

## Current trends in the Strategy of Innovative Development of Industries in Russia

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Doi:10.5901/mjss.2015.v6n5s3p364

### Abstract

Currently, Russian engineering industry is not competitive on the international market, which is largely due to its technological backwardness of the industrialized countries. One of the main reasons for this situation were shortcomings Existing-available methods of control in the engineering sector of the country, for the modernization which is necessary to accelerate the development and introduction of complex of measures approved international practice during the tse-quire monitoring of industrial policy, innovation policy. Accounting for me-zhdunarodnogo experience will clarify the evaluation indicators of innovational activities and determine the measures necessary for the functioning of the Russian-innovation system. Currently, the industrialized countries see innovation as an essential foundation for competitiveness in the global economy. Every year in these countries increased spending on research and development in various industries. In Russia, however, is still a very low level of expenditure on the development of new products, the development and introduction of new techniques and technologies, which leads to a low-competitiveness of the domestic manufacturing industry. Innovation policy is spreading as rapid strengthening of the role of foreign-valued ficking and foreign direct investment is based on the concept of din-Michna competitive advantages, the need for defining the active formation of the country's institutions, including the government, "image" boo-dushey economy and ways to practical implementation-oriented bathrooms on the formation of competitiveness of industrial enterprise-prises.

**Keywords:** innovative development, production, mechanical engineering.

### 1. Introduction

The intense competition in economic, financial, technological and military spheres at the present stage of development of the world economy gives a special relevance to the questions dealing with innovative development of Russian economy leading branches. The development of industries in Russia in the previous years was characterized by lack of accurate state impact on structurization of production systems and insufficient attention of the country leaders to the formation of the industrial policy. Subsequently it affected the development of the main branches of industry of Russia, first of all, mechanical engineering where the degradation has been most obvious. As a result by the beginning of the 2000's the considerable part of production capabilities was lost and has not been restored so far.

In modern conditions the majority of branches of machine-building in Russia can be characterized by technological backwardness, high level of depreciation of the basic means of production, low labor productivity and insufficient science intensity.

The increasing growth of import of the machine equipment during the post-reform period has resulted in the fact that at present the modernization of the domestic industrial complex is carried out mainly on the imported technological base. In this situation there is a threat for Russia to become technologically dependent on the countries supplying the machine equipment necessary for the domestic industrial complex. Technological modernization of the industrial enterprises is impossible without a modern machine-building branch. The competitiveness of the national economy depends on how much the machine-building branch is capable to generate and acquire innovations. In this regard it is very important to realize the obstacles slowing down the development of innovative processes in domestic engineering industry. Knowing their specifics, it is possible to develop a package of measures facilitating the creation and introduction of innovations in domestic engineering industry, and to create favorable conditions for a sustainable development of the national industrial complex. Nowadays the machine-building branch of Russia is not competitive in the international market that is substantially caused by its technological lag from industrialized countries. One of the main reasons for such

a situation are the shortcomings of the existing methods of regulation of the machine-building sector of the country for modernization of which it is necessary to accelerate the development and deployment of a set of actions approved by the world practice when carrying out a purposeful industrial and innovative policies. Taking into account the international experience allows to specify the criteria of assessment of the development of innovative activity, to define the measures necessary for functioning of Russian innovative system.

## 2. Methods

By the beginning of the XXI century, has developed a global specialization in the production of machinery and equipment. The world's most sophisticated Machine Designational structure allocated US, Japan and Germany. It is in these countries has been concentrated about 50% of the engineering world, about 60% of the automotive industry, more than 88% of the production of computers and office equipment, 63% of precision instruments. More than 65% product to of the electrical industry and 76% of communication is available in Japan and the US.

In the United States, Western Europe, Japan and other developed and newly industrialized countries dominated the fifth and sixth developed technological cal way of creating a "new economy" on completely different principles of science and technology, changing its structure is mainly due to a fully modernized manufacturing industries first of all, of engineering. In the US, for example, the proportion of the productive forces of the fifth technological order of 60%, fourth - 20%, about 5% in the emerging-hodilos sixth technological order E. Kablov (2010); Industry of Russia (2010) & Industry of Russia (2012).

In 2010, the structure of the manufacturing industry of the world machine-building took an average of about 40%. The level of this indicator-pondiroval Corresponding with the level of development in a country the fifth technological the order. As you know, the key factor of the fifth technological order are microelectronics and software. Accordingly, the core of the fifth technological order up production of electron-inflammatory calculation techniques, radio and telecommunication equipment, electronic components and devices, laser technology. Priority development in the way of receiving the extraction and processing of natural gas-elektrostaleplavle of technology and continuous casting technology for Prince Pial new structural materials, flexible automation of production, space and military technologies based on new areas under Applications, electronics, as well as the production of personal computers and a variety of consumer electronic devices. There are new kinds of economic activity-telnosti based on information and communication technologies, s. Against this background, there are new opportunities for the development of both traditional and new forms of transport, energy sources, expanding communications technology through inter-country and inter-continental interactions and others.

Nearly two-thirds of global production of conventional net-wave nostroitelnoy products are manufactured in three developed countries - the US, Germany and Japan, the share of machinery in their industrial produc ve fluctuated in the range of 30-50%.

According to expert estimates, the share of the fifth order technology in the Russian economy to the beginning of the second decade of this century was about 10%, and is preferably of the defense industry sector. More than 50% of technologies applied to the fourth order, about a third - the third. The peculiarity of Russian machine-building was that composed mostly during the second third of the last century Multiproduct and multi-functional engineering was based on the technology of the third and fourth technological order underdeveloped and lagging in scientific and technological development for at least three to four decades. Created a technological basis for engineering products (especially of science-capacious) was clearly not competitive on the world markets, but is used internally-valas maintaining and expanding fleet of vehicles and equipment obsolete types of equipment.

State Engineering Russia in the last five years preceding-ing the second decade of the new century, it was slightly better than in the mid 90s. the last century.

In terms of volume of shipped goods of own production share of machine-building activities in the industry as compared to the end of the NIJ-80s. the last century has fallen 1.8 times until 2011 oscillations-las in the range of 12-14%, while the same activity in the manufacturing sector in 2005 amounted to 20-21% and also remains virtually unchanged-las. Very little change in the structure of activity vnut-ri of engineering. It may be noted as a trend some increase in the share of the production of electrical and optical equipment and the decline in the production of machinery and equipmenttion.

The share of machine-building plants in Russia on a par with the industry in developing countries and the structure of the technological-ing orders in its economy.

In the 1980s. engineering was the proportion of industrial production at 18-20%, and it was not enough to be considered a country with a developed economy (remember, the share of mechanical engineering in industrial laziness-

developed countries is not less than 35-40%).

Production indexes reflect the instability of opportunistic pro-processes in the Russian economy, the effects of the 2008-2009 crisis, and lack the intensity of revival after the (increased rate of growth in 2010 obyas-nyayutsya decline in production engineering products for all kinds of activities during the previous crisis years). During the period of 2005-2011 years. GRAIN Pipeline production increased by 31%, production of machinery and equipment, of - 18, manufacture of electrical and optical equipment 38 -on production of vehicles and equipment - 26%. Slightly ahead of the pace of production of electrical equipment, electronic and optical equipment arose due to the small output growth of traditional electrical products (motors, cables, including fiber optic, wires, etc.). As well as production of the fifth technological order, the assembly of which they -portnyh parts made in Russia branches of trans-national corporations. At the same time, however, the total increase in production of machine-building complex in 2010 to 59% has been carried out through the production of transport equipment (including the contribution of pro-duction motor vehicles, trailers and semi-trailers - 43%, the production of ships, aircraft and spacecraft and other vehicles - 16%), 17% - due to the production of machinery and equipment, 24% - at the expense of pro-production of electrical and optical equipment. Share in the total growth of products relating to new technology-fifth Cesky structure, was 13%, but in most of the cost of production were present imported components, S.A. Konshakova & O.G. Kuralenko (2012).

Despite the positive changes point to a separate machine-building enterprises (modernization of production, the transition to new and innovative products, and others.), Generally for 11 years of the new century are indicators of the dynamics and structure of production of machine-building activities has not been much change, that should be associated with re-transition to innovative development.

Engineering production is, as is well known, thus economic activity, which should provide the restored-tion and the growth of the country's fleet of equipment based on new technology. It began with the 1990s. drop in the share of mechanical engineering as the foundation of PF-creating economic activity and industry of the Russian Federation, and in the manufacturing sector continued during the first ten years of the XXI century. Mechanical engineering before 1990. there has been relatively pro-sive fleet and equipment in the structure of which the group at WHO-under-5 years occupied 23%, the group of more than 5 and up to 10 years - 28%, over 10 to 20 years - 30%, equipment over 20 years old It had a share of 19%. By the end of the last century due to the severe economic crisis in the Russian fleet and equipment in the mechanical production has undergone very significant changes. The share of the youngest group of equipment (up to 5 years) decreased in the structure of the park up to 4-6%, the share of the group aged up to 10 years - up to 7%, the share of the group from 10 to 20 years rose to 43%, and the group older than 20 years - up to 27%, V.N. Borisov & O.V. Pochukaeva (2009); Ivanchenko, O.G. (2011) & Research and development: essential foundation for U.S. competitiveness in a global economy (2008).

In general, the qualitative composition of the fleet and equipment in the machine-building production was in worse condition than the industrial-ness and manufacturing industries.

Throughout this period, the proportion of the three types of RP-nostroitelnoy wave activity in the manufacturing sector is constantly decreasing. The deteriorating state of PF say figures falling retirement rate PF and their degree of wear, which, in spite of the contraction-schenie remains high. In particular, according to the Russian Engineering Union, park machining equipment consisting preimuschest-lively from domestic machines for the past 15 years, almost do not update-lyalsya. More than 70% of the machine fleet operated over 15-20 years and was on the verge of complete physical wear and tear, and the proportion of young progressive-sive equipment under the age of 10 years was only 3%.

Investing processing activities more than 20 years, it came about mainly due to enterprises' own funds. In particular, of investment in machinery and equipment production in 2011 by 80% formed at the expense of own funds of enterprises and only 1.3% from the budget; in the manufacture of electrical and optical equipment - respectively 73 and 10% in the production of trans-tailors and equipment - 54 and 6.5%. Moreover, if the first two kinds of engineering activities for the 2005-2011 years. the share of own funds increased, and the budget fell in the third form of Dey-telnosti share of equity fell and budget grew that sobst-lively, and led to this rise in the share of investment in the production of vehicles and equipment in the total investments in industrial production (Gonchar, 2009; Sorokin, 2010 & Lakyushina & Lysenko, 2013)).

Analysis of indicators of the state of engineering in Russia shows his little prominent role in the implementation of both the innovative development of industries, and the economy as a whole. By the end of the first decade of this century, the production apparatus of the Russian economy is maintained and updated mainly due to imports of machinery and equipment. But the composition of imports and Rui equipment and transport had a "Russian" specificity.

The modern history has proved that innovative activity is the basis for the competitiveness of the country in the world economy. The interrelation between competitiveness and innovative activity can be clearly seen from the definitions of the concepts. Competitiveness can be referred to as "...ability of a country or an enterprise to produce goods and

services which are competitive in the world market". In its turn, innovation is referred to as "introduction of a new or significantly improved idea, goods, service, process or practice aiming at the receiving a useful result. Thus, innovative activity can be considered as a means of competitive recovery .

Nowadays industrialized countries consider innovations to be the necessary foundation for competitiveness in the world economy. Every year these countries increase the research and development costs. In Russia the expenses on creation of new goods, development and introduction of new equipment and technologies are still at a very low level which causes low competitiveness of domestic manufacturing industry. The innovative policy extending along with a rapidly growing significance of a foreign trade and direct foreign investments is based on the concept of dynamic competitive advantages. The concept presupposes the state institutes including government to actively create the "image" of a future national economy and the ways of its practical realization focused on formation of competitiveness of the industrial enterprises. These include quality of human resources; level of scientific researches in the field of equipment and technology; communication among industrial firms, higher educational institutions and research institutes; ability to master foreign technologies; rate of introduction of technological innovations in the industries of the country; capacity of domestic market and level of requirements of domestic consumers to the quality of industrial products; availability of technologically connected and geographically close groups of enterprises capable to produce goods being in demand in foreign markets. As a result, the countries which achieved the most impressive success in the last decades are characterized by the advanced educational system and permanent rise of its level, on the one hand, and high level of support of research and developmental works (further R&D) and innovations, on the other hand. In the field of research and development (R&D) the innovative policy is defined by state financial support of fundamental science and scientific researches; creation of the innovative structures providing communication between science and production and commercialization of scientific development; implementation of the research and development programs with participation of enterprises and scientific organizations; creation of favorable conditions for activity of innovation-oriented enterprises.

Problems of formation of fundamentally different needs equipment complying with the new innovative stage of development of the Russian economy, existed at the end of the first decade of almost all domestic markets of engineering products. The bulk of the demand came from investment products related mainly to the fourth technological order, which in Russia in terms of at least one-third did not reach the maximum point, developed countries passed more than 20 years ago.

Therefore, it is possible that delayed for more than 20 years, the pace of modernization and renewal of production facilities in the Russian economy are good, because otherwise the intensive replacement of outdated technologies such as several improved version (psevdoinnovatsii), it was possible to get the lag in technological development for several more decades.

The above leads to the conclusion about the existence of significant difficulties and in some cases impossible to transition of the Russian machine-building in particular and the economy in general, the innovative way of development. Hailed as an innovative paradigm of the state it was not supported by the specific underlying policy documents, which have been identified not only the direction of scientific and technological progress in the long term, and measures to implement them with the appropriate sources of financing. Perhaps it should be a strategic long-term scientific and technical program (similar to the Soviet Union developed every five years, long-term comprehensive program of scientific and technical progress for the period of 20-25 years). It should have the force of law, which provides scientific and technical and innovation development in all spheres of economic activity in the country through reconstruction and modernization of production, and not only its infrastructure components, but also human capital. For Russia, the development of such a program is particularly important in the next phase of scientific and technological development, which should be the basis for the transition to the sixth technological order.

In this regard, we consider one of the latest government medium-term forecasting documents defining prospects of development of traditional engineering activities.

Order of the Government of the Russian Federation in January 2013 was approved in the new edition of the State program "The development of industry and increase its competitiveness."

As indicated in the text, state program aimed at "creating in Russia a competitive, sustainable, structurally balanced industry (in the structure of industries related to the subject of the program)

The state program was an important feature - the "state support of industry should be formed based on the understanding of the fact that the state is not fixed and permanent source of financing of the current and capital expenses of the enterprises." The state program was based on the previously developed strategies and targeted programs of a number of industrial facilities and include activities to implement international obligations.

### 3. Results and Discussions

Engineering in the state program received significant place - 7 out of 15 industrial sub-programs belonged to the engineering production. As in previous policy and program documents, the state program has been given priority to solve systemic problems of the industry as a whole, and completely related to mechanical engineering (structural imbalances, high degree of depreciation of fixed assets, low susceptibility to innovation, technological gap in some industries, low productivity of labor, high material and energy intensity of production, the lack of modern equipment for the production of innovative high-tech competitive products; insufficient proportion of products with high added value; insufficient staffing, inadequate financial and economic opportunities for innovative development). To address these systemic problems, as stated in the State Program, the government had to work out the state industrial policy, defining national goals and priorities in the field of industry, form a strategy for development of industries and tools to implement them.

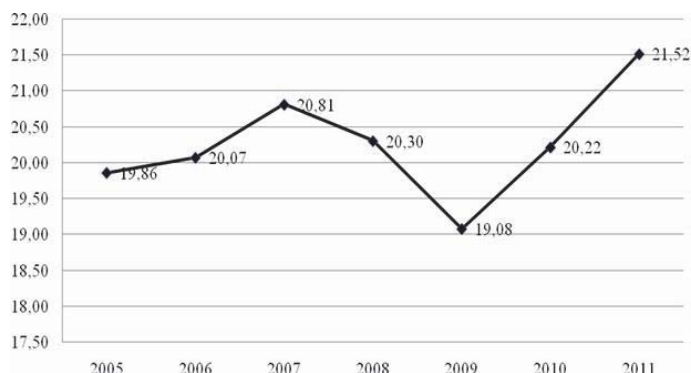
It is obvious that in order to overcome the crisis in the Russian mechanical engineering it is necessary to cope with the influence of the following negative factors:

- technological lag of Russia from the advanced countries, first of all in machine-tool construction;
- insufficient structure of a number of branches within the machine-building complex;
- low competitiveness of the Russian machine-building production in both domestic and foreign markets and low investment appeal of mechanical engineering (as a result of the factors stated above);
- absence of quality standards complying with the international requirements for the products.

The prime measures for overcoming the crisis in the Russian industries are modernization of innovation control system and development of effective administrative decisions aimed at competitive recovery as it is improvement of innovation control system and its elements that allows machine-building enterprises to increase their level of innovative activities.

Besides, the relevance of problems of innovative development of machine-building branch is caused by the following factors:

- The mechanical engineering is a branch of manufacturing activity which determines the level of development of other branches, providing them with machines, devices, equipment, vehicles and consumer goods.
- The machine-building branch occupies a rather big share in the structure of manufacturing activities. Now this indicator averages about 20% (Figure 1).



**Figure 1** – Share of machine-building in the structure of manufacturing activities in 2005–2011, %

The development of mechanical engineering in Russia is impeded by the necessity to solve three main problems simultaneously with implementation of the strategic objectives of the country's entering into the post-industrial society within a short period of time:

- intensive modernization and technical re-equipment of mechanical engineering and, first of all, of its priority branches; thus it is important in the long term to get rid of technological dependency of the Russian mechanical engineering (particularly defense industrial sector) on foreign suppliers of technologies and equipment;
- training and retraining of regular personal and formation of the new technical and administrative generation of

professional community capable to provide innovative development of mechanical engineering;

- creation of conditions for increase of investment appeal of machine-building enterprises and ensuring inflow of private investments into mechanical engineering.

Import substitution of the equipment should become one of the key elements of innovation policy implementation as this element has been successfully tested in other developing countries as well as in some branches of domestic economy. Besides stimulation of innovative development import substitution produces considerable positive outer effects.

Summarizing the above stated facts, we should note that the countries who are leaders in machine-building constantly carry out research and developments. The manufacturers of engineering products closely cooperate with universities, scientific research institutes and laboratories when developing new technologies. Every year the governments and private enterprises spend more and more money to develop fundamental science. Scientific research is financed by enterprises themselves, by government and at the expense of investments. National governments work out special programs to attract investors, provide preferential taxation for enterprises that carry out R&D either governmental or their own. Also the countries pay great attention to an educational system that provides training of qualified specialists. The technological backwardness of Russia is caused by a number of problems, such as considerable depreciation of plants, narrow specialization of manufacture, aging of staff that possess technologies, limited access to financial resources, backwardness of distribution system, i.e. production is not oriented to the world market. In total these problems lead to the technological lag of the Russian mechanical engineering and thereof – to non-competitiveness of its production in the world markets.

As appears from the international experience, the following measures stimulating research and development are required in order to make the innovative system of Russia work properly (Golichenko O., 2010):

- formation of the attractive environment for carrying out research and development, in particular increasing the prestige of scientific activity and bringing the income of the productive scientist up to the level higher than an average in the industry;
- formation of the modern engineering basis for carrying out research and development including both the community of highly-qualified specialists and the appropriate equipment;
- formation of the general engineering complex including state research organizations, universities, hi-tech small enterprises;
- formation of the attractive working environment in Russia for foreign experts in the field of research and development;
- introduction of preferential taxation and credit privileges for the enterprises engaged in research and development;
- creation of concepts and normative legal instruments required for definition and formulation of the perspective directions of growth of the beginning technological firms.

#### 4. Conclusions

The vital issue is reorientation of domestic engineering industry to the intensive, advancing way of development that assumes the solution of a complex of interconnected and interdependent problems that have been accumulated in legislative, standard and legal, financial and economic, educational, personnel and other spheres. And a time factor here comes to the front position taking into account that the developed countries re-equip their industries each 7-10 years.

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