Scientific & technological development as the basis for increasing the foreign trade potential of engineering enterprises

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Abstract. The presented in the article results are focused on goal to consider the influence of the level of Scientific & technological development of the state on the foreign trade potential of machine-building enterprises. To consider to goal of the research the indicators of the Scientific & technological development of the state were studied, including the state and effectiveness of the sphere of science, technology and innovation; the quality of government regulation and service provision of scientific, technical and innovative activities. The authors carried out a comparative analysis of foreign trade operations of countries against the background of the level of Scientific & technological development and highlight the importance of the formation of the production potential of a machine-building enterprise, which takes into account scientific and technical innovations and reflects the economic growth rate of the state.

The emergence and diffusion of advanced technologies clustered around the fourth industrial revolution is radically altering the nature of manufacturing production. The introduction of advanced technologies is feasible strategy of engineering enterprises to achieve growth of the foreign trade potential. This study contributes to this debate by presenting fresh analytical and empirical evidence on the future of industrialization in the context of a technological paradigm shift. It argues that industrialization continues to be the main avenue for successful evolution of the foreign trade potential of engineering enterprises.

The innovative model for the economic growth rate of the Russian presupposes a transition from a raw material export economy to a widely diversified knowledge economy. The innovative model of the economy is based on machine-building enterprises that are able to provide stable domestic demand, and
to export manufactured innovative products to foreign markets. To solve this problem, it is necessary to build up the foreign trade potential of manufacturing enterprises, which will allow increasing the presence of non-primary domestic products in international markets.

Modern global trends in scientific and technological priorities, as well as the experience of states, leaders in the export of industrial products, show a direct relationship between the level of Scientific & technological development (STD) of the state and the foreign trade potential of its manufacturing enterprises [1].

The study of the relationship between the level of growth rate of science, technology and the foreign trade potential of engineering enterprises has theoretical and practical importance against the background of the growing interest of the world scientific community in Scientific & technological development aimed at creating new knowledge and their subsequent implementation in new technologies and products produced with the help of these technologies.

The influence of new technologies on the growth of mechanical engineering could be confirmed by the theory of technological determinism, came from the German philosopher and economist Karl Marx, who argued that changes in technology, and specifically productive technology, are the primary influence on human social. Social relations and cultural practices ultimately revolve around the technological and economic base of a given society. Marx's position has become embedded in contemporary society, where the idea that fast-changing technologies alter human lives is pervasive [2]. The ideas of technological determinism theory are based on the following provisions: a fundamental factor influencing all aspects of society's life is technology and technology; shifts in technology are the most important source of change in society.

The influence of new technologies on the structure of the economy was noted by B. Twiss: “In each case, new technologies served as the basis for the formation of new industries that ensure the acceleration of economic growth. In light of these ideas, the importance of scientific and technological innovation as a source of economic growth is growing.” [3].

Today authors [4] consider Scientific & technological development as fundamental changes in the technological basis of the economy, leading to economic growth through the growth of science, the creation and use of advanced technologies, and the production of high-tech products (goods, services). One of the main properties of scientific and technological revolution is its complexity, expressed in the presence of components (directions), which together represent the scientific and technological revolution. The main directions of scientific and technological revolution are:

- Creation and introduction of advanced technologies;
- Technological modernization of economic sectors;
- Growth of the production of high-tech products (goods and services);
- Formation and growth of technological infrastructure;
- Growth of applied technological science;
- Increasing the level of technological competence of personnel [4].

The transformation of the level of Scientific & technological development into one of the main sources of economic growth in developed countries has determined the need to revise the model of economic growth rate in Russia, highlighting Scientific & technological development (STD) [5]. The key documents of state planning, along with the National Security Strategy, ensuring the implementation of scientific and technical policy, are the Strategy for Scientific and Technological Implementation until 2035, the National Project "Science", the state program "Scientific and Technological Development of the Russian Federation for 2019-2030" [6].

So, the state program "Scientific and technological development of the Russian Federation" was approved in March 2019 [7].

Indicators of the Scientific & technological development of the state were studied, including the state and effectiveness of the sphere of science, technology and innovation; the quality of state regulation and service provision of scientific, scientific, technical and innovative activities.
The development of the foreign trade potential of engineering enterprises is a necessary basis for the diversification of economies and the expansion of domestic and international trade. The processes associated with increasing the foreign trade potential of machine-building enterprises are complex and involve the implementation of joint high-tech projects with high integration effects and wide participation of economic entities [8]. The level of the foreign trade potential of a machine-building enterprise consists of the levels of its export and import potentials, the elements of which are production, intellectual, financial, human and cooperation potentials.

Among the elements of the foreign trade potential of machine-building enterprises, it is necessary to highlight the production potential - the totality of all material and technical resources, characterized by the presence of production capabilities of all enterprises of the complex. The basis of production potential - the availability and qualitative composition of production assets, depends on the degree of modernization of the equipment used at the enterprises of the technological structure, the degree of innovativeness of the production-technological and organizational-management processes of the enterprise. The production potential is the foundation of the foreign trade potential of machine-building enterprises, it characterizes the level of growth rate and efficiency of the use of labor instruments, objects of labor and the innovativeness of production-technological and organizational-management processes determine the prospects of enterprises that are part of the machine-building complex [9].

**Table 1.** The level of scientific and technological development and high-tech exports of countries.

| Countries | The level of technology use in production | Export values of high-tech products, average 2016-2018 |
|-----------|------------------------------------------|------------------------------------------------------|
| China; France; Germany; Japan; Netherlands; Republic of Korea; Taiwan; Switzerland; United Kingdom; United States America. | Leaders | Leading exporters and importers in world Over 70% of world high-tech markets |
| Austria; Belgium; Brazil; Hong Kong; Canada; Czech Republic; Malaysia; New Zealand; Israel; Italy; Poland; Russian Federation. | Followers (40 countries): production technologies (23 countries) using technologies (17 countries) | Near 28% of world high-tech markets and manufactured goods. |
| Bulgaria; Chile; Estonia; Kyrgyzstan; Latvia; Philippines; Moldova. | Latecomers (29 countries) | The share of the global high-tech market is insignificant |

Proposed by the authors. Based on data from UNIDO, Foster-McGregor et al.

Today, countries can be subdivided according to the level of Scientific & technological development into leaders (10 countries), followers (including the Russian Federation) and lagging behind (least developed countries) [10], analytical data are presented in table 1. This report details the development of modern digital advanced technologies and the export of high-tech engineering products, including robotics, as well as the technologies themselves. In other words, the higher the level of Scientific & technological development of the state, the higher the share of high-tech exports is occupied by goods produced by enterprises of a given country.

The access to frontier technology for engineering enterprises producing engineering products contributes to the growth of the competitiveness of products in the international market [11]. Countries
whose engineering enterprises actively use advanced technologies demonstrate a much higher level of export of high-tech products [12].

Figure 1. Increasing the engineering enterprises foreign trade potential.

Considering that the state leaders of the world market of high-tech products have leading indicators in terms of the use of advanced production technologies, it can be concluded that Scientific & technological development is a necessary basis for increasing the foreign trade potential of an engineering enterprises. Considering that the state leaders of the world market of high-tech products have leading indicators in terms of the use of advanced production technologies, it can be concluded that Scientific & technological development is a necessary basis for increasing the foreign trade potential of an engineering enterprises. The indicators presented in the state program "Scientific and Technological Development of the Russian Federation for 2019-2030" can be considered as indicators of the development of engineering enterprises in particular (see figure 1).

When conducting the study, the authors carried out a comprehensive analysis of the peculiarities of the development of the foreign trade potential of machine-building enterprises. The basic trend in the development of foreign trade potential is transformational changes, characterized by the transition to convergent ICT - technologies of production, distribution and consumption of products. The factors influencing the formation of the foreign trade potential of machine-building enterprises are identified, among which are: industrial development trends that change the architecture of international markets,
technological modernization of management processes and organization of production based on the acceleration of the diffusion of innovations, the formation of a coordinated industrial, export policy and the creation of international institutions to support industrial cooperation EAEU member states, an integrated approach to regulating relations arising from the development of the digital economy in the Eurasian space.

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