

## The problem of forecasting and modelling of the innovative development of social-economic systems and structures

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**Abstract.** This article is an overview of the current theoretical and methodological approaches to the forecasting and modelling of the innovative development of social-economic systems and structures. The innovation factor is considered to be a dominant factor of the stable development taking into account the restrictions in inner and outer environment of business and corporate entities. This work shows that the forecasting and planning are two interrelated procedures, aimed at development and implementation of the scientifically grounded basis for functioning and development of social-economic systems of macro- and micro-levels.

[Dudin M.N., Lyasnikov N.V., Veselovsky M.Y., Sekerin V.D., Aleksakhina V.G. **The problem of forecasting and modelling of the innovative development of social-economic systems and structures.** *Life Sci J* 2014;11(8):549-552] (ISSN:1097-8135). <http://www.lifesciencesite.com>. 77

**Keywords:** innovations, forecasting, modelling, planning, stable development, social-economic systems, inertial development, innovative breakthrough

### Introduction

The attention to the problem of forecasting of such a development is constantly growing in the last few years of active transformation of the national social-economic system and its transference into innovation-oriented type of development. Not only main approaches and ways of forecasts formation, but also the used instruments are of great scientific and practical interest. According to some researchers the raise of activity in the sphere of future forecasting is connected first of all with the global ecological, energetic, social-economic challenges, which is conditioned by the rapid growth of population size in the world [1].

High man-made burden on the natural system, that has conditioned the environmental depletion, sets the task of change of the macro-economic growth quality from outrun to stable. This needs an overall solution of social-economic problems, which exist now on macro- and micro-level, but at the same time the solving of the above mentioned problems is impossible without the formation of scenarios and forecasts for the global social development. It is important to take into account the fact that innovations and innovation theory became an integral part of the national and world development, innovation-technological changes lead to the social, economic and political changes. This allows us to speak of the fact that a "technological push" is the basis of the world development [2].

The dynamics of social-economic development and the quality of its display on macro-

and micro-levels is determined by innovativeness or objective existence or influence of the factor of science in expanded reproduction and constantly growing role of knowledge content of economic processes [3].

### Methods

Basing on the results of theoretical and methodological analysis the article presents a complex approach to the investigation of the peculiarities of forecasting of social-economic development under modern conditions.

### Body

Innovations and innovativeness are considered today as the basic factors or meta-factors that provide the transformation of social-economic development peculiarities on macroeconomic and microeconomic levels. However we should not forget the fact that the traditional sector of national and world economy is still active in its development and the resistance to the implementation of innovations within the framework of business and corporate entities is still high. We cannot say that the resistance to innovations in traditional sector is the today's creation; according to some researchers the realization of the existence of a innovation resistance problem in the industrial production and in service sector can be referred to the early-middle XXth century. J. Schumpeter mentioned the fact that the chain of command and the staff of industrial production enterprises are not ready to the creation of innovations and usage of the results of their

implementation [4]. The character of innovation resistance is mostly subjective-psychological, which can be seen on the level of individually taken business and corporate entities in their impossibility to create new combinations of production factors aimed at maximizing of economic and other benefits and intensification of development.

The preserved specific character of the extensive development in traditional sector does not contribute to the growth of innovation activity on micro- and macro-economic levels. The main problem here is that the national development strategy was until recently built more on market than on fundamental growth promoting factors. We can state that the macro-economic model has two main development directions: inertial and innovative breakthrough.

Inertial development presupposes the fact that the market mechanism which is capable of self-regulation (classic principle of "invisible hand of the market") can function for quite a long time. The main subjects in this scenario, which promote the economic growth, are transnational corporations that use national economy as the source of primary resources and trading area for their products.

The scenario of innovative breakthrough presupposes that the society's efforts, efforts of business and corporate sectors as well as efforts of the state and scientific sphere should be concentrated on the development and learning of brand new technologies, interest in innovative update and modernization of the existing manufactures and active cooperation of science and business. Actually the scenario of innovative breakthrough means the country's becoming an economic leader.

Most of the researchers, who follow the scenario of innovative breakthrough, agree that the first half of the XXI century will preserve the multistructurality of national economies [5] but will form new integral economic order in which social values will not be opposed to the private initiative and the role of the state will be transferred from the passive-regulative aspect into the strategy-innovative one.

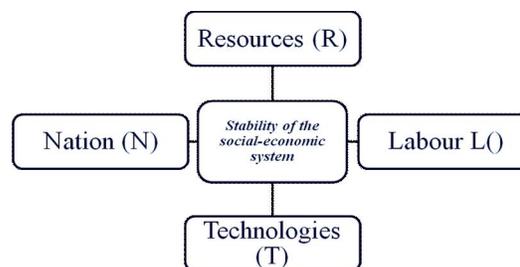
However in order to achieve such an integral effect it is necessary that the national social-economic system and low-order systems (private enterprise, corporate segment, social and scientific organizations) should reach out for the creation (producing) of innovations and their implementation [6].

This will condition the stability of social-economic development within the framework of the

current cycle of the world scientific-technical progress.

Transfer to the innovative development is possible only subject to the condition that the four main factors of the macro-economic model (resources, nation, technologies, labour) are in well-ordered structural dependence and their state have no negative impact on the correlations, formed in social-economic system (see Fig. 1).

In order to forecast pace and quality of the innovative development stability of the national social-economic system or low-order systems (business and corporate structures) it is important to take into account the state, tendencies of change and peculiar character of the development of the four factors, mentioned on the Figure 1.



**Figure 1 - Stability factors of social-economic system under the conditions of innovative development [1]**

These are the factors or the first-order parameters to the changes and transformations of which the second-order variables are adjusted [1]. The first-order variables can be classified as the slow parameters as their change cannot be characterized as high space; in other case at reaching high paces of changes of one variable the formed connection with the other variables is violated. Structural changes which take place in this situation do not provide the system's acquiring new features, i.e. they do not provide the system' evolving, but they do provide its entropy. To forecast the innovative development of small and big social-economic systems different methods and models are now used (Table 1). We consider it necessary to study two models more detailed: global integral forecasting and non-linear mathematical models, which describe the hierarchy of development. The first of these two models was suggested by B.N. Kuzyk, V.I. Kushlin, Yu.V. Yakovets [7]. The model uses two main approaches: genetic and normative.

**Table 1. Methods and models of forecasting innovative development of social-economic systems [1]**

Designation of the model or method	Used factors/parameters
Mathematical macro-modelling	The model is mainly based on the resource factor, other factors are used to a lesser degree (labour, nation, technologies)
Foresight-technologies (technologies of future formation)	The method is mainly based on two factors / variables (technologies and resources)
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Global integral forecasting of the world dynamics	The method is based on the usage of three factors: nation, technologies, resources, the capital factor is excluded from the integral forecasting
Non-linear mathematical models, which describe the hierarchy of demographic, social-economic and political development	The modelling uses full linkage and interdependence of all the factors / variables: resources, nation, technologies, labour

These two approaches are mutually exclusive, moreover, these approaches are recommended for the practical use collectively. Genetic or exploratory approach is based on the tendencies (history and heritage) of an economic object development, the hypothesis are formed and conclusions on the specifics of the further genesis of the object are proved / rejected on the basis of emphasizing the stable tendencies. Normative or teleological approach is based on the search of results of directed impact on the social, economic and other processes which are to be forecast.

This approach the hypothesis of genetic character ("what is to be expected if...") transform into teleological hypothesis ("what efforts are to be made or what actions are to be made to get final results..."). The joint use of the above mentioned approaches allows to forecast not only the desired states of social-economic system taking into account its innovative development, but also the possible, the best (optimal) motion patterns of this system from present to future.

The second of the above mentioned models was suggested by B.A. Sadovnichiy, A.A. Akaev, A.V. Korotaev, S.Yu. Malkov. It is the modelling of demographic, social-economic and political processes on three levels [1]:

1) on the world-system level (allows revealing the world trends and directions of world development of the processes under consideration);

2) on the world-regions level, which allows revealing disproportions of world regions development which appear as the result of the uneven dynamics of the processes under consideration of different countries;

3) on the basis of individual countries, which allows forming the concept of national development of the processes under consideration in the context of regional and world trends.

The use of all the three levels of social-economic, demographic and political development forecasting increases the accuracy and reliability of the forecasts

for the long-term period (20 - 30 or more years). The use of rules and interrelations of economic cycles (big, middle and small) and innovative waves allows not only to increase the accuracy of modelling and forecasting but also to detect bifurcation and breakdown points at the downward phase of economic cycle.

Forecasting serves as the basis for developing of plans for functioning and development of social-economic systems of different levels [8] including business structures of production-industrial and service sector. Today the planning is both the instrument and function of management activity in the sphere of creating and realization of strategy, and the management process of functioning and developing of small and big social-economic system. Planning as the procedure is the realization of the action sequence according to which an optimal resource distribution within definite directions, the set goals and tasks of functioning and developing of social-economic systems is taking place [9].

The more the planning falls behind the forecasting of innovative transformation of social-economic system, the higher is the possibility of revealing factors which were not previously taken into account and which can be considered as critical. That's why it is agreed to form plans according to the set schedule of functioning and developing of big or small social-economic system upon hierarchy for more successful realization of planning. It is also agreed to speak of the total of plans (as a rule there is one strategic or overall plan for development and tactical and operative plans for functioning subsystems of social-economic system which are subordinated to the above mentioned plan).

The realization of plans which are based on objective and possibly true forecasts in the practice of management of different social-economic systems including business structures, are the actions aimed at providing stable development of the said using the innovation growth factor as the main one [10].

## Conclusion

The above said allows us to draw a conclusion that to forecast the development of small and big social-economic systems first of all it is necessary to determine the scenario of the further development; to our mind this scenario should be based on the innovative breakthrough. Secondly during the forecasting of the innovative development it is necessary to take into account the whole combination of the first-order growth factors (labour, nation, technologies, resources) with their world, regional and state dynamics. However the forecasting should be not only and not so much exploratory as teleological, allowing to define the most ideal development patterns of demographic, social-economic and political processes of the system from present to future taking into account the set goals.

Planning is an iterative procedure which is derived from the forecasting and aimed at formation of the ideal combination of plans for functioning and developing of social-economic systems including business structures. Forecasting and planning procedures can be used both sequentially and in parallel, stage-by-stage approach of the use of forecasting and planning procedures depends on many parameters including planning time-frame, complexity of a planning object, planning directions etc.

So we can say that the task of forecasting is to create scientific antecedents of planning while the task of planning is to provide the creation of solution complex for the further management including the management of innovative transformation of social-economic systems [11].

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5/20/2014