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INFORMATION SUPPORT OF DECISION-MAKING IN THE MANAGEMENT OF SOCIO-ECONOMIC DEVELOPMENT OF THE REGION

Abstract. In the article the theoretical-methodological bases of informational support of decision-making in the management of socio-economic development of the region and provided suggestions for improving the process.

Keywords: management decisions, management decisions, information support of managerial decisions, region, socio-economic development of the region.

ІНФОРМАЦІЙНА ПІДТРИМКА ПРИЙНЯТТЯ РІШЕНЬ В УПРАВЛІННІ СОЦІАЛЬНО-ЕКОНОМІЧНИМ РОЗВИТКОМ РЕГІОНУ

Анотація. У статті визначено теоретико-методологічні основи інформаційної підтримки прийняття рішень в управлінні соціально-економічним розвитком регіону та надано пропозиції з удосконалення даного процесу.

Ключові слова: управлінські рішення, прийняття управлінських рішень, інформаційна підтримка управлінських рішень, регіон, соціально-економічний розвиток регіону.

ИНФОРМАЦИОННАЯ ПОДДЕРЖКА ПРИНЯТИЯ РЕШЕНИЙ В УПРАВЛЕНИИ СОЦИАЛЬНО-ЭКОНОМИЧЕСКИМ РАЗВИТИЕМ РЕГИОНА

Аннотация. В статье определены теоретико-методологические основы информационной поддержки принятия решений в управлении социально-экономическим развитием региона и даны предложения по совершенствованию данного процесса.

Ключевые слова: управленческие решения, принятие управленческих решений, информационная поддержка управленческих решений, регион, социально-экономическое развитие региона.

Target setting. The socio-economic reforms that have been conducted in recent years led to continuously growing complexity of the processes occurring in the region, exacerbated the crisis in the budget system, many

regions are facing the threat of underfunding and social stratification. These circumstances require fundamentally new approaches to management based on anticipatory, predictive information.

The first and the major step in the management process is information gathering and analysis of the status, which are usually carried out through monitoring of basic socio-economic indicators for the region. The analysis of the collected information, as well as identifying trends and development factors require the use of modern means of analyzing huge volumes of data and providing results to users in a convenient way to manage the socio-economic development of the region.

Analysis of recent studies and publications. Issues of socio-economic development of the region, as well as the support of management decisions are highlighted in the works of many famous Ukrainian and foreign scientists, including E. Y. Andyeva [10], V. D. Bakumenko [1], A. O. Dyehtyar [2], G. Gnatienko [4], V. R. Kigel [5], I. I. Kozak [11], K. M. Kosmina [12], P. M. Maydanevich [6], D. O. Lazarenko [6], V. V. Lytvyn [7], O. V. Luchakova [12], M. S. Pashkevych [8], V. E. Reutov [9], I. I. Semenova [10], B. Snytyuk [4] A. Sukhorukov [3], G. S. Tretyak [11], T. V. Umanets [12], A. M. Cheremys [11], Y. M. Harazishvili [3] and others.

Despite its importance and relevance, the issue of computer support for the decision-making in management of the socio-economic development of the region is still theoretically undeveloped. There are different approaches to the concept of "support for the decision-making in management", but to date is not formed a clear categorical apparatus; there are no single classification factors and indicators; there are no unified methodology for assessing the efficiency of decision-making support.

The purpose of the article is to determine the theoretical and methodological foundations of information support for decision-making in the management of the socio-economic development of the region, and provide suggestions to improve the process.

The statement of basic materials. In the current circumstances, the socio-economic development of the regions is an important strategic component of regional management, along with administrative and legal regulation and budget (financial and investment) policy. In practice, strategy development for the socio-economic development is connected with planning the long-term and the short-term development plan for the region. The formulated strategy largely determines the content of the main activities of local governments [12, p. 21]. Management of the region is composed of:

- comprehensive analysis and forecasting of the socio-economic development;
- formation of a consolidated plan for the development of the region;
- management of the socio-economic development.

In accordance with the structure of management of the region, three are three levels of decision-making in the field of the socio-economic development [11, p. 34]. At the top level is

carried out the macro modeling of the socio-economic development of the region and shaping the strategy of socio-economic development of the region, drafting a program for the development. At the secondary level, there is developing specific management decisions regarding economic regulation of the market. Lower level is informative, which flock information from the regions, governing bodies, committees, administrative and commercial services.

The main objective target in the management of the socio-economic development of the region is purposeful choice of the management decisions and economic management, determining such proportion of social reproduction (achieving a balanced of the use of resources in the system) that, to the fullest extent possible, meets the needs of the population in the region and improve living standards [9, p. 41].

Forecasting and simulation are a kind of information support for any decision-making process. They expand the horizons of strategic planning, provide timely and adequate response to changes in the external environment, determine the field of alternatives options of the development of the system, which is simulated, and the range of possible ways to achieve the desired options.

Permanent vision of the prospective allows promptly identify risks and take measures to avoid negative results. The socio-economic forecasting reveals uncertainty in the system, justifying factors at which the achievements of the objectives establish. Timely and accurate forecasting data and monitoring data should provide quality support

for all the necessary management functions, reduce uncertainty in decision-making of the crucial management decisions and promote the development of regional systems. Forecasting allows you to move from reactive management that is based on system which responses to the current challenges to the projective state regulation, which promptly detect possible threats and opportunities of the future.

Phase of the development of the plans and development strategies is based on an analysis of the status and forecasting and is a proposal of structural change, in which the development of the region will be the most balanced and will meet the requirements of the government and people of the region. The objectives of this phase are implemented taking into account expert opinion, and is also used scenario approach and computer methods of the decision-making support [8, p. 77].

Thus, forecasting and simulation are part of the management process, which is a tool of the socio-economic development of the region.

The high importance of forecasting and simulation for the regional management implies the need to improve its quality and make research results and models more accurate using new computer technology, accumulated and updated databases, modern methods of the simulation of complex systems, including stochastic and imitative approaches.

However, at the regional level theory and practice of simulation and the regulation of economic processes did not receive sufficient recognition. Local authorities remain inadequately engaged in the development perspec-

tive and little use modern tools of the regulation of economic processes. The current practice of forecasting and analytical activity does not provide a balanced forecast across many social and economic indicators related to the use of macroeconomic models and extrapolation methods. As a result, forecasting results are contradictory, especially in the long term. Furthermore, the used approaches do not allow assessment of the impact of control parameters, solve problems of the target management, and conduct scenario analysis, which are so essential for the real management of the socio-economic development areas.

Therefore, currently for the management of the socio-economic development is used modern technology of computer simulation that improves the quality of the developed forecasts and taken decisions. Methodological basis for simulation the socio-economic development of the region is a systematic analysis, the central procedure of which is building a generalized model of the region reflecting all the factors and relationships of the real system. Today the computer model of decision-making is seen as a situational computer model, which can not only solve the problems of forecasting, but the tasks of playing a large number of alternative scenarios.

In developing the models of the socio-economic development should be taken into account that the region is seen as a complex low structured system, system simulation which involves identifying a large number of complex interrelated causal relationships between factors described with a large portion of the expertise knowledge. The simulating object is characterized by the weakness of theoretical knowledge,

qualitative knowledge of the system, high level of uncertainty of the initial information. Investigation of the operating processes of the region requires a study of the dynamics of the system, analysis of the process of growth, taking into account the total life cycle of the region and its parts (people, enterprise, housing, etc.), while there is a conflict between the goals of long-term planning and the short-term solutions, thus there is need for coordination when making decisions [3, p. 52].

Recently, the major backbone method in the socio-economic simulation of the region are becoming imitation models that help to explore complex, low formalized systems in dynamics, in conditions of uncertain information and impact of a large number of factors of the stochastic nature, conduct a large number of options, scenarios and strategies.

The development of the modern information technology opens up new prospects for automation and informatization of functional activities of the government. Taking into consideration the fragmentation of information and analytical applications in the current practice of management, it is necessary to create a modern decision-making support system, with support of the collection of baseline information on the locations, its syntactic and semantic matching and placement in an integrated data warehouse, organization of processing and presentation of accumulated information by the means of modern methods of the decision-making support.

Analysis of technology of the territorial structures with information-analytical tasks allowed selecting a number

of factors that determine the need to develop a support system for enforcement of the socio-economic development of the regions:

1. Handling large volumes of diverse information that is often stored in databases, organized on different platforms and hard copies, and specialists of various units have no direct access to a whole variety of accumulated information.

2. The current technology of preparation and decision-making in the executive bodies at all levels requires a large amount of coordination within the department and with other agencies, both vertically and horizontally.

3. The presence of a large number of system complexity tasks of reporting, analytical and predictive nature requires the use of advanced and special mathematical and economic, and toolkit means to find relationships, study time series, analysis, simulation and variant forecasting of the key indicators of the socio-economic development.

4. The high diversity of possible forms of initial reports requires a flexible means available to developers and users for the rapid formation of reports.

5. Disparate information and analytical support for various stages of development management of the region.

6. Using outdated models and forecasting techniques, lacking of information base and tools for using advanced computer models lead, as a consequence, to poor quality of forecasts.

7. The high complexity of the processes of regional management.

All above factors lead to the conclusion that for the successful implementation of the functions of management for the development of economy and social sphere should be used systems for the support of decision-making, which are capable to: consider the huge amount of financial and economic, social and demographic, natural and environmental, and other retrospective information, conduct identification and specific indicators forecasting of the economic development, and social sphere on possible future scenarios of the region development, and on the basis of their assessment determine the most reasonable, that is quite cost-effective and perfectly acceptable for the social and environmental evaluation criteria.

In such a system are organized processes of accumulation, analytical processing of the territorial information and tools for the system simulation of the socio-economic development and decision-making.

The main purpose of the decision-making support for the government bodies and local authorities is to solve such complex problems [1, p. 34]:

• monitoring of the socio-economic and financial indicators in order to control and make comprehensive analysis of the current socio-economic situation;

• analysis of the territorial information and identifying trends and patterns in accumulated data;

• forecasting of the state of sectoral and regional systems, and allocating distortions in markets and corresponding points of rise in the socio-economic system;

• analysis of the impact factors of different nature on the socio-economic situation in the regions;

• system simulation of the socio-economic development of the regions

on the basis of complex interrelated imitation and optimization models;

• information and analytical support of the decision-making of management decisions that involves performing multivariate calculations of scenario and target type of the socio-economic development and the assessment of effects of the decision.

With the creation and operation of the decision-making support system should be used by the management and specialists of the structural units of public authorities and local self-government bodies of the regions in the analysis of the current situation, identifying trends and patterns in the decision-making and the evaluation of performance, and in some other areas, on general issues of the socio-economic development of the region.

Thus, the central objective of this study is the developing of common approaches to the construction of system of this class for authorities and toolkit means that perform the complex decision-making support.

The basis of toolkit filling of the system of the decision-making support is a process of decision-making and support methods that are implemented in the circuit of this class of systems. Modern decision-making support systems should have a complete set of tools that provides continuous support of the entire decision-making process.

There are two approaches to the concept of administrative decision in scientific works on the theory of the decision-making management [2, p. 64]. The difference between them, above all, in the width of coverage of this concept in the narrow definition of the decision-making management is seen as a selection of the best set of alternative rational decisions, and in extended terms the decision-making management is understood as the whole process of management.

In known work the decision-making process is seen as some iterative procedure in which the authors identify the different decision-making phases. The process of development and adoption of the management decision is rather well developed and reflected in scientific works. In meeting the challenges focused on the computer decision-making support will be considered, according to [4, p. 78], the decision-making process as a set of stages: collection and analysis of information, problem statement; generation of possible solutions (alternatives); assessment of the proposed scenarios; computer analysis of the dynamics in the situation; decision selection; conformity assessment of the decision tasks.

Currently, there are a large number of the decision-making support methods known that can be implemented as appropriate tools in the decision-making support systems. The most frequently used method are: heuristic methods such as decision trees, method of hierarchy analysis, cognitive maps, so-called data mining, among which the most widely used are factorial, regression and correlation analysis, simulation techniques, including mathematical, imitation, neural network models and genetic algorithms. Analysis of these methods allowed assessing their suitability for various stages of the decision-making.

At the first phase, there are preparations for the development of management decision that includes: getting

information about the situation, setting goals, developing evaluation system, analysis of the management situation, diagnosis of the situation, identify problems and setting objectives and implementing them. The most important element at this stage is to collect and structure information on the processes that take place in the socio-economic systems. In the regions it is collection and analysis by statistical bodies the information in the following areas: generalized indicators of the socio-economic development, demography, labor market, money income and living standard of the population, municipal engineering, supply health services to the region's population, education, investment activity, characteristic of the regional budget, and so on. In modern computer systems this stage is supported by the subsystem monitoring.

An important aspect of the decision-making procedure is identifying the key issues of the subject area and analysis of trends, comparisons, exceptions, accumulated in data storage, as well as confirmation and interpretation of the identified patterns, which in turn stimulates the search for adequate solutions. Information and analytical support for this phase is implemented so-called data mining tools [5, p. 24], the spectrum of used methods which, depending on the task, is rather wide: from advanced statistical techniques, including regression, cluster analysis to intelligent technologies: genetic algorithms, neural network technology.

Visualizing of found dependencies using OLAP technology [7, p. 52] that forms multidimensional submission of data and arbitrary cuts of the analyzed data using a convenient and beautiful graphics membranes, significantly increases the efficiency of the system analyst at this stage.

At the second stage, there is a phase of development of possible management decisions of elimination the problem. The output of the second stage provides several options for management decisions and the influence on the situation, and creating scenario conditions. It is necessary to consider various options for changing the dynamics of the main factors of the situation. At this point are used cognitive maps, processes of generation solutions, scenario development, expert evaluation.

At the third stage is carrying out the analysis and assessment of the applicability of the scenarios proposed in the previous step. At this stage, the main task is to develop a feasibility evaluation of the considered options of administrative actions and the goals to be achieved. On the basis of this assessment is carried out ranking the considered options. As a result of this stage, only the most likely scenarios are left, usually 3–5. The main method here today is peer review [6, p. 31].

At the next stage is carrying out a computer analysis of the dynamics of the situation in accordance with the proposed and selected scenarios. Technological support for this phase is often imitating [7, p. 97] or mathematical simulation [6, p. 62]. Dynamic analysis gives the opportunity to explore the behavior of the system as a result of changes taking place both within the system, and as a result of changes in the external environment that allows to understand the development trends of the system under consideration in time, and to analyze possible trajectories of

such development. When calculated on a comprehensive imitation model scenario approach takes a prominent place, which allows conducting multivariate situational analysis of the simulated system.

At the fifth stage is carrying out the procedure of evaluating options and making choices on the results of sophisticated, informative experimental studies conducted on a set of imitation models, characterized by the direct participation of an expert in targeted modeling research and using computational procedures based on compensation experimental approach combining computer modeling with different analytical Data Mining methods (from statistical methods to the expert and intelligent systems), balance methods, iterative imitation and optimization computational procedures and others [4, p. 58]. If necessary, the problem of coordination of proposed solutions between different divisions is solved by using different rules of searching for a compromise, such as an ideal point method, concessions method, and method of approval decision on the main criterion.

At the final stage is performed the decision directly by the performers, the use of financial and material resources. Also in this phase are carried out control procedures of the implementation and results analysis of the situation after the management impact. It is advisable to use a monitoring system as part of the decision-making process, which should control the process of achieving intermediate results of the management solutions. Another objective of this phase is the timely development plan for correction of the taken decision. In particular, the adjustment of the earlier taken decision often requires the same procedures and actually the decision-making.

Conclusions. In the decision-making support system for government bodies and local self-government at the regional level, should be implemented man-machine procedures that support all stages of the decision-making process, including analytical monitoring, generation of possible scenarios, computer dynamic analysis, up to procedures of selection alternatives and evaluating the results of the changes.

However, in practice, there is no comprehensive support for all stages of the decision process in the modern decision-making support systems. At best, implemented analytical tasks of analytical monitoring, storage of consolidated data and identifying trends, that are, the components of the decision-making process in most of the modern decision-making support systems are implemented fragmented, and methods of computer analysis and simulations of situations are not represented at a proper technological level.

All this hence the relevance of developing new approaches to build the decision-making support systems for the governing bodies that carry out cross-cutting information and analytical support of the decision-making processes are composed of advanced tools that allow to provide the computer decision-making support, form a complex computer model of the socio-economic system from positions of system approach that allows the study of complex regional processes, forecasting indicators of the socio-economic development, computer analysis of the dyna-

mics of situations, and make evaluation and selection of proposed management decisions.

REFERENCES ───────

1. *Bakumenko V. D.* Formation of the public-management solutions: problems of theory, methodology, and practice: monograph. / V. D. Bakumenko — K: Printed UADU, 2000. — 328 p.
2. *Dyehtyar A. O.* Public management decisions, information analysis and promotion: monograph. / A. O. Dyehtyar. — Kh.: Printed Khar-PI NADU "Master", 2004. — 224 p.
3. *Simulation* and forecasting of the socio-economic development of Ukraine: monograph. / A. I. Sukhorukov, Y. M. Harazishvili. — K., NISD, 2012. — 368 p.
4. *Hnatienko G.* Expert technology decision-making: monograph. / H. Gnatienko, V. Snytyuk. — K.: LLC Maklaut, 2008. — 444 p.
5. *Kigel V. R.* Methods and models of decision support in a market economy, monograph. / V. R. Kigel. — K.: TSUL, 2003. — 202 p.
6. *Lazarenko D. O.* Providing informative credentials in the managment decision-making: Collective monograph. / D. O. Lazarenko, P. M. Maydanevich. — [Common. Ed. T. O. Lazarenko]. — Slovyansk: SDPU, 2008. — 250 p.
7. *Lytvyn V. V.* Knowledge bases of the intelligent decision support systems: monograph. / V. V. Lytvyn. — Lviv, Lviv Polytechnic National University Publishing House, 2011. — 240 p.
8. *Pashkevich M. S.* The scientific basis for regulating regional economy: monograph. / M. S. Pashkevich. — Dnepropetrovsk, Donetsk National Mining University, 2012. — 790 p.
9. *Reutov V. E.* Regional dimension of transformational changes in economy of Ukraine: monograph. / V. E. Reutov. — Simferopol: PE Enterprise Fyeniks, 2010. — 432 p.
10. *Semenova I. I.* Support of adoption decisions in the credit system, monograph. / I. I. Semenova, E. Y. Andyeva. — Omsk: SybADY, 2010. — 168 p.
11. *The socio-economic* development of the region: the mechanisms of state influence, monograph. / supervisor. com. col. Ph.D., Assoc. O. P. Kraynyk; com. col .: G. S. Tretiak, O. M. Cheremis, I. I. Cossack. — Lviv: LRI NAPA, 2011. — 232 p.
12. *Umanets T. V.* Evaluation of the regional economic development of Ukraine: theory and Practice [Text]: monograph / T. V. Umanets, O. V. Luchakova, K. M. Kosmina. — Donetsk: AGE, 2010. — 477 p.