

Innovations as factor of sustainable development of economic systems

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Abstract—Modern emphasis on the management of economic systems predetermined the need for increased attention to the problems of applying a variety of approaches to identifying innovation processes as factors contributing to the development of socio-economic relations, both at the level of the national economy and at the level of building macroeconomic relations, as well as at the level of forming decisions environment.

In the proposed article, the set of innovative characteristics that can have a significant impact on the sustainable development of economic systems is explored.

Keywords—Innovations, sustainable development, economic systems, management, national economy, management cycle, organization, modern management decisions, socio-economic systems, situational approach, development, human potential

I. INTRODUCTION

At the present stage of development of the world economy, as well as the Russian economy, as an integral system element of the world, there is a clear trend towards the formation of economic relations based on the generation and use of knowledge, information, growth of digitalization level (as a combination of information technologies used). An innovative approach to the reproduction of the economy naturally leads to an increase in uncertainty factors, systemic entropy and their influence on decision-making in economic systems at all levels - from a small organization to a national economy and transnational corporations.

Globalization has a dual effect on all types of innovation structure: on the one hand, scientific and technical progress objectively spreads across countries, on the other hand, it encounters obstacles in the form of regionalization, strengthening the interaction of various types of infrastructure within the country and increasing the efficiency of the infrastructure of innovation development.

However, there are factors of global innovation development that hinder the transfer of innovations to a single country. A number of scientists, and in particular, D. Ernst, argue that, in contrast to developed countries (2000), developing countries should ensure economic growth mainly with their own forces due to growing competition in the global arena. However, the domestic resources of developing countries are usually insufficient, and in the short term, they all have to rely on foreign sources of new knowledge [1]. Therefore, the phenomenon of globalization leaves the national government with fewer degrees of freedom. The production system of many developing countries becomes part of an international production system and, therefore, is managed and coordinated by transnational companies (TNCs).

Regulatory documents, in particular, the Strategy of Economic Security of the Russian Federation until 2030, set priorities for economic development, including ensuring economic growth, maintaining the scientific and technological potential for economic development at the global level and increasing its

competitiveness occupy a special position [2]. The level of scientific and technological development causes the growth of the economic potential of each country, taking into account the level of its development.

A key factor in this large-scale process is finding a balance between the level of intercountry borrowing and technology transfer, development, knowledge, and maintaining a certain, high level of national sovereignty, preserving the sustainability of the national economic development system. In recent years, the natural turbulence of the world economy, caused by the imposition of several phases of economic cycles stagnating, exacerbation of geopolitical confrontation and sanctions policy, has actualized the discussion about the need to build economic and managerial processes in the national economy while maintaining international stability competitiveness and a certain independence of its subjects.

In connection with the above, it seems relevant to pay attention to the study of the features of the development of innovative economic systems at the macro and micro levels.

II. MATERIALS, RESEARCH METHODS AND RESULTS

A review of the scientific literature has shown that, depending on the object and subject of their research, different economists consider the category “innovation system” differently.

TABLE I. THE MAIN CONCEPTS OF A SYSTEMATIC APPROACH TO INNOVATIVE DEVELOPMENT

Basic concepts of a systematic approach	Representatives	Views
The concept of technological systems	G. Dosi, N. Rosenberg, S. Glazyev, G. Fetisov, D. Lvov	Considers technologies as integrated systems of components, supported by management or public relations. Changes in technology entail changes in the entire social structure.
The concept of industrial clusters	M. Porter	Consider the existence of industrial sectors from the standpoint of integration of various types of firms and industries, often based on high technologies, when intersectoral relationships and adequate external factors form dynamic clusters or “bundles” of industries characterized by high productivity and high output.
The concept of innovative systems	B.-A. Lundvall, C. Freeman, R. Nelson	The focus primarily on the processes of learning and accumulation of knowledge, highlighting their institutional aspect, and the various forms of interaction between innovators. The main idea is that economic activity and dynamics are due to various types of innovation, in which the main role is played by learning processes, through which new technologies are created and used. This idea is justified by the fact that the learning process is collective, universal, and is influenced by both formal institutions (such as universities, corporations, the

		regulatory system, etc.) and social norms and values; Such a system for the creation and dissemination of knowledge is the main prerequisite for economic activity. Education here is understood in the broad sense of the word, as the accumulation of knowledge, their reflection and use in further activities.
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Other concepts based on a systems approach focus on specific groups of factors that determine innovative development, primarily technological ones.

The concept of innovative systems allows you to more fully take into account the full range of determinants of production, and especially the spread of knowledge and innovation - and technological, and economic, and institutional, and socio-cultural. Therefore, it is precisely this concept that is now widely used by scientists and analysts of developed countries and international organizations to analyze the problems of the formation of the “new economy” and to develop proposals for their solution (Reviews of the Organization for Economic Cooperation and Development (OECD), the UN, the European Commission, Electronic resource).

Some authors note the equifinality of the existing model of economic system development [3-5], fix the limits of its growth and note that the system is in a bifurcation phase, a state of crisis in which any innovations can change the course of further events, therefore it is important to provide mechanisms to correct the imbalance and ensure the security of the economic system in transforming conditions.

According to the authors, the innovation development should be understood as the state of the economy, in which the increase in industrial production is ensured by at least 50% of new products obtained on the basis of scientific and technical developments and introduced to the market in the last 3-5 years.

The essence of innovation is to maximize the socio-economic effect by increasing the efficiency of the use of intellectual potential. At the same time, in a generalized form, the innovation process itself is a closed two-loop (product and resource) cycle. In the course of the innovation process, with the appropriate resource provision, on the basis of the results of fundamental and applied research, the creation of high technologies, the organization of production and the realization of high technology products are carried out.

The ultimate goal of innovation processes (including socio-organizational innovation) is the emergence of a new socio-economic system that combines market mechanisms and government regulation, spontaneity and planned economic processes, criteria for economic and social efficiency, stability of economic growth and progressive changes in the structure of production and consumption, providing improved quality of life. This means that the countries in transition have mastered the opportunities that have already been established and are being realized in developed countries, with gradual

advancement to competitive positions in the global economy.

In addition, focusing on the development of human capital through training and the accumulation of knowledge, as well as their further use in the reproduction of the economy, is a key factor in stabilizing economic development and guaranteeing sustainable economic growth in the national economy. It is the education and development of abilities that allow a person to contribute not only to improving the economic situation, but also to the creation of cultural heritage and to participate in public life. It can increase the level of family and community health, protect the environment, expand its own activities and at the same time continue its fruitful development for the benefit of society. This creates an effective cycle of personal development and promoting the prosperity of the country. By ensuring access to high-quality education for all - regardless of gender, ethnic origin, religion or language - it is possible to increase citizen participation in national development and equitably distribute and ensure the benefits of economic growth.

From the position of management of the socio-economic organization, there is also a clear tendency towards the formation of innovative views on the understanding and application of a variety of management tools, a system of management methods and management decisions. As a result, scientific disciplines began to emerge, for example, such as operations research, systems analysis, management of technical systems, and others that include probably the most important component, or rather, the result of management activities, that is, management decision.

Continuing this thought, we note that it is a decision, being one of the main ones, if the most important management phenomenon emphasizes the need for understanding the entire logic of management cycles.

Thus, speaking of the cycles in management, two ways can be identified, which determine its content:

- from the point of view of the totality of successive operations or stages of the life cycle;
- Understanding it as a dynamic and consistent management process.

But it is important to emphasize that in this and the other meaning it has a final or final turn of the state, which in management is defined as a management decision.

As for the first direction, it is quite interesting and in detail presented by one of the scientific theories of I. Adizes about the life cycles of companies, described in his book "Management of the life cycle of a corporation" [6]. The essence, which boils down to the fact that any company, like any living organism, is experiencing different stages of development: birth, childhood, adolescence, etc. The company is experiencing growing pains and all those problems that any living organism faces during life. Contrary to the

philosophy of opposition, its methodology reflects a system of self-learning and self-government.

Note that within this article we are more interested in the second understanding of the management cycle, namely, the property that indicates the degree of relevance of the management decision in the system of understanding management cycles, then we will call this solution a modern management decision.

In this regard, a look at the investigated aspect of the INTALEV group of companies specializing in the development of its own software products and complex industry solutions deserves attention, which puts forward the idea of the expediency of using management cycles in the real activity of the company instead of the well-established conservative use of management functions. According to INTALEV, the management cycle (Fig. 1) is a closed chain representing the results of the execution of functions: decision making, organization of implementation, control over the implementation process and feedback to correct the decision or implementation process.



Fig.1. Scheme of control cycle (Intalev, Electronic Resource)

Next, we define what should be understood by modern management decisions - is the result of management activities, reflecting the use of modern means and methods of working with staff, information and stakeholders.

For a more detailed description of this definition, we will conduct a small comparative analysis of managerial decisions inherent to classical (traditional) organizations and organizations of the modern type (Table 2):

TABLE II: TRANSFORMATION OF
MANAGEMENT DECISIONS

Criteria for evaluation	Management solution in a classical organization	Management solution in modern type organizations
Purpose	Organization of activities	"Management without hierarchy", effectiveness
Features of	Formalized structure	Project orientation

creation		
Attitude to the external environment	Inertness and static	Flexibility and dynamics
Vision	Balance of activities and maintaining stability	Desire to develop
Evaluation and control activities	Centralized scheme	Priority-cross functional links

Thus, the following conclusion suggests itself that modern management decisions, focusing on accelerated development and decision-making, on the diversity of market participants, on constant competitive confrontation, apart from updating the management process under conditions of uncertainty and risk, should equally contribute to the formation of innovative social management methods. - economic systems in order to eliminate imbalances in a constantly updated economic space.

In this sense, if solutions that were developed solely on the basis of the principles of a systems approach and were understood as a sequence from situation to solution (Fig. 2), today it is not enough.

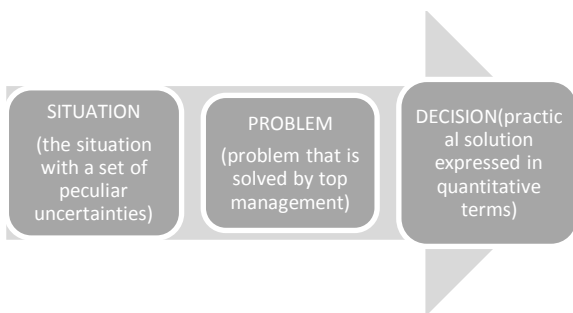


Fig. 2. Solution Cycle based on the principle of consistency

There is a need to apply a situational approach with its focus on uncertainty and risk factors. Consequently, the algorithm of the management cycle must express the following structure (Fig. 3).

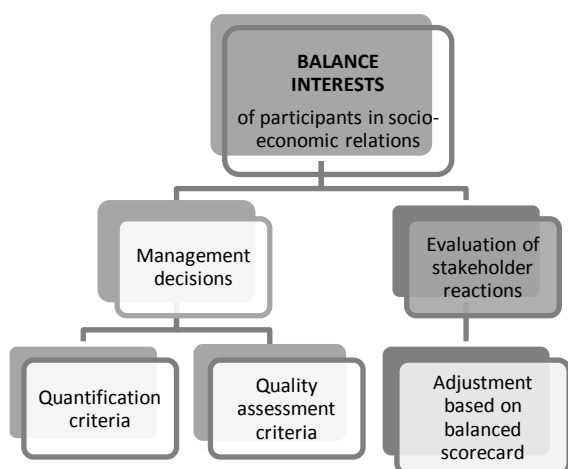


Fig. 3. The structure of the management cycle

Thus, the main task of modern management decisions is determined by the ability to resist in time or be prepared for risky circumstances, and therefore meet or use the presented requirements in order to ensure growth based on human potential:

1) the flexibility of technology, which is implemented through continuous assessment and improvement of the level of professional training of relevant groups;

2) reality in assessments of the external environment, based on the core competencies of various groups or institutions;

3) consideration of the interests of the participants in the decision, contributing to the formation of innovatively oriented goals based on cognitive technologies.

III. DISCUSSION

Economists identify three factors that ensure growth by increasing human potential: the development of capital inland (the ability of workers to use more efficient equipment), higher-quality work (more skilled workers who can increase production) and technological innovation (the ability of workers create, disseminate new knowledge, share it and use it) [7, 8].

These productivity factors serve as the basis for three complementary and partially overlapping approaches that link educational policies with economic development:

1) to increase the level of technological training of students, active citizens and the working population by incorporating innovative technologies into the curricula (literacy-based approach);

2) to increase the ability of students, citizens and the working population to use knowledge for the benefit of society and the economy, using them to solve complex problems of the surrounding world (an approach based on a deeper development of knowledge);

3) increase the ability of students, citizens and the working population to introduce innovations, create new knowledge and take advantage of their application (knowledge-based approach).

These three approaches are consistent with the alternative formulations of the strategic goals of countries and their understanding of future education. Together, they set the trajectory, following which, education reform will promote the use of modern methods of ensuring economic and social development - from technological preparation to highly skilled personnel, an economy based on knowledge, and an innovative society. These approaches will enable students, and then active citizens, and the working population to master the increasingly complex skills necessary to maintain economic, social, cultural and environmental development, as well as a higher standard of living.

As noted in the strategy [9], the key task of innovation development, comparable in importance and scale to the sum of all others, is creating conditions for the citizens to form the competences of innovation activity, in other words, the competences of “innovation man” as the subject of all innovation transformations.

“Innovative person” is a broader category than “innovative entrepreneur”, meaning that every citizen must become adaptive to permanent changes: in his own life, in economic development, in the development of science and technology — an active initiator and producer of these changes. At the same time, every citizen will play its role in the general innovation community in accordance with its inclinations, interests and potential.

IV. CONCLUSION

Key competencies of the innovation community should be:

1) the ability and willingness to continuous education, continuous improvement, retraining and self-study, professional mobility, the desire for the new;

2) the ability to critical thinking;

3) the ability and willingness to reasonable risk, creativity and enterprise, ability to work independently and willingness to work in a team, willingness to work in a highly competitive environment;

4) broad knowledge of foreign languages as communication tools for effective participation in the processes of globalization, including the ability for free everyday, business and professional communication in English.

Building up such competencies is a long and complicated process, which includes the need to adapt for these purposes not just individual areas of social and economic policy (first of all, educational policy), but also the social environment in general, the formation of a “climate” in society, providing freedom of creativity and expression, encouraging and rewarding people with relevant competences and achieving success through their use.

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