

# Cluster Approach in Assessing the Level of Socio-Economic Development of the Municipal Districts (Voronezh Region)

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**Abstract**—The article presents the ranking of the main socio-economic municipal subsystems with their subsequent clustering to identify specific areas for further development on a similar socio-economic status. The scientific relevance of the research is substantiated. The object of research is the old-developed region of the Central Federal District of the Russian Federation - Voronezh Region. The subject of the study is presented by the organizational and economic relations that arise in the process of preparing promising areas of regional policy and development of the region. The research tasks are the identification of the main municipal subsystems and the definition of their composition, as well as a set of indicators that give a quantitative description of their state; identification of the main problems in the socio-economic development of the region. The definition of the level of differentiation of socio-economic development of municipalities in the context of the region explains the territorial features of all processes occurring in the country. Based on the author's methodology, the integral indicator of the level of social and economic development of the municipalities of the region was calculated. One of the best methods for conducting a typology on the level of social and economic development of municipalities is the cluster approach. A map of the Voronezh region, reflecting the differentiation of municipalities in the context of the subject of the Russian Federation, is elaborated from scratch. The implementation of the cluster strategy as part of the overall regional development strategy provides an opportunity to increase the competitiveness of the region.

**Keywords**—*socio-economic development, Voronezh Region, cluster analysis.*

## I. INTRODUCTION

At the current stage of the development of the regions within the Russian Federation, issues of balanced and stable development are moving forward. However, the process is relatively slow, which is stipulated by the high rate of heterogeneity and general imbalance of the social and economic area of Russia, which in its turn occur in

heterogeneity and general imbalance of the social and economic development.

## II. RELEVANCE OF THE STUDY

The cluster approach in the whole world is recognized as the most effective tool of the regional policy[1]. An overview of the Russian practice of regional governance shows the absence of established systematic and strategic approach towards development of the regions. Currently, enhancing the effective functioning of economic system within the regions remains a high priority scientific issue both from the position of the state and regional community[2]. Therefore, the evaluation of differentiation in the level of social and economic development of municipalities in the region seems to be relevant and up-to-date.

## III. THEORETICAL BASE OF THE STUDY

The founder of the cluster approach towards definition and strengthening of regional competitiveness became Professor of the Harvard Business School, Michael Porter. In the foreign scientific literature sufficient attention is paid to the cluster approach and cluster policy research. Sölvell Ö [14,15] for instance, defines evaluation as a process of systematic application of different research procedures with the aim to hold an analyses of conceptualization, development and implementation of policy, programmers, projects or other objects [6-9,11-13,16-22].

## IV. PURPOSE OF THE STUDY

Purpose of the study to provide the evaluation of differentiation in the level of social and economic development of municipalities in the Voronezh Region based on the cluster approach.

## V. GENERAL PRESENTATION OF THE STUDY

The term «level of social and economic development of the region» appears to be multidimensional and development –

multi-criteria. Thus, from the point of view of all scientists, whether economists or scientists in regional studies or economy and geography, special emphasis is being given to the one or a group of major indexes of the state of the region, crucial from these positions. Objective evaluation under consideration of all indexes inevitably faces necessity to connect multiple indexes into single, which undoubtedly leads to the lost of information and subjective evaluation. Economic heterogeneity study of the region could be held by the variety of mathematic tools, including application of the cluster analyses, which allows to divide the municipalities into relatively similar groups.

For the analysis of the level of social and economic development in municipalities of the Voronezh region, the author methodology was used [1-3], which appeared to be a base of integral evaluation of sustainability of the municipalities within the Voronezh region including 10 following indexes: 1) social (fertility and mortality rates, crime rate, the Engels coefficient, housing); 2) economic (industrial output, agricultural output, total turnover of the retail trade and catering facilities, investment volume, average salary of workers).

Then the integral evaluation of the level of social and economic development was held regarding all municipalities within the Voronezh region and social and economic development indicators. Four integral coefficients were selected as a base of synthesis: level of economic development, level of social development, economic performance, social performance. The average level of economic development during the period under review in accordance with the proposed author methodology appears to be 1 [3,4]. The integral coefficients allow to create a systematic picture of municipalities differentiation on the base of the level of social and economic development and as a result draw conclusions about their stability\instability.

It is also necessary to outline that there are relatively significant differences in coefficients, which characterize economic and social spheres from the one side and general level of social and economic development from the other side, as well as dynamic changes.

With the use of cluster hierarchal analysis procedures, it was revealed the whole area of the Voronezh region could be separated into 5 clusters (fig.1). Usual Euclidean distance between objects was used as a similarity measure.

The final stage of clustering was held by the k-average method which involves splitting of aggregate of objects into previously known number of clusters in order to minimize the amount of interclass dispersions. Homogeneity of the objects is one of the main requirements to the conduction of cluster analyses, so all observations should be standardized.

The conducted analyses of tendencies in social and economic development of municipalities within the Voronezh region allows to draw some conclusions:

1 cluster – areas with high level of development. This includes one municipality – center, leading territory Voronezh City, which significantly differs from other areas of the old-

explored region by coefficients of development level and their dynamics.

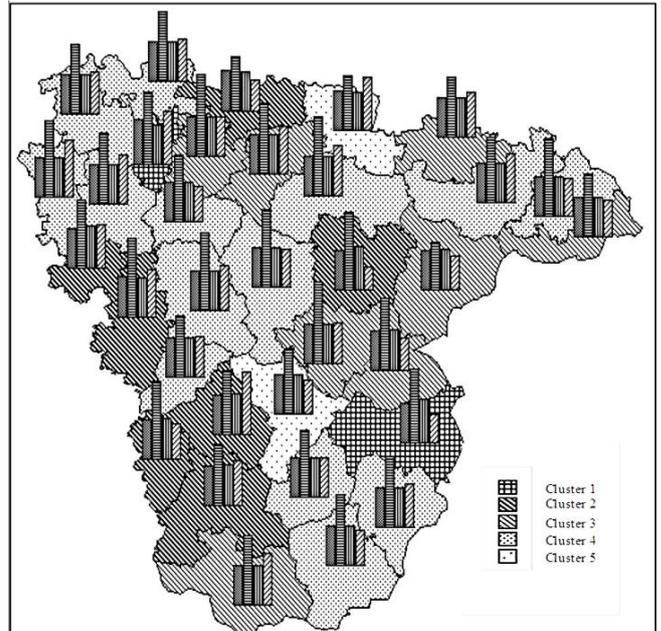


Fig. 1. Clustering of municipal districts of the Voronezh region by level of social and economic development.

2 cluster – weakly-depressed areas (Repjevskiy, Talovskiy, Kalacheevskiy districts), where differences in the dynamic of social and economic development emerge explicitly.

3 cluster – mid-depressed areas - 14 districts of the region, which are characterized by average dynamic of indicators of development level and development dynamic. They are consolidated within the territory and appears to be neighbors to each other. The center of the group is represented by one district - Rossoshanskiy.

4 cluster – strongly-depressed areas with the severe stunting in dynamics of economic and social development.

5 cluster – outsider areas or critically depressed areas. This includes only one municipality – Ertilskiy, which is characterized by severe development gap from other municipalities by development level and social and economic development dynamic.

## VI. CONCLUSION

Thus, the conducted analyses of unequal economic and social development between the municipalities of the Voronezh region undoubtedly rises increasing research and practical interest, especially from the point of the development of regional policy activities, aimed at balanced development of the regional economy in general.

The analyses of the social and economic situation show, that management of the crises by local authorities on their own is problematic or even impossible. There is a necessity of new organizational models, tools of municipal governance and coordination of social and economic processes, including new technologies of integrated impact on the process of improvement of the level of human resources.

**ACKNOWLEDGMENTS**

The study was carried out with the support of the RFBR grant 16-46-360686 r\_a "Informational and analytical system for forecasting social and economic development of the Voronezh region".

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