

Management of Companies' Competitive Ability on the Basis of Intellectual and Technological Leadership

Michail Ya. Veselovsky
*Department of Management
 Technological University*
 Korolev, Russia
 consult46@bk.ru

Tatiana V. Pogodina
*Department of Management
 Financial University Under the
 Government of the Russian Federation*
 Moscow, Russia
 TPogodina@fa.ru

Lenar A. Yunusov
*Ministry for Foreign Affairs of Russia
 Moscow State Institute of International
 Relations (MGIMO-UNIVERSITY)*
 Moscow, Prospect Vernadskogo, 76
 kaz@mail.ru

Daria A. Andrianova
*Department of Management
 Technological University*
 Korolev, Russia
 milkevichdaria@gmail.com

Abstract– Factors of national economies competitive abilities are researched in the article on the basis of system implementation of Industry 4.0. It is noticed that the majority of economically developed countries in their competitive abilities to a greater extent are focused not on natural but acquired factors which include technological ones. Technologization is leading to the formation of the top style of industrial production. The pyramid of intellectual leadership has been analyzed which is gradually moving from emotional to business and then to collective and spiritual leadership.

The concept of relatively low cost of innovations in connection with the active introduction in production, distribution, exchange and consumption of digital technologies is substantiated. Advanced digital technologies used by the production companies in the world have been emphasized and analyzed. Necessity of social functions implementation by business including production and distribution of digital goods has been proved. Production and implementation of digital goods provide formation of moral foundation of socio-economic activities.

Findings: It is noticed that a small number of Russian companies mainly use the second-tier digital technologies. Venture investment priorities in Russia which include cloud technologies, software, cybersecurity are highlighted. A proposal on the necessity to form a digitalization strategy of production activities on the basis of technological platforms in cooperation with industrial clusters in the field of information technology has been formed. Transition from low-tech to high-tech type of industrial production on the basis of development of pharmaceutical and biotechnological clusters which possess high competitive advantages has been proved.

Keywords: *competitive abilities, technological leadership, digital technologies*

I. INTRODUCTION

Actuality of the article is determined by the necessity of problems decision on Russia's entry into the five top economies of the world. Quick growth is possible only on the basis of domestic companies competitive abilities

increase. To decide this problem it is required to reconsider organizational economic mechanisms and tools of competitive abilities management on the basis of technological and intellectual leadership.

Problems of competitiveness and competitive ability factors at the macro-level and some separate companies are reflected in different work of lead researchers: : Drucker P., Doyle P., M. Porter [2, 5]. However, practically they don't consider the problems of company's competitive ability dependence upon development of scientific technological capacity.

The factor of technological leadership taking into account has permitted to formulate key problems on which it's necessary to focus determining competitive ability of economic entity. Namely - they are the company's goals; internal and external parameters of competitive abilities level; methods and means of problems decision associated with its formation and sustainable vector of development.

Taking into consideration the abovementioned approaches competitive abilities of the company are based on the formation opportunity, high level of development and degree of competitive capacity use for the fullest satisfaction of customers on the certain market segment than companies-competitors. The goal of this research is to reveal priority guidelines of production company's competitive ability increase in long-term period. In the process of given problem achievement the following problems were decided: to conduct analysis of Russian and some foreign countries economy competitive ability, to reveal the role of digital technologies in competitive ability formation of production companies.

In terms of modern transformations competitive ability of companies should be based on use of technological leadership on key guidelines of scientific-technological progress. Digital technologies should be considered as the most significant and advanced in the world economy.

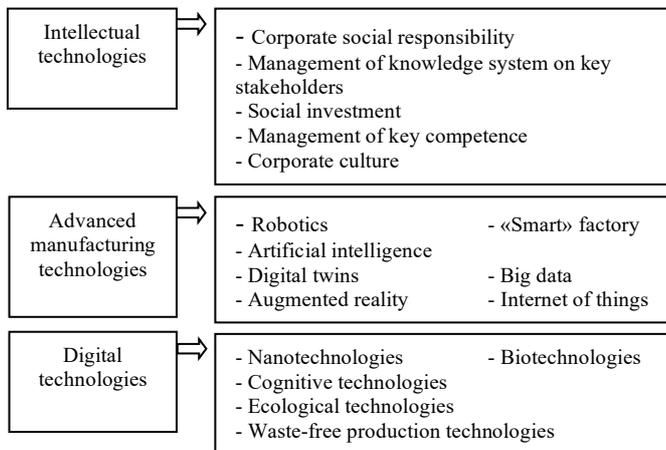
The methods of statistical and dynamic analysis were used within the research. Coefficient and structural analysis has allowed to investigate development trends of Russian and foreign countries economy. A comparative method has permitted to assign competitive ability factors and features of competitive industrial companies in short- and long-term periods.

II. ANALYSIS OF COMPETITIVE ABILITY AND COMPETITIVE ADVANTAGES OF PRODUCTIVE COMPANIES

A. Modern trends of companies competitive advantages formation in the world

Management of productive companies competitive ability is a complex and dynamic process. It is based on the formation of internal and using external institutions. Competitive advantages at present and long-term future are created due to effective use of resources and more attractive compared to competitors, market positioning for key stakeholders in terms of financial sustainability and positive dynamics of business value. However, in the process of socio-economic dynamics, the competitive advantages of the company have undergone changes, gradually moving from quantitative (economies of scale) to strategic (competitive strategy, unique values of the company), and then to intellectual and technological (intellectual and digital, technological leadership).

In this regard, it's efficient to consider new competitive advantages of the company which are formed on the basis of advanced technologies. They are presented in Fig. 1.



a. Elaborated by authors

Fig. 1. Characteristics of technologies providing competitive advantages of high-tech companies

Thus, in modern conditions of production technologization the competitive advantages characteristic of companies are focused on increasing the use of high-tech and social components. To provide the competitive ability of companies, the three - fold outcome-economic, environmental and social efficiency - is important.

Skillful and efficient management of competitive advantages is an essential factor of financial-economic indexes improvement, increase of company and corporative

brands market value. Market value dynamics of the biggest world companies is reflected in Table 1.

TABLE I. MARKET VALUE OF THE BIGGEST CORPORATIONS IN WORLD ECONOMY IN 2019

Company	Value, milliard \$	Country	Competitive advantages
Apple inc.	182,8	USA	Use of innovative technologies and exclusive design of electronics, Apple production recognition as iconic all over the world
Google	132,1	USA	Intellectual leadership through comprehensive care of staff
Microsoft	104,9	USA	Well-known brand among buyers, low prices and availability of software package, convenient for use by any entrepreneurs, expansion in foreign markets.
Facebook	94,8	USA	A huge number of customers (2 billion people), technological leadership
Amazon	70,9	USA	Client-orientation, personnel policy, diversification, long-term perspective orientation

b. Made by authors [6]

The United States are the leader among the largest corporations in the world by market value of business. One corporation from the Republic of Korea and one from Japan are represented in the top ten corporations. Information technologies and electronics hold the leading positions by types of activities. Consequently, it is emphasized once more that in modern world the main competitive advantage is intellectual and technological leadership. Competitive advantages are also of great importance. They are based on the formation of unique value of the company (innovative advantages and breadth of nomenclature and assortment, product quality, consumer confidence).

B. Trends of competitive advantages development of the Russian corporations

The most striking indicator that reflects the competitiveness of companies is the value of the brand. The Russian companies lag behind the world leaders in competitive advantages and brands formation. In 2018, the global consulting company Brand Finance estimated the value of the most valuable brands of Russian companies. In accordance with the results of this assessment, the highest brand among Russian companies is PJSC Sberbank (670.4 billion rubles), which is the most reliable credit institution in the country according to the estimation of the Bank of Russia. It should also be noted that the value of PJSC Sberbank is almost 2.1 times higher than the value of the brand of PJSC Gazprom (320.8 billion rubles), which took the second place in the rating. In the third place is PJSC "LUKOIL" (281.1 billion rubles.). The difference in brand value between PJSC "Sberbank" and PJSC "Pyaterochka" (91.2 billion rubles), which occupies the 10th place, was 7.3 times. This is considerably more than the top ten brands of corporations in the world. It highlights the lack of companies' knowledge about customers in Russian companies.

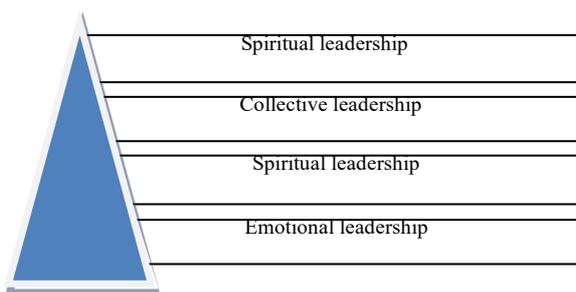
At the same time it should be noted that among the presented Russian corporations there is not a single industrial one, which indicates their lack of competitiveness and the need to form their competitive advantages.

C. Factors and possibilities of Russian companies competitive advantages formation on the basis of intellectual leadership

G. Hamel and K. K. Prahalad made a significant contribution by their idea of the competitive advantages theory development. In accordance with their work, due to the fact that the success of modern business depends entirely upon technology, the main competitive advantages are of intellectual values, which in the future will determine the development not only in production technology, but in management and business as well. The company's growth perspectives are determined by its intellectual leadership compared to other market participants. Therefore, as a strategy of growth, it was supposed to invest resources in intellectual long-term development in order to ensure a competitive advantage in the future. And work with the consumer of a product, it is supposed to conduct in the form of formation of its future requirements about which the consumer probably has not got any idea as well.

Formation problems of the company competitive advantages in terms of technologization of production and management are essentially modernized based on the triad "science –production - marketing" to the system "knowledge -intellectual capital - intellectual leadership - technologization-competitive ability of the company".

Leadership is considered to be the driving force of the implementation of the main functions of companies. A new generation of corporate leaders will live in a turbulent world where success depends upon the ability to identify emerging threats, anticipate their emergence, and explore new opportunities. Survival in such an environment will require a combination of different competence that provide intellectual leadership [9]. The pyramid of key components of intellectual leadership is presented in Fig. 2.



c. Elaborated by authors

Fig. 2. Pyramid of intellectual leadership

Emotional leadership arises in socio-psychological groups on the basis of human sympathies, attractiveness of mutual communication. Emotional leadership contributes to the formation of trust between people, instills confidence, relieves psychological tension, creates an atmosphere of psychological comfort in the team. Business leadership is characteristic of groups that were arisen based on production goals. It is based on such opportunities and qualities as high competence, the ability to solve organizational challenges better than others, business credibility, experience, etc.

Collective leadership characterizes a higher stage of bringing people together. Its distinctive feature is the ability and desire of people to unite independently to solve various types of problems, both industrial and non-industrial in nature.

Spiritual leadership is the highest form of intellectual leadership which arises on the basis of internal motivation, common targets in the activity of people and provides accelerated development of the company on the basis of unity.

III. ANALYSIS AND GUIDELINES OF INCREASING RUSSIAN AND SOME FOREIGN COUNTRIES INDUSTRIAL PRODUCTION COMPETITIVE ABILITIES

There are such realities in the modern world that it's impossible for one participant of the reproductive process to generate knowledge for quick improvement of its competitive abilities. It's necessary to have an appropriate environment which is formed at the national and regional levels.

On the basis of mutually beneficial cooperation between the different companies of the branches and the region transaction revenues are reduced, an effective chain of creating new knowledge is built and companies are "tied" to the region by their inclusion in the territorial branding.

A. Comparative analysis of competitive ability factors of Russian and foreign countries industrial complex

Competitive ability of companies, branches and national economies is determined by quite a number of factors among which one can emphasize technological and financial-economic indexes.

Among the European countries in the market of high-tech goods and services, the best positions are held by Germany, Great Britain and France, each of them control 5-10 macro-technologies. Control over even a relatively small number of macro-technologies in the market of high-tech goods has permitted European countries to take a leading position in the world economy and to provide high rates of growth of national GDP.

Although innovative industrial companies in Europe are developing independently, nevertheless, the state provides them with significant financial and economic support. In according to various sources, about 30 % of funding comes from national public funds, 25 % are membership fees of participants of innovative industrial clusters, 20 % - from regional public funds.

Thus, about 50% of financial sources in Europe one way or another is associated with the participation of state bodies of national and regional levels [2,3].

This plays an important and, in many cases, key role in providing their sustainable socio-economic development. Thus, the positive influence of innovative industrial clusters on the regional economy is provided on the basis of the industrial territory brand formation. As a result, it leads to the growth of innovative activity of organizations of related industries, cross-sectoral and interregional technological chains are formed.

Production indexes, the level of capacity utilization, the rate of increase in labor productivity are economic factors of

industrial companies competitive ability. Let's conduct a territorial comparative analysis of these indicators for 2019 and represent the results in Table 2.

TABLE II. ANALYSIS OF FINANCIAL-ECONOMIC INDICATORS OF ECONOMIC ENTITIES IN RUSSIA AND OTHER COUNTRIES IN THE WORLD IN 2017, PER CENT^d

Countries	Index of industrial production	The level of utilization of production capacities in the industry	Labor productivity growth rate
Russia	102,1	102,1	1,5
Belarus	106,1	106,1	...
Germany	103,0	103,0	0,7
Great Britain	101,0	101,0	0,7
India	104,0	104,0	...
Canada	104,0	104,0	1,1
Poland	107,0	107,0	3,4
USA	102,0	102,0	...
Finland	104,0	104,0	1,6
France	102,0	102,0	0,7
Sweden	104,0	104,0	-0,1
Japan	104,0	104,0	0,0

^d Rosstat /<https://gks.ru> [8]

In according to the results of table 2 we can see that the growth rate of industrial production is lower than in many European countries including Germany, Finland and Sweden. Level of capacity utilization in Russia is one of the lowest among European countries and it is only 64% against 87% in Germany and 85% in France and Sweden. This is an indicator of the lack of competitive ability of domestic industrial enterprises.

The share of Russia in the world export and import is lower essentially than in the abovementioned countries (Rosstat).

The material base of companies competitive abilities is created by investments including foreign ones. The attracted amount of foreign direct investment (FDI) is a factor of economic entities in the competitive ability. FDI was 33.2% in Russia compared to Germany, 28.7% of the UK, 43.8% in France in 2017 [7].

In whole, Russia has considerable underutilized traditional resources providing opportunities to accelerate the pace of socio-economic development of the country. At the same time the majority of the economically developed countries in their competitive ability are more focused not on natural, but acquired factors that include technological factors. The influence on the competitive ability of technology can be classified into macro-, breakthrough and critical. There are about 50 macro-technologies in the world. Capacity of Russia is higher than that of most world power. Such macro-technologies include aviation, space, nuclear power, shipbuilding, metallurgy and power engineering. That's why the problem of Russia's industrial policy in the medium-term perspective should be oriented to the preservation of the achieved advantages in the existing

position and the development of new macro-technologies that will bring the national economy to the world level.

It's practically impossible for companies to decide such a problem alone. Therefore, it's efficient to combine them and formation of organizational and economic forms of entrepreneurship. Alliances between production and scientific, educational and scientific organizations are the form of bridging of gaps in the innovation process. An effective form of integration of scientific research and development is the innovative cluster. Technological platforms are organizational and economic forms of development of strategic guidelines of innovative and technological development of industries and complexes. Concerns can contribute to the arrangement of innovations as the "junction" of industries.

Close attention should be paid to the innovation and technological processes both by federal and regional bodies of authorities. Therefore, at the regional level it's preferable to create a working body in the form of a non-profit organization – the centre for coordination of innovations which will perform the functions of forming a database, monitoring the innovation of the region, preparing proposals for the use of opportunities for further development of the innovation and production sphere.

B. Role of digital technologies in the formation of competitive advantages of manufacturing companies

Russia should catch up with leaders to provide an intensive transition from the lower to the upper way of technological development of the national economy. The development of leadership, first of all, technological one should play the leading role in this process.

Digitalization of main business processes has penetrated profoundly into the world economy due to the positive impact on productivity growth, resource economy and reduction of time spent on production and sales. The best results in this process have reached China and the United States. For example, in China, the share of the digital economy is more than 30 % of the gross domestic product, and in Russia, according to various estimates - about 4-5% [7, 10].

Digital modeling, artificial intelligence, digital supply chains, digital manufacturing, robotics, intelligent machines – these are the mechanisms that are the most promising in the developed economies of the world. Unfortunately, in Russia, the vast majority of companies are introducing second-tier digital technologies, which are not able to quantitatively expand and qualitatively improve their competitive advantages. Only a small number of Russian manufacturing companies implement first-tier digital technologies that form competitive advantages based on intellectual and technological leadership.

Venture investment actively promotes the first-tier digital technologies. In the field of information technology, venture capital investment processes are actively carried out in the global space. In the world their share is more than 50 %, in Russia it is even higher-about 75%. Venture investors actively invest in business solutions, cloud technologies and software. The investment attractiveness of cybersecurity and corporate accelerators is increasing. Thus, the real

prerequisites for the active introduction of the first-tier digital technologies in the business community have been formed.

Digital technologies advancement not only expands competitive advantages, but also opens up new business opportunities, including improvement customer service, modernizing operational processes and transforming business models.

It is efficient to augment digital technologies advancement by active development of advanced production technologies. In terms of the number of advanced production technologies developed in Russia, metallurgical production and production of finished metal products are the leaders (114 units in 2017), followed by the production of computers, electronic and optical products (82 units), which indicates the potential of these industries in generating knowledge in the region. A few modest achievements in the development of advanced manufacturing technologies for the production of medicines and materials used in medical applications (5 units in 2017) [8]. Therefore, in the coming years it is necessary to focus on the development of innovative industrial clusters in the development of biotechnology and pharmaceuticals.

One of the developing cluster is the biotechnological one of the Kirov region, which is of intraregional importance and is focused on the implementation of cross-cutting projects, starting with scientific research and experimental constructive work (R & d), pilot production up to the commercialization of innovations and bringing them to the final consumer. The mission of this cluster is to create a system promoting the transition from the traditional economy to the knowledge-based Bioeconomy. Biotechnological cluster of Kirov region can be considered as a cross-sectoral, taking into account the diversity of centres introducing biotechnologies: medical biotechnologies and healthy eating; industrial biotechnologies; agricultural and forestry biotechnologies; spatial data and projecting [1].

It is possible to activate innovative processes in the industry by ensuring the formation of IT - clusters, which are formed in the Republic of Tatarstan, Rostov region, Perm region. Their activities are focused on improving competitive ability and the formation of a focus of dynamic growth, the formation of a full-fledged ecosystem, providing wide access to high technologies and improving the skills of personnel in the region. Consequently, all necessary organizational and economic prerequisites for the intensification of industrial development on the basis of the introduction of advanced digital technologies are formed in the abovementioned regions.

However, there are few examples of active formation of IT - clusters in Russian regions. The main reason is that the majority of regional leaders emphasize the consideration of additional costs, but do not take into account that informatization is a tool that helps to save budget funds and allows you to find new sources of revenue.

The final stage of the information system building will become the formation of an "e-government" in the region, which will carry out indicative counter-planning, bringing its main provisions and their adjustments by regional actors and the population.

IV. CONCLUSION

Let us summarize the research on the role and potential of industrial production on the basis of intellectual and technological leadership.

A. The first part of conclusion

In order to achieve the goal of Russia's entry into the top five powers of the world it's efficient to move from the current to the strategic objectives of developing a national economy based on the generation of knowledge, intellectual and technological leadership. For a qualitative change in the structure of products, the transition to higher technological modes of production it is necessary to build innovative capacity by increasing the social orientation of business, the production of digital goods, the development of digital and advanced production technologies. [9].

B. The second part of conclusion on the article

Key guidelines of the strategic approach to the management of a manufacturing company focused on innovation include:

- development of organizational and economic forms of entrepreneurship on the basis of innovative clusters, technological platforms and concerns for the implementation of strategic guidelines of technological leadership;
- the use of strategic marketing, the formation and communication to the developers of the corporate strategy of indicators of "selling information" influencing consumer competence and awareness of a wide range of consumers;
- development of the first-tier digital technologies (robotics, artificial intelligence, "smart" production);
- distribution and promotion of digital goods forming the moral foundations of socio-economic activity;
- estimation of the corporate strategy effectiveness on the basis of management deviation, taking into consideration the gap between the strategic plan and the real opportunities of the company and the development of preventive measures to avoid the occurrence of these gaps;
- development of the advanced experience distribution system throughout the country's economy by the use of modern technologies which include digital technologies;
- intensification of interaction between innovative industrial clusters and technological platforms, on the basis of which it is possible to determine strategic priorities for the development of not only individual clusters, but entire industries as well.

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