

ӨНДІРІСТІК ЖҮЙЕЛЕРДІ ЭКОНОМИКАЛЫҚ-МАТЕМАТИКАЛЫҚ МОДЕЛЬДЕУ ЖӘНЕ БОЛЖАУ

ЭКОНОМИКО-МАТЕМАТИЧЕСКОЕ МОДЕЛИРОВАНИЕ И ПРОГНОЗИРОВАНИЕ ПРОИЗВОДСТВЕННЫХ СИСТЕМ

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A.Bissekov¹, A.Bekbulatova², D.Alimbekov²

¹*Ministry of Foreign Affairs of the Republic of Kazakhstan;*

²*L.N.Gumilyov Eurasian National University, Astana*

Dispersion analysis of development of tourism sector in the republic of Kazakhstan

For quite short time after obtaining independence, economic development of the Republic of Kazakhstan promptly goes forward. In the message of the president «Kazakhstan–2030», besides development of production of natural energy resources, special value is allocated the tourism industries. According to the concept of development of tourism in the Republic of Kazakhstan, it is capable to render three positive effects on national economy: first, to provide inflow of foreign currency and to have positive impact on such economic indicators as the balance of payments and cumulative export; secondly, helps to increase population employment; in the third, promotes development of infrastructure of the country. This research is devoted to study the branch of tourism in the Republic of Kazakhstan with use of the one-factorial dispersion analysis.

Key words: Republic of Kazakhstan, one-factorial dispersion analysis, tourism, Ronald Fischer, development strategy, gradations, influence of a factor, tourists flow, average size of a productive sign, tourist potential.

Data of tourism sector in the Republic of Kazakhstan

At the present time the role of the tourism industry is an important economic priority in the majority of the countries of the world community. Its development represents the extensive market of workplaces, satisfies inquiries of the personality, and also social communications between the countries. At the end of the 20th century the tourism sphere entirely became international, that was promoted by two factors: on the one hand — obtaining benefit to increase profitability of the tourist enterprise, firms expand geography of travel worldwide; on the other hand — aspiration to profitability, tourist business should be invested at the international level. Along with the developing countries, the Republic of Kazakhstan also has all possibilities for successful development of a hotel industry [1].

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- activization of a state policy in the field of tourism;
- improvement of system of regulation by tourist activity;
- further development of legal, organizational and economic bases of the industry of tourism;
- protection of the tourist market by granting tax privileges, the state guarantees and other measures of the state support;
- safety of tourists;
- formation of image of Kazakhstan as attractive tourist market;
- improvement of information system support;

- deepening of scientific researches in the field of tourism;
- providing measures for environmental protection and preservation of a cultural heritage.

Recently the increase in interest of foreign tourists to tourist sights of the Republic of Kazakhstan is observed. This phenomenon is caused first of all, by a geographical position of the republic, high potential in the field of the organization tourist attractive routes, existence of unique natural zones and reserves, historical and cultural sights of world level. Development of the main indicators of tourist branch is connected not only with natural appeal, but also with prospect of foreign investment. Due to the increase population standards of living, level of exit, increases entrance and internal tourism (table 1) [3].

Table 1

Main indicators of the tourist industry

Indicators	Year			
	2009	2010	2011	2012
Number of the served visitors, one million person	14,8	16,6	19	21,8
Entrance tourism	4,3	4,7	5,6	6,8
Exit tourism	6,4	7,4	8	8,6
Internal tourism	4,05	4,4	5,3	6,3

Note. Compiled by the author based on data from the Statistics Agency of the Republic of Kazakhstan.

As table 1 illustrates, in 2009 as a whole in the country about 15 million people were served. In comparison with 2012 the indicator increased 1,5 times and makes 21,8 million people. It should be noted that the most part of the served visitors is the share of exit tourism that is the number of traveling citizens and the persons who are constantly living in the Republic of Kazakhstan out of its limits increased. Such tendency of growth is characteristic for indicators of all types of tourism — the number of persons and citizens constantly living, and also the persons who aren't living in the country, traveling in its limits grows. Changes in number of visitors and travel of citizens of the Republic of Kazakhstan are shown in table 2.

Table 2

Number of tourists on purposes of visit, one million people

Indicators	Year			
	2009	2010	2011	2012
The resident visitors who have gone abroad	6,4	7,4	8	8,6
From them for tourism	0,15	0,16	0,30	0,56
The visitors nonresidents who have driven to the Republic of Kazakhstan	4,3	4,7	5,6	6,6
From them for tourism	0,44	0,48	0,14	0,24

Note. Compiled by the author based on data from the Statistics Agency of the Republic of Kazakhstan.

In 2009 Kazakhstan was left by 6,4 million people, by 2012 their number increased to 8,6 million that is 2,2 million more than people. For tourism, in 2009 left 150 thousand people, and in 2012 their number increased to 560 thousand people. Similarly the number of the tourists who have visited Kazakhstan — in 2009 of 4,3 million, and in 2012 of 6,6 million people increases. From them for tourism to the country 440 thousand and 240 thousand people respectively drove.

Due to the increase in socio-economic indexes of the country, tastes and preferences of tourists change. This fact, promotes expansion of infrastructure of quality in hotel business (table 3).

Table 3

The number of the foreign citizens who have arrived to Kazakhstan

Year	Russia	Kirgizstan	Uzbekistan	China	Turkey	Germany
1	2	3	4	5	6	7
2012	1,4	1,74	2,09	0,133	0,056	0,08

1	2	3	4	5	6	7
2011	1,3	1,5	1,9	0,128	0,060	0,067
2010	1,2	1,1	1,3	0,133	0,065	0,082
2009	1,1	1,04	1,1	0,169	0,067	0,083
2008	1,1	1,1	1,4	0,190	0,097	0,097
2007	1,3	1,07	1,5	0,171	0,121	0,102

Note. Compiled by the author based on data from the Statistics Agency of the Republic of Kazakhstan.

As table 3 illustrates, most of all the Republic of Kazakhstan accepts visitors from CIS countries. Most in 2012 arrived people from Uzbekistan — 2,09 million. On the second place by quantity arrived to Kazakhstan there are guests from Kyrgyzstan — in 2012 the indicator is equal 1,74 million people. The smallest number of people comes from Germany and Turkey. The number of leaving persons from the Republic of Kazakhstan is presented in table 4.

Table 4

The number of citizens of Kazakhstan which has left to other countries

Year	Russia	Kirgizstan	Uzbekistan	China	Turkey	UAE
2012	2,4	3,88	1,22	0,546	0,335	0,123
2011	2,2	3,4	1,08	0,447	0,268	0,102
2010	2,4	2,9	0,950	0,365	0,215	0,084
2009	2,2	2,6	0,795	0,263	0,133	0,067
2008	2,4	1,6	0,411	0,284	0,171	0,066
2007	2,3	0,922	0,411	0,414	0,160	0,064

Note. Compiled by the author based on data from the Statistics Agency of the Republic of Kazakhstan.

It should be noted that in case of departures out of borders of Kazakhstan, on a place of Germany is the United Arab Emirates. It is connected, certainly, with growing every year tourist interest of citizens. Main objectives of trips are shopping — rounds, visit of friends and relatives, business and cultural — historical interest. So, in 2012 in the United Arab Emirates the Republic of Kazakhstan was left by 123 thousand people. The greatest number of tourists went to Kyrgyzstan, the Russian Federation and Uzbekistan. To these countries generally leave for the purpose of business trips, visit of relatives and friends. It is necessary to consider that among quantity driving and leaving Kazakhstan there are also those who leaves or drives on a constant residence, are considered not only tourists.

Within the last 20 years, in the Republic of Kazakhstan a number of the major actions for formation of the national tourist industry is carried out, 22 international agreements in the field of cooperation in the sphere of the tourism, having the huge potential of social efficiency are concluded. Thus, the analysis of tourist activity showed that arriving from abroad, prefer to stay at hotels, providing high-quality service and a full set of services, therefore further development of a network of hotels of the international level will depend on business tourism in the large cities of the country.

The conducted researches showed low level of appeal of certain regions of the republic. The solution of problems of development and deployment of additional programs of development of tourism in regions, their timely financing and modernization of operating infrastructure will allow to increase considerably in the future appeal of all tourist regions. The main reasons for backwardness of tourist infrastructure are not only economic difficulties, but also the imperfect tax and tourist legislation, in particular, partial absence necessary for control of development of branch and observance of the rights of the consumer of state standards.

In the course of carrying out the analysis of a current state of tourist branch of Kazakhstan the following problems were revealed [4]:

- prevalence of the small travel companies which don't have personnel and material resources, doesn't promote development of investment investments in tourism branch;
- backwardness of transport infrastructure. Insufficient quantity the specialized motor transportation enterprises for tourist activity. Also the system of electronic booking and planning of trips isn't created;
- low level of preparation of specialized shots;
- weak level of financing of development of tourism in regions, etc.

Dispersion analysis of tourism industry

In literature of tourism often used methods of the analysis are statistical. Among them an example of influence of any factors on changes of one size represents the dispersion analysis. It allows to estimate reliability of difference of several selective averages simultaneous, i.e. to study influence of one controllable factor on a productive sign by an assessment of its relative role in the general variability of this sign caused by influence of all factors.

To define a definition of the dispersion analysis, it is analysis of variability of a sign under the influence of any controlled variable factors [5]. Task of the dispersion analysis is to characterize force and reliability of influence of a factor on a sign, and only at a size (average level) of a sign, but not on its variability. It is some kind of method of comparison of several arithmetic averages. The essence of the dispersion analysis consists in a partition of the general dispersion of a studied sign on the separate components caused by influence of concrete factors, and check of hypotheses of the importance of influence of these factors on a studied sign.

Comparing dispersion components with each other by means of F — Ronald Fischer's criterion, it is possible to define, what share of the general variability of a productive sign is caused by action of adjustable factors. Thus, the analysis can be one and multiple-factor. In this work the analysis will be used one-factorial, using criteria of R.Fischer who in itself represents the relation of selective dispersions of S21 and S22 which are considered as an assessment of the same general dispersion Σ^2 . For example, as growth of an average monthly salary in the Republic of Kazakhstan can affect growth of tourists leaving abroad. In the practice, each dose of a studied factor there correspond one selection (gradation) therefore each group (selective) average will characterize reaction of objects to the corresponding dose of a studied factor, and the effect of a studied factor can be expressed as a deviation of group average from general average, from here: [6]

$$(X_i - M) = (M_j - M) + (X_i - M_j)$$

Generalizing this record, we have dispersion decomposition which is made by the rule of addition of dispersions:

$$\sum_{j=1}^m \sum_{i=1}^n (y_{ij} - \bar{y})^2 = \sum_{j=1}^m (\bar{y}_j - \bar{y})^2 n_j + \sum_{j=1}^m \sum_{i=1}^n (y_{ij} - \bar{y}_j)^2$$

where y_{ij} — value of a productive sign at unit i -y in j -y to group; i — unit number; j — group number; n_j — number at y group; \bar{y}_j — the average size of a productive sign in at- y group; \bar{y} — general average of a productive sign.

From here the structure of the one-factorial analysis will look:

Table 5

Variation source	The Sum of squares of deviations	Number of degrees of freedom	The Average square of deviations	F — criterion
Between the groups	$\sum_{j=1}^m (\bar{y}_j - \bar{y})^2 n_j$	$m - 1$	S21	$F = \frac{S1^2}{S2^2}$
Inside the groups	$\sum_{j=1}^m \sum_{i=1}^n (y_{ij} - \bar{y}_j)^2$	$n - m$	S22	
Total	$\sum_{j=1}^m \sum_{i=1}^n (y_{ij} - \bar{y})^2$	$n - 1$	S2	

Note. See Yelisseyeva I., Iuzbashev M. General theory of statistics, Finance and statistics publishing house, 2005, p. 54.

Having studied analysis way, we can construct it on the example of number of the served visitors in hotels, according to data of the table 3 «The Number of the Foreign Citizens Who Have Arrived to Kazakhstan over the Countries». For this purpose in the MS Excel program we use the Analysis of Data function in the Data menu. Having noted the entrance and output data, we will build them in groups on the countries (the Russian Federation, Kyrgyzstan, Uzbekistan, China, Turkey and Germany) we will receive:

Table 6

One-factorial dispersion analysis

RESULTS				
Groups	Account	Sum	Average	Dispersion
Column 1	6	6218495	1036415,9	2,66965E+11
Column 2	6	5883544	980590,6233	2,64412E+11
Column 3	6	7509382	1251563,682	4,3457E+11
Column 4	6	794037,1	132339,5222	4769390578
Column 5	6	412453,6	68742,26	1678273371
Column 6	6	434305,8	72384,3	1407176206

Note. Compiled by the author based on Ivanter E.V., Korosov A.V. Introduction in quantitative biology, Peter-GU, 2011, p. 66.

According to Table 6 data, the MS Excel program automatically builds results of influence of groups (the studied period 2009–2012). The dispersion analysis on the example of the table 4 «The number of citizens of Kazakhstan which has left to other countries» is showed below:

Table 7

Dispersion analysis

Variation source	SS	df	MS	F	P-value	F critical
Between the groups	9,23E+12	5	1,84632E+12	11,37596926	3,24251E-06	2,533555
Inside the groups	4,87E+12	30	1,623E+11			
Total	1,41E+13	35				

Note. Compiled by the author based on Ivanter E.V., Korosov A.V. Introduction in quantitative biology, Peter-GU, 2011, p. 66.

Thus, for definition of influence of a factor, we will find *F*-criterion in R.Fischer's table:

Table 8

Fischer's table of values (<i>F</i> -criterion)											
	f1										
f2	1	2	3	4	5	6	7	8	9	10	15
1	161.45	199.50	215.71	224.58	230.16	233.99	236.77	238.88	240.54	241.88	245.95
2	18.51	19.00	19.16	19.25	19.30	19.33	19.35	19.37	19.38	19.40	19.43
3	10.13	9.55	9.28	9.12	9.01	8.94	8.89	8.85	8.81	8.79	8.70
4	7.71	6.94	6.59	6.39	6.26	6.16	6.09	6.04	6.00	5.96	5.86
5	6.61	5.79	5.41	5.19	5.05	4.95	4.88	4.82	4.77	4.74	4.62
6	5.99	5.14	4.76	4.53	4.39	4.28	4.21	4.15	4.10	4.06	3.94
7	5.59	4.74	4.35	4.12	3.97	3.87	3.79	3.73	3.68	3.64	3.51
8	5.32	4.46	4.07	3.84	3.69	3.58	3.50	3.44	3.39	3.35	3.22
9	5.12	4.26	3.86	3.63	3.48	3.37	3.29	3.23	3.18	3.14	3.01
10	4.96	4.10	3.71	3.48	3.33	3.22	3.14	3.07	3.02	2.98	2.85
11	4.84	3.98	3.59	3.36	3.20	3.09	3.01	2.95	2.90	2.85	2.72

f2	1	2	3	4	5	6	7	8	9	10	15
12	4.75	3.89	3.49	3.26	3.11	3.00	2.91	2.85	2.80	2.75	2.62
13	4.67	3.81	3.41	3.18	3.03	2.92	2.83	2.77	2.71	2.67	2.53
14	4.60	3.74	3.34	3.11	2.96	2.85	2.76	2.70	2.65	2.60	2.46
15	4.54	3.68	3.29	3.06	2.90	2.79	2.71	2.64	2.59	2.54	2.40
16	4.49	3.63	3.24	3.01	2.85	2.74	2.66	2.59	2.54	2.49	2.35
17	4.45	3.59	3.20	2.96	2.81	2.70	2.61	2.55	2.49	2.45	2.31
18	4.41	3.55	3.16	2.93	2.77	2.66	2.58	2.51	2.46	2.41	2.27
19	4.38	3.52	3.13	2.90	2.74	2.63	2.54	2.48	2.42	2.38	2.23
20	4.35	3.49	3.10	2.87	2.71	2.60	2.51	2.45	2.39	2.35	2.20

Note. See Deffel K. Statistics in analytical chemistry, Moscow, Mir, 1994.

As table 7, F illustrates — the criterion is equal 11,37596926. It is present at R.Fischer's table. Therefore, the factor influence, in the studied period 2007–2012 is rather strong, so influence on indicators of number of the foreign citizens who have arrived to the Republic of Kazakhstan over the countries, has strong influence a certain factor which is characteristic for the studied period. The similar analysis can be done, using these tables 4 «The Number of Citizens of Kazakhstan Which Has Left in Other Countries». Results are presented in table 9:

Table 9

One-factorial dispersion analysis

RESULTS				
Groups	Account	Sum	Average	Dispersion
Column 1	6	11768149	1961358	9,31968E+11
Column 2	6	11640182	1940030	1,75516E+12
Column 3	6	3653137	608856,2	1,65211E+11
Column 4	6	1777245	296207,4	26174531829
Column 5	6	949564,3	158260,7	8262429550
Column 6	6	384733,1	64122,19	1196689551

Note. Compiled by the author based on Ivanter E.V., Korosov A.V. Introduction in quantitative biology, Peter-GU, 2011, p. 66.

In the table 9 the number of the Kazakhstan citizens who have left abroad, is presented in the first column and form 6 groups (Russia, Kyrgyzstan, Uzbekistan, China, Turkey, the United Arab Emirates). The dispersion analysis looks as follows:

Table 10

Dispersion analysis

Variation source	SS	df	MS	F	P-value	F critical
Between the groups	2,33003E+13	5	4,66E+12	9,681655232	1,39539E-05	2,533554545
Inside the groups	1,44399E+13	30	4,81E+11			
Total	3,77402E+13	35				

Note. Compiled by the author based on Ivanter E.V., Korosov A.V. Introduction in quantitative biology, Peter-GU, 2011, p. 66.

According to the table 10, F criterion is equal 9,681655232. Let's find approximate equal in the table of values of R.Fischer — during the period from 2007 to 2012 influence growth/reduction of number of leaving citizens of the Republic of Kazakhstan abroad, therefore, action of this factor considerably.

In the described examples of factors of the visited/left tourists defining quantity can be a little. Considering this Republic of Kazakhstan, they can be the following:

- social and economic development;
- carrying out number of actions of the international value (OSCE, 7th Winter Asian Games, Economic forum, Energy forum of «Kazenergy», etc.);
- increase of a living standard of the population;
- political stability;
- visit native, relatives and friends;
- trip business, earnings;
- return to the historical homeland of citizens of the Republic Kazakhstan/departure living in the Republic of Kazakhstan on the historical homeland;
- foreign investment activity, etc.

Conclusion.

In literature it is often mentioned that the one-factorial dispersive analysis gives not the exact characteristic of a contribution of a factor in the general variability and for it, it is necessary to count a certain amendment. Secondly, the statement «a factor influences with force of 25 %» transfers nothing, except impression about not so great influence of a factor. It would be much more interesting to give a forecast of possible values of a productive sign at this or that level of action of a factor. Thirdly, applying the dispersion analysis, it is important to mean always: in spite of the fact that Fischer's criterion uses dispersions, selective averages arithmetic are compared with each other [7].

It should be noted that the made analysis of influence of the period from 2007 to 2012 on number of the tourists who have driven and left abroad is quite great. Having idea of economic development of the Republic of Kazakhstan, it is possible to claim that the listed possible factors have strong influence on variability of visitors and tourists in the country.

However further effective development of tourism in the Republic of Kazakhstan is closely connected with search of optimum ways of the maximum use of its potential opportunities [8]. The solution of this problem is impossible without improvement of qualitative structure and rational use of the most tourist potential. In this regard there is a problem of ensuring further effective development of the Kazakhstan tourism at the expense of improvement of use of its potential. Tourist potential is defined by the volume of used resources, their structure and realization opportunities. It is characterized by existence of natural and climatic resources (resource potential), quantity of qualified personnel, quality of their preparation, quantity and quality of necessary information, level of technical equipment.

Tourist potential is defined by the volume of used resources, their structure and realization opportunities. It is characterized by existence of natural and climatic resources (resource potential), quantity of qualified personnel, quality of their preparation, quantity and quality of necessary information, level of technical equipment.

Formation of tourist potential can't be considered as end in itself or as a result of a certain development of society. It is the integral component of economic potential and is created for the most effective development of national economy and ensuring its steady growth. Proceeding from told, tourist potential should be considered as: source and factor of growth of national wealth and economic power of the country; generalizing indicator of efficiency of functioning of a tourist complex of the Republic of Kazakhstan [9].

References

- 1 *Bizhanov, M.* (2008). Introduction in tourism. The 9th edition. Gerda.
- 2 The «Kazakhstan-2030» Strategy for development, Official site of the President of the Republic of Kazakhstan, www.akorda.kz
- 3 The Statistics Agency of the Republic of Kazakhstan: www.stat.kz
- 4 *Suraganova S., Bekbulatova A.* perspectives of the Development of the tourist service market in the Republic of Kazakhstan, Management sciences in Kazakhstan and in Poland at the beginning of the 21 century — perspectives for development and cooperation, Cracow School of Business, Cracow University of Economics, 2012, p.49.

- 5 *Ivanter E.V., Korosov A.V.* Introduction in quantitative biology, Peter-GU publishing house, 2011.
- 6 *Yelisseyeva I., Iuzbashev M.* General theory of statistics, Finance and statistics publishing house, 2005. — P. 54.
- 7 *Kai-Erik Peiponen, E.M.* (1999). Dispersion. complex analysis and optical spectroscopy: Classical theory.
- 8 *U.Temnyi, L.T.* (2003). Tourism Economics. Textbook.
- 9 *P.Figini, L.V.* (2010, December). Tourism and growth in a cross section of countries. Tourism economics. — Vol. 16. — № 4.

А.Бисеков, А.Бекболатова, Д.Әлімбеков

Қазақстан Республикасында туризм саласының дамуына дисперсиондық талдау

Мақалада Қазақстан Республикасы тәуелсіздік алғаннан кейінгі қысқа мерзім ішінде экономиканың барлық секторлары даму үстінде екендігі көрсетілген. Қазақстан Республикасының Президенті Н.Назарбаевтың «Қазақстан–2030» Жолдауында табиғи энергетика ресурстарын өндіруден басқа, туризм саласына да үлкен көңіл бөлінген. Авторлардың пікірінше, туризм саласының даму тұжырымдамасына сәйкес мемлекет экономикасына үш оң әсері бар: біріншіден, шетелдік қаражаттың құйылуын қамтамасыз етіп, экспорт пен төлем балансы сияқты экономикалық көрсеткіштеріне оң әсері, екіншіден, жұмыспен қамту деңгейінің артуы, үшіншіден, мемлекеттің инфрақұрылымының дамуы. Осы жұмыс Қазақстан Республикасында туризмнің қалыптасуы мен дамуын, жалғыз факторлық дисперсиялық талдауды қолданып, зерттеуге бағытталған.

А.Бисеков, А.Бекбулатова, Д.Алимбеков

Дисперсионный анализ развития отрасли туризма в Республике Казахстан

В статье отмечено, что в течение довольно короткого промежутка времени после получения независимости Республика Казахстан переживает перемены в развитии всех экономических секторов. В Послании Президента Н.Назарбаева «Казахстан–2030», помимо производства естественных энергетических ресурсов, ассигнование получила также отрасль туризма. Авторами отмечено, что согласно концепции развития туризма в Республике Казахстан, эта отрасль способна оказать положительный эффект на экономику страны, в том числе: обеспечить приток иностранной валюты; положительно влиять на такие экономические показатели, как платежный баланс и совокупный экспорт; способствовать увеличению занятости населения и развитию инфраструктуры страны. Данная работа посвящена изучению развития и становления туризма в Республике Казахстан при использовании одnofакторного дисперсионного анализа.