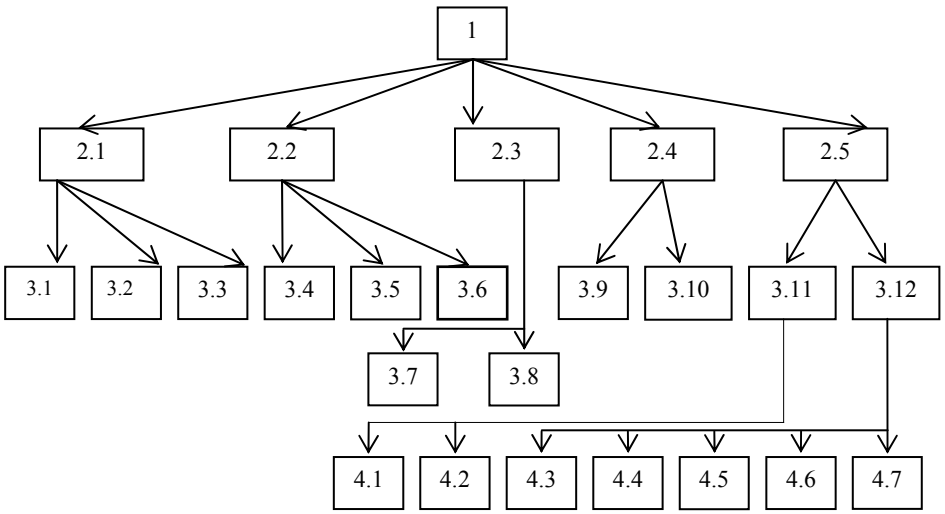

Fig. 2. "Goals tree" of the social and economic development of Krasnoyarsk region

Thus, the main attention is paid to the fuel and raw materials factors whereas machine building is thought to be less important. Meanwhile, machines, equipment, vehicles and other products of machine building industry are not only the most complete kinds of final products but also those very goods, which characterize the scientific and technological potential and industrial development level of the country. That is why perspective development of the region's industry should gradually become its priority goal, achievement of which will help the region to get a stable economic position in the long-term period, independent of the external or international conditions; become attractive for investments and successfully implement the developed social programs.

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O. V. Patsuk
Siberian State Aerospace University named after academician M. F. Reshetnev,
Russia, Krasnoyarsk

METHODOLOGICAL ASPECTS OF ANALYSIS AND FORECAST OF ECONOMIC SYSTEMS' DEVELOPMENT

Assessment methodology of the different territories' economic effectiveness is uniform and independent of a territory's size and structure. However, certain methodological assessment techniques could differ according to the characteristics mentioned. The complex's type and special features of the problem being solved are of particular importance when choosing a research method.

Keywords: social and economic development of the territories, forecast of the economic systems' development.

System analysis of the region's social and economic development indices is a structure with a number of separate indices. In accordance with the management task it may include criteria that reflect social, economic and other effects of the development scheme. Methodology of the analysis and forecast of the region's economic system development is based on:

– a combination of formal and informal approaches in a system of decision-making;

– an experimental approach to the implementation of any model;

– mathematical and technological support of a calculating experiment on imitation models.

Designing the models allows to realize the existing problem and facilitate the decision-making process, but can not replace the knowledge and intuition of an expert. Due to this, development of an informal approach to the regional economy management is based on the

application of the expert systems and use of artificial intelligence. In such model complexes as regional management systems, in the multicriterion situation the application of planned decisions optimization methods is restricted by the difficulty of their implementation, as it is almost impossible to determine the goals with mathematical exactness and develop an adequate variant, when the information is not complete. That is why when developing a regional economy managing system the main method is imitation modeling, which through previously conducted analytical research mathematically explains the received results. This allows to solve the problems of social and economic development, design actual strategies and choose rational variants of development.

Development of the social and economic sphere becomes possible when the managing bodies are continuously receiving and processing into planning decisions the diagnostic information about its state and the state of the environment; about the deviations in the social and economic sphere's process of reaching its goal. This also allows the managing bodies to change the state of an object according to the goals set. Region-studies research uses a full complex of scientific research methods:

System analysis is based on a principle of consistency and includes setting a goal; determining the objectives, stating a scientific hypothesis, complete investigation of a suitable variant of branches' distribution. This method allows to study the structures of activities, their inner connections and interaction.

Systematization method is connected with the division of the studied phenomena and criteria into sets, which are characterized by certain similarities and distinguishing features (classification, typology, concentration etc.).

Balance method is characterized by establishing different regional balances (natural, financial, labour etc.).

Method of economic and geographical research is divided into three constituent parts: regional method (studying the ways of the regions' forming and development); branch-wise method (studying of the social production's development and distribution according to activity type and geographical factor); local method (studying the ways of establishment and development of a separate town or village's production).

Cartographical method is a visual aid, which illustrates the distribution peculiarities.

Method of economic and mathematical modeling allows to model the territorial proportions of the region's economic development and economic complexes' formation. Using the modern electronic means, it provides the opportunity to process various data much quicker and choose the most suitable variants and models in accordance with the set regional research goals.

Methods of multivariate statistical analysis are connected with the statistical data processing. One of the most widespread methods of a multivariate information analysis is a factor analysis, or cluster-analysis. It researches the influence of different factors (causes) on a result indicator. In today's study of social and economic regions' development the main clusters and ordinal classification methods are used.

One of the first kinds of statistical models used in regional studies was an economic base model, introduced by H. Hoyt (USA) in the '30s. An economic base analysis is an accelerated method of a region's economic growth forecasting, which uses a simplified growth theory and requires minimum information. For creating these models, economic activity indexes (in general, employment) for two periods of time are necessary. It results in forecasting of the basic and servicing sectors' development.

Region-metrics is a scientific branch in regional economy, which uses mathematical methods, i. e. regional modeling. It includes:

Taxoning method is a process of dividing the territory into correlating or hierarchically co-subordinate territorial cells. In fact, zoning at any level is taxoning, as its objects are regions, so it is possible to use the concept of regionalization.

Variant method of the region's productive forces distribution is mostly used in development of the production distribution schemes at the first stages of planning and forecasting. It implies studying of the variants of regions' development levels and territorial economic proportions.

Survey methods include standardized interviews, face-to-face conversations with representatives of different activities and spheres of the region's social and economic complex; analysis of the region's executives, scientists and specialists' speeches etc.

Methods of regional living standards' comparison and regional social infrastructure development's forecasting study living standards on different territories on the basis of synthetic and special indices. The main purpose of the analysis is to determine actual differences in living standards and performance in relation to the equal degree of the population needs' satisfaction in all the regions. These needs are directly connected with the development of the regional social infrastructure.

Thus, study of the regional social and economic systems is based on a wide range of methods and ways which are applied by regions' specialists. Apart from the methods described, there are also conceptions of sinuous development, which are an integral part of the methodology used in long-term forecasting of the dynamic in the national economy's state regulation [1]. At present, there exist several classifications of the sinuous development theories. According to the classification, offered by S. M. Menshikov and L. A. Klimenko, there are:

1. Monetary and credit conceptions, where development fluctuations are caused by monetary factors.

2. Conceptions of intensity changes in producing of capital goods. (Kondratyev, Mandel, Forrester).

3. Theories of fluctuation of the particular production factors, which cause deviations from an economic development trend (Friedman – interchange of excess and lack of labor; Rostow – abundance and lack of food and raw materials; Craig and Watt's theory).

4. Neoschumpeterian conceptions, which study economic system's transition from one equilibrium state

to another on every long wave. Innovations' cluster plays a particularly important role here as the innovations provide the material basis for this transition (conceptions of Mensch, Weidlich, Wordl, Newcamp and others).

5. Institutional conceptions, according to which the long waves are caused by the main economic and political institutions (theories of Peres-Peres, Chandler, Kaletsky, Screpanti).

There is also one more classification of sinuous development conceptions:

1. Investments conceptions suggests that the long wave is determined by periodic accumulation and then devaluation of the durable capital goods (Kondratyev, Forrester, Sterman).

2. Innovations conception implies that the key part in wave-formation belongs to innovations clusters which create a leading sector in the economy, and expansion of this sector causes a corresponding cycle in economic development (Schumpeter, Mensch).

3. Capitalist crisis theory concludes that a tendency of the profit rate to decrease leads to a crisis, that can be overcome due to external factors, which increases profit rate for some time and creates conditions for a new long-run rise of economic development (Mandel, Day).

The main method applied in development of the sinuous theory is determination of the trends using different functions, which describe change of economic indices with time. Using the least squares method, which allows to eliminate unsuitable directions and select suitable ones, they studied different relations, determined by the actual dynamics of the index concerned. Deviations from the trend are processed with the help of the special filter-functions, the most widespread of which are 9-, 21- and 51-year moving averages.

Another widely-used way of eliminating a trend is a transition from the observable indicators to the first differences, which are also statistically processed and subjected to various transformations (squaring, equalizing with help of moving average etc.) Deviations from a trend, considerably different from each other in size and amplitude prove the existence of a wave.

The main difficulty in the sinuous development theory is not statistical study of retrospect calculations, but development of the forecasting models of long waves to study them in future and analyze long-term trends of the economic development. Besides, it is quite hard to design a set of practical methods for anticycle policy in order to avoid lasting economic crises or alleviate their consequences. That is caused by the necessity of taking into consideration irregularity of the economic growth, systematic shifts in the economic system's structure. Today creation of different imitation models with help of the computer is the most effective way to forecast structural shifts.

A variant of the economic systems' cyclic development is Teves' model, which gives a cycle's dynamic interpretation, based on interaction between a multiplier and accelerator in an economic system through an interest rate for capital investments [2]. The model's special feature is that the change in capital investments volume functions as the main source of cyclic fluctuations. Teves' model divides investments demand in two directions: for receiving of or adding to the existing working capital and for creating or maintaining of the economic system's main funds. In the model an interest rate is a time function, and the volume of investments is a function of the interest rate:

$$L_t = L_v\, Y_{t-1} + L_i i_t, \tag{1}$$

where L_t – investments demand (necessary investments); L_v – investments, necessary for operating; L_i – funds-generating capital investments; Y_{t-1} – total yield of the previous period; i_t – current interest rate.

Caldor's model is a dynamic model of an economic cycle, where the savings' volume is a non-linear increasing function of income. Cyclic development can be noticed in the dynamic of savings and investments indicators, taking into account region's various activities. Equilibrium points of the economic systems are crossing points of the investments and savings graphs, and analytically their coordinates are determined when the volumes of those indicators are equal. The main postulate of the model described above is that approaching motion of the investments and savings curves causes change in the equilibrium from stable to unstable. This characterizes the beginning of a new economic cycle.

Economic development is a set of rises and falls in the system, and those changes are connected with the sinuous character of economic dynamics. Samuelson-Heeks model explains the mechanisms of economic dynamics' fluctuations on the basis of acceleration principle and multiplier conception. Acceleration principle is based on the conclusion that investments volume depends on increase or speed of changes in the demand for the final product. Generated by such conditions investments demand is multiple of the demand for final product. The degree of its multiplicity is called an acceleration factor. The model's special feature is that it connects the income of a certain period with the sum of consumption and investments and considers autonomous investments as independent of the income changes. Samuelson-Heeks model can be represented by the following formula:

$$Y_t = C_a + MPCY_{t-1}, \tag{2}$$

where Y_t – total yield; C_a – autonomous consumption; MPC – Maximum propensity for consumption.

In this model dynamics of the total yield fluctuations is determined by the meanings of the maximum propensity for consumption or those of the multiplier and accelerator. The main forms of the total yield fluctuations are the total yield's volume movement, dying fluctuations, explosive fluctuations of the total yield's volume, infinite monotonous growth of an indicator, constant steady fluctuations.

In an extended model investments are divided into 3 constituent parts:

– "extensive" investments, aimed at increasing the capital of the existing technology;

– "intensive" investments, aimed at introducing the capital, which uses new technology. These investments lead to the increase of productivity;

– "innovation" investments, aimed at creating new products and areas of production.

This model is described by a system of linear differential equations and can have only one equilibrium state. The deviation from that state can either decrease with time (stable solution) or increase to infinity (unstable solution). Command qualifiers – labor productivity (reflects intensive character of technological advance) and capital provision (extensive) – influence production through the profit rate or in combination with it.

Forrester's G. system dynamics model is an imitation one. It consists of 6 parts: production, finance, householders, labor resources, government. These parts are responsible for establishing the correlations which determine consumption, investments, employment, prices, governmental policy, interaction among sectors. By distributing investments to different sectors it is possible to model the variants of economic movement, create various scenarios of the region's economic development. For example, the production part contains more than 15 producing sectors, based on Cobb–Douglas' production function with 12 factors as well as the system of balance equations. In non-production parts it is possible to model a large number of different interrelated processes, where there should be distinguished models of financial and credit institutions, state consumption and external relations.

Technique used in determination of cyclic phases of the economic system development is based on a joint analysis of the production increase and its structural changes. These tools of structural and dynamic analysis divide speed of growth into inertial and reconstructive components and studies how the economic system's structure influences its dynamics. Among the main developers of the structural and dynamic approach there is R. Akoff, V. Leontyev, J. von Neiman, L. V. Kantorovich and their today's successors, for example, L. A. Dedov [3]. To solve the mentioned problem a physical volume index is separated into a component related to the production inertia, and a component connected with the structural changes in the production volume. An interim calculation indicator is an index of the production physical volume change λ:

$$\lambda = \frac{\sum y_i q_i}{\sum A_i q_i}, \tag{3}$$

where y_i – actual or reported value of the sector's production volume; A_i – basic volume of the i-sector's production (quantities y_i and A_i are measured in natural merchandising measures); q_i – basic prices, in accordance to which quantities y_i and A_i are transferred into price measurement.

It can be written:

$$\lambda = \sum h_i d_i; \tag{4}$$

$$h_i = y_i : A_i; \qquad d_i = (A_i q_i) : \sum A_i q_i. \tag{5}$$

where h_i – speed (index) of growth of the i-component of production; d_i – доля i-sector's share in the basic composition of production; n – the number of sectors; $\sum d_i = 1$.

Apart from basic share characteristics of the production output it is also necessary to operate with the share characteristics of the 'report' composition of P_i, which are evaluated with the formula:

$$P_i = \frac{y_i q_i}{\sum y_i q_i}. \tag{6}$$

Between d_i and P_i there is an interrelation expressed by:

$$P_i = \frac{d_i h_i}{\lambda}. \tag{7}$$

To compare the structures there are several evaluation schemes. The most widespread is evaluation of the common structural shift:

$$m = 0.5 \sum |P_i - d_i|. \tag{8}$$

Economic statistics uses a measure, that is contrary to evaluation of the common structural shift – a quotient of similarity m^*, which shows to what extent starting and factual share structures are similar. Evaluation of the common structural shift characterizes the level of an object's change, i. e. is a characteristic of a reconstructive component in the structure's evolution. Degree of similarity can be interpreted as a quantitative evaluation of persistence:

$$m^* = 1 - m. \tag{9}$$

Separation of the physical production volume index into components is made by a metric approach. There are 3 effects in the dynamics of production output:

1. Effect of the production volume change (as it is) (λ).

2. Effect of eviction demonstrates that if production output has a structural shift, then shares of some product groups will enlarge. Total share of these groups will extend, and they will evict other positions of the output. Measure of the eviction effect is a sum of the corresponding increases:

$$\sum (P_i - d_i) = m. \tag{10}$$

3. Effect of compression shows that shares of some product groups in the total sum of shares are reducing. эффект сжатия выражается в том, что доли некоторых продуктовых групп в общей сумме долей снижаются. In terms of quantity effect of compression is expressed by a sum of the corresponding reductions, i. e.:

$$\sum (P_i - d_i) = -m. \tag{11}$$

Effects of eviction and compression are equal, but opposite in sign; they characterize a common phenomenon – structural shift from different points.

Let us make some transformations like $\lambda = (h_1 d_1 + h_2 d_2 + \ldots + h_n d_n)$ and determine a share structure of the output:

$$\lambda = \lambda(h_i d_i : \lambda + h_2 d_2 : \lambda + \ldots + h_n d_n : \lambda) = \lambda(P_1 + P_2 + \ldots + P_n). \tag{12}$$

So:

$$P_i = d_i + I_i, \quad (13)$$

where I_i – change of the i-share in transition from a share structure $d = (d_1, d_2, ..., d_n)$ to the share structure $P = (P_1, P_2, ..., P_n)$.

Allowing that $I_i = P_i - d_i$, in the last expression we can distinguish effect of compression:

$$\sum I_i = \sum (P_i - d_i) = -m \quad (14)$$

and effect of eviction:

$$\sum I_i = \sum (P_i - d_i) = m. \quad (15)$$

We will have:

$$\begin{aligned} &\lambda\left(\sum d_i + \sum I_i + \sum I_i\right) = \\ &\lambda\left[\sum d_i + \sum (P_i - d_i) + \sum (P_i - d_i)\right] = \\ &= \lambda(1 - m + m) = \lambda(l - m) + \lambda m = \lambda m^* + \lambda m. \end{aligned} \quad (16)$$

Evaluation λm^* is considered as a measure of similarity of the "starting" and "reported" structures of production output, reduced to the level of growth index λ. Hence, λm determines a reconstructive component of the output. Growth index is decomposed into inertial and reconstructive components.

The next stage is decomposition of the growth rate. Growth index λ can be expressed in the following way:

$$\lambda = y : A = (A + \Delta) : A = 1 + \Delta : A = 1 + N, \quad (17)$$

$$\begin{aligned} y &= \sum y_i q_i; \\ A &= \sum A_i q_i; \\ \Delta &= y - A; \\ N &= \Delta : A. \end{aligned} \quad (18)$$

where N – output growth rate.

It seems logical to move from growth tempos to the growth rate and, consequently, to the decomposition of the latter into reconstructive and inertial.

$$N = \lambda - \lambda_H, \quad (19)$$

where $\lambda_H = 1$ – a starting meaning of the growth indicator, corresponding to the level of the base year.

Logically:

$$\begin{aligned} N = \lambda - \lambda_H &= (M_1 - M_{1H}) + (M_2 - M_{2H}) = \\ &= M_1 + M_2 - 1, \end{aligned} \quad (20)$$

where $M_1 = \lambda m^*$, $M_2 = \lambda m$.

So, $M_{1H} + M_{2H} = 1$. This unity should be shared between the two components of the starting state: inertial and reconstructive. We will define M_{1H} as $\lambda_H m_H^*$, and M_{2H} as $\lambda_H m_H$. Letter "H" marks the base numbers.

It is already known that $\lambda_H = A : A = 1$. $M_H = 0$ (as it is a base structure shift in relation to itself). So: $M_{2H} = 1 \cdot 0 = 0$. Consequently:

$$M_{1H} = \lambda_H m_H^* = \lambda_H (1 - m_H) = 1(1 - 0) = 1. \quad (21)$$

But then

$$\begin{aligned} n_1 &= M_1 - M_{1h} = \lambda m^* - 1 = \lambda(1 - m) - 1; \\ n_2 &= M_2 - M_{2H} = M_2 - 0 = M_2 = lm. \end{aligned} \quad (22)$$

As a result:

$$N = n_1 + n_2, \quad (23)$$

where $n_1 = \lambda(1 - m) - 1$ – an inertial component of the growth rate; $n_2 = \lambda m$ – a reconstructive component of the growth rate.

To study the structural cycles, whose analysis is important for monitoring of the region's economic development, a concept of output structural elasticity is used:

$$E = n_1 : n_2, \quad (24)$$

where n_1 – conservative (inertial); n_2 – reconstructive component of the growth rate.

Structural elasticity values correspond to the phases of the structural cycle, i. e.

1. Structural elasticity is positive: growth, based on the traditional output structure is complemented with growth based on structural changes, i. e. $n_1 > 0$ and $n_2 > 0$. Then $E > 0$. A corresponding phase of the structural cycle is called a phase of complementary development.

2. If growth, based on the traditional output structure is decreasing ($n_1 < 0$), but growth based on structural changes is still there, ($n_2 > 0$), is positive and increasing, then $E > -1$. Such situation characterizes a phase of compensating replacement. That is growth due to n_2 – component compensates and replaces decrease based on n_1 – component, which is caused by the purpose of the structural shifts. Growth based on them should expand production capabilities. However, decline of the traditional production capabilities often has a disastrous state; in this case an economic system moves to phase 3.

3. In the situation of cardinal transformations of the traditional output structure decline ceases being compensated by a simultaneous growth based on a reconstructive component, which is related to the late effect of structural changes. We have $N > 0$ and $E < -1$, that is a situation of non-compensating replacement.

4. The fourth phase clearly demonstrates the mentioned factors, i. e. a common (deep) setback of production takes place: $E << -1$ and $N << 0$. Then the setback reduces, and a compensating influence of structural changes becomes significant. An economic system moves to phase 3, and then to phase 2. A new output structure, supported by additional changes, is established and the system returns to phase 1, but with a reconstructive output composition.

Practically, the deviations from the given theoretical scheme are possible (failures and repeat of the phases). It is considered, that a gradual transition of a structural cycle with the regular replacement of its phases is characteristic of a regulated (plan) economic system. The economy in acute instability is characterized by structural and dynamic instability. So, in case of instable correlation between the replacement effect and complement effect a local rise is followed by a local decline. Values of E are

changed at random which represents the structural and dynamic instability.

There is a classification of the variants of economic system development, based on decomposition of the output growth (setback) rate:

1. Innovation economic growth takes place when the growth rate is significant, and the components of inertial growth ($п_1$) and growth caused by the structural changes ($п_2$), are comparable in volume.

2. Extensive economic growth is characterized by the correlation $п_1 >> п_2$. An inertial component of growth prevails here, which proves unexpressed efforts to balance production and needs and insufficient use of innovations, so growth rate N can be relatively significant. This takes place when it is defended from external competition and becomes a monopolist on the internal market. As a result, such development turns into stagnation.

3. Stagnation implies extensive management and appears due to absence of innovation, resources deficiency and obsolete ways of organizing economic processes etc. This variant is characterized by the following conditions: $N \approx 0$; $п_1 \approx 0$; $п_2 \approx 0$. To overcome stagnation is often a serious economic problem.

4. Structural crisis is represented by the following condition: $п_1 << 0$ and $N \approx 0$. Elements of the structural crisis include reduction of the traditional production capabilities, complicated changes in technology, assortment and structural unemployment increase. However, it creates conditions for gradual increase of the replacement influence by the growth rate component, based on the structural changes. As a result, such replacement begins to completely compensate the decline of traditional production capabilities, then the growth starts and parameter N becomes $N >> 0$.

Thus, sinuous economic development is continuous fluctuations in business activity, alternation of the extensive and intensive types of the economic growth. The main factor, influencing the length and depth of the cyclic fluctuations is the investments movement. Crisis forms a base for the new mass investments because the main capital devaluation leads to conditions for the production renovation on the new technological base, allowing to reduce expenses, restore the pre-crisis profit rate and then increase it. That is why strategically oriented investments policy allows to influence the cyclic development of an economic system and raise it from the critical states to the growth phase using intensive factors.

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T. V. Polozova
Krasnoyarsk State Agrarian University, Russia, Krasnoyarsk

A. A. Kolesnyak
Plekhanov Russian University of Economics, Russia, Moscow

FORMATION OF REGIONAL WHOLESALE FOOD MARKETS SYSTEM

The management structure and the infrastructure of regional wholesale food market, the scheme of agricultural products and foodstuffs movement to the end-consumer are offered. The place of the wholesale market in the system of food supply is defined.

Keywords: food supply, wholesale food market, system.

The organization of physical distribution plays an essential role in the system of population food supply of any region. Population food supply of any region of the country is defined first of all by the condition of food producing and serving branches. The agricultural commodity producers' share in the price of agricultural products decreases every year (15–18 %), a considerable part falls at processors, trade and middlemen. In 1990 commercial structures and black money structures had 0.5 % of costs in the final goods price. Today these figures are 25–28 %. The organizational unit of the food resources promotion system from the sphere of their production to the sphere of their final consumption, that provides increase of commodity producers' share in the final price of agricultural products, is the wholesale food market.

The notion of "the wholesale food market" is treated differently in scientific literature. The wholesale food market is a managed and operated system of goods promotion with a proper infrastructure [1; 2]. We consider that "the wholesale food market" has two meanings: first, it is one of the structures of the mechanism of a large goods consignment concentration and delivering from producers to consumers; second, it is an organizational form that solves certain problems and carries out corresponding functions in the subsystems of food resources formation and distribution. The main advantages of such form of the organization in the