

## Key success factors of high-tech enterprises in innovative activity

Factores clave de éxito de las empresas de alta tecnología en actividades innovadoras

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### ABSTRACT

The task of development of the Russian industry is not only to ensure the transition of the economy to the trajectory of sustainable development, but also to change the quality of economic growth. Here, an important role belongs to the state scientific and industrial policy which determines the overall economic strategy and the most promising basis for development. Experience shows that the priority development of the resource-based industries that have become the leading sectors of the Russian economy to date is unable to solve the problem of economic upsurge fundamentally and for the long haul.

**Keywords:** factors, high-tech, innovative activity

### RESUMEN

La tarea del desarrollo de la industria rusa no es solo garantizar la transición de la economía a la trayectoria del desarrollo sostenible, sino también cambiar la calidad del crecimiento económico. Aquí, un papel importante pertenece a la política estatal científica e industrial que determina la estrategia económica general y la base más prometedora para el desarrollo. La experiencia muestra que el desarrollo prioritario de las industrias basadas en recursos que se han convertido en los principales sectores de la economía rusa hasta la fecha no puede resolver el problema del repunte económico fundamentalmente y a largo plazo.

**Palabras clave:** factores, alta tecnología, actividad innovadora.

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Economic growth should be based on the priority development of the group of export-oriented industries capable of being a stable, long-term driving force of development, the most promising basis for the growth of the Russian economy due to intensive factors. High-tech enterprises of the defense industry being part of the High-Tech Complex (HTC) of Russia basically form the backbone of such industries. Creating new high-tech products is a complex and multifaceted process that includes scientific, technical, production, economic and social aspects, and the functioning in the market conditions requires improving the organization and management of production in the lower tier of the national economy, i.e. at the enterprise level. In the process of development of new products, certain production and management relations are established between the business units of the enterprise and between related firms, which relations reflect the links between the direct manufacturers of products, management staff, as well the organization of joint activities of participants in the production of new products.

New goals and objectives of knowledge-intensive enterprises to create high-tech products can be achieved only through new approaches to management. In this regard, the task of comprehensive research of theoretical and practical problems of the knowledge-intensive enterprise management in systematic development of new products takes on particular significance. The concepts of development management that could include all modern developments in this area are required.

The following factors can be considered as special aspects of management of the Russian knowledge-intensive enterprises in the market conditions:

- Modernization of knowledge-intensive productions in the context of a large-scale reform of the defense industrial complex;
- Continuous improvement of the enterprise management system in the process of developing new products;
- Preservation of the business profile of knowledge-intensive enterprises (technological area, scientific and technical issues);
- Use of the large science and technology reserve of the enterprise (transfer of documentation, inventions, know-how to the civil sphere) to manufacture knowledge-intensive products that are not typical for such enterprise (diversification of production);
- Use of the development and production potential of the enterprise to manufacture high-tech civilian products at available production facilities (conversion of production);
- Use of dual-use technologies to manufacture civil and military products of similar functions and complexity;
- Disposal of the part of military equipment that is subject to liquidation as a result of international agreements, and modernization of the basic types of core products;
- Restructuring of knowledge-intensive productions (establishment of integration structures).
- Pursuing an employee-focused personnel policy to maintain a highly skilled workforce at the enterprise.

At the present time, the HTC is the largest supplier of machine-building products in the domestic market. Knowledge-intensive enterprises form the backbone of the HTC, in which the share of R&D expenditures in total sales is at least 3.5%, and the share of employees engaged in research and development in the total number of employees is at least 2.5%.

A knowledge-intensive business is a social and economic system that develops and creates innovative technologies, products and services, using its development and production potential and scientific and technological reserve to introduce high-tech products to the market, and in which R&D expenses represent a significant part of the production prime cost.

Sustainable development of knowledge-intensive businesses and launching of production of high-tech products that are competitive in the domestic and foreign markets are the main modernization tasks set to the HTC by the Government of the Russian Federation. Industrial modernization involves bringing the production system of enterprises and industrial complexes to state-of-the-art, and first of all this concerns the technical and technological base of production (Budovich Lidia, 2019). The management system is a purposeful, really functioning interrelation between the object and the subject of management (Krizhanovskiy, 2018). The system of management of a knowledge-intensive business in the development of new products should reflect the necessity to manage the two types of processes such as the processes of production of military products and the processes of production of civilian products. All these contribute to the adaptation of the process of development of new products of the knowledge-intensive enterprises to the modern conditions for creating new types of products for the national economy. Therefore, two subsystems of management can be clearly identified as part of the management system of a knowledge-intensive business. Each of these subsystems has its own management object in combination with which it acts as a single organizational system. According to this approach, the new product development management system of knowledge-intensive enterprises can be presented as a set of the following basic elements. Under the action of control commands the state of the controlled object changes. The management system ensures, firstly, collection, accounting and analytical processing of information about the state of the controlled object, and secondly, communication of managerial decisions to the controlled object. A new product development process is the initial stage of the product manufacturing process and is characterized by great complexity in the planning and organization of production. At the HTC enterprises in which, as a rule, the major part of the product range include the products intended for the needs of the country's defense capability, the development of new, high-tech civilian industry products should be performed in

the conditions of maintaining the necessary volume of production of core defense products. The content of the development of high-tech products can be represented in the form of a logical chain of interdependent actions in which all types of resources of a knowledge-intensive business are used for the production of a product (for a certain period of time) with consumer properties clearly defined by customer (Rasooli & Abedini, 2017; Rocha et al., 2017; Shaker Mehdi Rahimi & Zare, 2016; shafiezd Abkenar, B., & Negahdari, 2017).

Development of high-tech products is a manufacturing process during which the technological process of organization and planning of high-tech production is adjusted and optimized in order to produce new products (that were not previously produced by the enterprise) for the national economy in specified quantities, using dual-use technologies while achieving the planned economic performances and maintaining the required volume of production of defense products. In contemporary research studies, the following characteristic features of development can be pointed out: dynamism of production; uncertainty of results; adaptability to innovations; and excessive consumed resources.

The following features are characteristic for the process of development of new products of knowledge-intensive enterprises in addition to the above-mentioned ones:

- High knowledge intensity of newly created products (entails an increase in the development and production costs due to tougher regulatory requirements to the knowledge-intensive products and complication of products as such);
- Shortened exclusivity period (general availability of new technologies leads to a quick product removability);
- Mainly a long period of product use (this implies that a service system should be established).

The role and specifics of knowledge-intensive businesses in the innovative development of the economy are as follows:

- Knowledge-intensive technologies and the HTC are the main driving force of economic development both within a single country and globally;
- Knowledge-intensive industries are 3-4 times higher than other sectors of the economy in terms of economic growth rates;
- Knowledge-intensive industries are characterized by a large share of value added in final products, by high wages of employees, large export volumes and high innovation potential;
- Knowledge-intensive industries are a priority line of business for small and medium-sized firms, as well as the main object of venture capital investments;
- Knowledge-intensive technologies are the basis for scientific and technological progress.

Foreign experience shows that the management of the HTC in the industrialized countries (USA, Germany, France, England, Japan, Sweden, and China) is performed through market mechanisms where the main objectives are: to prevent the growth of unemployment and to prevent the decline in economic growth rates. Financial assistance to businesses is not considered as a prerequisite for modernization. Even if such aid does take place, it is short-term and takes the form of tax breaks. The probability of bankruptcy acts as an incentive for enterprise management to search for competitive products. It is obvious that all products manufactured in the knowledge-intensive industries should be high-tech and knowledge-intensive. High-tech products are the products that are manufactured by knowledge-intensive enterprises, created using their scientific and technological reserve and scientific and technical potential and that have high social and economic efficiency. Knowledge-intensive products are the products with qualitatively new characteristics created through the use of technologies developed on the basis of modern scientific achievements. The category of knowledge-intensive products usually includes the products in which the share of research and development costs in the total cost of production is not less than from 3.5 to 5.0% (Krizhanovskiy, 2018).

The theory and practice of modern corporate governance suggest a number of reasons to justify the necessity of restructuring the knowledge-intensive industries in the form of integration structures. The restructuring focuses on improving the competitiveness of companies. Analysis of the experience of U.S. and Western European aerospace companies in managing their products to increase their competitiveness by reducing their cost shows that the reduction of the final cost of products is achieved due to:

- Reduction of marginal production facilities (10%);
- Improvement of the production process, introduction of efficient technologies and enhancement of professional training of personnel (20%);
- Use of information technologies in the management of the programs of development, manufacturing, testing and delivery of products to consumers while monitoring costs incurred at each stage of the program implementation (24%);
- Use of new, efficient resource-saving materials and saving thereof in the production process (16%);
- Improvement of information technologies, borrowing of existing technological developments mainly in the commercial production sector in order to save funds on own developments (30%). The integration

processes in the HTC, as well as in the entire Russian economy, contribute to an increase in the total potential (scientific and technical, technological, production, investment and human resources).

Labor productivity has been increasing, the structure and competitiveness of production has been improving being increasingly in line with market requirements. The potential is utilized more and more efficiently due to many factors, the main of which are as follows:

- Concentration of financial and material resources in the most critical or profitable areas;
- Increase of funding and material resources, hence, increase of the scale of investment projects;
- Increased mobility of use of all types of resources;
- Mitigation of technical and investment risks.

Concentration of high technologies and highly qualified human resources at the leading HTC enterprises is one of the important factors ensuring the strong development of scientific schools and the development of world class high-tech products.

The modernization of knowledge-intensive industries has set out a number of tasks to the management of such enterprises, which tasks are the core of the implementation of the human resource management policy. Among them are:

- Definitive training of young specialists as an element of human resources recruitment;
- Economic incentive tool improvement;
- Introduction of the fundamentals of the contract system;
- Assignment of responsibilities to managers for ensuring contract volumes, payroll and product quality;
- Improvement of the employee social security system;
- Provision of resources to human resource management policies.

Practical experience has shown that a comprehensive approach to the motivation policy at a knowledge-intensive enterprise enables to achieve high performances in the professional growth of employees, real income increase, ensuring occupational safety and social guarantees. For this purpose, the following tasks have been set and accomplished:

- Wage growth supported by the stable growth of the economic position of the enterprise;
- Differentiated individual salaries based on results (fixed salary + bonus + personal allowance);
- Reasonable preservation of some social and cultural facilities (health care center, children's camp, recreation center, sports complex);
- Partial compensation for the cost of the purchased housing.

Thus, it can be concluded that the innovative product management at the knowledge-intensive enterprises is an important management tool which not only reduces unproductive costs, but also increases the product quality due to the use of all resources of the enterprise, i.e. primarily scientific and technological reserve and development and production potential. This is a tool that enables to obtain full information about the current process of development and business as a whole, as well as to make timely and strategically correct decisions.

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