

# Development of Innovative Activities in Depressed Regions

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**Abstract**— One of the urgent problems of social and economic development in modern Russian conditions is the search for ways to activate innovation in depressed regions. It is necessary to study the existence and strength of the link between the level of development of innovation activity and the state of the socio-economic climate using quantitative methods.

The article analyzes ten constituent entities of the Russian Federation, which are considered to be "depressive". With the help of correlation analysis, it was defined that there is a connection between the position of the subjects in the innovation development rating and the position in the rating of their socio-economic situation. Then, using the dispersion analysis, the authors of the article established a causal relationship between the level of socio-economic development of regions and the level of their innovative development. The statistical processing was carried out using a software package Statistica 10.

The authors pointed out that there are two most often mentioned factors which restrain the development of innovative activity of depressed regions: "Socio-economic conditions of innovation activity" and "Scientific and technical potential". The first factor is determined by the level of efficiency of the regional economy, the availability of human resources for innovation, the level of development of the information society. The second is determined by the state of financial and human resources for innovation and the effectiveness of research and development.

The development and implementation of measures to improve the effectiveness of the use of these factors will have the greatest impact on the development of innovative activities of depressed constituent entities of the Russian Federation and, accordingly, will contribute to increasing their level of socio-economic development.

**Keywords**—*innovation, innovation infrastructure, depressed regions*

## I. INTRODUCTION

One of the urgent problems in modern Russian conditions is to find ways to activate innovation in depressed regions. The development of innovative activities in depressed regions is influenced by a number of factors, among which the status of the socio-economic climate has become increasingly important. In this regard, the urgency and importance of studying the availability and strength of the link between the level of development of innovation activity and the state of the socio-economic climate based on the use of quantitative methods is reinforced. It will allow to determine the priority directions for raising the level of innovative development, and, as a consequence, the investment attractiveness and

competitiveness of the economy of the depressed regions in general.

## II. LITERATURE REVIEW

In foreign economic science there are many research works on such aspects of innovation as: innovation activity at the micro level [4,5]; innovative activity at the meso level [3,12]; management and regulation of innovation activities [6,10,11]; infrastructure and attraction of investments [7,8,9], etc. Russia also has a certain theoretical base for research in the field of innovation, including innovation in depressed regions. In particular, issues of depressiveness, trends in its development in the Russian regions were studied in [13,14,16,17,20], questions of innovation development of such regions were covered in [15,18,19]. Though there is a significant number of works, the problem of the development of innovative activity in depressed regions in economic literature has not been thoroughly studied.

## III. METHODS OF RESEARCH

In this study we used methods of correlation and dispersion analysis applied to a number of subjects of the Russian Federation which are considered to be "depressive" [21]. The correlation analysis made it possible to establish a connection between the position of the subjects in the rating of innovation development and the position in the rating of their socio-economic situation. Then, using the dispersion analysis, the authors of the article established the causal dependence of the level of innovative development of the regions on the most significant factors on their socio-economic development. Among such factors were: the socio-economic conditions of innovation; scientific and technical potential; innovation activity; quality of innovation policy. For the purposes of correlation and dispersion analysis, the authors used a software package Statistica 10.

## IV. RESULTS

The correlation between the level of development of innovation activity in the regions and the state of their socio-economic climate is confirmed by the results of the correlation analysis. A correlation relationship was found between the position of the subjects in the innovation development rating developed by the specialists of the National Research University of the Higher School of Economics, Moscow [1], and in the socio-economic ranking of the constituent entities

of the Russian Federation, compiled by RIA Rating Agency [2].

All subjects of the Russian Federation were divided into three groups with subsequent coding. Code 1 was assigned to the regions included in the first third of the rating, code 2 to the regions in the middle of the rating and code 3 to the regions in the last group of the rating. The analysis was carried out using the Statistica10 application software package. The results of the analysis are shown in Table 1.

TABLE I. CORRELATION BETWEEN THE LEVEL OF DEVELOPMENT OF INNOVATION ACTIVITY IN THE REGIONS OF THE RUSSIAN FEDERATION AND THE STATE OF THEIR SOCIO-ECONOMIC CLIMATE

Factors	Group in the rating of the socio-economic situation of the constituent entities of the Russian Federation
Group in the rating of innovative development of the subjects of the Russian Federation	0,632245

The correlation coefficient, which is 0.632 and measured on the Cheddock scale, corresponds to the value "an appreciable relationship between the variables". For a group of regions classified as "depressed", the link is even more pronounced and is characterized as "strong" (Table 2).

TABLE II. CORRELATION BETWEEN THE LEVEL OF DEVELOPMENT OF INNOVATION IN THE REGIONS OF THE RUSSIAN FEDERATION AND THE STATE OF THEIR SOCIO-ECONOMIC CLIMATE FOR DEPRESSED REGIONS OF THE RUSSIAN FEDERATION

Factors	Group in the rating of the socio-economic situation of the constituent entities of the Russian Federation
Group in the rating of innovative development of the subjects of the Russian Federation	0,801784

At the same time, correlation analysis allows only to ascertain the presence or absence of statistical dependence between variables, but can not point to a causal relationship. The hypothesis on the impact of innovative development of the regions of the Russian Federation on the level of their socio-economic development is checked using the dispersion analysis. For this purpose, Statistica10 first defines the "Rating of innovative development of the subjects of the Russian Federation" as a dependent variable, and then as a categorical predictor. The results are shown in Tables 3 and 4 respectively

The results reflect the significance of the constructed model, where the criterion p, equal to 0.0052, is much smaller than the critical value 0.05, set by default. These tables indicate the existence of a dependence of the level of innovative development of regions on their socio-economic

situation. At the same time, as we see, there is an effect of other factors that are not taken into account, as evidenced by the magnitude of the variation  $SS = 2,0$

TABLE III. RESULTS OF THE DISPERSION ANALYSIS FOR THE VARIABLE "RATING OF INNOVATION DEVELOPMENT OF THE SUBJECTS OF THE RUSSIAN FEDERATION", USED AS A DEPENDENT VARIABLE.

Indicator	SS	Levels of freedom	MS	F	p
Group in the rating of innovative development of the subjects of the Russian Federation	3,600	1	3,600	14,40	0,0052
Mistake	2,000	8	0,250	-	-

TABLE IV. RESULTS OF THE DISPERSION ANALYSIS FOR THE VARIABLE "RATING OF INNOVATION DEVELOPMENT OF THE SUBJECTS OF THE RUSSIAN FEDERATION", USED AS A CATEGORICAL PREDICTOR.

Indicator	SS	Levels of freedom	MS	F	p
Group in the rating of innovative development of the subjects of the Russian Federation	1,750	2	0,875	8,166	0,0147
Mistake	0,750	7	0,107	-	-

If the variable "Rating of innovative development of the subjects of the Russian Federation" is defined as an independent variable, and the socio-economic situation of the subjects of the RF as a dependent, the constructed model is also significant ( $p = 0.014$ ), but the influence of unaccounted factors is much weaker ( $SS = 0.75$ ). Therefore, we can assume that, first of all, it is necessary to consider the influence of the level of innovation activity of regions on their socio-economic situation, and not vice versa. Thus, the increased activity of depressed regions innovation would improve their socio-economic status and move to higher rated line, as evidenced by a positive value of correlation coefficient. According to the authors of the rating [1], the level of innovative development of the region is determined by a number of factors: the socio-economic conditions of innovation; scientific and technical potential; innovation activity; quality of innovation policy. Comparison of positions of depressive regions in the rating of innovation development and ratings by the value of the indices of these factors is presented in Table 5.

## V. CONCLUSION

Summarizing the above, the authors come to the conclusion: there are two most often mentioned factors which restrain the development of innovative activity of depressed regions: "Socio-economic conditions of innovation activity" and "Scientific and technical potential". The first is determined by the level of efficiency of the regional economy, the availability of human resources for innovation, the level of development of the information society. The second one is the state of financial and human resources for innovation and the effectiveness of research and development. Thus, the development and implementation of measures on these two

factors will have the greatest impact on the development of innovation activities of these subjects of the Russian Federation and will create the necessary prerequisites for the successful removal of them from a state of depression.

TABLE V. POSITIONS OF DEPRESSED REGIONS IN THE RATING IN THE CONTEXT OF INNOVATIVE DEVELOPMENT FACTORS OF THE SUBJECTS OF THE RUSSIAN FEDERATION.

Subject of the Russian Federation	Innovation development rating	Socio-economic conditions of innovation	Scientific and technical potential	Innovative activity	Quality of innovation policy
Chuvash Republic	7	27	49	2	5
Ulyanovsk region	22	19	3	53	57
Altai region	27	71	54	10	21
Kirov region	38	82	39	38	24
Volgograd region	39	54	51	54	25
Kurgan region	52	77	79	47	20
Smolensk region	56	39	8	51	78
Ivanovo region	57	66	13	75	57
Oryol Region	60	32	68	35	68
Pskov region	83	64	84	68	76

AUTHORS ON [1] PP. 27–28, 33–34, 40–41, 47–48.

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