

# State Policy in the Area of Implementation of Innovations in Industrial Production

**Konstantin Yurievich Reshetov**\*

National Institute of business, Youth Str., 5, Bld., 1, Moscow, 111395, Russia

**Natalya Sergeevna Khoroshavina**

University of Technology (UNITECH), Gagarin Street, 42, Korolev, Moscow Region, 141070, Russia

**Victor Ivanovich Mysachenko**

National Institute of business, Youth Str., 5, Bld., 1, Moscow, 111395, Russia

**Vyacheslav Yurievich Komarov**

National Institute of business, Youth Str., 5, Bld., 1, Moscow, 111395, Russia

**Mikhail Ivanovich Timofeev**

National Institute of business, Youth Str., 5, Bld., 1, Moscow, 111395, Russia

## Abstract

The purpose of this paper is to systematize and summarize the findings from theoretical research by leading domestic and foreign scholars and key practices related to the role played by the state in ensuring and the extent of its influence on the nation's innovation-driven development and input to implementation of innovations in industrial production. The key methods employed by the authors are data summarization, description, interpretation, and theoretical methods of formal and dialectical logic. As this work's key result, the authors have assessed and systematized a set of proposals on government support and regulation of innovation activity in Russia. Implementing these proposals will help provide a significant boost to the innovation process in most sectors, especially science-driven ones, like information technology, machine-tool manufacture, the radio-electronics industry, the nuclear power generation complex, the power engineering industry, ship building, the aviation and rocket-and-space industries, etc. The authors' key conclusions drawn based on the research reported in this paper are associated with determining a set of ways to enhance the efficiency of government regulation of the innovation sphere, as well as a set of priorities regarding Russia's scientific/technical development.

**Keywords:** Innovation.; Innovation activity; Innovation policy; Innovation-driven economy; Science-driven sector; Science-driven production; Competitiveness; Government policy; Government regulation.



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## 1. Introduction

Most nations which have achieved success in terms of developing their high-tech sector have had in place a well-substantiated government policy aimed at implementing a certain model for innovation-driven development (Gnezdova *et al.*, 2016a); (Khrustalev, 2014). Currently, there are several major models for fostering innovation. Boosting the role played by the state in regulating innovation processes is a crucial trend in the innovative development of science-driven sectors within the domestic economy (Pirogov, 2016); (Lyasnikov and Pirogov, 2016).

In the view of scholars M.L. Gorbunova and N.K. Elizarova, the development of the high-tech business sector in the Russian Federation is a top-priority objective in the state's economic policy aimed at overcoming the nation's existing raw materials' specialization within the global economy (Gorbunova and Elizarova, 2010). Most present-day economists (e.g., S.Yu. Glaz'ev, M.Ya. Veselovskii, M.N. Dudin, V.I. Mysachenko, N.L. Pirogov, E.P. Popova, V.P. Fomina, etc.) are of the view that science-driven production operations, which form the basis of innovation and high technology, serve as an indicator of the nation's production potential and its competitiveness and are among the top-priority areas for development in the area of national security (Fomina *et al.*, 2001). In this regard, certain scholars (e.g., Yu.V. Gnezdova, D.V. Kuzin, I.A. Fil'kevich, L.A. Yunusov, etc.) have suggested that restructuring the sectors of industry and adapting them to a high-tech environment and stiff competition requires purposeful government support (Gnezdova *et al.*, 2016b). If the Russian Federation is to shift from an exclusively raw materials' specialization toward a focus on domestically developed competitive high-tech innovative technology, this can be achieved only through the concerted effort of the nation's business community, scientific community, and authorities.

## 2. Methods

The authors' investigation into the role played by government policy in the area of implementation of innovations in industrial production incorporated the collecting, reviewing, and systematizing of theoretical and practical material, which helped identify some of the key benefits of the government's pursuit of an active innovation policy and gains from implementing it. To process the study's results, the authors employed the following methods: data aggregation and grouping, summarization of information from the literature and statutory-legal sources, and comparison. The study's methodological basis was grounded in the systemic approach, cause-and-effect analysis, deduction and induction, and some other methods. Its information basis was grounded in data from Russia's Ministry of Industry and Trade, analytical materials from Rosstat and its regional units, statutory regulations, prognostic, analytical, and conceptual materials from relevant agencies provided in the literature and special databases. The study's theoretical basis was works by leading Russian and foreign researchers and specialists in the area of the theory and methodology of innovation processes.

## 3. Results

### 3.1. The Role Played By the State in the Management of High-Tech Production Operations

In today's world, innovation-driven development can be fostered by way of four major models – Asian, Scandinavian, American, and Israeli. Table 1 provides a characterization of each of these models.

**Table-1.** Characterization of Models for National Innovation Policy in Developed Countries

Major models for national innovation policy	Description
Asian model	Creating favorable conditions for attracting foreign capital for innovation-related purposes (e.g., cheap manpower and a quality infrastructure)
Scandinavian model	An emphasis on the development of areas that are promising for the country and a focus on the export of high-tech products
American model	Effective interaction among the business community, the government, and educational institutions based on market initiatives
Israeli model	Active innovation-driven development of the small and medium-sized enterprises' sector based on effective government support through providing small and medium-sized enterprises with government contracts with a major focus on the defense component and the development of support programs

Over the last few decades, the high-tech sector within Russia's industry has faced unfavorable circumstances. At the same time, it is this sector (more specifically, its potential and scientific-production base) that has largely governed Russia's national and economic security and served as the prospective basis for its technological independence. The country's national security is, above all, based on the availability of internal potential for economic development for a long strategic period, although it is worth noting that in recent years its size has not changed much (Dudin *et al.*, 2015b).

In recent years, due to a decline in the rate of industrial production and economic growth as a whole, as well as a plethora of sanctions imposed by the US and EU member states against Russia, special relevance has been taken on by the putting in place of sectoral structural scientific-production associations, the dynamic development of which will enable the domestic economy to embark on a well-charted course of effective development (Doronin *et al.*, 2016); (Pirogov *et al.*, 2018). Regulating the national economic system should facilitate the orderly and rational use of the nation's innovation resources.

To ensure its security, the nation needs to pursue an effective government policy in the area of innovation activity (national innovation policy). The development and implementation of innovation policy and the building of an innovation-driven economy must be a crucial component in the strategy for the nation's long-term socio-economic development (Dudin *et al.*, 2015a).

Employing a purposeful approach and putting in a meaningful effort in the area of fostering sound boosts in competitiveness through innovation is a key circumstance that will help the Russian Federation not only build a modern economy but retain its status at the level of economically developed nations (Ledovich *et al.*, 2015); (Dudin *et al.*, 2013). Among the key preconditions for the implementation of national innovation policy are the following:

- the availability in the nation's economy of high-tech and science-driven sectors capable of actualizing their scientific-production potential and ensuring future economic growth;
- the availability of many years' experience in creating and implementing in industrial production models for the distribution of innovative achievements, including in production operations characterized by inhomogeneous technical and resource levels of development;
- a focus on engaging in the process of innovation-driven development highly intellectual human resources based on the use of a sound system of higher and academic education, as well as through fostering high levels of scientific-technical and production culture;

- a focus on creating the conditions that will facilitate boosts in the competitive advantage of Russian production enterprises in the internal and external markets through their structural reformation and the development of an effective strategy for development.

The effective fulfillment of the above preconditions requires a deeply thought-out mechanism for government regulation of the innovation sphere (Il'yuk and Ignatov, 2017). In the context of the state's objective intervention in the economy, it is worth considering that the market is characterized by the following restrictions and limitations:

- the market does not produce social goods;
- the market does not guarantee profit;
- the market is moving toward monopolism in an unregulated fashion;
- the market does not do much about environmental protection;
- the market does not always distribute the resources in an effective manner;
- the state is not engaged in direct legal regulation of relationships between the buyer and the seller;
- it is not allowed to directly distribute the resources, without taking into account the market factors and needs;
- it is not allowed to practice centralized directive planning, with planning on a scale of the economy being only market-based, prognostic, and indicative;
- it is not allowed to practice prolonged and absolute administrative regulation of prices on a major scale.

That is why over the last two decades the Russian Federation has witnessed a significant decline in the use of purely administrative methods for managing the national economy in favor of a shift to predominantly economic regulation methods. In this climate, the state's participation in regulating the economy is aimed at:

- minimizing the level of monopolization of the economy and driving growth in its sectors;
- providing support for financial and pricing stabilization;
- pursuing a targeted social policy;
- improving the condition of the economy and the well-being of the population;
- protecting the environment.

The state is pursuing these objectives via the following methods:

- direct – administrative methods that imply the provision of budgetary funding to enterprises, provision of investment support for production activities, provision of subsidies to enterprises, including export-oriented ones, pursuit of policies of antimonopoly regulation, and development and implementation of relevant standards.
- indirect – economic methods such as monetary regulation, tariff regulation of foreign trade, stimulation of export, setting rates with respect to restricting the size of or permitting the use of foreign capital, and fiscal regulation.

State participation can, thus, influence processes taking place across the global economic space and govern most of the key indicators of products' competitiveness, as well as govern the extent of penetration of science into production and the economy.

It is worth clearing up that a national innovation system is a set of government and scientific institutions that are engaged in production, including high-tech production operations, as well as the transfer and use of innovative knowledge. Government regulation of innovation processes is a set of forms and methods of influence on the part of the authorities on the market for innovative products with a focus on helping build their competitive advantage, speed up the process of materialization of new scientific knowledge, and create a favorable innovation climate (Lyasnikov *et al.*, 2014).

### 3.2. Preconditions for Effective National Innovation Policy in Industrial Production

At the moment, Russia's high-tech sector is not sufficiently sought after. Over the last several years, its share in the overall volume of industrial production has declined significantly, which has led to sharp declines in the pace of development of innovation sectors within the economy. In the global market, domestic high-tech products are still not sufficiently competitive, their share not exceeding 0.5%.

The nation's processes of technological exchange are not distinguished by high levels of innovation activity, which is due to low levels of internal incentivization for innovation. This is affecting the innovation-driven development of the Russian economy as a whole.

The development of an innovation-driven economy is regarded to be successful if a nation annually invests in R&D 3 to 4% of its GDP. However, the current focus on the issue of cross-integration of high-tech production operations within the sectors of the national economy is not sufficient for the consistent algorithmic development of the national economy (Dudin *et al.*, 2015a). Thus, trends in the fostering of integration and development of mechanisms for the regulation of science-driven production operations are signaling the need for having in place a sound system of administration. A number of Russian scholars have justly spoken of major difficulties in the technological development and modernization of industry. Above all, these difficulties are associated with the fact that during the Soviet period, characterized by the development of a planning economy, the nation had strayed away from the practices of corporate building and management of new solutions.

The process of restructuring most of the major national enterprises and state-run corporations was taking place in a climate of their imperfect structural and corporate set-up, with significant economic and technological lags behind foreign corporations (Baranenko *et al.*, 2014).

A certain degree of underdevelopedness of domestic market relationships may be explained by a particular approach being taken to regulating economic activity, with there currently still being no alternative offered to the regulating role of the state, especially in a climate of a sustained focus on the monopoly of large enterprises and weak domestic competition in a number of sectors within the Russian economy (Sandu *et al.*, 2014).

Under these conditions, the development of an innovation-driven national economy is forcing market participants to develop and implement on their own new forms of interaction among the corporate organization and the business community, the scientific community, and the government and regulation of their joint economic activity based on the influence of the government and business establishments on processes of management of science-driven industrial complexes.

Boosts in the state's influence on processes of management of high-tech production operations as part of an innovation-oriented model for development can be facilitated by government support for the development of domestic high-tech sectors, like the radio-electronics industry, ship building, the aviation and rocket-and-space industries, the power engineering industry, the nuclear power generation complex, machine-tool manufacture, information technology, etc. (Dudin *et al.*, 2018); (Dudin *et al.*, 2017).

In this context, to resolve relevant objectives for innovation development, it may help to make use of certain strengths of the Russian economy:

- the significant scientific-technological potential of industry's commercial and defense sectors;
- the nation's ample reserves of natural resources, powerful material and raw-materials base, and sound transportation-logistics infrastructure;
- the nation's significant reserves of production capacities for turning out mass products, with a relatively low true product cost, which should make it easier to find sales outlets in both the domestic and foreign markets;
- the nation's ample intellectual resources cultivated previously, highly qualified scientific-production workforce, and sound system of higher learning.

The use of the above strengths may help overcome:

- scientific and technological backwardness, which is resulting in the low competitiveness of innovative products;
- the insufficient level of development of the small business sector in the context of innovation activity and its lack of flexibility in a climate of quickly changing market conditions;
- the disunity of science and industrial production in the context of innovation activity;
- the lack of proper motivation with manufacturers, which is resulting in low demand for scientific-technical potential and reluctance to invest in innovation, which could provide an edge in international competition;
- the inevitable aging of scientific human resources in enterprises and colleges, with many staff having gotten their education back in the Soviet scientific school, the lack of a sound scientific culture, and the lack of interest with the young generation in the reproduction of advanced technology.

To boost the efficiency of government regulation of the innovation sphere within domestic industry, it is necessary to:

- develop and streamline regulatory and legal support in the area of innovation activity, work out a mechanism for stimulating it, and put in place a system of legal protection of investments by the participants – interested parties, including those without a blocking stake;
- expand and modernize innovation infrastructure concerned with the commercialization of high-tech solutions;
- create the legal and statutory conditions for the assimilation of high technology with a focus on putting together production operations dealing with the production of advanced types of products;
- ensure the fulfillment of priorities in the area of support for advanced technology on the part of the government;
- train relevant specialists in the area of commercialization of advanced technology and in the area of management of innovation projects;
- identify and systematize domestic innovation enterprises and gain an insight into their competitive advantages to help promote their products in the global market;
- upgrade technology for mass innovation production operations that may offer the greatest economic effect;
- employ in production promising dual-purpose technology;
- develop the latest methods for the reproduction of natural resources and technology for obtaining mineral raw materials;
- put in place a system of scientific examination of the results from R&D activity;
- develop a system of venture capital investing and engage in innovation projects extra-budgetary sectoral and specialized funds to drive investing in intersectoral innovation projects and for experimental advanced solutions;
- boost gains from the use of state-owned assets, including in the context of transfer of state-owned assets into day-to-day commercial administration, as well as leasing it out to galvanize innovation activity as much as possible;
- integrate Russia's innovation system with the national innovation systems of industrially developed and developing nations;
- stimulate the development of small and medium-sized innovation-focused businesses through the creation of favorable investment conditions for them.

## 4. Discussion

The state's innovation policy may be characterized as a goal-oriented process of creating the preconditions in the area of innovation-driven development of society's socio-economic, scientific-technical, and organizational-managerial forces. Regulating innovation activity may include the following elements:

- agencies concerned with regulation of and control over innovation activity at all levels of the management hierarchy;
- a set of socio-economic and scientific-technical factors in long-term national development;
- a complete roster of priorities and government programs associated with strategic innovations in key sectors of society and industry;
- a wide array of R&D institutions concerned with the conduct of innovation research and its distribution across all sectors of science, all sectors of industry, and all stages in innovation cycles.

A goal-oriented mechanism underpinning the development of production forces in industry must incorporate joint participation in decision making by central and regional science-driven establishments and must be focused on resolving the following issues:

- putting in place a sound scientific-technical infrastructure in regions across the Russian Federation and creating an efficient economic mechanism for the implementation of government policy in the area of science and technology;
- developing and implementing a set of measures aimed at fostering the nation's human resource potential, ensuring the social protection of science workers, and building their work motivation;
- assessing and diagnosing the efficiency of innovation activity and building a competitive market for scientific-technical products;
- enhancing existing mechanisms for engaging in innovation projects interested private investors, commercial banks, and financial companies and funds and building relevant economic motivation systems.

This mechanism may serve as the basis for the determination of key objectives and priorities for development. The key objective for the state's scientific-technical policy is to create the statutory, economic, and organizational conditions for the proper conduct of scientific, scientific-technical, and innovation activity. These include enhancing scientific, scientific-technical, and innovation potential, ensuring proper economic and social development, and facilitating the achievement of high intellectual and cultural levels within the context of development of the economy and society.

Scientific/technical priorities in the area of scientific/technological and science-driven industrial development must have overriding significance and be given the utmost attention due to the high socio-economic significance of the above issues for industry and the economy as a whole.

Priorities for innovation-driven scientific/technological development are governed by the following criteria:

- government stimulation must lead to a level of growth in the competitiveness of high-tech production operations under which at a certain point in time they will embark on an independent path in the development of expanded reproduction;
- priorities chosen must be aligned with promising scientific and innovation areas for building a modern technological and economic paradigm;
- government support for promising areas must produce a substantial external effect and initiate the growth of the economic effect across a wide array of sectors interlinked with promising production operations;
- structural transformations must be interlinked with boosts in the employment rate, increases in pay, and improvements in worker qualifications, as well as overall boosts in people's well-being.

## 5. Conclusion

To integrate the Russian Federation into the global scientific-technical process, there is an imperative need for a shift to an innovation-driven economy. An innovation-driven economy is predicated on knowledge, innovation, active perception of new ideas, and preparedness to put those ideas into effect in practice. It is innovation activity that is at the heart of Russia's economic growth, as it helps the nation compete with others by virtue of high technology. With that said, in conducting innovation activity, many industrial enterprises get to face a number of issues, this especially being the case lately in a climate of economic sanctions and counter-sanctions imposed in response. Issues in the innovation-driven development of industry can be resolved if there is a competent government policy in place.

The development of industry's science-driven sectors requires galvanizing their innovation activity, creating proper mechanisms for the implementation of specific measures aimed at boosting the competitiveness of the national economy and shifting to dynamically sustainable progressive economic development. This requires taking a systemic/methodological approach to the implementation of capital- and resource-intensive government programs on reorganizing the sectors of industry. Otherwise, the overall budget for a completed project on putting together an innovative production operation, product, or service may prove cost-prohibitive. Based on an analysis of the current state of innovation activity in Russia, it may be possible to put together a specific strategy in the area of the state's innovation policy for future years. The state's scientific-industrial policy must be predicated on principles of systemicity, coordination, balance, prioritizing the R&D sphere, and target-orientedness in the area of government support for high-tech, science-driven sectors. Implementing an innovative scientific/industrial policy aimed at actualizing the entire economic potential of the real sector of the economy should help overcome stagnation trends in Russia's economic development.

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