CHAPTER 14

# Global Competitiveness of High-Tech Companies: Factors, Barriers, Government Support

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## Introduction

Connected with the use of high technologies, which determine the introduction of the most effective innovations from the point of view of socio-economic and geopolitical development (Konina 2018), modern changes

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in the economy constitute the basis for increasing the competitiveness of both individual companies and national economies in general. The most significant development factors contributing to economic growth at the end of the twentieth century and the beginning of the twenty-first century are knowledge, innovation (including technological), and investment in human capital (Romer 1990). Comparison and analysis of the factors underlying the formation of technological and economic structures at the current stage of economic development make it possible to distinguish the main variables in measuring competitiveness of market actors, to determine the most significant barriers to development, and to propose mechanisms for stimulating economic growth.

In the second decade of the twenty-first century, a special role in socio-economic development belongs to digital technologies: cloud technologies, artificial intelligence, the Internet of Things, neural networks, boundary and quantum computation, blockchain, immersive technologies, and many more. They contribute to the emergence of new business models and enterprise ecosystems, and also create conditions for not only the fullest possible realization of their present potential, but also the formation of further strategic competitive advantages in new and traditional markets based on using new development tools (fintech, e-commerce, Big Data processing, digital platforms, digital twins, etc.) (Stepnov et al. 2018). Data-driven innovations, new business models, and digital applications are now becoming the basis of a high-tech transformation across all sectors of the economy.

The term "high technology" (hi-tech) appeared in the 1950s, but there is still a lot of uncertainty about both the concept and the criteria for being classified as such (Zhukova 2007; Glushak 2017). Among the most significant criteria for compliance with "high technologies", it is important to distinguish the following: the knowledge intensity of research (the cost of scientific research in total production costs should be at least 3.5%; for leading science-intensive technologies at least 8.5%), knowledge efficiency, innovation, and focus on commercialization of the results of scientific activities.

It is customary to view the following as the key characteristics of high technologies: the use of the latest materials and methods of production, high cost-effectiveness (providing an optimal cost-benefit ratio compared to previous technologies), a significant share of R&D costs, a short product life cycle and high rates of obsolescence and product renewal, high risk of implementation, and use of technologies (Berezina 2011).

It is also important that the very concept of high technologies is temporary, and reflects the level of technological development typical of a certain economic order. Not all values related to this concept have accepted criteria, and the list of the industries included is undecided, but despite this, high technologies are incorporated into all areas of the modern economy. Under the influence of high technologies, changes significantly occur, not just in the industry structure (new industries, technologies, goods, and services develop; there is a significant transformation of traditional industries through changes in business processes) but also in the spatial structure of the economy (new forms of spatial organization of the economy appear: free economic zones, clusters, urban agglomerations, smart city, etc.); the business processes of companies are also affected and have to adapt.

The modern transition period—from post-industrial to digital development—is characterized not only by the strengthening of the processes of the commercialization of science, but also by the use of the achievements of high socio-humanitarian technologies, called "hi-hume" (Zhukova 2008). Changing the structure of high technologies leads to a change in approaches to the differentiation of high-tech industries. In 2020, five high R&D-intensive industries (aircraft, computers, electronics, optical products, pharmaceuticals) and eight medium-to-high R&D-intensive industries (including chemicals [excluding pharmaceuticals], electrical equipment, motor vehicles) were included in the group of knowledge-intensive and technologically intensive industries by the US Science Foundation.

In 2018, knowledge-intensive and technologically intensive industries launched productions for a sum of more than $9 trillion (about 11% of global GDP) (Fig. 14.1). Almost a third of the world's production in high-intensity R&D industries is produced by US companies, whilst the largest producers in medium R&D-intensive industries are Chinese companies.

The role of high-tech companies in the global economy is determined not only by their ability to produce goods and services with a high degree of knowledge intensity, but also by their ability to consolidate and disseminate new knowledge, creating and implementing progressive technologies at all stages of value addition (Tsukanova and Dubitskaya 2018). It is high-tech companies that act as a locomotive for the development of the economy, bringing new and improved consumer and industrial goods to the market, thereby contributing to the creation of new goods, services,

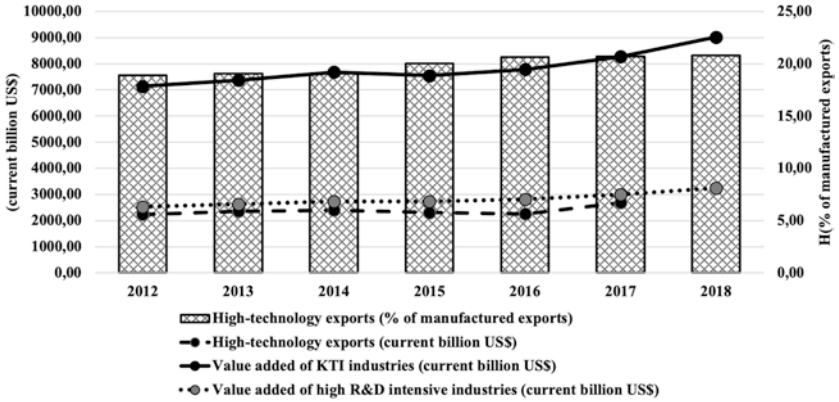


**Fig. 14.1** Dynamics of the contribution of the high-tech sector to the world economy. (Source: Compiled by the authors according to the World Bank and the US Science Foundation)

and industries, whilst also improving the efficiency of traditional ones (Khalimova and Yusupova 2019). Analysing the factors of increasing such companies' competitiveness, not only in domestic but also in foreign markets, becomes crucial for the formation of competitive advantages in individual national economies.

## Methods

The following general scientific methods serve the methodological basis of the study: system analysis, retrospective analysis of domestic and foreign literature on the international competitiveness of high-tech companies, a synthesis of knowledge gained, a systemically structured integration of the factors of international competitiveness and barriers that hinder the transition of companies to international markets, and, finally, measures of state support of their activities.

The development of the theory of competitiveness is based on an analysis of the leading factors determining the possibility of realizing competitive advantages. Until 1960 it was believed that an enterprise's competitiveness was determined by an organization's internal environment (production technology, the nature of the organization of production processes, the quality of labour resources, etc.). The key task of

improving the organization itself was believed to be the effective use of material factors in production, due to which tactical superiority would be achieved at the technical and technological level of an organization (Matveeva 2017). The competitiveness of an enterprise was seen as its ability to create new technologies, new markets, and new ideas. In the 1960s–1990s, the external environment began to be actively considered as a leading factor to determine the competitiveness of an organization (Lischuk 2014). The formation of an organization's competitive advantages is associated with an organization belonging to a certain industry, its use of competitive strategies, product value chain (Stepnov et al. 2018), and executing key strategic activities (design, production, marketing, and distribution of products with lower costs or better quality than competitors). A firm's competitive advantage is based on its ability to use the conditions, innovations (including new technologies), new or changed customer demands, the emergence of a new industry segment, changes in the cost or availability of production components, or changes in government regulation (Porter 1990).

In this regard, in the second half of the twentieth century, researchers already were beginning to study not only the conditions for the formation of competitiveness, but also the process of forming competitive advantages itself, thus forming a resource-oriented approach. The emergence of the resource-oriented approach created the basis for analysing the external environment of enterprise development due to intra-company factors. The key idea of the approach is that the growth of a company takes place through the most efficient use of resources for the production of products, with a maximum added value for the consumer (Karlik and Platonov 2013). It was representatives of the resource-oriented approach who introduced the notions of "distinctive competencies" (on the basis of which special advantages can be created, both in individual parts of the product value chain and throughout the entire chain) and "dynamic competencies" (related to a firm's ability to change existing competencies in accordance with changing environmental requirements).

Thus, the modern, resource-oriented analysis of enterprise competitiveness is based on the assessment, diagnosis, and prediction of "the qualitative use of consumed resources" (Yendovitskiy et al. 2013).

The resource-oriented approach is also used in the definitions of competitiveness of a number of international and industry organizations. The "Europe 2020" strategy presents seven key aspects of competitiveness: the corporate environment, digital agenda, innovative Europe, education and

training, the labour and employment market, social integration, and environmental sustainability (World Economic Forum 2014). This approach has been further developed in European Union policy documents, where competitiveness is defined as the ability of firms to mobilize and effectively use the productive resources necessary for the successful supply of their goods and services in the global economic environment. The competitiveness of a firm is determined by its ability to develop and adapt to changes through innovation. Achieving and maintaining competitiveness requires continuous improvement in productivity and constant adaptation in the conditions of the dynamic economic environment (European Investment Bank 2016).

In Russian economics, the resource-oriented approach only began developing at the beginning of the twentieth century, primarily in the theory of strategic management. The broad and diverse concepts of "competitiveness" and "the competitiveness of an enterprise" were reduced to the following direction: the "competitiveness of an enterprise" is based on the nature of a company's activities, the manner of the competitiveness of the goods produced, the combination of goods, and the production activities of an economic actor (Plotitsyna 2010).

In recent decades, international competitiveness has become one of the most complex phenomena of modern economic life, and has become one of the most important scientific and practical problems. The concept of a company's international competitiveness implies its ability to outstrip competitors in gaining and strengthening positions in national and global markets.

International competitiveness is a rather complex economic category which includes several levels. Specifically, while analysing the international competitiveness of a company, it is necessary to assess the advantages of the goods and services it produces, the distinctive features of the company itself, industry competitiveness, and the national characteristics of its home country. In general, the international competitive position of a company depends on several key groups of factors, which should include the resources and capabilities of a company, the competitive conditions of the industry, and national factors. The key factor in achieving high competitiveness is that the country has a "critical" number of firms capable of generating innovation in developing markets and eventually providing new types of employment. In order to achieve effective results, enterprises need to adapt to constantly changing conditions, which, in their turn, require the evolution of innovative concepts for the development of an

enterprise and its competitiveness. In view of the above, the most important competitive advantages in the field of intangible assets are: patented technologies; unique technologies, goods and services; positive corporate reputation; well-established distribution means and so on.

## Results

As there is no unified approach to the notion of "high technologies", we currently have no unified approach to defining "high-tech companies". Vostrikov suggests considering the following among their key characteristics: producing and commercializing products related to "high-tech"; the use of modern scientific achievements in the most important areas of the company's activity; high competence of employees at all levels; a high level of production research intensity and the subsequent need for continuous interaction with research units; economically feasible production profitability due to the uniqueness of products, high productivity, and labour quality; attractiveness for investors; speed in adapting to changes, improving products, technologies stimulating new research; and, cumulatively, generating innovative improvement and development (Vostrikov 2015).

Thus, high-tech companies can include the following organizations:

- high-tech industries (generating new knowledge and an innovative product based on R&D);
- medium- and low-tech industries (not generating but actively introducing high-tech products using high technologies and innovations in their activities).

From this point of view, any high-tech company can be considered innovative, but not any innovative company is high-tech.

The analysis of the level of technological development, the competitive advantages formed by them, and the nature of the technological process in a company made it possible to distinguish several characteristics of each group, presented in Table 14.1.

The fundamental basis for the development of high-tech companies is "scientific and technical" and "scientific and technological" competitive advantages: a high level of the development of applied science and technology in the industry; special technical characteristics of production equipment; technological features of raw materials and materials used in production.

**Table 14.1** Competitive advantages associated with "scientific and technical" and "scientific and technological" development

| *Industry* | *Level of technological development* | *Implementation stage* | *Competitive advantage* |
|---|---|---|---|
| Medium- and low-tech | Medium-tech<br>Low-tech | Use of innovative technology<br>Use of high-tech technology | Technical<br>Technological |
| High-tech | High-tech | Use of new knowledge to produce market-new goods or services, based on own R&D in existing knowledge | Scientific and technical |
| | High-tech based on leading knowledge-intensive technologies | Production of knowledge based on own R&D and creation of market-new products or services in the field of the 4th Industrial Revolution | Scientific and technological |

Source: Compiled by the authors

The realization of "scientific and technical" and "scientific and technological" benefits is related to:

- the ability to introduce new developments and goods faster than other companies, as well as to quickly respond to changes in consumer demand (as a result, improving institutional management and streamlining production processes);
- the high scientific and technical skills of employees (as a result, improving an organization's activities, modernizing production, introducing new technologies, and attracting the best suppliers);
- production of unique goods;
- introducing innovations into the organizational structure that manages the operation of the machinery (this will aid with upgrading equipment and output growth);
- effective implementation of the investment strategy (which ensures a high rate of a company's economic development);
- a comprehensive solution throughout the life cycle, from the development of technology (production) to its use, which guarantees competitive cost;
- enterprises provided with a stable portfolio of technology (with the participation of foreign actors as well) and new products or services

(e.g. despite the European company Airbus, in 2017, losing in production volumes to its main competitor Boeing, it was able to bypass it in the market using firm orders that could not be cancelled).

However, if the ability to produce and apply new knowledge for the production of new goods or the provision of services becomes the main factor for high-tech companies, then for medium-tech industries the key factors are those that influence the nature of the deployment of high technologies into the production process.

As a result, 8 of the 11 most innovative companies in the world belong to high-tech industries. These companies spend on their R&D activities an amount of funding that is comparable to the levels of the R&D investments made by some states in totality (Table 14.2).

Generally, R&D expenditures among the 1000 largest companies has increased to $782 (an increase by 11.4% in 2018 compared to 2017). The R&D costs of companies connected with the hi-tech nature of products or services, or with pharmaceutical companies (Roche Holding AG, Johnson & Johnson, etc.) or the companies producing software or developing internet services and products (Microsoft Corporation, Alphabet Inc., etc.), may not raise many questions; the margin of leadership held by Amazon.com, Inc.—the largest company in the sphere of Internet retail—in R&D investments definitely attracts certain interest. Meanwhile, most of the investments in R&D are aimed at developing a cloud platform, Alexa-esque voice assistant, and computer vision technologies. Today, Amazon is not only an international trading platform, but also the world's leading provider of cloud computing, the first among internet companies to begin using predictive analytics (Marr and Ward 2019).

The peculiarities of modern high-tech companies are related to the fact that their activities are of a cross-sectional nature: deployment of high technologies into the organizational and technological process has become the basis for diversification (expansion) and deepening of their activities. The expansion of this activity can be connected not only with an increase in the number of economic activities, but also with an increase in the number of cooperative activities, both with consumers (expansion of the assortment of goods and services) and with counterparties (strengthening the role of integration processes within a company itself); this invariably, as the next step, leads to an increase in the share of internal production (depth of vertical integration). Therefore, in the most dynamic

**Table 14.2** Cost comparison of the world's leading innovation companies with R&D public expenditures

| | *Company name* | *Country* | *Industry* | *R&D expense (in USD billions)* | *Country* | *Gross domestic spending on R&D (in USD billions)* |
|---|---|---|---|---|---|---|
| 1 | Amazon.com, Inc. | United States | Internet and direct marketing retail | 22.62 | Spain | 21.87 |
| 2 | Alphabet Inc. | United States | Internet software and services | 16.23 | Israel | 16.35 |
| 3 | Volkswagen Aktiengesellschaft | Germany | Automobiles | 15.77 | Belgium | 15.12 |
| 4 | Samsung Electronics Co., Ltd. | South Korea | Technology hardware, storage and peripherals | 15.31 | | |
| 5 | Intel Corporation | United States | Semiconductors and semiconductor equipment | 13.10 | Austria | 14.66 |
| 6 | Microsoft Corporation | United States | Software | 12.29 | Poland | 14.07 |
| 7 | Apple Inc. | United States | Technology hardware, storage and peripherals | 11.58 | | |
| 8 | Roche Holding AG | Switzerland | Pharmaceuticals | 10.80 | Denmark | 9.12 |
| 9 | Johnson & Johnson | United States | Pharmaceuticals | 10.55 | | |
| 10 | Merck & Co., Inc. | United States | Pharmaceuticals | 10.21 | | |
| 11 | Toyota Motor Corporation | Japan | Automobiles | 10.02 | | |

Source: Compiled by the authors on the basis of Strategy & (2018)

technology companies in Germany, the average value added is about 40% (compared to 30% on average in the country) (Simon 2012).

Scientific literature has not developed a unified approach to determining groups of factors and the nature of their influence on the international competitiveness of high-tech companies as a complex, multifunctional,

open, hierarchical, socio-economic system. Of interest regarding the basic factors of the development of high-tech companies are those companies that are working towards the development of innovative entrepreneurship, the removal of barriers that hinder the growth, and the creation of conditions that stimulate their development.

The international competitiveness of high-tech companies is connected with several groups of factors, the nature of which is determined, first of all, by the industry affiliation of the company. A comparison of these groups for high-tech companies of different industries is presented in Table 14.3.

Improving the competitiveness of high-tech companies in all industries is currently associated with the digitalization of their activities. This will require the use of all the instruments of the new economy, and will intensify the degree of the new groups of factors. In 2017, Boston Consulting Group experts, on the basis of the synthesis of the experience of advanced countries in the field of the digital economy, defined four new categories of instruments for socio-economic development (Boston Consulting Group 2017). An increase in the competitiveness of companies while implementing the "digital privatization" mechanism is based on eliminating the least effective segments in economic activities. The introduction of the "digital leap" mechanism is due to the creation of conditions for the development of production as a result of the development of certain digital technologies: Big Data, artificial intelligence, neural networks, blockchain. In the first and second cases, to support companies, the state itself initiates the introduction of digital tools into the company's activities, with the help of the application of incentives (stimulating demand for high-tech products, innovative activities, etc.).

The third tool helps to actively digitalize the activities of the state and companies with state participation. It makes it possible to increase the efficiency and transparency of all processes of interaction with the state, which simplifies doing business in the country. All this gives a wide multiplier effect for the economy. As a result, there is a significant increase in value added; a reduction in transaction costs in companies and significant cross-industry effects are the result thereof. With "digital reinvestment" the state is supposed to assume the role of an investor in the fundamental factors of economic development.

However, while entering high-tech industries, newly created companies face a number of barriers limiting their competitiveness, including in international markets.

**Table 14.3** Factors of international competitiveness of high-tech companies of various industries

| *Groups of factors* | *High-tech companies* | |
|---|---|---|
| | *High-tech industries* | *Medium- and low-tech industries* |
| Institutional and legal | State support for high-tech industries and innovation | State support for innovation |
| "Scientific-technical" and "scientific-technological" | High level of patent activity (intellectual property availability) | |
| | Development and use of new products based on the 4th Industrial Revolution technologies | Use of new products based on the 4th Industrial Revolution technologies |
| | Building competitive advantage across the life cycle—from new launch to global player (Dawson 2020) | |
| Economic | Venture capital funding | Investment funding |
| | Building the consumer value of new technology (Rydehell et al. 2018) | |
| Human resources | Advanced (professional) digital competencies of personnel | Basic digital competencies of personnel |
| | Having digital dexterity | Having soft skills |
| | Increased staff flexibility and adaptability requirements | |
| Organizational and administrative | Company management organization flexibility | |
| | Ability to develop and use new business models | Ability to use new business models |
| | Having an effective marketing strategy | |

Source: Compiled by the authors

In foreign literature, one of the barriers to entering an industry is the cost of production, which should be paid by a firm seeking to enter the market (McAfee et al. 2004). The presence of this barrier allows firms already operating in the industry to set prices below average costs, which prevents newly created companies from making the same amount of profit (Lukyanov and Kislyak 2007).

Through the study it is possible to define the main barriers that limit entry into high-tech industries. The main barriers should include the existing "scientific and technical" and "scientific and technological"

restrictions in the development and implementation of high-tech technology and products. At present, there is a tendency to significantly reduce the life cycle of high-tech goods, the development of which takes much longer; in the telecommunications industry, the life cycle of a product can be a year, whilst in mechanical engineering it is 3–4 years. Besides, the development of "high technologies" often takes place under conditions close to technological saturation, which is close to the boundary of the production capacity. Shifts are possible only in the long run (further development of sound transmission technology, video, etc.).

An important limitation is the resource availability of a newly created company. The existence of conditions created by the state for business development (tax relief and other preferences), the availability and adequacy of financing, and the development of an effective marketing strategy are significant advantages for companies in competition. Separately, free access to information, including industry information, should be noted under the conditions of the digitalization of the economy.

A significant barrier for a company to enter a high-tech industry is the shortage of human resources in the field of high-tech, management, and business development.

The monopolization of markets by transnational companies creates a number of constraints. The presence of such companies in the market often determines the stages of bringing technology and products to the market, which prevents other small companies—without the necessary targeted financing or breakthrough technologies—from introducing more advanced products within a shorter period of time.

Political restrictions on free competition can bar the doors for selling products completely (tabooing Huawei products in the United States, Europe, Canada, and Australia, or Apple products in China, etc.). As a result of the introduction of barriers, the principles of capital movement and the system of interaction in international markets in general are violated. This includes restrictions for reasons of national security and lobbying for the interests of states (the creation of the Mir payment system, boycotting Yandex by American government departments, etc.).

Institutional and management barriers should include the need for industrial cooperation in the field of "high technologies": very often the flow of output requires the organization of production in one place, then assembly and packaging in another, and then financing and management in a third. In general, this distributed production model can contribute to

conflicts between states, create risks for suppliers, contribute to the emergence of technological dependence, and so on.

Among the emerging legal barriers worth noting are the problems of the need for copyright documentation. Intellectual property, on the one hand, protects the rights of developers and owners of technology, limits its use as a factor in production, and closes the market to competitors. On the other hand, the high cost of the patent procedure in some cases is not available either to small firms or to large ones as well. Besides patents, copyright certificates partially reveal the essence of innovation, contributing to the development of industrial espionage.

On the whole, the typology and nature of barriers to entering the high-tech industry depend on the size of a company, the specifics of the industry, and the national characteristics of the home country. Based on the results of the assessment of barriers, the attractiveness of the market is determined, a marketing strategy is developed, the business model of a company is adapted, and further steps are taken. Digitalization of the economy causes changes in traditional barriers to entering the industry, as production, warehouse, trade, and other traditional business principles are transformed.

## Discussion

Analysis of foreign experiences in supporting the development of high-tech companies demonstrates the manner of emerging problems in different countries of the world. The choice of directions, mechanisms, and tools for solving these problems is determined on the basis of the specifics of their manifestation and the conditions of socio-economic, scientific, technological, and innovative development in the country. A number of states focus on active state support for scientific and technical developments; in other countries, tax incentives for developers come to the fore; the problem of supporting the creators of intellectual property results is solved, and so on. At the same time, it is possible to distinguish the general directions and solutions, including financial, administrative, tax, and a number of other mechanisms within the framework of which countries build strategies to support the development of high-tech national companies that are competitive in foreign markets.

The consolidated foreign experience provides examples in which state participation in business activities has been subject to detailed and balanced regulation, both through direct participation in the activities of companies and through indirect support and the development of innovative infrastructure, stimulation of consumer demand, and so on. There are several areas related to state support for high-tech companies:

1. targeted support for high-tech companies;
2. support for innovative entrepreneurship, including small- and medium-sized businesses forming the basis for the technological development of the economy (Saunila 2019);
3. support of sectoral development projects, including in high-tech industries;
4. support for certain activities (R&D, exports, etc.).

Innovative entrepreneurship takes many forms (commercial activities aimed at profiting from the creation of technical and technological innovations, the spread of innovation in all sectors of the economy, etc.). State support for this has become widespread in many countries, and itself takes many forms:

| | |
|---|---|
| *Institutional*: | referring innovation policy to the competence of specially created state bodies. |
| *Organizational and legal*: | the right of state research institutes to be participants (shareholders, founders) in commercial innovative companies, stimulating the establishment of joint ventures by scientific institutions and business structures, and the use of innovative technologies at the level of small- and medium-sized enterprises (SMEs). |
| *Infrastructure*: | information and methodological support for innovation actors; support for technology parks and technology incubators. |
| *Financial and economic*: | direct financing of innovative enterprises (grants, loans on preferential terms, other financing programmes); financial support for venture capital enterprises; tax preferences to innovative enterprises. |
| *Scientific and technological*: | stimulation of patent activity (including international); additional payments to development authors in the commercial use of their inventions; granting permission for the employees of state research institutes to participate in commercial activities. |

Economically developed countries around the world show, through their experience, the special effectiveness of supporting medium-sized fast-growing high-tech companies. These companies are recognized throughout the world as the main source of job creation and innovation support. To support their development in the domestic market, and for their access to outside foreign markets, special state structures and development institutions are formed, and a large number of programmes are being developed; these are meant to carry out direct subsidies of innovative projects and provide preferential taxation of high-tech companies, consulting services, training of specialists, analytical materials, assistance for participation in international congresses and exhibitions, and so on.

The most effective support programmes for fast-growing high-tech companies in Europe, the Asia-Pacific region, and the United States (world leader in the innovation process) are formed in a highly developed institutional environment. Such programmes include Growth Accelerator in the Netherlands, Mid-Tier Companies Development Programme in South Korea, programmes of the State Innovation Agency Callaghan Innovation of New Zealand, "Competitiveness Leaders–National Champions 2.0" in Kazakhstan, "Support of private high-tech leading companies" in Russia, and others in other countries. These programmes focus on soft support (implementation of educational programmes, organization of network communication between companies, consulting and marketing support, etc.), concierge management, assistance in developing a leadership strategy, and so on. At the same time, support is selective: assistance is provided to a limited number of companies on the basis of competitive selection, the winners of which are companies, not individual projects.

According to the results of the analysis, the most effective measures for the development of medium high-tech entrepreneurship adopted in international practice and possible for replication can include:

1. Tax relief to innovative small- and medium-sized enterprises in industries that are a major priority for the country's economy.
2. Simplifying the system of regulation of innovative medium-sized business, and updating the norms imposed on it.
3. Providing small- and medium-sized businesses with access to government orders.
4. Increasing government guarantees (and guarantee coverage) for SME investment loans.

5. The provision of targeted concession loans to innovative export-oriented enterprises.
6. The development of innovation voucher mechanisms as the most effective tool for innovation development and stimulating innovation.
7. The creation of a flexible system of state support which provides money for small- and medium-sized enterprises in an economic slowdown, and the development of a system of SME recovery.
8. Development of the national innovation system. The innovation system makes it possible to increase the intensity of the country's economic development by using effective mechanisms for obtaining, transferring, and using the results of scientific and technical activities in economic practice.

## Conclusions

Modern high-tech companies are drivers of socio-economic, scientific, technological, and innovative development. An important condition for improving the competitiveness of high-tech companies in the current context is the presence of their critical mass, which has the ability to stimulate economic growth. The fundamental bases for the development of high-tech companies are "scientific and technical" and "scientific and technological" competitive advantages. However, the support of any innovation can become a catalyst for the high-tech development of both companies and countries in general. A special role here belongs to the digitalization of all production processes of companies of any industry.

Among the factors determining the success of companies in global markets, there may be, on the one hand, the possibility of successfully including companies into global value chains (these create conditions for companies to participate in global production, specializing in the segments in which they have a comparative advantage but not in the production of the whole product). The experience of the most efficient fast-growing high-tech companies shows that it is much more important to expand one's presence in different regions of the same industry rank than to introduce products to different markets within the same region. But, on the other hand, the role of vertical integration of companies (implementation of all production processes) is growing. There are also

emerging business risks associated with the geopolitical situation between states, technological dependence, and other bodies.

Under such conditions, a significant change in the requirements for employee competencies takes place: there is a gradual decrease in demand for professions associated with the performance of formalized repetitive operations; the life cycle of professions is reduced due to the rapid change of technology; the competency profiles of certain categories of personnel are transformed due to changes in the operational tools; new professions are emerging, based on the increased requirements for flexibility and adaptability of staff.

Dynamic and comprehensive responses to the rapidly changing market requirements—to both the need to produce new knowledge and the deployment of new technologies into all structural elements of a company's business processes—is the key to a company's high competitiveness in both domestic and foreign markets.

A comprehensive and coordinated system of state measures to support high-tech companies across all sectors of the economy is essential for the realization of all factors.

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