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**REGIONAL DEVELOPMENT DIAGNOSTICS BY MEANS
OF STATISTICAL MONITORING AND CONTROL**

The article provides a program of regional development monitoring and control for regions-leaders and outsiders by the level of statistical support of socioeconomic regional development. The level of statistical support of socioeconomic regional potential development is evaluated on the basis of a multivariate statistical analysis.

Keywords: monitoring; control; diagnostics; socioeconomic development; region; statistical support.

Костянтин С. Жадько, Юлія Г. Горященко
**ДІАГНОСТУВАННЯ РЕГІОНАЛЬНОГО РОЗВИТКУ ЗАСОБАМИ
СТАТИСТИЧНОГО МОНІТОРИНГУ І КОНТРОЛЮ**

У статті розроблено програму моніторингу та контролю регіонального розвитку для регіонів-лідерів та аутсайдерів за рейтингом рівня статистичного забезпечення соціально-економічного розвитку регіонів. Оцінено рівень статистичного забезпечення розвитку соціально-економічного потенціалу регіонів на основі методу багатовимірного статистичного аналізу.

Ключові слова: моніторинг; контроль; діагностика; соціально-економічний розвиток; регіон; статистичне забезпечення.

Табл. 2. Літ. 12.

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**ДИАГНОСТИРОВАНИЕ РЕГИОНАЛЬНОГО РАЗВИТИЯ
С ПОМОЩЬЮ СТАТИСТИЧЕСКОГО
МОНИТОРИНГА И КОНТРОЛЯ**

В статье разработана программа мониторинга и контроля регионального развития для регионов-лидеров и аутсайдеров по рейтингу уровня статистического обеспечения социально-экономического развития регионов. Оценен уровень статистического обеспечения развития социально-экономического потенциала регионов на основе метода многомерного статистического анализа.

Ключевые слова: мониторинг; контроль; диагностика; социально-экономическое развитие; регион; статистическое обеспечение.

Problem statement. At the stage of information society progress statistical monitoring and control as an effective means of improving regional development efficiency in terms of unstable economy can be the indicator of socioeconomic inequalities between regions.

At present the necessity in statistical monitoring and control at a regional level is related to reducing the amount of objects and volumes of mandatory statistical reports. In terms of national statistics today there is a complication in diagnostics of almost every economy sector development of Ukraine regions due to the critical scale of such processes as shadow economy, self-employment of population etc. Consequently, a structure of regional statistics, basis for regional statistical monitoring and control, is being ruined.

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Latest researches and publications analysis. A number of scientists and practitioners gave due consideration to the issues of diagnostics of socioeconomic regional development of Ukraine by means of monitoring and control. The ways of solving these problems are disclosed in the works by O.A. Vishnevskaya (2009), L.K. Semiv and M.I. Dolishniy (2007), Y.V. Orlovska and O.O. Zauchenko (2009), O.G. Osaulenko et al. (2004), T.V. Pepa (2006), T.V. Umanets et al. (2010) and others. However, despite plenty of theoretical, methodological and applied researches devoted to this issue, a lot of them are still debatable.

The purpose of the research is to develop recommendations on creating statistical support for socioeconomic development monitoring and control of Ukraine's regions.

The specified purpose was concretized in the following research objectives:

- to define the role and aims of regional development statistical monitoring and control at the present stage;
- to estimate the level of statistical support for socioeconomic regional potential development using a multivariate statistical analysis;
- to draw up a program of regional development monitoring and control.

Key research findings. Regional development supply with information is formed by national statistics by the results of monitoring and control of socioeconomic development of the country's regions. A synergy of monitoring and control provides an effective mechanism for constant supervision over complex indices of regional development and prevention of regional disproportions.

Monitoring and control are effective facilities to diagnose the regional development and a mechanism of constant supervision over planned indices of regional development, evaluation of actual results deviation from the expected ones and identification of its causes.

Hierarchical cluster analysis (data clustering), one of the multivariate statistical analysis methods, was applied to diagnose socioeconomic regional development. Its basic task is to discretize a sample into subsets (clusters) so that every cluster consists of similar objects and objects in different clusters differed substantially.

In compliance with cluster analysis requirements:

- selected objects are dimensionless;
- distribution of objects is near-normal;
- objects meet stability requirement that implies the absence of random factor influence on their values;
- the sample is homogeneous;
- objects do not correlate between themselves.

The basic steps of cluster analysis performed during the research are:

- data for clustering is sampled;
- features to estimate objects in the sample are defined;
- the level of objects similarity is evaluated.

Clusters are joined in groups of similar objects by applying the method of inter-group connections.

The characteristics of clusters by the statistical support of socioeconomic regional development in 2010 are provided in Table 1.

Table 1. Description of clusters by separate statistic factors of socioeconomic regional development in 2010 (cluster average), authors' development

Clusters	Regions	Library stock per capita, units	Total expenses of enterprises engaged in innovations, UAH per capita	Park of computers, items per 1000 persons	Amount of unemployed persons (by MOP methodology) per 1000 persons*
Cluster 1	Vinnitsya, Volyn, Zhytomyr, Zakarpattia, Ivano-Frankivsk, Kirovohrad, Luhansk, Rivne, Sumy, Ternopil, Kherson, Khmelnytskyi, Cherkasy, Chernivtsi, Chernihiv regions and Autonomous Republic of Crimea	8.2	108.8	54.2	47
Cluster 2	Donetsk, Zaporizhya, Kyiv, Lviv, Mykolayiv, Odesa, Poltava regions and Sevastopol city	7.0	122.1	107.0	40
Cluster 3	Dnipropetrovsk and Kharkiv regions	7.2	258.7	233.7	38
Cluster 4	–				
Cluster 5	Kyiv city	3.9	351.1	741.1	35

* Factor analysis preceded cluster analysis in this research, therefore the sample does not require any adjustments – the requirements are accomplished automatically by factor modeling procedure.

Taking into account the accuracy of the received multivariate linear model, it was determined that such factors as library fund, total expenses of enterprises engaged in innovations, available park of computers and amount of unemployed persons (as a destimulating factor) in region must be taken into account while working up measures of statistical support improvement of socioeconomic regional development monitoring and control of Ukraine.

Thereby, regions distribution by clusters in 2010 was mainly determined by the factors mentioned above. As the result, most regions were included in the cluster 1 – 16 regions (59%), cluster 2 – 8 (30%), cluster 3 – 2 (7%) and cluster 5 – 1 (4%). It represents the moderate degree of primary indices value similarity.

Cluster 1 has low level of statistical support of socioeconomic regional development monitoring and control (SSMC) and includes sixteen regions. It is characterized by low amount of computers available per 1000 persons and small spending of enterprises engaged in innovations per capita. Besides, it corresponds with the greatest amount of unemployed persons among all 5 clusters. However, the regions included in this cluster differentiate by the highest library stock per capita.

Cluster 2 has the SSMC level below average and consists of 8 regions (Table 1).

Cluster 3 is characterized by the average SSMC level and incorporates 2 regions (Dnipropetrovsk and Kharkiv).

In 2012 no region was included in Cluster 4 marked by SSMC level above average.

Cluster 5 – with high SSMC level – includes only the Kyiv city. The fact that there was only one region in 2010 is explained by the greatest total sum of expenses of enterprises engaged in innovations per capita and especially park of computers avail-

able per 1000 persons and by the lowest level of unemployment per 1000 persons. Meanwhile, Kyiv differs by the lowest library stock per capita.

Furthermore, cluster analysis of regional development diagnostics by means of statistical monitoring and control educed respectively low level of socioeconomic regional development and very slow pace of its improvement; a high degree of regions' divergence by SSMC level; geographical concentration of the lowest cluster 1; 5 clusters that differ by SSMC level – high, above average, average, below average and low.

The measures of a theoretic and practical nature are offered to improve the SSMC level. The theoretical measures should include the development of an information space of a region based on the information policy that pursues such strategic aims as the increase of regional management efficiency by introducing and expanding ICT use; enabling population to access information resources (broadening choice options); augmentation of cultural and scientific potential of a region (development of culture industries); transformation of regional information resources into a strategic resource of regional development; support of information culture of society etc.

However, as the amount of regional initiatives aimed to stimulate the economy development increase, we observe the slow pace of development of basic elements of information infrastructure in regions (hardware, personnel potential, new knowledge formation). In our view, this situation resulted directly from unsatisfactory management (in particular, creation of the improper system of goals and functional system) at both state and regional levels and, as a result, implementation of imperfect strategic state and regional programs. The goal of strategic development is defined in strategic plans of socioeconomic and cultural development of a region.

The government programs of socioeconomic regional development are one of effective instruments to provide systematic development of productive forces. They are developed to form an effective economic complex of a region on the basis of rational usage of existing resource potential.

Generally, strategies do not take into account all regional features of human potential development. Particularly, they are not aimed to develop social and demographic (educational attainment) and socio-cultural (state of science, culture etc.) potential of regions. Moreover, they partly contradict the concept of a steady development though its implementation, as showed above, is desirable and necessary for Ukraine. It stipulates a steady innovative intensive (but not extensive) economic development of countries (regions) together with solving a complex of questions in such spheres as environmental conservation, poverty liquidation, exploitation, discrimination etc. The majority of strategies specified in the Concept are based on the inertial development scenario that differs from the innovative one by aiming at more active implementation of scientific and technical achievements and innovative infrastructure development.

The program of regional development monitoring and control for regions-leaders and outsiders by the level of statistical support of socioeconomic regional development – was designed on the basis of (Table 2). This program embraces the measures of economic, social and innovative nature.

In particular, the program for regions-leaders includes cluster formation – association of enterprises, organizations and research institutions with a common purpose; development of business social responsibility; implementation of remote and

continuous education for office workers in information and telecommunication technologies industry and other.

Table 2. Program of regional development monitoring and control, author's development

Area of measures implementation	Regions-leaders	Regions-outsiders
Economic	Impelling to form clusters primary oriented not only at stimulating innovations but also creating zones for active collaboration of research institutions, businesses and authorities	Creation of specialized organizations network in regions – business-centers, incubators, industrial parks able to partly compensate the absence of necessary financial resources for entrepreneurs
	Facilitate socioeconomic regional development, efficient and economical use of natural resources, priority development of ecologically conscious manufacturing	Working up a regional development mechanism to brisk up interregional relations (it is limited by directions of frontier collaboration stimulation yet)
	Development of innovation sector of economy, using the high scientific and educational potential of a region	Diversification of smokestack industry and institutional structure of production by means of efficient development of non-commercial industries and enhancement of a role of small business
Social	Development of electric communication networks in a region including communication networks of the third and further generations	Providing an appropriate telecommunication infrastructure in rural areas
	Active involvement into information and telecommunication network of online education institutions, museums, hospitals, libraries and other socially important organizations through organizing regional data communication networks	Realization of information and infrastructural projects with the involvement of mass media, civil groups with relevant orientation, authorities and business
	Encouragement of business participation in social life including the development of a system of regional charity, investment and venture funds for social projects	Rising psychological motivation in social policy realization on the basis of joint participation of different classes of society, in particular active public awareness campaigns in local mass media and communication of principles, aims and tasks of socio-cultural policy
Innovations	Developing conditions for commercialization and implementation of scientific researches' and pilot projects' results and expansion of scientific data exchange as well	Support of common usage of information technologies, creation of integrated information environment of education
	Improvement of specialists preparation quality and building the system of continuous education for government employees in information and telecommunication technologies	Restructuring the network of primary and high professional education institutions with involvement of business resources interested in appropriate personnel, creating the mechanisms of cofounding enterprises interested in personnel

Conclusions:

1. Recommendations on building up statistical support for socioeconomic regional development monitoring and control of Ukraine were worked up; in particular, content and aims of regional development statistical monitoring and control at

the present stage were defined. Thus, monitoring and control are effective facilities for regional development diagnostics and the mechanism of regular supervision of check indices of regional development, evaluation of actual results deviation from the expected ones.

2. The level of statistical support of regional socioeconomic potential development is evaluated using the method of multivariate statistical analysis (cluster analysis). Thus, cluster analysis of Ukraine's regions by the level of statistical support of socioeconomic regional development monitoring and control showed high degree of regions divergence by this factor. In particular, Kyiv city and Dnipropetrovsk, Kharkiv and Donetsk regions have high indices and Chernivtsi, Ternopil, Zhytomyr, Vinnytsya, Volyn, Zakarpattia, Luhansk and others – low indices; the lowest cluster 1 is geographically concentrated; 5 clusters that differ by SSMC level – high (Kyiv city), above average (not a single region is included), average (Dnipropetrovsk and Kharkiv regions), below average (Donetsk, Zaporizhyya, Kyiv, Lviv, Mykolayiv, Odesa and Poltava regions and Sevastopol city) and low (Vinnitsa, Volyn, Zhytomyr, Zakarpattia, Ivano-Frankivsk, Kirovohrad, Luhansk, Rivne, Sumy, Ternopil, Kherson, Khmelnytskyi, Cherkasy, Chernivtsi, Chernihiv regions and the Autonomous Republic of Crimea).

3. A program of regional development monitoring and control was developed; it includes a set of economic, social and innovative measures.

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