SIMULATING AND TERRITORIAL COMPETITIVENESS DATA ANALYSIS IN THE TRANSITION TO CLEAN ENERGY ECONOMY

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INTRODUCTION

The global economy is currently moving towards a new clean energy economy. This transition is carried out through investing in ESG-projects, that is, projects related to investments in the environment, social development, and corporate governance. ESG-projects will lead to an environment improvement and the creation of alternative energy. To assess the impact of the environmental factor on the competitiveness of a municipal entity (ME), a model was created with a set of factors.

ENVIRONMENTAL FACTOR MODEL DEVELOPMENT OF COMPETITIVENESS OF MUNICIPAL ENTITIES WITH THE SENSITIVITY ANALYSIS OF PARAMETERS

The basic factor is the factor EF, which determines the assessment of the environmental factor of the competitiveness of the Samara region. The assumed dependent variables (13 parameters) are: ^{Kp} is the concentration level of industrial production in ME; ^{Vp} is the level of harmfulness of industrial production in ME; ^{To} is the level of anthropogenic impact of ME objects; ^{As} is the level of automotive transport network development in the ME; ^{Yn} is the population level of ME; ^{Pr} is the provision of ME with product pipelines (including oil and gas pipelines); ^{Ot} is the condition of treatment facilities in ME; ^{Ep} is the level of energy intensity of production in ME; ^{It} is the use of innovative technologies for waste processing in ME; ^{Sb} is the level of budget financing (at the expense of own funds and receipts from the budgets of all levels) the costs of implementing environmental projects in the municipality.

Table 1

ENVIRONMENTAL FACTOR

Parameters	Importance
Concentration of industrial enterprises	5
Presence of hazardous industry	5
Absence of objects of anthropogenic impact	3
Level of automotive transport network development	5
Development level of public utilities	5
Population density	3
Presence of oil, gas and product pipelines on the territory	5
Extent of industrial equipment wear	4
Implementation of modern treatment technologies and reconstruction of existing treatment facilities	5
The level of energy intensity of production	4
Implementation of innovative waste processing technologies	5
Introduction of environmentally friendly modes of transport and fuel	5
The amount of funds allocated from the budgets of all levels for the implementation of environmental projects	5

Table 2

DESCRIPTIVE STATISTICS

Parameters	Component	
	N	Mean
1.Concentration of industrial enterprises	15	3,80
2.Presence of hazardous industry	15	3,93
3.Absence of objects of anthropogenic impact	14	3,64
4.Level of automotive transport network development	15	4,80
5.Development level of public utilities	15	4,13
6.Population density	15	2,73
7.Presence of oil, gas and product pipelines on the territory	15	3,33
8.Extent of industrial equipment wear	15	3,73
9.Implementation of modern treatment technologies and reconstruction of existing treatment facilities	15	4,00
10.The level of energy intensity of production	15	3,67
11.Implementation of innovative waste processing technologies	15	4,13
12.Introduction of environmentally friendly modes of transport and fuel	15	3,53
13.The amount of funds allocated from the budgets of all levels for the implementation of environmental projects	15	4,13
Actual	14	

The model of the environmental factor of competitiveness for large cities will take the following form:

*EF=-0,76 *Kp-0,79 *Vp-0,73*To-0,96*As-*
*-0,55*Y-0,67 *Pr+0,8 *Ot-0,73 *Ep +0,83*It +0,83 *Sb.*

Table 3

DESCRIPTIVE STATISTICS

Parameters	Component	
	N	Mean
1.Concentration of industrial enterprises	32	4,03
2.Presence of hazardous industry	33	4,36
3.Absence of objects of anthropogenic impact	30	3,93
4.Level of automotive transport network development	32	3,78
5.Development level of public utilities	32	3,78
6.Population density	30	2,97
7.Presence of oil, gas and product pipelines on the territory	32	3,72
8.Extent of industrial equipment wear	32	3,84
9.Implementation of modern treatment technologies and reconstruction of existing treatment facilities	31	4,35
10.The level of energy intensity of production	32	3,63
11.Implementation of innovative waste processing technologies	32	4,22
12.Introduction of environmentally friendly modes of transport and fuel	31	3,77
13.The amount of funds allocated from the budgets of all levels for the implementation of environmental projects	31	4,26
Actual	26	

The model of the environmental factor of competitiveness for urban districts will take the following form:

*EF=-0,81 *Kp-0,87 *Vp-0,79*To-0,76*As-*
*-0,59*Y-0,74 *Pr+0,87 *Ot-0,73 *Ep +0,85*It +0,83 *Sb.*

Table 4

DESCRIPTIVE STATISTICS

Parameters	Component	
	N	Mean
1.Concentration of industrial enterprises	58	3,45
2.Presence of hazardous industry	59	3,61
3.Absence of objects of anthropogenic impact	57	3,18
4.Level of automotive transport network development	59	3,80
5.Development level of public utilities	60	4,23
6.Population density	58	2,76
7.Presence of oil, gas and product pipelines on the territory	58	3,88
8.Extent of industrial equipment wear	60	3,13
9.Implementation of modern treatment technologies and reconstruction of existing treatment facilities	59	4,02
10.The level of energy intensity of production	59	3,08
11.Implementation of innovative waste processing technologies	59	3,59
12.Introduction of environmentally friendly modes of transport and fuel	59	3,73
13.The amount of funds allocated from the budgets of all levels for the implementation of environmental projects	59	4,08
Actual	52	

The model of the environmental factor of competitiveness for rural settlements will take the following form:

*EF=-0,69 *Kp-0,72 *Vp-0,64*To-0,76*As-*
*-0,55*Y-0,78 *Pr+0,80 *Ot-0,62 *Ep +0,72*It +0,82 *Sb.*

MODELING AND DATA ANALYSIS TO PREDICT THE GROUP OF PARAMETERS OF ENVIRONMENTAL FACTOR

Next, we select groups of related parameters for joint promotion, for this reason we carry out a factor analysis of the parameters.

Table 5

TOTAL VARIANCE EXPLAINED

Component	Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
1	3,528	27,140	27,140
2	2,603	20,021	47,161
3	2,194	16,875	64,035
4	1,980	15,228	79,264

Table 6

ROTATED COMPONENT MATRIX (A)

1	2	3	4
0,943	-0,117	0,052	-0,131
0,800	0,187	0,243	-0,097
-0,131	0,139	0,266	-0,879
-0,482	-0,024	0,273	0,677
0,105	0,229	0,460	0,754
0,091	0,472	-0,147	-0,055
-0,153	0,904	0,158	-0,235
0,424	0,611	0,539	0,089
0,748	0,219	0,399	0,274
-0,019	0,850	-0,151	0,286
0,105	-0,451	0,781	-0,138
0,112	-0,020	0,871	0,133
-0,688	0,307	0,327	-0,376

Table 7

COMPONENT TRANSFORMATION MATRIX

Groups of parameters			
1	2	3	4
0,808	0,264	0,515	0,230
-0,415	0,896	0,129	0,095
0,327	0,280	-0,254	-0,866
-0,329	-0,223	0,783	-0,434

Group 1 has an importance coefficient of 0.808; group 2 has 0.896; group 3 has 0.783, group 4 has 0.230. The first group should be promoted with the maximum coefficient of importance, that is, the mechanism for promoting the environmental factor should be carried out according to the following algorithm: group 2, group 1, group 3, group 4.

CONCLUSION

Recommendations for the model analysis of the environmental factor of competitiveness for ME are as follows.

1) In the group of environmental factors, the following are important: the concentration of industrial production; the presence of hazardous industries; the level of the motor transport network development; the level of public utilities development; presence of oil, gas and product pipelines on the territory; introduction of modern treatment technologies; introduction of innovative waste processing technologies; introduction of environmentally friendly modes of transport and fuel; the amount of funds from the budget for environmental protection measures.

2) Respondents excluded the parameter "territory density" from consideration. In a dynamic model of the environmental factor of competitiveness, it is necessary to change: the level of the motor transport network development, public utilities, the development of product pipelines, innovative technologies for waste processing, the amount of funds from the budgets, and other parameters are constant values.

3) To increase the attractiveness of the environmental factor, first of all, with limited investment potential, it is necessary to promote a group of parameters 2, consisting of the following set: population density, the presence of oil, gas and product pipelines on the territory, the extent of industrial equipment wear, the level of energy intensity of production.

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