.

On the results of the study of foreign studies should be noted that during this period the cluster analysis mainly conducted in regions with developed tourism industry (Spain, Greece, USA, Mexico, Australia). In countries where the tourism industry is in the process of formation and development, including the Commonwealth of Independent States (CIS), more attention is paid to study tourism development from the point of the cluster theory.

Meanwhile, taking into account the awareness of the socio-economic importance of tourism in emerging markets and the need to develop practical tools for assessing the effectiveness of measures taken to develop this industry, it is obvious that the scope of cluster analysis should be expanded.

2. Methodology

Tourist sites in Kazakhstan include many natural and historical and cultural monuments, as well as monuments of both natural and historical and cultural value.

Data from the State List of Historical and Cultural Monuments of Republican Significance (Order of the Minister of Culture and Sports of the Republic of Kazakhstan No. 88 2020), the List of Objects of the State Natural Reserve Fund of Republican Significance (Decree of the Government of the Republic of Kazakhstan No. 932 2006) were used as sources of information for the analysis.

Statistical data on the average number of bed-days provided to tourists in each of the 14 regions of Kazakhstan for the period from 2015 to 2019 were used as categorical variables (Tourism of Kazakhstan 2016; Tourism of Kazakhstan 2017; Tourism of Kazakhstan 2018; Tourism of Kazakhstan 2019; Tourism of Kazakhstan 2020). The specified period of time was not chosen by chance. In 2015 the Government of the Republic of Kazakhstan began to take active measures to develop the tourism sector. So, in 2017, in accordance with the established procedure, by a government decree, the Concept for the Development of the Tourism Industry [35] was approved, and two years later, the corresponding State Program (Decree of the Government of the Republic of Kazakhstan No. 360 2019), in the context of regions, approved roadmaps for the development of tourism. In addition, in 2017, the international specialized exhibition EXPO-2017 was held in the capital.

Table 1. Initial data on indicators in the context of regions

Region	Number of objects of the nature reserve fund, units	Number of cultural and historical sites, units	The number of objects of special natural, historical and cultural value, units	Total amount, units	Number of bed-days provided
Akmola	34	4	20	58	615381,4
Aktobe	12	9	19	40	267224,6
Almaty	8	12	14	34	911367,8
Atyrau	3	4	0	7	399237,0
West Kazakhstan	3	7	25	35	318346,2
Zhambyl	10	30	2	42	202151,2
Karaganda	21	23	14	58	607479,6
Kostanay	10	5	3	18	343409,8
Kyzylorda	7	30	3	40	119021,4
Mangystau	0	20	25	45	299365,2
Pavlodar	10	3	16	29	312504,4
North Kazakhstan	8	8	15	31	190262,2
Turkistan	2	31	26	59	371823,8
East Kazakhstan	13	21	24	58	1095946,0

Source: Decree of the Government of the Republic of Kazakhstan No. 932 2006; Order of the Minister of Culture and Sports of the Republic of Kazakhstan No. 88 2020; Tourism of Kazakhstan 2016; Tourism of Kazakhstan 2017; Tourism of Kazakhstan 2018; Tourism of Kazakhstan 2019; Tourism of Kazakhstan 2020

Table 1 shows data on the number of objects (natural, cultural and double) and bed-days provided for each of the 14 regions of Kazakhstan, which were used to conduct two different types of analysis.

At the beginning, 14 regions were divided into four categories according to the number of tourist sites (above average - below average) and the number of bed-days provided (above average - below average) using the arithmetic average:

$$\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i \qquad 2.1$$

Then, using the computer program for statistical data processing 'SPSS Statistics', a two-step cluster analysis was carried out for categorical variables with an estimate of the distance based on the likelihood function and the choice of the optimal number of clusters by minimizing the Akaike information criterion (hereinafter - AIC) (Berikov, Lbov 2008; Mandel 1988; Jain 2010).

This approach assumes that for a given statistical model, if k is the number of estimated parameters in the model, and L is the maximum value of the likelihood function for the model, then the AIC value of the model will be as follows [1, 7] (Akaike 1974; Burnham, Anderson 2002):

$$AIC = 2k - 2\ln(L), \qquad 2.2$$

Given the available set of candidate variable models, the model with the lowest AIC value is most preferred. Thus, the AIC rewards the quality of fit (as assessed by the likelihood function), but also includes a penalty that is an increasing function of the number of parameters being assessed. The penalty prevents

overfitting because increasing the number of parameters in the model almost always improves the quality of the fit.

3. Case Studies

The average number of tourist sites in the regions was calculated at 39.57. Thus, regions with 39 or fewer properties are classified as below average, while regions with 40 or more properties are classified as above average.

Next, we calculated the average number of bed-days provided for 14 regions for the period from 2015 to 2019. The average number of bed-days provided was 432.4 thousand. Thus, regions with more than 432.4 thousand bed-days provided were classified as above average, while regions with less than 432.4 thousand bed-days provided were classified as below average.

As a result of the bilateral classification by the average number of tourist sites and the number of bed-days provided, the regions were divided into 4 categories (Table 2).

Table 2. Results of the distribution of regions by the average number of tourist facilities and provided bed-days

The number of visitors below average (<432394 people) The total number of objects below average (≤ 39)	The number of visitors above average (> 432394 people) The total number of objects below average (≤ 39))
Atyrau West Kazakhstan Kostanay Pavlodar North Kazakhstan	Almaty
The number of visitors below average (<432394 people) The total number of objects above average (> 39)	**The number of visitors above average (> 432394 people) The total number of objects above average (> 39)**
Aktobe Zhambyl Kyzylorda Mangystau Turkistan	East Kazakhstan Akmola Karaganda

As can be seen from Table 2, Akmola, Almaty, East Kazakhstan and Karaganda regions are classified as regions that are in high demand among tourists. In accordance with the State Program (Decree of the Government of the Republic of Kazakhstan No. 360 dated 2019), 5 out of 10 most promising tourist destinations of the country are located in the above 4 regions: Lake Alakol (Almaty and East Kazakhstan regions), mountain cluster of Almaty region, Shchuchinsk-Borovoe resort area (Akmola region), lake Balkhash (Karaganda region) and the city of Nur-Sultan (Akmola region).

Thus, Kazakhstan attracts the majority of tourists mainly due to the presence of mountains and water bodies, which contribute to the development of beach, health-improving, skiing, ecological and other types of tourism.

At the next stage, the authors performed a two-step cluster analysis procedure. At the same time, the optimal number of clusters was selected using the AIC.

The result is the final two-cluster solution, corresponding to the lowest AIC value of 50.59. According to the "silhouette measure of cluster connectivity and separation' = 0.4, the quality of the clusters is "satisfactory".

The composition of two clusters, profiles of two cluster centroids (mean values and standard deviations) and t-statistics for three variables: the number of natural, historical and cultural objects, as well as objects of both natural and historical and cultural value are shown in Table 3.

According to the results of cluster analysis, similar regions that are most popular among tourists (Akmola, Almaty, East Kazakhstan and Karaganda regions) were grouped into the first cluster. In terms of objects, the first cluster accounts for 76 natural (54% of the total in the country), 72 (35%) of double significance and 60 cultural (29%) objects. Taking into account the foregoing, the results of the cluster analysis once again confirmed the conclusion that domestic objects of particular natural value, including water bodies and mountain ranges, are a great advantage for tourism in Kazakhstan.

In order to obtain further conclusions about the relative importance of 3 types of objects (natural, cultural and double) for tourism, the authors studied their weight coefficients, the calculation of which was carried out in the process of two-step cluster analysis for three types of tourist objects.

Table 3. Results of two-step cluster analysis

Cluster 1 (4 regions)	Cluster 2 (10 regions)	
Akmola Almaty East Kazakhstan Karaganda	Aktobe Atyrau Zhambyl West Kazakhstan Kostanay Kyzylorda Mangystau Pavlodar North Kazakhstan Turkistan	
Cluster 1 (4 regions) Centroid mean and standard deviation	Cluster 2 (10 regions) Centroid mean and standard deviation	t-test (df) and p-level of significance for independent samples
Natural objects μ = 19,00 σ = 11,343	Natural objects μ = 6,50 σ = 4,170	t-statistics = 3,14 (df = 12) p-level < 0,05
Double value μ = 18,00 σ = 4,899	Double meaning μ = 13,40 σ = 10,511	t-statistics = 0,83 (df = 12) p-level < 0,45
Cultural objects μ = 15,00 σ = 8,756	Cultural objects μ = 14,70 σ = 11,757	t-statistics = 0,05 (df = 12) p-level < 0,97

Table 4. The results of calculating the weighting factors for 3 types of tourist objects

Input fields (predictor): I (P) ↓	Cluster 1	Cluster 2
Number of bed-days provided (Higher-lower) (Above average-below average)	Above (above average) Number of bed-days provided 71.4%	Below (below average) Number of bed-days provided 28,6%
Number of natural objects	Weight I(P) = 0,6 μ = 19,00	Weight I(P) = 0,6 μ = 6,50
Number of objects of double value	Weight I(P) = 0,1 μ = 18,00	Weight I(P) = 0,1 μ = 13,40
Number of cultural objects	Weight I(P) = 0,0 μ = 15,00	Weight I(P) = 0,0 μ = 14,70

As can be seen from Table 4, natural objects are of the greatest importance, followed by objects of double importance, the last in importance are historical and cultural objects. This conclusion is consistent with our previous argument that today the regions with a greater number of objects of the nature reserve fund are more attractive for tourists, which are an incentive for the development of active types of tourism.

At the same time, it should be noted that the historical beginning of tourism in Kazakhstan is the formation and development of the Silk Road on its territory, the emergence of which dates back to the 3rd millennium BC (Decree of the Government of the Republic of Kazakhstan No. 333 dated 2001).

In 1997, the interaction of the Republic of Kazakhstan with the UN World Tourism Organization (hereinafter - the WTO) made it possible to obtain technical support in conducting a preliminary study of the country's tourism potential. Based on the results of the analysis, based on the WTO proposals and the accumulated experience, several basic components of the domestic tourism product were identified: cultural tourism on the Silk Road (pilgrimage and traditional) and eco-adventure tourism closely related to it (safari, rafting, bird watching, trekking, mountaineering, hunting, fishing) (Decree of the Government of the Republic of Kazakhstan No. 333 2001). Also, according to the State Program (Decree of the Government of the Republic of Kazakhstan No. 360 2019), the development of tourism on the Silk Road is highlighted as one of the priority directions of tourism development.

Meanwhile, according to the results of cluster analysis, the leading regions in terms of the number of cultural and historical sites (Turkestan, Zhambyl, Kyzylorda and Mangistau regions), which account for the bulk of the objects of the Kazakh section of the Silk Road (65 out of 115) (Decree of the President of the Republic of Kazakhstan No. 3859 1998)and World Heritage sites UNESCO in the Republic of Kazakhstan (main list: 3 out of 5, preliminary list: 7 out of 13) [45, 46] (UNESCO World Heritage List. Kazakhstan; World Economic Forum. The Travel & Tourism Competitiveness Report 2019) were included in the cluster, which is less popular with tourists.

Along with them, the second cluster included 6 out of 7 regions (Atyrau, West Kazakhstan, Aktobe, Kostanay, North Kazakhstan and Pavlodar regions), which have common external borders with the Russian Federation, which has a high potential for outbound tourism.

In terms of objects, the second cluster accounts for 147 cultural (71%), 134 (65%) of double significance and 65 natural (46%) objects.

One of the possible reasons for the current situation may be that regional initiatives are not given sufficient attention from the interested central executive bodies and, as a result, they do not receive the necessary funding. In this regard, the efforts of interested government agencies can be successfully redirected to promoting ethnographic and cultural tourism in these regions and increasing the attendance of their respective attractions, some of which are UNESCO World Heritage Sites.

Conclusion

The results of the conducted cluster analysis of tourist sites in the regions of Kazakhstan allow us to draw the following conclusions.

Four regions, in particular Akmola, Almaty, East Kazakhstan and Karaganda regions, attract significantly more tourists than the other 10 regions of Kazakhstan.

It has been established that natural sites are the most important determinants of tourism, dual sites are the second most important, and cultural sites are the least important determinants of tourism. Of course, this is a problem, since, along with natural objects, Kazakhstan has a large number of monuments of historical and cultural heritage, including those located along the Silk Road route and are of global importance.

Today, cultural and educational tourism is effectively used as a tool to popularize the culture of a particular country abroad. The popularity of ethnographic tourism, which allows you to get an idea of the customs, rituals and traditions of your own or other people, to get acquainted with architectural monuments, national costumes and festivals, language and culture, is becoming increasingly relevant today, when most of the population lives in large cities and megalopolises.

Thus, many regions of Kazakhstan that do not have significant objects of the natural reserve fund, nevertheless, can be quite attractive for tourists due to the large number of monuments of history and culture, architecture, customs and traditions. In this regard, it is necessary to develop tourism in these regions, which, in turn, will open up new horizons for global tourism in Kazakhstan.

Taking into account the fact that the cluster analysis of tourist sites in the context of regions for emerging markets using this method is carried out for the first time, the authors express great hope that its application will be expanded in the future.

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