Challenges for state support of innovative developing regional machine-building enterprises

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Abstract. Authors consider the opportunities of state support system of machine-building enterprises development. The conclusion about the key role of the strategic development of the engineering industry to reduce the resource dependence of the region and the transition to an innovative economy is found. The incentives and obstacles to the transition of the machine-building complex of the Krasnoyarsk Territory to the production of innovative products are identified. The analysis shows that the innovative activity of machine-building enterprises in resource-oriented regions shall be directed to serving of the extractive industries enterprises according to the regional clusters development.

State management of the regional economy development is determined by the state of its economic sectorial structure. Therefore, the innovation policy is formed in accordance with a production the regional profile. The evidence from practice shows the level of their resource dependence significantly influences the innovative development of the Russian regions. The resource-oriented type of regions is characterized by the presence of a set of objective obstacles to innovation processes, such as:

- the natural surplus of natural resources (their high availability), the export orientation of the economy (raw materials export);
- the dominance of low technological structures (outdated production structure);
- a high level of organizational and economic inertia of economic entities (low level of innovation culture), etc.

In this regard, public policy, which taking into account the specifics of resource-oriented regions, is relevant in a modern time.

It is necessary to take into account a fact that for the resource-oriented regions the transition to an innovative development way is a strategic problem. It is connected with innovations don’t play the role of an efficiency factor (survival and / or growth) of their economies in a future. In this regard, the planned transition of resource-dependent regions to an innovative economy will involve the development of missing competencies, primarily in the manufacturing industries. For this reason, the management of an innovative development of the engineering industry is of particular importance. Mechanical engineering is an economic and technical complex, which has a system forming character
for the sectorial structure of a region, because it is able to stimulate the development of both mining and related processing industries. On the one hand, it systematically consumes their products, and on the other hand, produces necessary for these industries the technological equipment, mechanisms and aggregates. Mechanical engineering has a similar effect on infrastructure sectors, such as construction, road transport complex, and fuel and energy complex. Thus, the regional machine-building complex has significant the strategic potential for the state innovation policy, which needs to be developed.

The economic condition of the machine-building complex of the Krasnoyarsk Territory shows the auxiliary character of this industry in the structure of the regional economy, i.e. complex contribution to the industrial production of the region is 7.4%, providing engineering industry the fourth place in the regional industry. The production workers in the mechanical engineering enterprises are 4.7% of the total number of people employed in the economy of the region. It is comparable to employment in the metallurgical complex, but the volume of production in mechanical engineering is much less.

The equipment for the metallurgical industry is approximately 70% of engineering products in the Krasnoyarsk Territory. In modern time, the machine-building complex of the region is quite segmented, including several main groups of enterprises that are in different economic situations and have different development prospects [1]:

- Enterprises of high-tech and high-tech production, whose products are in demand in the All-Russian and, in some cases, in the world market. This group includes the following enterprises: Information Satellite Systems academician M.F. Reshetnev", Scientific Production Union "Radio communication ", JSC "Central Design Bureau "Geofizika", "Krasnoyarsk Machine-Building Plant", these enterprises produce military purposes and for the civil needs. The enterprises of this group, as a rule, are part of large all-Russian integrated structures. Taking into account the existing backlog and the high competitiveness of these enterprises in a strategic perspective, the task is to preserve and strengthen their positions as leaders in the Russian and world markets [2].
- Enterprises of traditional engineering, for which in the new economic conditions, the strategic task is the modernization and diversification of production, the expansion of sales markets in order to integrate into the modern economic system. This group includes such companies as Krasnoyarsk plant of trade equipment “Biryusa”, LLC “KiK”, LLC Casting and Mechanical Plant “SKAD”, JSC Krasnoyarsk Machine Building Plant, Kansk Engineering Plant Segment, LLC “Option-99", JSC" Spetstehnomash ", Experimental Design Office “Micron” and etc.
- New service enterprises, repair and tool companies specializing in the creation and production of innovative types of machinery and equipment for the extractive industries of the region. Thus, the technologies of the enterprises of the machine-building complex in the Krasnoyarsk Territory are represented by the main technological structures from the traditional (2-3) to the innovative (4-5). The main indicators of activity of the enterprises of the machine-building complex in Krasnoyarsk territory are presented in the table 1.

| Industry sector | 2016 | 2017 | 2018 | 2019 |
|-----------------|------|------|------|------|
| Manufacture of machinery and equipment | | | | |
| Production of motor vehicles, trailers and semi-trailers | 101,7 | 94,8 | 108,0 | 105,6 |
| | 93,2 | 119,6 | 159,3 | 166,5 |
Manufacture of other vehicles and equipment | - | 45,7 | 2,6 p. | 109,0
Manufacture of the electrical equipment | 102,0 | 88,6 | 119,1 | 114,0

According to the statistics given in table 1, in a modern time the economic condition of the machine-building complex of the region is quite stable.

In general, a number of trends in the development of the machine-building complex of the Krasnoyarsk territory can be identified:

- reducing the share of engineering products in the regional industry;
- stabilization of the production of basic engineering products;
- a progressive increase in the production of vehicles;
- increasing service production.

Innovations are able to significantly enhance the development of the engineering industry through the development of new types of raw materials and materials, the introduction of new production technologies, the development and production of new types of competitive products, and the organization of new industries. Experience has shown that the global economic crisis (2008–2009) had a destructive impact on an innovative development of the machine-building complex in Krasnoyarsk territory.

During this period, there was a significant reduction (almost in 2 times) in the number of innovatively active enterprises in the industry from 26% (2007) to 14% (2009), R & D costs decreased by 2/3, only 4% of all costs for innovation in the industry of the region (in 2009) accounted for the machine-building complex. Therefore, as a result of the volume of the innovation products produced in the industry decreased by 3 times and amounted to only 2%, while in the whole of the region’s industry this figure was 5.3 [3]. The cost structure for the innovation activities of the mechanical engineering in Krasnoyarsk territory by 2009 was as follows (figure 1).

![Figure 1. The cost structure of an innovation in the mechanical engineering branch in the Krasnoyarsk territory in 2009.](image)

According to a result from figure 1, the largest amount of costs (61%) is accounted for by research works. In order to stabilize the economic situation of the machine-building industry in the Krasnoyarsk Territory, the law “On State Support of Organizations of the Machine-Building Complex in 2009-2010” was adopted by authority. This law provides for subsidizing part of the costs of enterprises for the following purposes [3]:

- To update of basic production assets for the production of new products;
To repayment of interest in R&D;
To repayment of interest rates on loans received for the production of innovative and export products;
To produce of the electrical equipment, electronic and optical equipment for the needs of regional enterprises.

The subsidy about 185 million rubles were allocated to these measures of state support. As a result, it compensated for the negative effects of the financial crisis and prevented the curtailment of innovation activities at machine-building enterprises. The subsequent efforts of machine builders and regional authorities were mainly aimed at restoring the pre-crisis level of innovation activity and development rates. In addition, special attention was also stimulated by the subsidy of the development of promising high-tech and knowledge-intensive industries: high-performance machinery and equipment for the mining, metallurgical and other sectors of the region’s specialization; machines and mechanisms for work in extreme conditions; technologies for the creation and effective using of energy-saving systems for the production, transportation, distribution and consumption of water resources, electric and thermal energy; the design of new types of transport and technological machines and equipment [5].

As a result, this industrial innovation policy contributed to ensuring the necessary level of sustainability of the innovative development of mechanical engineering complex. According to statistics for the time period from 2010 to 2015, it was possible to increase the proportion on average engineering products to 15% (in the industrial production in the Krasnoyarsk territory), and the proportion of innovatively active engineering enterprises to 17.6% [6].

It should be noted that a number of factors have a stimulating effect on solving the problem of activating innovation in the machine-building complex of the region:

- development of extractive industries;
- high competition (with foreign manufacturers);
- relevance of import substitution;
- development of the military-industrial complex;
- national technology initiative;
- the relevance of increasing non-commodity exports;
- formulated strategic priorities (development of the industry).

But at the same time, the low level of an investment activity of enterprises in the industry and private capital remains a significant deterrent to an innovative development of the mechanical engineering in Krasnoyarsk territory. In the post-crisis period (2013), the share of investments in fixed capital of engineering enterprises in the region of the total investment in the manufacturing industry of the region was extremely small, aggravated by the critical level of depreciation of fixed production assets [7].

The share of production of the machines and equipment in the machine-building complex in the region has decreased markedly. The low level of investment in the industry has hampered the introduction of innovative projects and increasing the production of innovative products. In this regard, according to experts’ calculations for the time period from 2010 to 2015, the machine-building complex in the Krasnoyarsk territory is noticeably inferior to the neighboring regions with similar specifics, despite the higher weight index of innovative products [8]. The analysis of factors of development of the machine-building industry carried out by Russian scientists indicates the need for state support for the innovative development of enterprises of the machine-building complex of the Krasnoyarsk territory. The urgency of the problem of an innovative development of the machine-building industry is reflected in the branch program for the development of the machine-building for 2015 to 2017 adopted by the Krasnoyarsk territory Government. In order to promote the development
and promotion of innovative products of the machine-building complex in the Krasnoyarsk territory, priority areas of work have been identified, such as:

a) To assist in the creation of an oilfield service complex with the involvement of engineering enterprises of a region;

b) To attract machine-building enterprises of the region to the sites of regional technology parks and business incubators;

c) To assistance in the introduction of the results of research and development in machine-building enterprises of the region by organizing their presentations.

For solving of the tasks of the industry program, it was planned to finance measures of state support in the amount of 39,323.5 million rubles in the planning period.

Funding for the program is provided only by the federal budget. As part of the implementation of the target program, state support for innovation activities of the machine-building enterprises in a region was carried out annually on a competitive basis through the KSAE Krasnoyarsk Regional Fund for Support of Scientific and Scientific-Technical Activities. The new program for the development of mechanical engineering in the Krasnoyarsk Territory provides for 15,985 million rubles for 2019-2021. The dynamics and prospect of financing state support for engineering enterprises are shown at figure 2.

![Figure 2](image_url)

**Figure 2.** Dynamics of financing state support for engineering in a period from 2013 to 2021.

Attention is drawn to the fact that since from 2016 the volume of state support has been consistently decreasing, which is due, on the one hand, to the achieved stabilization effect of the industry (during the geopolitical crisis in 2014-2015), and on the other hand, the orientation of the region towards development of the extractive industries.

According to the regional development strategy of the industry, the main attention will be primarily on the development of service engineering. In the modern time, these enterprises will be one of the main facilities for the provision of state support. Regional authority of Krasnoyarsk territory declares that for developing these machine-building enterprises will be implemented “measures to enhance public-private partnerships, promote the use of existing federal government support mechanisms, provide state support from the regional budget, promote an infrastructure support, assist in the provision of production facilities, including accommodation for territories of industrial parks and business incubators”.

This field of industrial innovation policy in the region is capable of achieving synergy effects due to the intensification of cooperation between the machine-building enterprises and enterprises of the regional extractive industries.

To activate the innovative development in a machine-building complex it is necessary to focus on the machine-building enterprises of the region towards meeting the needs of basic industries and
domestic consumption, as well as the reciprocal orientation of enterprises of the industry’s specialization areas towards the consumption of local engineering products. Therefore, the regional authority is going to continue working in the cooperative development intra-regional industrial relations, as well as the information networks creation for ensuring the interaction of the machine-building enterprises with organizations of other economic sectors.

Thus, the state support system for an innovative development of the machine-building complex in Krasnoyarsk territory should be aimed at ensuring the production and technological integration of industry enterprises into regional cluster structures formed on the basis of the extractive industries.

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