

Simulation of Entrepreneurship Development Scenarios in the Recreational Sphere of the Region*

Nadezhda K. Boyarchuk¹[0000-0003-3702-6645] and Igor A. Bukreev¹[0000-0002-6903-946X]

¹V.I. Vernadsky Crimean Federal University, Simferopol, Russia
b_nadin@bk.ru
bukreev.igor@bk.ru

Abstract. The article is devoted to modeling scenarios for the development of entrepreneurship in the recreational sphere of the region. The paper notes the importance of resource and institutional support for the development of entrepreneurship in the recreational sector of the Big Yalta region. Priority elements of the institutional support system make it possible to develop activities and scenarios for the development of entrepreneurship in the recreational sphere of the region. Based on the priority elements of the institutional support system, measures and scenarios for the development of the region have been developed. Based on the results of further research using the method of cognitive modeling, an assessment of the prospects for the development of entrepreneurship in the recreational sphere of the Big Yalta region shows that it is necessary to pay attention to the modernization and organization of the work of the recreational and resort complex of the subregion. The problems are associated with the moral and physical obsolescence of the recreational and general infrastructure, and irrational use. There is also no constructive dialogue between the private and public sectors as users of the recreational potential. The development of the subregion must be considered in the process of the development of Crimea, neighboring regions, and settlements. The need to develop a sanatorium and resort complex as one of the main sources of income during the off-season and employment of the population is noted. This work aims to analyze scenarios for the development of entrepreneurship in the recreational sphere of the Big Yalta region based on the use of cognitive technology methods.

Keywords: Entrepreneurship in the Recreational Sphere, Resource Provision, the System of Institutional Factors, Cognitive Technology, Factors Matrix of Adjacency, Scenarios for Modeling the Development of Entrepreneurship in the Recreational Sphere.

1 Introduction

The Republic of Crimea is a unique region of the Russian Federation, which has a powerful natural and climatic, landscape, historical and cultural, recreational, and resort

* Copyright 2021 for this paper by its authors. Use permitted under Creative Commons License Attribution 4.0 International (CC BY 4.0).

complex, which is the basis for the development of the health resort and tourism sector [1]. In the works of domestic scientists S.Yu. Tsekhla [1], I.V. Berezhnaya [2], I.M. Yakovenko [3] investigated the components of the recreational potential (hereinafter RP) and the problems of tourism and recreation development.

Despite the resource potential of the region, problems arise regarding the effective use of the potential and the sufficiency of demand for a recreational product. In the process of research, economic phenomena in the recreational sector of the region are presented as a set of multifactorial and interconnected occurring phenomena characterized by constant variability of their causes. All changes in political, social, and economic aspects can be considered as factors for the development of entrepreneurship in this area. In the process of researching entrepreneurial activity, there is a problem of insufficient quantitative information, which allows the use of qualitative characteristics with the determination of their quantitative assessment. Regardless of the complexity of such situations, decisions are required regarding the methods and tools used in solving the problem.

The number of factors in the studied situations can be not only many but also their significance and state depend on other changing conditions. This situation makes it possible to characterize many institutional formations that are emerging in the economy as semi-structured systems and to use the means of cognitive modeling to solve the set goals and objectives. This method is developed by scientists N. A. Abramova [4], Z. K. Avdeeva, S. V. Kovriga, D. I. Makarenko [5], E. K. Kornoushenko [6], V. I. Maksimov [7], GV Gorelova and E. N Zakharova [8].

Purpose of the study. To analyze scenarios for the development of entrepreneurship in the recreational sphere of the region based on the use of cognitive technology methods.

2 Main content.

The problem associated with the development of entrepreneurship as a form of realization of the recreational potential requires the development of certain measures, the effectiveness of which depends on the assessment of the state of the system of institutional factors that ensure entrepreneurship in the field of recreation. The number of factors in the studied situations can be not only many but also their significance and state depend on other changing conditions.

The development of entrepreneurship in the recreational sphere of the region depends on such groups of factors [9; 10].

1) The first four factors are related to the resource potential of the region:

a) the natural component, or as it is customary to call the land in economic theory, which implies all-natural conditions and resources (natural reserve fund, beach resources, hydromineral resources, climatic factor);

b) the quantity and quality of social and labor resources (local, visitors, and other regions of the population);

c) the amount of fixed capital and other material resources (recreation and resort complex, cultural and historical resources, catering and trade infrastructure);

d) information.

The availability of more and more quality resources, including information, enables the production of more recreational products and services.

The next two groups of factors are associated with the extensiveness and intensity of entrepreneurship development.

2) For the extensive development of entrepreneurship, the following must be provided:

a) informational representation of the region both in the Internet space and at various forums, fairs, and exhibitions;

b) favorable economic conditions for doing business and financial support in the field of lending.

Conditions of this kind contribute to an increase in demand for a recreational product and the maximum possible employment of recreational resources.

3) Factors of intensive development of entrepreneurship are economic efficiency.

a) distribution efficiency - the best use of resources, ensuring the production of the most important products and services, including recreational ones;

b) production efficiency - the use of resources that ensures production at the lowest cost.

The necessary market conditions, combined with the state mechanism of influence on the economy, contributing to the formation of infrastructure in interaction with the natural component, are the result of the action of the institutional conditions for the development of entrepreneurship.

It is worth noting the importance of one of the sides of the state mechanism for regulating the economy since the impact on the environment is not reflected in various economic indicators of enterprises' activities. The negative impact on the social and natural environment is not shown, and in the case of the recreational orientation of the region, there is a direct impact on the formation of the recreational benefit, which consists not only of the results of the activities of enterprises but also the action of natural and social factors.

In the process of research, there is a problem of insufficient quantitative information necessary to assess the processes occurring in the economy, which makes it possible to use qualitative characteristics. Regardless of the complexity of such situations, decisions are required regarding the methods and tools used in solving the problem. Cognitive technology in its complex widely uses the method of simulation of complex semi-structured systems. This approach is based on the cognitive aspects of the activity of cognition and adaptation of a person to environmental conditions, which has a similarity in structure in the activities of experts in various fields [11; 12].

Cognitive technology consists of the following stages: immersion in the problem; building a graph based on key factors and causation; functional graph, that is, modeling [13; 14].

To structure information on the significance of the basic factors of the system, sensitivity analysis was used, which is necessary for constructing a graph and implementing scenario modeling. Sensitivity analysis allows you to establish the causal relationship between the factors of the system, that is, how one factor affects the state of others, to determine the value of the factor for the system and the effect of the system on its

state. As experts, we've involved: representatives of the Ministry of Resorts and Tourism R Crimea, heads of enterprises of the tourism industry in Yalta, as well as teachers of higher educational institutions who are researching this problem [11].

The mechanism for the development of entrepreneurship in the recreational sphere of the region means interaction in the transmission of movement in the aggregate of the whole (system) by the receipt of an impulse in the element of the system, which determines the directions of development of recreational and tourist activities [11].

In the process of sensitivity analysis, such matrix indicators are calculated as:

- the sum of the row of a specific key factor shows its ability to influence the system, and the result is expressed in the "asset" column of the stimulation and inhibition matrices;

- the sum of the column of a specific key factor shows the system's ability to influence this factor, and the result is expressed in the line "passive" of the stimulation and inhibition matrices;

- the product of the results of the "asset" row and the "liability" column of a particular factor shows the degree of interaction in the system;

- the result of dividing the amount of "asset" by the amount of "liability" of a particular factor shows the level of its activity in the system (if the value is <1 , then the factor is more influenced by the factors of the system than to influence it).

For clarity of expression of the role of factors, a coordinate system can be used, on which the ordinate and abscissa are the degrees of interaction and activity (Figure 1).

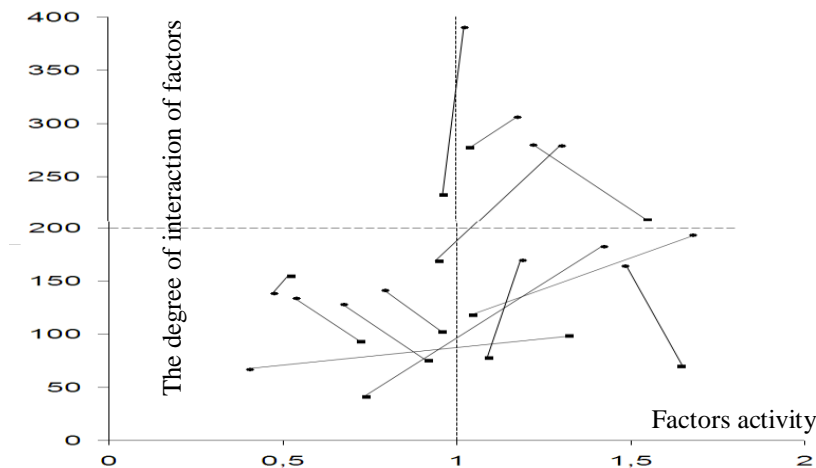






Fig. 1. Activity and interaction of factors of development of entrepreneurship in the recreational sphere.

* Compiled by the author based on expert estimates

Each factor, according to the results of two matrices, will have two points in the coordinate system, where one characterizes the stimulation, and the other - inhibition [8].

The factor is characterized by the degree of activity and interaction in the system:

-  – the factor is passive and lends itself to strong influence from the factors of the system;
-  – the factor is active, amenable to strong influence from the factors of the system, and, therefore, has a strong degree of interaction;
-  – factor weakly affects the state of the system and strongly depends on it, while there is a weak degree of interaction in the system;
-  – the factor has little effect on the system and the system has little impact on it.

The listed indicators make it possible to determine the role of a factor in terms of its significance for the system using indicators such as the level of activity and the degree of interaction in the system. The next stage of cognitive research based on the causal relationships of factors is the construction of a cognitive map, which is a partial similarity in the construction methodology with the stimulation and inhibition matrices.

According to the results of the analysis of the conducted questionnaires, the relations of each pair of factors F_i, F_j were formed arcs for constructing a graph and an adjacency matrix. In the questionnaires, it was required to indicate the values: positive, negative, zero. Based on problematic institutional factors, behavioral modeling scenarios were developed that allow determining the necessary combinations of factors and are based on the desired impulse effects on the mechanism as a system (following Table 1).

Table 1. Scenarios for modeling the behavior of the mechanism for the development of entrepreneurship in the recreational sphere of the region.

		F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13
	Simulation Scenarios													
	Pulses													
	The formation and use of labor resources													
	Formation of public-private partnership in the development of medical tourism and tourism innovation													
	investment activity in the region and international tourism cooperation													
	Competitiveness of tourist and recreational services													
	Rational use of natural and historical-cultural resources													
	Budget financing of tourism infrastructure development													
	The formation and use of social resources of the region													
	Change in population in the region													
	Development of instruments of economic incentives													
	Seasonality of the industry													
	Formation of a resort education system in the region													
	Formation of competitiveness of the material and technical base of recreation and tourism													
	Use of natural recreational factors and the environment													
1.				+1										
2.	Qf3=+1													
	Qf6=+1			+1			+1							
3.	Qf3=-1													
	Q4=-1			-1	-1									
4.	Qf2=+1													
	Qf6=-1													
	Qf9=-1		+1				-1			-1				
5.	Qf2=+1													
	Qf6=+1													
	Qf9=+1		+1				+1			+1				

* Compiled by the author based on expert estimates

Impulse arrival at the top of Figure 2. According to the impulse scenario, an increase in the level of investment activity in the region contributes to the improvement of the material and technical base of recreation and tourism, the development of the training system, etc. The growth of indicators is observed from the third cycle of modeling. The results are presented in a table of the values of the graph vertices after the simulation of the generated impulse (Table 2).

Table 2. First scenario of development Qf3=+1.

l	X(1)	X(2)	X(3)	X(4)	X(5)	X(6)
F1	0	1	3	20	87	382
F2	0	1	5	26	101	427
F3	1	1	5	18	87	357
F4	0	1	5	21	74	338
F5	0	1	3	5	10	73
F6	0	1	2	8	24	116
F7	0	0	4	9	31	130
F8	0	0	5	27	111	450
F9	0	1	3	6	29	117
F10	0	-1	-2	-13	-68	-285
F11	0	0	1	8	33	140
F12	0	1	3	12	52	212
F13	0	-1	1	-3	-6	-29

* Compiled by the author on the basis of expert estimates

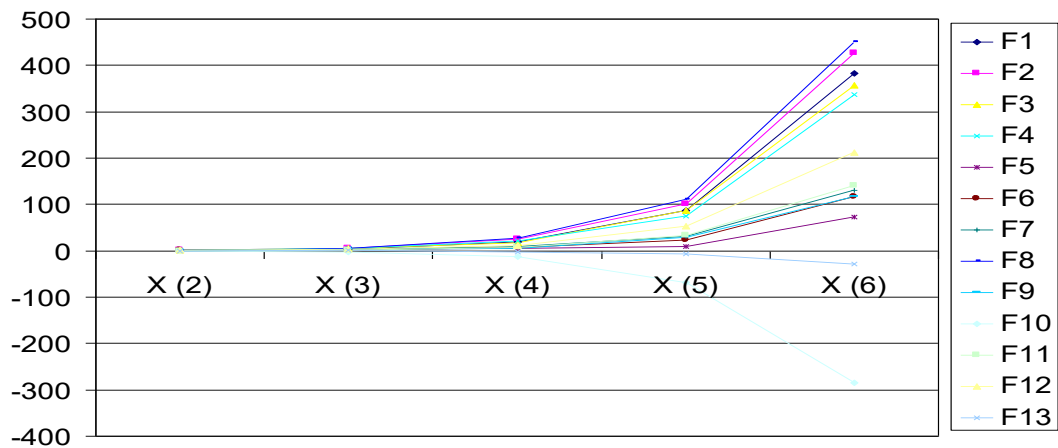


Fig. 2. Development modeling scenario Qf3=+1.

* Compiled by the author based on expert estimates

Impulse arrival at the top of graph F3. According to the impulse scenario, an increase in the level of investment activity in the region contributes to the improvement of the material and technical base of recreation and tourism, the development of the training system, etc. The growth of indicators is observed from the third cycle of modeling. For more rapid growth of regional development indicators, a set of measures is required to influence the system (Table 3) (Fig. 3), which is a complex process of the propagation of disturbances on the graph. The arrival of impulses to the vertices of graphs F3 and F6. According to the development of the scenario of generated impulses: an increase in the level of investment activity in the region, budget financing, and public-private partnerships contribute to the improvement of the material and technical base of recreation and tourism, etc. The growth of indicators is observed immediately after the third cycle of modeling and a significant effect is observed after the fourth cycle of modeling.

Table 3. First scenario of development $Qf3=+1$, $Qf6=+1$.

1	X(1)	X(2)	X(3)	X(4)	X(5)	X(6)
F1	0	1	5	33	154	666
F2	0	2	9	44	180	752
F3	1	2	8	32	151	628
F4	0	1	9	37	135	583
F5	0	1	5	10	20	117
F6	1	2	5	14	45	200
F7	0	0	6	18	54	225
F8	0	0	7	47	197	795
F9	0	2	5	12	48	208
F10	0	-1	-4	-23	-115	-505
F11	0	0	2	12	59	245
F12	0	2	6	22	90	376
F13	0	-1	1	-2	-12	-53

* Compiled by the author on the basis of expert estimates

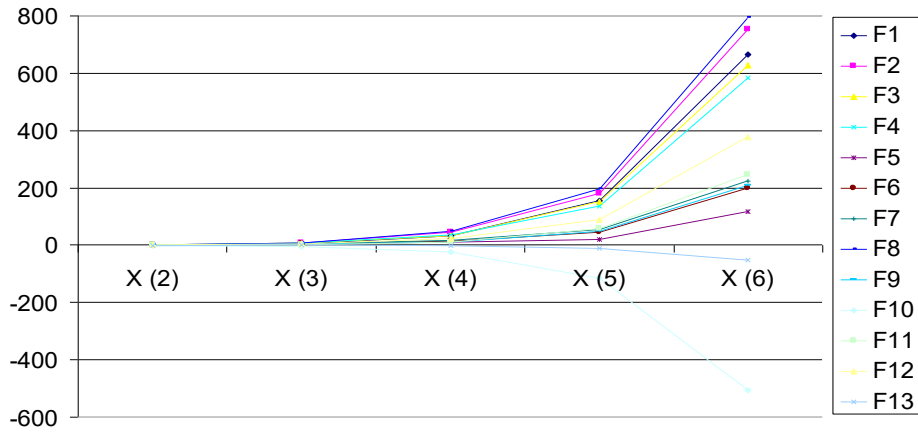


Fig. 3. Development modeling scenario $Qf3=+1, Qf6=+1$.

* Compiled by the author based on expert estimates

Negative arrival of impulses (Table 4) (Figure 4), at the vertices of the graphs F3 and F4.

Table 4. Scenario of development $Qf3=-1, Q4=-1$.

1	X(1)	X(2)	X(3)	X(4)	X(5)	X(6)
F1	0	-1	-5	-26	-108	-482
F2	0	-1	-6	-33	-125	-541
F3	-1	-1	-7	-22	-110	-445
F4	-1	-2	-6	-26	-95	-430
F5	0	-1	-3	-6	-15	-93
F6	0	-1	-2	-10	-30	-147
F7	0	0	-4	-10	-42	-164
F8	0	-1	-7	-33	-139	-572
F9	0	-1	-3	-8	-37	-144
F10	0	2	3	18	85	356
F11	0	0	-2	-10	-41	-176
F12	0	-1	-3	-15	-65	-265
F13	0	1	-1	5	4	39

* Compiled by the author based on expert estimates

According to the development of the scenario of generated impulses: a decrease in the level of investment activity in the region, a deterioration in the indicator of the competitiveness of tourist and recreational services, are the result of the absence of any actions. This situation is a trend characterized by a slight decline, but after the fourth cycle of modeling, a significant drop in the main indicators of the system is observed.

There is an increase in the level of uniformity of loading of the RP since the industry transfers the decline in production during periods of habitual activity, which in the future will require the development of other non-seasonal industries.

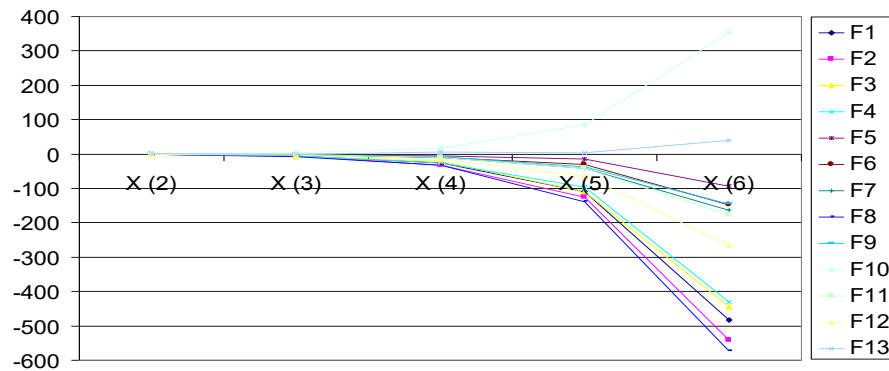


Fig. 4. Development modeling scenario $Qf3=-1$, $Q4=-1$.

* Compiled by the author based on expert estimates

Negative arrival of impulses to the vertices of the graph (Table 5) (Figure. 5) F6, F9, and positive in F2.

Table 5. Scenario of development $Qf2=+1$, $Qf6=-1$, $Qf9=-1$.

1	X(1)	X(2)	X(3)	X(4)	X(5)	X(6)
F1	0	0	1	-12	-55	-234
F2	1	-1	3	-14	-68	-257
F3	0	0	-1	-11	-49	-232
F4	0	0	-2	-16	-48	-191
F5	0	-1	-2	-5	-3	-30
F6	-1	-2	-3	-6	-16	-66
F7	0	0	-5	-10	-16	-73
F8	0	1	-1	-17	-76	-274
F9	-1	-2	-4	-4	-16	-75
F10	0	-1	1	5	41	183
F11	0	-1	-1	-5	-21	-92
F12	0	0	-3	-7	-31	-133
F13	0	1	-1	-2	9	16

* Compiled by the author based on expert estimates

According to the development of this scenario of generated negative impulses, a decrease in the main indicators is observed as well as in the previous scenario, but along with this, there is a faster increase in the level of uniformity of loading of the RP, due

to the development of innovations in tourist and recreational services and medical tourism, which makes it possible to extend the seasonality or distribute the load on the RP.

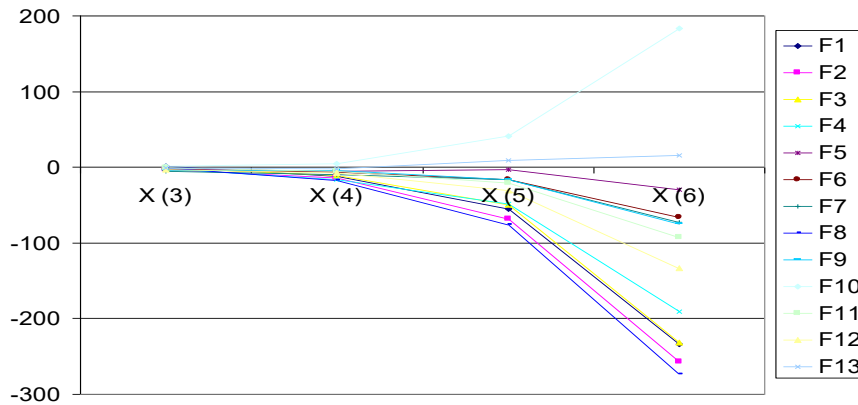


Fig. 5. . Development modeling scenario $Qf2=+1, Qf6=-1, Qf9=-1$.

* Compiled by the author based on expert estimates

In the fifth scenario, a significant increase in system performance is observed, especially after the fifth simulation cycle. Of the simulated development scenarios, this is the most favorable for the system. Factors $Qf6 = + 1, Qf9 = + 1$ provide positive impulses to the top of the system and cause balanced development of tourism positive impulses to arrive at the vertices F2, F6, and F9. The arrival of an impulse to vertices F2, F6, and F9 (Table 6).

Table 6. Scenario of development $Qf2=+1, Qf6=+1, Qf9=+ 1$.

1	X(1)	X(2)	X(3)	X(4)	X(5)	X(6)
F1	0	0	9	46	203	850
F2	1	3	13	56	232	967
F3	0	2	9	45	193	808
F4	0	2	12	44	174	759
F5	0	1	4	7	29	164
F6	1	2	5	14	60	256
F7	0	2	7	18	64	309
F8	0	1	13	63	246	1030
F9	1	2	4	14	62	273
F10	0	-1	-7	-33	-155	-647
F11	0	1	3	17	77	308
F12	0	2	7	27	115	485
F13	0	1	1	-2	-19	-52

* Compiled by the author on the basis of expert estimates

The impulse is given to the top $Qf2 = +1$, which is reflected in the development of entrepreneurship, innovation in tourism and recreation services, and medical tourism during the off-season.

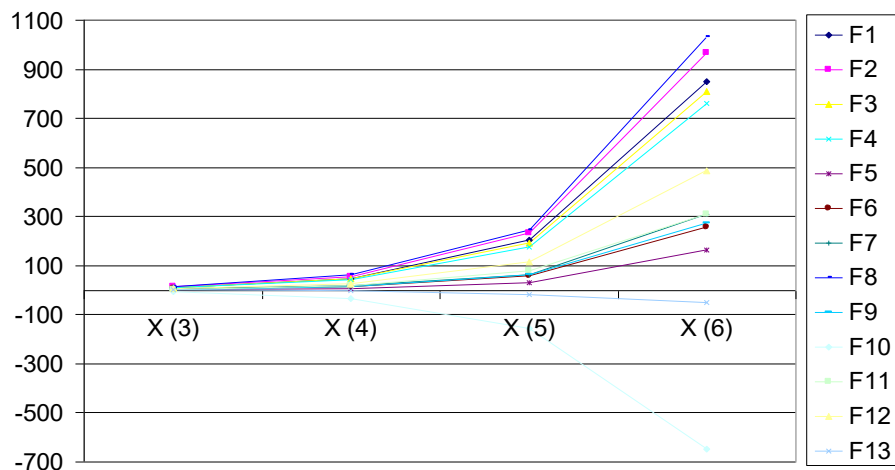


Fig. 6. Development modeling scenario $Qf2=+1$, $Qf6=+1$, $Qf9=+1$.

* Compiled by the author based on expert estimates

3 Conclusion.

The fifth modeled development scenario is the most favorable for the system. Factors $Qf6 = +1$, $Qf9 = +1$ provide positive impulses to the top of the system, which is reflected in the development of entrepreneurship in the field of innovation in tourism and recreation services and medical tourism during the off-season.

The use of cognitive technology makes it possible to obtain a qualitative assessment of the interaction of factors, scenario development of the situation, and trends, as well as evaluate the results of the proposed activities.

References

1. Tsyokhla, S.Yu.: Transformation of Recreational Activity and Tourist Regional Markets of Resort and Recreational Services: Monograph. Simferopol: Tavria, 2008. 352 p.
2. Tarasenko, V.S., Ena, V.G., Berezhnaya I.V.: Stable Crimea. Kurortopolis Big Yalta. Simferopol: IT "Arial", 2010. 392 p.
3. Yakovenko, I.M.: Recreational Nature Management: Methodology and research Methods: Monograph. Simferopol: Tavria, 2003. 335 p.

4. Abramova, N. A.: The Human Factor in the Cognitive Approach. Cognitive analysis and management of the development of situations (CASC'2006): materials of the VI international. Institute of Control Sciences, RAS. M., 2006. PP. 8–28.
5. Avdeeva, Z.K. Kovriga, S.V., Makarenko D.I.: Cognitive Modeling for Solving Problems of Control of Semi-Structured Systems (Situations) / ZK Avdeeva, // Management of large systems: a collection of articles. scientific. tr. / scientific. ed. : Novikov D. [and others]. - M. : IPU RAN, 2007. - Issue. 16. - S. 193 p.
6. Kornoushenko, E.K., Maksimov, V.I., Kachaev, S.V.: Cognitive Technologies to Support and Make Managerial Decisions. Information Society. 1999. V. 2. PP. 50–54.
7. Maksimov, V.I.: Structural-target analysis of the development of socio-economic situations. Management problems. 2005. №. 3. PP. 30–38.
8. Gorelova, G.V., Zakharova, E.N., Radchenko S.A.: Study of Weakly Structured Problems of Socio-Economic Systems: Cognitive Approach: Monograph. Rostov-na-Donu: Publishing house Rost. University, 2006. 334 p.
9. Porter, M.: Competitive Advantage. The Free Press, New York, NY. 1985. 557 p.
10. Bukreev, I.A.: Problems and Prospects of Development of the Tourist and Recreational Industry in the Region of Big Yalta. Regional Economy: Theory and Practice. 2018. V. 16, No. 9. P. 1777-1790. DOI.org/10.24891/re.16.9.1777
11. Bukreev, I.A.: Analysis of the Scenario Development of the Situation in the Tourist and Recreational Industry of the Big Yalta Region. In the book: modern economy: problems, patterns, prospects. Penza, 2018, PP. 66-78.
12. Makarova, E.L., Firsova, A.A.: Cognitive Modeling of the Influence of the Regional System of Higher Education on the Innovative Development of the Region. Izvestia of the Saratov State University. New episode. Series: Economics. Control. Right. 2015. №. 15. PP. 411–417. DOI: 10.18500 / 1994-2540-2015-15-4-411-417.
13. Thibeault, I.V., Prichina, O.S., Gorelova, G.V.: Cognitive Russian Modeling in the System of Corporate Governance. Mediterranean Journal of Social Sciences. 2015. V. 6, №. 2. PP. 442–453. DOI: 10.5901 / mjss.2015.v6n2p442.
14. Ursul, A.D., Ursul, T.A.: Noospherogenesis as a Global Evolutionary Process. Philosophical Thought. 2015. №. 1. P. 9–92. DOI: 10.7256 / 2409-8728.2015.1.14365