INSTITUTIONAL ASPECTS OF DEVELOPMENT OF ORGANIZATIONAL AND ECONOMIC MECHANISM OF MANAGEMENT BASED ON MODERNIZATION AND INNOVATION

Antonina Pakhomova, Larisa Namestnikova

FGBOU VPO "South-Russian State Technical University (NPI) of the MI Platov", Russia

Abstract

The article summarizes the experience of the organization and management of scientific and technical developments of enterprises in such countries as the USA, China, Russia. The author proves that for the successful functioning and development of industry in the Russian Federation it is necessary to have institutional mechanism providing a set of prior organizational and economic activities. The concept of formation of organizational and economic mechanism of development by modernization and innovation activity is suggested.

Key words: *scientific and technical development, organizational and economic mechanism, innovations, modernization*

Studies and international experience show that levels of technological development of different countries and regions of the world are very different and depend on the structure and nature of innovative economic relations of subjects among themselves and with society in general. In the mid 80-ies of the last century, Chris Freeman introduced the concept of national innovation systems. In a number of countries markedly different from each other national innovation system (NIS) were created, and in those countries where they were most successful, progress became apparent. Currently, the experience of these countries in the form of separate elements of the organization of the NIS other countries are trying to apply, and sometimes with considerable effect. However, the problem of technological backwardness of many countries (including Russia) remains unresolved.

Analyzing the global practice of regulation of scientific and technological development, the US experience should be noted. So, by the long-term reform programme of administration of B. Clinton, approved by Congress in 1993, was intended to achieve the country's scientific and technological leadership, and to provide a consistent implementation of the doctrine of "global technological competitiveness of the U.S. in the face of global competition". [5].

In the development of a long-term program of reforms in the United States a number of laws that provided state responsibility for the development of science and technology, stimulation of scientific and technical progress, implementation of new technical and industrial policy, protecting the interests of private capital from foreign competition were adopted. All these measures were aimed at increasing state presence in R & D because the private sector without assistance from the state is not able to solve the problem of maintaining competitiveness, overcoming the slowdown in economic growth, deterioration of indicators of industrial production. The main coordinators of the scientific and technical policy and the policy in the field of basic research are: the National Science Foundation (NSF) and the Office of science and technology of the White house. At the final stage the coordination of strategy development of science and technology is executed by special scholar Council President. The core of government policy in the field of STP is formed within the scientific and technical complex, which is based on the Department of defense, NASA, NSF, Department of energy, trade and a number of other agencies. Here the main approaches and requirements for state-legal regulation of development of science and technology are produced. Laws for functions of Federal agencies provide the development and implementation of own scientific, technical and industrial policy. The mechanism of state economic and legal regulation of scientific and technological development is determined by the unit of Federal legislation in the USA. In General, the mechanism of economic and legal regulation of scientific and technological development of the United States identifies six levels [3, pp. 46-48] (table. 1).

Table 1. State economic-legal regulation of technological development in the USA (source 3, p.48])

Structure of legal acts the legal regulation	Basic levels of state regulation
The U.S. Constitution, its provisions and amendments passed by Congress. The Federal budget law, adopted every year by the Congress as the main instrument of management and organization of public management and entrepreneurship. Federal laws on budgets of state departments, ministries, agencies and committees, annually adopted and approved by the Congress	I level
Executive orders of the President issued by the White house as secondary legislation to Federal laws. Federal laws on the goals, objectives, and functional activities of Federal agencies, adopted by Congress at their creation	II level
Federal laws are the programs in science, technology and scientific and technical progress, periodically taken by the Congress in accordance with the needs of scientific, technical, economic, military and foreign policy	III level
Federal laws on state orders for goods and services. Federal internal control (regulations in development of Federal laws)	IV level
Federal contract program (R & D project). Federal contract law	V level
State arbitration. The decision of the appellate courts	VI level

As can be seen from the contents of table 1, among the legal rules of the first level of regulation the crucial one belongs to the Law on the Federal budget that is the main source of funding state long-, medium - and short-term R & D programs, the creation and acquisition of new equipment and technologies. The second level of regulation includes the Federal law that governs the establishment, purposes, tasks and functional activities of Federal department, ministry, administration or other authority of the Federal government (the laws of creation of NASA, NSF, administration on Affairs of small business, ministries of trade, industry, science and technology, energy, agriculture, internal Affairs, etc.). The third level of regulation are the Federal laws programs in the field of scientific and technical progress, designed to develop and strengthen scientific and technical potential of the country and implementation of strategic and tactical tasks of the state scientific-technical and military-technical policy. The fourth level contains the Federal interdepartmental regulations – by-laws integrated into a common "Set of rules of Federal regulation." Its special section "Federal regulation of state orders for goods and services" is a practical tool of regulation of everyday economic activities of Federal agencies, as well as the primary means of organization, management, regulation and functioning of the state market of goods and services, primarily research and development. Fifth level of regulation is submitted by the Federal government contract for the project (program) implementation of fundamental or applied research, development and creation of new technology for civil or military purposes." In content, the Federal contract is a "code of laws" in miniature, as in it in concentrated form in a very rigid legal regulations the requirements of the state of scientific, technical, industrial, economic, social, military and foreign policy clearly embody. The sixth level of regulation is administrative orders through which economic operational management of the implementation of government orders and decisions of the arbitral authorities and the courts of appeal are done. These legal acts are economic and legal basis of economic activities of the state as entrepreneur [3, pp. 49-50].

The US experience in the strategic management of research and technological development can be useful for Russia. It is needed to assume that purely market-based mechanism used by the private sector is not able to provide a solution to economy problems. State intervention and new measures of state regulation in the sphere of science, technology and technological progress, widely used in the United States and Western European countries is necessary. [3,9].

It is worth considering the experience of China's modernization, where, since 1990, a strategy of catch-up modernization, based on active development of the most advanced scientific and technological achievements and technology has been implementing. Thanks to advances in neoindustrialization of its national economy, China now has a major impact on the distribution of world economic forces and economic interaction. In a short period of time China began to occupy a leading position in the world economy. The volume of industrial production of China in 2009 surpassed the US. According to forecasts, China's GDP will reach the level of the U.S. by 2020-2025 In April 2011, the IMF stated that the new leader in 2016 would be China whose GDP will grow in 2016 to 19 trillion $ against 18.8 trillion $ in the U.S., and its share in the world economy will amount to 18% against 17.7 percent in the U.S. [3, p. 51].

Currently in the economy government provides for the sale almost all complex mechanisms, proven abroad: integration of scientific organizations and higher educational institutions with manufacturers of products; development of consulting services in the field of innovation activities; the creation of horizontally integrated structures (holding companies), etc. However, the scale, direction and structure of the innovation does not meet the requirements, does not promote the level of modernization and innovative development of economic sectors of the country.

Based on research and practice, the author proved that the management processes of modernization and innovation in an industrial enterprise depends on many factors: principles, objectives, functions and tasks of management, organisational structures and composition, methods and processes of management activities, information database, technical, personnel, financial and legal support management system, methods and style of work of personnel management, etc. All of these elements of control form a single integrity - the system in which they linked in the causal relationships, they are in constant development and therefore, while the improvement of the management system they must be taken into account in complex, interconnection and interdependence. In modern conditions management of modernization and innovation processes carried out on the basis of program-target method. This method allows to determine the necessity of formation of these or that management structures to perform the necessary functions of the control system in implementation of programs as functions dictate the need of establishing of management structures, content and nature of their activities.

For the coordinated interaction of all levels of management modernizing and innovation activity it is suggested to include such priority directions of perfection of system of organization and management: strengthening of control activities for the coordinated and proportional development of branches of production and over budget spending; enhanced action on the development of new modern production technologies, forms and methods of management, etc. To regulate the production and acceleration of technological development of industrial enterprises all accumulated practice variety of methods of

To enhance the industry in Russia it is proposed to develop at the Federal level and to adopt the Concept of formation and development of organization and economic mechanism of management of modernization and innovation activity (hereinafter – the Concept). In our view, this Concept represents directions of modernization development, containing the wording of the main goals and priorities of modernizing and innovational activity, system of relations between the state, scientific-technical, production sphere and market segments; the list of the most important forms, tools and methods to ensure continuous improvement and upgrade of production and technological base.

The Concept should define the basic strategic approaches to the creation of the control mechanism of modernizing and innovational activity of industrial enterprises, providing the organization of effective interaction of financial and administrative resources, the mutually-agreed activities of the authorities, science and business, attracting of powerful public resource for modernization and innovative development of the industry by the executive and legislative authorities of the Russian Federation.

Schematically the Concept of formation and development of organization and economic mechanism of management of modernization and innovation industry in the Russian Federation is presented in figure 1.

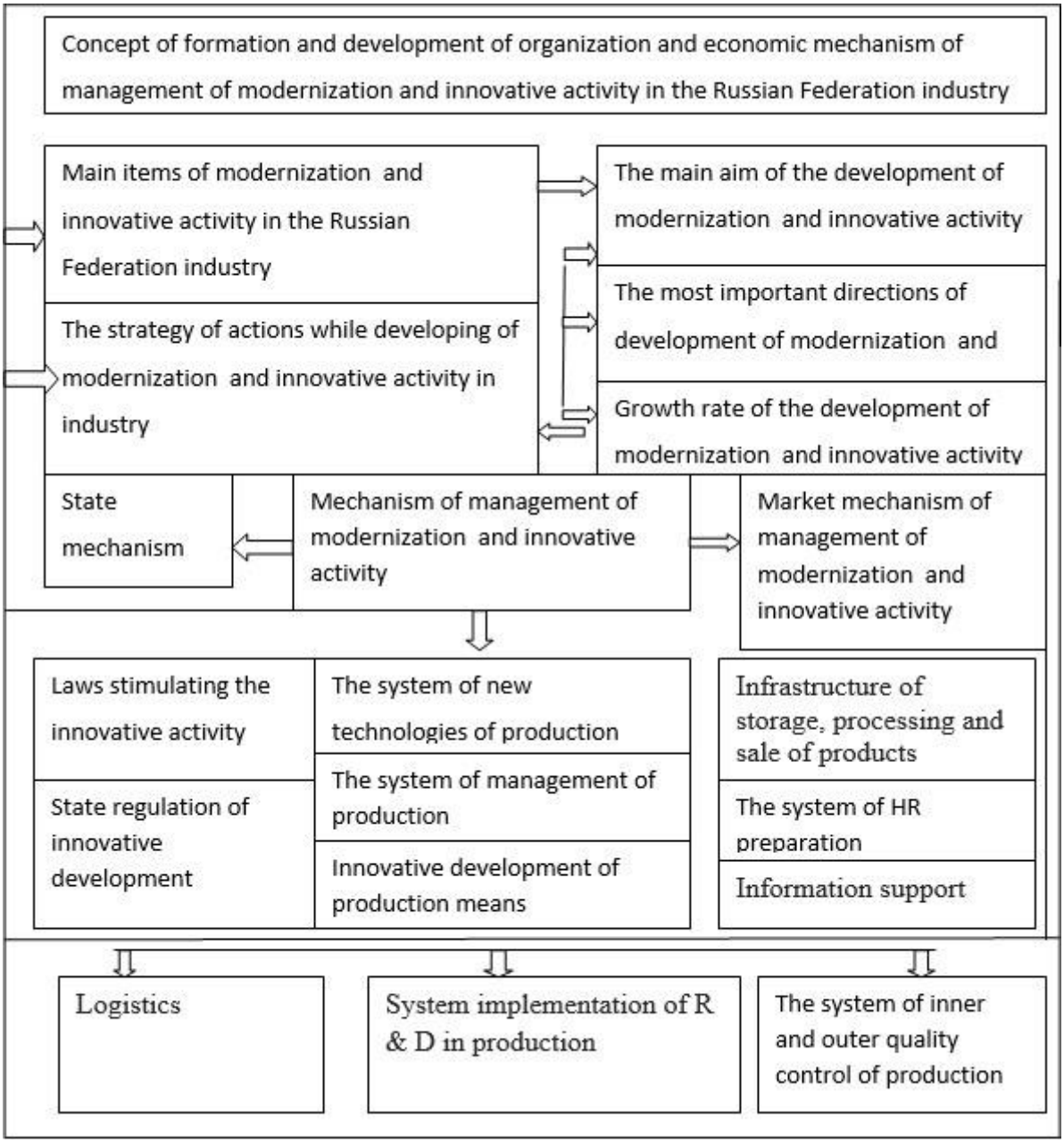


Figure 1. Scheme of development of the concept of formation and development of organization and economic mechanism of management of modernization and innovation activity in industry of the Russian Federation

The implementation of the Concept of formation and development of organization and economic mechanism of management of modernization and innovation activity in industry of the Russian Federation, in our opinion, will allow to go into modernizing and innovational way of development, will significantly increase the efficiency and competitiveness of products on internal and foreign market. The aim of the Concept is definition of the main strategic approaches to the creation by the executive and legislative authorities of the Russian Federation of the mechanism of management of modernization and innovation activity in the industry, providing the organization of effective interaction of financial and administrative resources of the line ministries, the mutually-agreed activities of the authorities, science and business, attracting powerful public resource for modernization and innovative development of national economy.

The main tasks defined in the Concept are:

- effective use of available resource and innovative potential of the national economy and all industries that supply equipment, machinery, technology, working capital to ensure the needs of the population in industry products at affordable prices, ensuring food and processing industry with raw materials and exit of Russia in perspective on the role of one of the main suppliers of industrial products on the world market;

- elimination of disparities among the individual links of the industry;

- innovative development of subjects of the industry with the aim of strengthening competitive positions on the domestic and foreign markets and broad product diversification.

The main directions of realization of the Concept include:

1. The formation and development of organizational, economic and institutional conditions for sustainable and dynamic of modernization and innovative development of industry of Russia and its regions with the aim of achieving high competitiveness in the globalized economy.

Lack of effective communication between government at various levels and business representatives of the industry trouble the formation and development of management of modernizing and innovational activity. Experience has shown that government believes that the market and competition will regulate the organizational, industrial and financial relations between economic entities. However, in real Russian conditions of doing business in general and industrial business in particular this is not happening. The market of industry products is represented both by domestic manufacturers and foreign, a significant proportion of the processing, logistical, and raw material supply is imports, effective competition has not developed, and led to the imbalance of the financial relationships of manufacturers and suppliers of raw materials. At the state level in the country there is no systematic approach to the formation of organization and economic mechanism of management of modernization and innovation, there is no coordination in the development and implementation of Federal and regional target programs in modern modernizing and innovational level.

With the aim of maintaining of organizing, economic and institutional conditions' forming and development for stable dynamic development of industry based on modernization and innovations it is necessary:

- to work out the scheme of power's vertical for the administration of the activity based on modernization and innovations;

- to move from the policy of non-interference to preemptive state regulation of organizational, economic and social industrial processes;

- to use the advantages of target- oriented method of predicting and planning, unified functions of all levels' control system, precise division of authorities, responsibilities and control.

- to maintain control over coordinated activity and proportional development of industry's subject, objective expenditure of budget resources allocated for upgrading and innovative development, familiarity with new modern production's technologies, forms and methods of administration.

- the usage of all variety of methods, accumulated be world practice, which can ensure the influence on economics should be provided.

2. Technological rearmament of industry based on upgrading and innovative methods with the usage of domestic material and technical base, which is in a response for modern needs of subcomplex.

The deterioration of industrial equipment, used in food processing industry, on the average in 2012 exceeded 65 % comparing with 35 % in 2000. Technological machines, meeting modern requirements, can be used only by innovative enterprises; only 6 % of profitable firms implant innovations in the process of production,15 % produce modernization of equipment which they have and which meet modern requirements. About 40 % of technological equipment is put into operation more than 40 years

ago. Such equipment is used by enterprises which have low level of profitability: these machines are extremely worn and are exploited in disrepair.

Only 12-15 % of all needs of food processing industry's enterprises in material and technical resources are met. Domestic producers, who have achieved the level of profitability more than 20 %, use imported material and technical resources. The innovative world enterprises of material and technical provision have lots of benefits over domestic producer: the term of accident-free operation, the usage of modern engineering approaches, economy, high productivity and quick service [5,6]. Wisely planned chain of material and technical displacements allows moving to the way of development which is based on innovation and modernization, producing extended range of products of higher quality, which now doesn't have analogues of domestic production and is fully depended on imported goods.

3. The liquidation of disproportions between elements of production. High indicators of production were achieved as the result of industry's development recently. Nevertheless, the technological processes of production, recycling and realization are broken, which creates disproportions between elements of production system. The ratio of product's prices and material and technical resources' prices shows the real growth tendency of prices' misbalance, which has negative influence on financial indicators of industrial enterprises.

Recently available cooperative relations inside one sector of the economy or between different sectors are mainly broken because of the bankruptcy and the liquidation of different plants, designing, technological and projecting establishments and etc. The information about possibilities and competences of plants – suppliers of components for enterprises is being lost. It is necessary to establish different economic sectors' centres of innovative and technological industrial competences, like data base and modern technological platforms. There are plenty of innovative working-outs for industrial enterprises in scientific and higher education establishments, which are not popular for many years. There are no realization and implantation of innovations or it can be applied only for particular cases because of the absence of organizational and economic mechanism of control of operation based on modernization and innovations. Scientists of academic, research, constructors and technological institutions can't commercialize working-outs which they have on their own.

The creation of organizational and economic mechanism of control of operation based on modernization and innovations will supply the liquidation of disproportions and the achievement of high level of capacity utilization, based on making optimal decisions and implantation of measures for effective operation of productive resources.

4. Innovative development of industrial subjects with the aim of strengthening of competitive positions inside the market and out of it and wide diversification of products.

According to the researches, the business in the process of integration and cooperation of its participants inside the processes of products' production, storage, transportation, recycling and realization on account of expansion of productive relations and improving of organizational and economical relationships contributes to the solution of problem of operation based on modernization and innovations and to the maintaining its' stable development. Each type of integration has specific features for a particular aim of this form of integration's creation.

Cluster as a new type of association is just beginning to develop and demand further scientific researches. According to M. Porter, "cluster is a group of interconnected complementary situated nearby companies and organizations, connected with them, acting in a particular sector of economy, united by similar activity. [8, p.207]. The phenomenon of cluster, the theory of national, state and local competitiveness in the context of the world economy, justification of historical and intellectual clusters theory's background is given in the paper of M. Porter which is called "The Competitiveness". He marked that clusters are pronounced features of practically any national, regional and even capital's economy. M. Porter paid attention to the fact that the world most competitiveness firms of one industrial sector are usually not chaotically situated in different developed countries, but concentrate in one country or even in one country's region.

One or several firms, achieving world market's competitiveness, spread its influence on the nearest surrounding: suppliers, consumers and competitors. Then, the successes of the surrounding's elements have positive influence on the further growth of this company's competitiveness. As a result, "cluster" are being formed – the group of firms, tightly connected industrial sectors, mutually contributing to the competitiveness growth of each other [7].

Formation of clusters' process of foreign experience allows revealing necessary conditions for clusters' self-organization, using the elements of foreign experience in the process of building industrial clusters' system. Foreign experience of clustering has just been considered in terms of discussion fragmentary with the aim of justification of specific industrial clusters' Russian model [1, 2]. Describing the clusters' phenomenon in economic papers, such concepts are used as: "industrial districts", specialized industrial agglomerations" and "local industrial systems". The interest to clusters and innovative systems' operation reflects economic interest's revival to the aspects of economics' functioning and realizing of specific local resources' meaning in stimulation of innovative possibilities and small and medium-sized business's competitiveness [2]. Alfred Marshall, scientist in the field of economic science, was one of the first researchers of production's geographic concentration. He noticed advantages of such concentration in his paper "Principles of economics": the presence of specialized work force's common market; specialized delivery and service; fast spread of innovative technologies [4].

He thought that this concept of organizational and economic mechanism of control of operation based on modernization and innovations is aimed at: the maintaining technological industrial development's high rates based on scientific and technical achievements, mass implantations of perspective innovations and new technological way of production's creation; radical renovation of scientific and industrial potential; and will allow to activate the realization of measures for productivity's increasing, the quality of production's improvement, decreasing its prime price, increment of profitability by means of rotation of new technological approaches and upgrading of available ones, which lead to qualitative changes of the whole system of economic sector's management and transition from one technological way of producing to another.

According to the measures' and parameters' analysis, which are provided by laws, the operation in the industry based on modernization and innovations will not be able to develop at a pace which will provide the achievement of the competitiveness's necessary level in the nearest future. In this connection, the role of the government in innovative development must be strengthened for the maintaining of modernized and innovative development, the state innovative policy must be worked out and all the conditions for its gradual realization must be created. State innovative policy must be consequent and include next tendencies applying to industry:

- controlling of industry's condition and system of organization and administration of operation, based on modernization and innovations with the aim of getting reliable mark of production's state, its' comparison with the indicators of forward countries and development's planned ones and making decisions about the necessity of measures' and systems of administration's corrections;

- the working out of long-termed target programs and predictions of industrial operation based on modernization and innovations in the connection with other sectors of national economy;

- the creation of legal regulations' of innovative operation system, which maintain the realization of target programs and predictions of industrial activity based on modernization and innovations.

Development of innovative process is connected with rather labor-consuming and long-lasting coordination of different stages, which make up the process of innovative activity on appropriate levels of administration and creation of uniform, regulated premises for making management decisions in the lowest levels of the system – groups which deal with science and research, based on this approach. The most difficult part is to compound wisely the interaction of simultaneously used arms, incentives and methods, which allow turning on the mechanisms of interest of business entities' interests. The differentiation of needed influence's parameters, depending on aims and problems of administration has the specific relevance in creation of mechanism like this.

It is also important to consider other regularities, caused by the necessity of specific arms' and economic methods of influence on the character of intensification and renovation of production's processes' choice and the innovative activity as well while forming and developing the mechanism of innovative processes' administration. The usage of regularities stays out of the economic management's mechanism in the real system of innovative activity's management; it is what maintains the mechanism of abruption of technical innovations and braking of fundamental researches.

The systems of scientific and technical progress's management (scientific and productive associations (SPA), scientific and productive systems (SPS), etc.) were being formed for development, organization and usage of regional science's potential in pre-reforming period. These systems had organizational and functional structure on its basis. SPA and SPS disappeared with the market economy's appearance.

As a result, it is necessary to reorient the whole industrial system, but not just specific industrial sectors, connected with the production for the realization of innovative programs and accelerated innovative technologies' development. It is only possible to create market's saturation with high technologies of appropriate quality and in needed quantity if to involve all national economy's sector into the processes of production's maintaining and intellectual products' consumption.

The author supposes that it is necessary to correct the development's innovative policies, which is defined by the author as "industrial activity based on modernization and innovations" as systems based on innovations, investments, institutions and infrastructure. The innovative activity is becoming the basis of industrial development and the necessary condition of productive, technological and technical innovations' realization. Besides, investments should be aimed not only at the scientific working-outs, but also at its implantation in the production's process and the market's regulation and the development of territories where the production is situated, and it is necessary to create institutions' and infrastructure's development for this aim. It is also necessary to adopt existing institutions to the modern conditions of competitive environment, to establish strategic management's institutions and institutions of self-regulation. It is necessary to adopt institutional, productive, legal, financial and credit infrastructures to the market economy's requirements. All elements of the activity based on modernization and innovations are interrelated and interdependent, requiring their coordination in time and space. So the activity, based on modernization and innovations as the system of development include all interrelated and interdependent elements and contribute to increasing of production's volume and its competitiveness.

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