Information Provision of Planning the Balance of the Innovational and Investment Spheres of Activities

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Abstract. The issues studied in this article are very topical, as all specialists are confident in the necessity for provision of well-balanced innovational and investment spheres of activities. For management of these processes, it is important to have correct information on their dynamics, as well as methodologies and tools of its processing for assessment of balance.

For solving the set problem, the essence and indicators of balance of the innovational and investment spheres of activities were analyzed. It was determined that the notion "balance" has the financial, economic, ecological, organizational, and technical & technological senses. The system of indicators that reflects them has to conform to certain requirements (accessibility, authenticity, fullness, and compatibility) and include the indicators of balance of the required resources and their sources, as well as coordination of the required and existing (planned, forecasted) rates of change of the results of their usage.

It is especially important to determine and prevent the critical level of imbalances in the state system of management, including the sphere of innovational development and its investment provision. One of the key aspects in this process is formation of the comprehensive innovational & investment policy at the state level as a primary precondition for the balance of the innovational and investment spheres of activities and the basis for its planning.

The authors identify the sources of the information necessary for conduct of evaluation of balance and methods of assessment of its indicators and distinguish the most acceptable of them, which, due to high information content and relative simplicity, include the following: the matrix (for evaluation of the resources' balance) and correlation methods (for evaluation of balance of dynamics of the basic indicators of development).

The principles (of normative & legal provision, strategic orientation, coordination of interests, and constant monitoring) and organizational & methodological approaches to information provision of the process of planning of balance are determined.

The article provides the results of evaluation of balance at the level of the sphere (industry). The determined limitations in development show that it is necessary to reorganize management of regional and sectorial systems from the positions of provision of balance. For this, the mechanism of information

provision of planning of balance of the innovational and investment spheres of activities is offered.

1 Introduction

The value of indicators of balance development is that they provide factual basis for determining:

strategic feedback that shows to the persons who make decisions the current status of the organizations from several perspectives;
diagnostic feedback from various processes for management of changes;
temporary tendencies of the change of effectiveness of work with control over indicators;
feedback between the methods of measuring and selection of controlled indicators;
quantitative incoming parameters for the methods of forecasting and modeling for the systems of decision support.

Topicality of the problem of information provision of planning of balance development of industry is caused by a lot of problems of the methodological, organizational, technological, and economic character.

According to the works (Niven 2004; Sirotkina and Vorontsova 2014; Khamidulina and Suldina 2015, Goncharov and Sitorkina 2015a, 2015b; Kruglyakova et al. 2017), as well as Parakhina and Khanaliev 2011, Boris 2014, Timoshenko and Gorbenko 2016, there is no methodology for balance evaluation that is acceptable for various spheres. Therefore, it is necessary to compare different approaches that allow evaluating the level of "imbalances" and planning their reduction.

Organizational problems are manifested in the fact that the existing system of planning supposes evaluation of balances of the material and financial characters (which is reflected in the works on planning of regions and separate spheres – (Basovsky 2002; Maximenko 2009; Tadtaev and Parakhina 2016) and does not deal with the issues of collecting information for coordinating the tendencies of innovational & investment development.

The technological problems are related to weak elaboration of the technologies of receipt and processing of interconnected information of the innovational and investment spheres of activities – as is seen in the works (Anshina 2006; Arsenyeva et al. 2016; Bergman and Charles 2003; Goncharenko 2014; Doloro and Parto 2003), etc.

The economic problems are determines by increasing negative influence of imbalance and uncertainty of the forecast situation in the sphere of the innovational & investment spheres of activities on the results of development of the spheres of the Russian national economy – which is shown by the works (Glazyev 2013; Parakhina et al. 2015; Treshchevsky et al. 2017).

2   Methods

The following methods were used:

- monographic, for studying the essence, principles, and approaches to creation of the system of information provision planning of balance of the innovational and investment spheres of activities and formation of the investment policy at the state level;
- economic & statistical – for receipt, selection, and evaluation of information on the indicator of balance of the innovational & investment spheres of activities;
- index, matrix, economic & mathematic modeling – for complex evaluation of the level of the system's development balance;
- induction and deduction for the formation of conclusions for the results of calculations of the indicators of balance of the innovational & investment spheres of activities in the analyzed systems.

3   Main Part

1. *Studying the essence and the indicators of balance of the innovational & investment spheres of activities*

For the purposes of monitoring and diagnostics of the influence of various conditions on well-balanced innovational development, for adequate managerial interaction at the macro-economic level, it is necessary to apply special research methods, developed in view of peculiarities of the component structure of balance. This condition predetermines the topicality of substantiation the indicators of well-balanced development and further development of methodological approaches to conduct of monitoring of the socio-economic position and interpretation of the received results from the positions of well-balanced development. The system of indicators of socio-economic development should conform to the requirements of completeness, accessibility, and correctness of the information; possibility of expansion of spatial and time limits; compatibility; information content of results.

That's why the indicators should be developed on the basis of priorities of the strategic plan which contains the key factors of development of business and criteria of selecting the indicators that are most interesting for the managers. Then, the processes of information collection are planned and bringing them into the numerical from for storage, reflection, and analysis.

During determining the criterion of balance, it is necessary to consider several aspects of this category, providing each indicator in two "views" (the present and the future) and as to a certain level of the production complex (a company or the sphere on the whole, a region or the country on the whole). Integrating various approaches to the forms of balance (Timoshenko and Gorbenko 2016), we offer – for the purpose of similarity of evaluation of the internal and external balance – to study the following list of forms of balance: financial; economic; material; targeted (large industrial systems – sphere, region, country)/technical & technological (companies and organizations); innovational; labor; social, ecological.

Let us view the essence of balance of industrial complex by its forms and select one of the indicators as the main criterion of its assessment.

Firstly, financial balance is the balance of needs and sources of financial resources, which could be characterized by profitability or profitability of capital in industry, as only a certain level of profitability allows accumulating own assets for development (at least, profitability should be above the inflation level) and attracting borrowed assets (profitability should be above the interest rate for the credits).

Secondly, economic balance, as ratio between industrial production (its results) and needs for them (demand for industrial production). This ratio cannot be reflected by enlarged indicator, though it may be characterized by the level of business activity and turnover of capital in the industry on the whole and for the spheres and companies: if the products does not satisfy the demand, the company acquired more products, and the stock of final products and unfinished goods are increased, the capital becomes "dead", and its turnover reduces.

Thirdly, labor balance, as proportional distribution of public labor (resources) between various spheres of industry and balance between the required and existing human capital (quantity and quality), which could be expressed by the indicators of effectiveness of human resources use, as the lack (or "excess") of labor force leads to its "overload", loss of the potential of labor activity (or "underutilization") – as a result, labor efficiency decreases.

Fourthly, targeted and technical & technological balance as the balance of existing and required (according to the priorities of development) production capacities and correspondence of the performed changes to the set strategic goals of development of industry. At a company, this comparison is conducted for each area of product creation (in the quantitative and qualitative aspects). We think that this is reflected in the level of return on assets. Presence of "narrow" spots in the technological chain leads to underutilization of other areas of the production chain and lower return of production funds on the whole.

Fifthly, material balance – as the balance of existing and required material resources (raw materials, spare parts, etc.). Lack of one resource leads to its urgent and more expensive purchase, use of replacements, reduction of quality and/or growth of the cost of products cost in the part of material expenditures. As a result, the share of material expenditures in the products' cost grows.

Sixthly, balance of innovational processes, as the ratio between the existing and used innovational potential. Underuse of the innovational potential leads to overrun of the rates of growth of expenditures for innovations and development over the rates of growth of the innovational product.

Seventhly, social balance as a reflection of the level of social provision of employees, expressed by the level of wages and the volume of expenditures for the social programs in the industrial complex and their growth in view of inflation.

Eighthly, ecological balance as a ratio of growth rates of production (reflects the usage of natural resources) and the costs of reproduction of natural resources (assets allocated for ecological programs).

This structure of the indicators of balance is applicable to the industrial sphere of the country on the whole and reflects the balance of its development.

2. *Necessity for formation of the integrated innovational & investment policy and the system of collection of information on its implementation at the state level*

For evaluation of balance of production complexes, it is necessary to collect the required information on the state of their innovational and investment spheres and to observe certain priorities that ensure coordination of their development. These priorities are set by the public authorities bodies within the corresponding policies, strategies, or concepts of development of the spheres, regions, and the country on the whole.

An important element of the state economic policy is innovational policy, which supposes selection of the top-priority directions in development of science and technology and full support from the state in their development. As a rule, when developed independently, investment policy creates conditions for implementing the innovational programs and projects – but analysis of the goals, mechanisms, and tools of state regulation of investment policy that are used in practice show that they are ineffective as to the innovational sphere.

Thus, it is expedient to use the complex and systemic approaches during formation of the innovational & investment policy at the state level, which allows viewing it as a union of two spheres: innovational and investment; as well as interconnected components: goal, limitations, the processes of entering and exiting (Fig. 1).
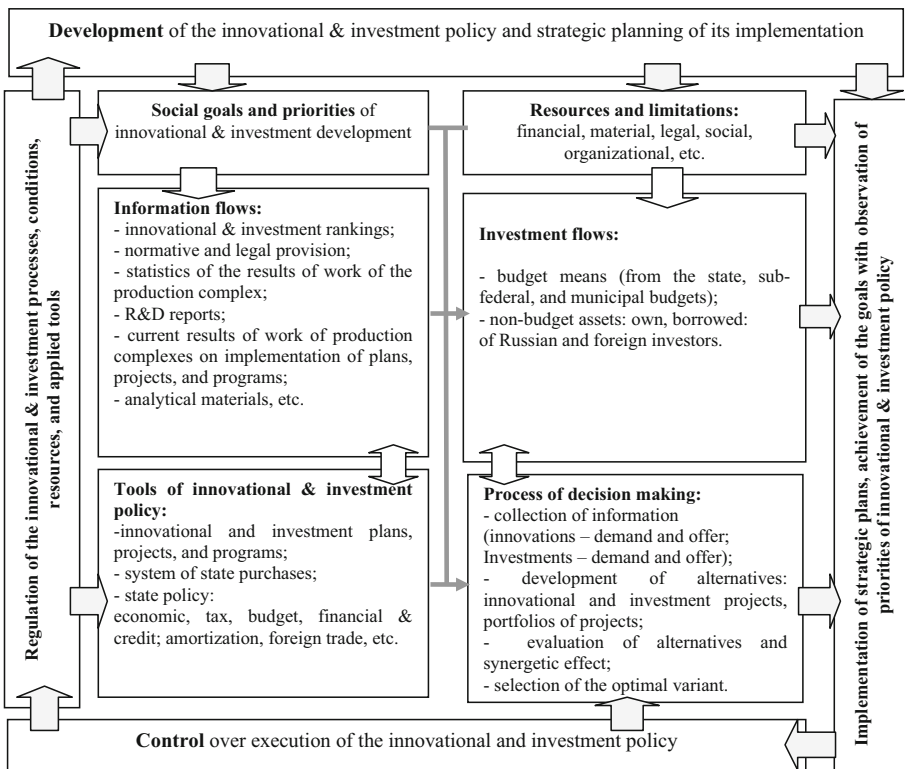

Development of the innovational & investment policy and strategic planning of its implementation

Social goals and priorities of innovational & investment development

Resources and limitations: financial, material, legal, social, organizational, etc.

Information flows:
- innovational & investment rankings;
- normative and legal provision;
- statistics of the results of work of the production complex;
- R&D reports;
- current results of work of production complexes on implementation of plans, projects, and programs;
- analytical materials, etc.

Investment flows:
- budget means (from the state, sub-federal, and municipal budgets);
- non-budget assets: own, borrowed: of Russian and foreign investors.

Tools of innovational & investment policy:
- innovational and investment plans, projects, and programs;
- system of state purchases;
- state policy: economic, tax, budget, financial & credit; amortization, foreign trade, etc.

Process of decision making:
- collection of information (innovations – demand and offer; Investments – demand and offer);
- development of alternatives: innovational and investment projects, portfolios of projects;
- evaluation of alternatives and synergetic effect;
- selection of the optimal variant.

Control over execution of the innovational and investment policy

Regulation of the innovational & investment processes, conditions, resources, and applied tools

Implementation of strategic plans, achievement of the goals with observation of priorities of innovational & investment policy

Fig. 1. The system approach during formation of the state innovational & investment policy

During formation and implementation of the state integrated innovational & investment policy, it is necessary to pay attention to such constant negative factors as inequality of distribution of the investment potential among the country's regions and deep differences in the regional investment risks.

3. Identification of the methods of evaluation of the balance indicators

The main idea of the increase of the level of balance of functioning supposes creation and usage of its indicators. The indicators of balance are measured characteristics of products, services, processes, and operations that are used by the company for tracking and increasing the balance.

Analysis of the methodological approaches to evaluation of balance of innovational & investment development of the production complexes allowed determining the following.

Most often the researchers use the system of well-balanced indicators offered by Kaplan and Norton (2003), Neeley et al. (2003), Niven (2004). It includes the following groups: finances, satisfaction of customers, internal business processes, and the company's capability to develop and grow. However, this concept does not draw a difference between achievement of internal and external balance – i.e., this system could be applied for the companies of various levels, but not for their aggregated totality in the form of sectorial complexes, regional and national economies.

The opinion of Goncharov and Sirotkina (2015a, 2015b) on the issue of well-balanced regional development on the basis of implementation of the stakeholder and Social Darwinism approaches, which reflect the external and internal balance of the socio-economic system, is especially interesting.

However, the works of various authors do not set the criteria of balance that would ensure the compatibility of evaluations of organizations and complexes of different levels. It seems that the indicators of this evaluation could be formed on the basis of the selected methods of provision of correspondence and become the calculations of:

(1) index of correspondence to the criterial indicator of balance;
(2) indicator of observation of normative proportions and limitations;
(3) level of implementation of the necessary functions and operations;
(4) coefficient of correlation of the rate of change of various indicators and the set ranks of priority.

On the basis of private indicators of balance of innovational & investment development for the formed groups $Ki(i = 1, 2, \ldots, n)$, the complex indicator is calculated (1):

$$\mathcal{K}p = fp(K1, K2, \ldots, \mathcal{K}n), \tag{1}$$

where $fp(\mathcal{K}1, \mathcal{K}2, \ldots, \mathcal{K}n)$ – function of variables $(K1, \mathcal{K}2, \ldots, \mathcal{K}n)$.

The methodological basis for determining this indicator could be the multi-factor model. The model of multi-factor analysis is of the universal character, as it allows studying various phenomena and processes. According to this model, balance should be evaluated at all levels of analysis: federal, regional, sectorial, and entrepreneurial. The system of criteria of balance of innovational & investment development forms on

the basis of analyzing the general strategic goals of the economic system, problem spheres for innovational activities, and investment possibilities of the economic system.

The drawbacks of the traditionally used economic & mathematical and statistical methods are the necessity for quantitative determination of the evaluation's indicators. For overcoming the drawbacks of the traditional methods, it is possible to use the theory of fuzzy logic, theory of graphs and scenario approach, which are applied in the works of Prigozhin (2003), Nedosekin (2003), Katkova et al. (2013), etc.

In the process of analysis, the most acceptable methods of evaluating the balance of innovational & investment development of the production complex were determined; the following ones were assigned to them due to high information content and relative simplicity of usage: matrix (for evaluation of the resources' balance) and correlation methods (for evaluation of balance of dynamics and the basic indicators of development) (Timoshenko and Parakhina 2017). Determination of the methodological approaches to evaluation of balance and conditions that determine it is the initial position for development of the recommendations aimed at effective management of economy for the purpose of provision of its well-balanced development.

4. *Conduct of evaluation of balance in the sectorial and regional levels*

For evaluation of balance of the industry development, the growth rates of each indicator is assigned with factual rank; based on coordination of normative (Table 1) and factual ranks, the level of balance of development of industry with the usage of the correlation coefficients of the ranks of Spearman (Kc) and Kendall ($K\kappa$) is used:

$$Kc = 1 - \frac{6\Sigma di}{n \times (n2 - 1)}, \tag{2}$$

$$Kk = \frac{(Sp - Sn)}{\frac{1}{2} \times n \times (n - 1)}, \tag{3}$$

where
di – second degree of difference between the normative and factual ranks;
n – number of the observed features (indicators);
Sp – number of the rank ratios that were observed;
Sn – number of violated rank ratios

The results of evaluation of balance, performed with the usage of the offered totality of indicators, show that the level of balance of development of the Russia's industrial complex was below average in the pre-crisis period of 2011–2012: less than half of the required normative ratios were observed.

In the period of quick decrease of oil prices and implementation of economic sanctions, the level of balance drops down. However, apart from the export-import operations (due to the policy of import substitution), it restores rather quickly: even at the higher level than in 2011–2012. However, export-import operations are the top-priority direction, so the level of balance is lower than before the sanctions (Fig. 2).

Table 1. The ranked basic list of indicators for evaluation of balance that takes into account the priorities of modern development of industry (innovational and social orientation of development)

	Rank of norms	Indexes of growth of indicators *				
		2011	2012	2013	2014	2015
Index of growth of balanced financial result	1	117.77	102.16	77.58	105.48	136.31
Index of growth of gross added value of industrial production	2	119.26	111.65	106.26	108.29	111.59
Index of investments into fixed capital	3	120.64	118.73	108.99	105.43	110.24
Index of growth of fixed funds in industrial production	4	117.35	113.89	113.51	113.70	113.22
Index of growth of the volume of innovational industrial goods	5	158.47	135.85	122.43	98.86	107.27
Index of the volume of export of industrial goods	6	130.13	101.55	100.24	94.56	69.07
Index of industrial production for the types of economic activities - processing production	7	108	105.1	100.5	102.1	94.6
Index of industrial production, total	8	105	103.4	100.4	101.7	96.6
Index of the volume of import of industrial goods	9	133.57	103.76	99.38	91.04	63.65
Index of growth of the expenditures for scientific and technical works	10	168.42	116.73	123.65	113.05	125.81
Index of growth of internal expenditures for R&D	11	125.62	121,09	118.81	102.72	122.52
Index of growth of the number of industrial companies that perform scientific and technical works	12	117.65	97.86	97.08	103.38	134.91
Index of growth of expenditures for payment of labor for production of industrial goods	13	114.88	109.56	109.44	106.71	107.51
Index of growth of investments into fixed capital, aimed at protection of environment	14	105.92	110.02	123.57	124.49	107.83
Index of growth of current expenditures for protection of environment	15	100	100	106.69	103.35	109.97
Index of growth of material expenditures for production of industrial goods	16	123.03	108.82	106,07	108.64	110.79
Index of growth of expenditures for production of industrial goods	17	122.66	110.10	111.19	107.80	106,41
Index of growth of average annual number of companies' employees	18	99.90	98.61	99.10	97.66	98.41
Index of growth of average annual number of employees in the industrial production	19	100	99.25	99.24	97.71	100

*Based on the data of the Federal State Statistics Service. http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/enterprise/industrial/
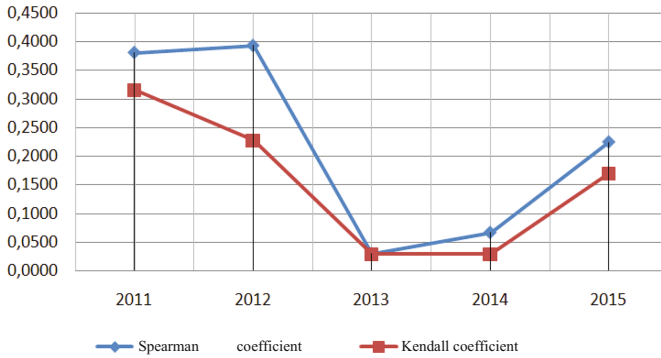
Fig. 2. Evaluation of balance of the Russian industry development (in view of export-import operations)

It is possible to say that social priorities are damaged. Without considering the social priorities, balance of industry is higher and grows in a stable way (Fig. 3).
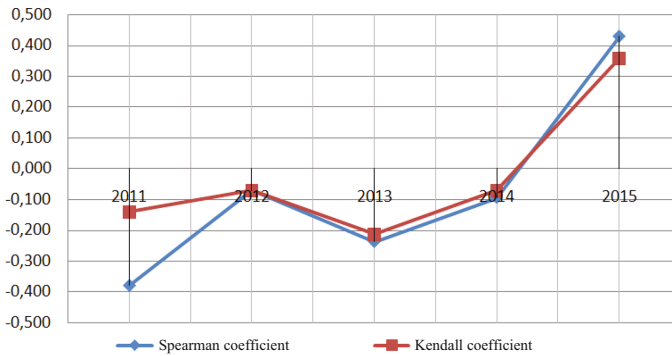

Fig. 3. Evaluation of the production and financial balance of the industrial complex of the RF

On the contrary, balance of the industrial complex reduced in 2014 and reached zero level in 2015. The obtained data show that the financial and economic problems cannot be solved by means of social results and expenditures, though attention is not paid to the social problems.

In the course of the complex diagnostics of well-balanced development, the key problems were determined; a conclusion was made that the available reserves of the previous stage of development are depleted, and there's necessity for the innovational approach, which supposes re-industrialization and development of the powerful "innovational sector" in the reproduction system.

5. *Organizational and methodological approaches to provision of the process of planning of balance with the necessary information*

Overview of the existing approaches to formation of the information and analytical sub-system allowed distinguishing the basic functional tasks and methods of their solution (Fig. 4).
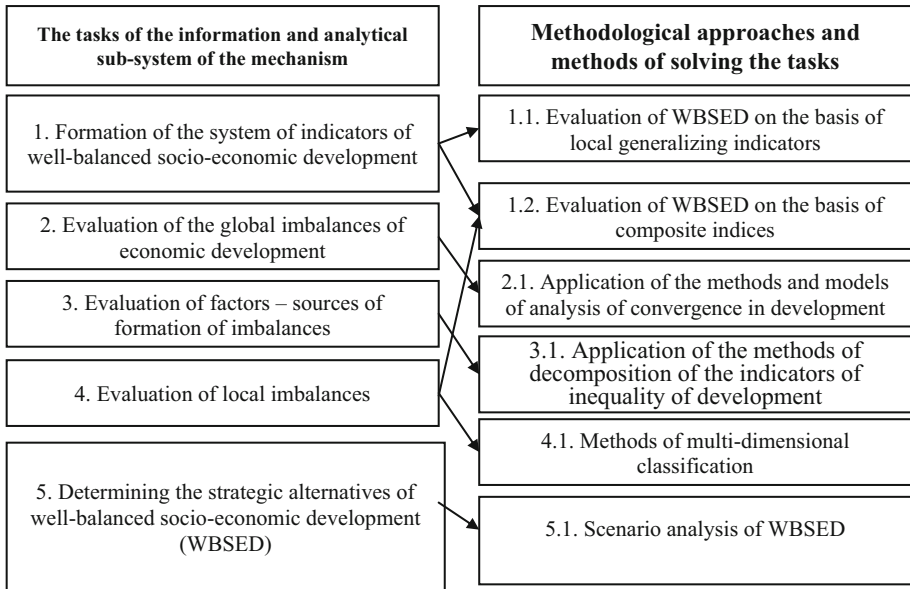
The tasks of the information and analytical sub-system of the mechanism	Methodological approaches and methods of solving the tasks
1. Formation of the system of indicators of well-balanced socio-economic development	1.1. Evaluation of WBSED on the basis of local generalizing indicators
2. Evaluation of the global imbalances of economic development	1.2. Evaluation of WBSED on the basis of composite indices
3. Evaluation of factors – sources of formation of imbalances	2.1. Application of the methods and models of analysis of convergence in development
4. Evaluation of local imbalances	3.1. Application of the methods of decomposition of the indicators of inequality of development
	4.1. Methods of multi-dimensional classification
5. Determining the strategic alternatives of well-balanced socio-economic development (WBSED)	5.1. Scenario analysis of WBSED

Fig. 4. Classification of tasks of the information and analytical sub-system and methodological approaches to their solution

Management of innovations at the company level and at the level of industrial complex is the criterial sign of the possibility for well-balanced management of changes in the strategic aspect. The innovational sub-system determines the necessity and possibility for well-balanced changes in other components of an industrial company management.

Developing the organizational and methodological approaches to information provision of the process of planning of balance, it is possible to distinguish the following principles of implementation of this process:

- normative and legal provision, which supposes coordinated improvement of the normative and legal provision of investment & innovational activities;
- strategic orientation which shows concentration of efforts on the strategic directions of balance;
- coordination of interests, including organization of interaction of public authorities and business for the purpose of mobilization of investments at the top-priority directions of innovational policy;
- constant monitoring, includes constant control and analysis of positive and negative aspects of the innovational & investment development.

4   Conclusions

The necessity for managing the balance of balance of development of socio-economic systems, including the industrial complexes, is caused by the fact that violations of balance lead to quick reduction of effectiveness of the companies' activities, emergence of crises and threats to national economic security. The mechanisms of managing the balance of industry's development should ensure the prevention of emergence of these negative phenomena.

Their information provision could be based on the following:

– the initial precondition for developing the models of evaluation should be the ideas of the main reasons for emergence of imbalances in development;
– the information basis for evaluation of balance should be organization of monitoring of the state of industrial complex, timely setting of the problems of its development, and diagnostics of the possible threats to economic security of the region.

From the position of the systemic and cybernetic approach, the mechanism of formation of well-balanced development could be treated as a system for conducting the targeted activities related to evaluation of the threats to formation of imbalances of development, forecasting of their negative consequences, and development of the strategies of prevention or their neutralization.

Within the information and analytical sub-system, the level of threats to well-balanced socio-economic development is evaluated, and the possible tools and levers of management are determined. One of the basic providing elements is the information and analytical block, which forms the foundation of the strategy and policy of well-balanced changes in regional economic systems. The central role in these documents belongs to the integrated innovational & investment policy aimed for creation of the favorable investment climate and the organizational and economic basis of positive structural changes in the innovations-oriented economy of the region.

References

Arsenyev, V.A., Litvinova, S.A., Parakhina, V.N., Kozenko, Z.N., Denisov, M.Y.: Mechanisms of innovational development of countries with transitional economy. Contemp. Econ. **10**(4), 373–380 (2016)

Bergman, E.M., Charles, D.: Innovative Clusters: Drivers of National Innovation Systems. Organization for Economic Cooperation and Development, San Antonio (2003)

Doloreux, D., Parto, S.: Regional innovation systems: a critical review. Int. J. Innov. Manag. **7** (2003)

Goncharov, A.Y., Sirotkina, N.V.: The mechanism for managing balanced development of regions with dominant economic activities. News High. Educ. Establ. Technol. Text. Ind. **4** (358), 35–43 (2015a)

Kaplan, R., Norton, D.P.: Alignment: Using the Balanced Scorecard to Create Corporate Synergies. Harvard Business School Press, Boston (2003)

Kruglyakova, V.M., Treshchevsky, Y.I., Bredikhin, V.V.: The development of the textile industry in the context of harmonizing national, sectoral and regional strategies. News High. Educ. Establ. Technol. Text. Ind. **1**(367), 60–67 (2017)

Parakhina, V.N., Timoshenko, P.N.: Internal balance of the industrial complex: the fundamental necessity and methodology of assessment. Bull. North-Caucasian Fed. Univ. **3**(60), 124–131 (2017)

Parakhina, V., Boris, O., Midler, E.: Evaluation of innovative regional development Russia. Asian Soc. Sci. **11**(5), 201–208 (2015)

Treshchevsky, Y., Nikitina, L., Litovkin, M., Mayorova, V.: Results of innovational activities of Russian regions in view of the types of economic culture. In: Popkova, E. (ed.) Russia and the European Union Development and Perspectives Part (Series Contributions to Economics), Contributions to Economics, pp. 47–53. Springer, Cham (2017)

Anshina, V.N.: Innovational Management: Concepts, Multi-level Strategies, and Mechanisms of Innovational Development (2006). Delo, M

Basovsky, L.E.: Forecasting and planning in the market conditions. In: INFRA-M (2002)

Boris, O.A.: The Socially Oriented Innovational Company: Theory and Practice of the Holistic Development. The Publishing and Information Center "Fabula", Stavropol (2014)

Glazyev, S.Y.: Regarding the purposes, problems, and measures of state policy of development and integration, Moscow, 29 January 2013. http://www.glazev.ru/econom_polit/305/

Goncharenko, L.P.: Management of investments and innovations. In: KnoRus, 160 p. (2014)

Goncharov, A.Y., Sirotkina, N.V.: Well-balanced regional development: the stakeholder and social darwinism approaches. Reg. Syst. Econ. Manag. **3**(30), 10–17 (2015b)

Kaplan, R., Norton, D.: Well-balanced System of Indicators. Olimp Business CJSC, From strategy to action. M. (2005)

Konovalova, M.E.: Structural Balance of Public Reproduction: Issues of Theory and Methodology, 184 p. Samara State University of Economics Publ., Samara (2009)

Maximenko, L.S.: Development of the Theory and Methodology of Planning: Structural and Logical Approach. North Caucasus State Technical University, Stavropol (2009)

Niven, P.: Well-balanced system of indicators step-by-step. Maximum increase of effectiveness and establishment of the received results. Balance Business Books, 328 p. (2004)

Neeley, E., Adams, K., Kennerly, M.: The prism of effectiveness: map of well-balanced indicators for measuring success in business and management. Balance Club, Dnipro (2003). 400 p

Parakhina, V.N., Khanaliev, G.I.: The conceptual issues of managing the well-balanced development of regions. Bulletin of North Caucasus Federal University **3**, 244–249 (2011)

Sirotkina, N.V., Vorontsova, I.N.: The notion and essence of well-balanced development of region, competitiveness, innovations, finances, no. 1, pp. 55–59. Institute of management, marketing, and finance, Voronezh (2014)

Tadtaev, D.M., Parakhina, V.N.: Strategic planning of innovational development of the Republic of South Ossetia. Retrospective analysis and the modern model. Bull. North Caucasus Fed. Univ. **4**(55), 143–147 (2016)

Timoshenko, P.N., Gorbenko, L.I.: Forms of balance of the innovational development of organizations. Bull. North Caucasus Fed. Univ. **6**, 151–157 (2016)

Khamidulina, A.M., Suldina, G.A.: Evaluation of balance of socio-economic development of municipal entities in the region. Bull. Kazan (Volga) Fed. Univ. 3(17), 55–59 (2015)

Katkov, E.V., Borodin, A.I., Streltsova, E.D.: Fuzzy logic in evaluation of the investment attractiveness of projects. Appl. Inf. **46**(4), 19–24 (2013)

Administration of Oslo. Recommendations for collection and analysis of the data on innovations/Joint publication of the OECD and Eurostat. 3rd edn., 107 p. CRSS (2010)

Nedosekin, A.O.: Strategic planning with the use of fuzzy descriptions. Audit Financ. Anal. **2**, 38–42 (2003)

Prigozhin, A.I.: Methods of organizations' development. In: ICFED, 863 p. (2003)