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Advanced production technologies of the Russian Federation. Influence on the development of industries

Tecnologías de producción avanzadas de la Federación Rusa. Influencia en el desarrollo de las industrias

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Contents

ABSTRACT:
In the article the analysis of statistical data of the Rosstat on the number of developed advanced production technologies new to Russia and distribution of production technologies in the sample according to the codes of the Russian classifier of types of economic activity. The degree of influence of results of innovation to ensure compliance with modern technical regulations, rules and standards. The study was carried out a systematic analysis of the application of advanced information technologies described in the works of domestic and foreign authors. The article describes the path of development of digital enterprises. Scientific novelty is to identify new trends influencing the use of advanced production technology, new for Russia and the allocation of production technology in the sample according to the codes of the Russian classifier of types of economic activity. The materials of the article are of practical importance.
Keywords: advanced production technology, high-tech, medium–technology types of economic activities,

RESUMEN:
En el artículo el análisis de los datos estadísticos de Rosstat sobre la cantidad de las tecnologías avanzadas desarrolladas de producción nuevas a Rusia y la distribución de las tecnologías de producción en la muestra de acuerdo con los códigos del clasificador ruso de los tipos de la actividad económica. El estudio se llevó a cabo un análisis sistemático de la aplicación de tecnologías de información avanzadas descritas en las obras de autores nacionales y extranjeros. El artículo describe el camino del desarrollo de las empresas digitales. La novedad científica es identificar nuevas tendencias que influyan en el uso de tecnología de producción avanzada, nuevas para Rusia y la asignación de tecnología de producción en la muestra de acuerdo con los códigos del clasificador ruso de tipos de actividad económica. Los materiales del artículo son de importancia práctica.
Palabras clave tecnología avanzada de producción, alta tecnología, tipos de actividades económicas de tecnología media, tipos de actividades económicas

knowledge-intensive types of economic activities	intensivas en.

1. Introduction

The use of modern technology in all sectors of the economy is an element of efficiency. Finance Minister Alexei Kudrin spoke at the Primakov readings (readings in honor of Primakov is a Soviet and Russian politician and statesman, Prime Minister of the Russian Federation, the Minister of foreign Affairs of the Russian Federation). In his speech 30.06.2017 of the year "Russia needs to keep pace with the main trends of the global technological revolution," A. Kudrin (2017) said: "We are at a new stage of international integration and, I would say, a special new state of globalization..... Today no country, even the most innovative, there is no "controlling stake" in technological development. We become a factory for the production of these innovations and will continue to happen in India, in China and in the United States and in Germany. There will be new points, including in Russia, in other developing countries – those that are more cleverly (qualitatively) will be able to use these technological breakthroughs or areas where technological breakthroughs will be. This means that the world is the factory where we share these achievements." The next wave of globalization associated with the development of world trade. Technological tools global trade is a platform to promote products and services with regard to international law. According to A. Kudrin (2017), "...the number of enterprises engaging in technological innovation over the past 10 years remains at the level of 8-9% in Russia. In the countries innovative development is 40-50% of the companies involved in technological innovation".

Wave of sanctions against Russia significantly lowered the amount of investment. Forming of institutes of improvement of labor productivity should begin with public administration. Global value added is the sum of the exports and imports of goods and services. According to Rosstat, but relative to the December 2014 dynamics of export and import of Russia shows the alignment and as of 2017 is equal to 2014. (the data of Rosstat http://www.gks.ru/). Russia prefers a Russian-Chinese trade and economic relations. Planned free trade with Singapore in term of economic and trade relations with India and Iran. The efficiency of trade and economic relations between the two countries is impossible without the use of tools of the Digital economy work (Khitskov et al., 2017). Russia has determined the way of joining the Digital economy. In previous studies (Khitskov et al., 2017) identifies the main problems of entering in the Digital economy (Shmakova, 2013). In the main identified challenges included:

1. The first identified problem is the lack of understanding of the processes. For example, a key element of the Digital economy considers the system and person-system relationship;

2. The second problem is a lack of understanding of the need to increase the number of it professionals for the digitalization of the economy;

3. The third problem observed is not in full possession of operations in the digital environment, which include: the acquisition of goods and services through existing and accepted technologies of payment, such as: payment of goods, payment of services of housing and communal services (HCS) through Sberbank online, can sync digital devices to each other;

4. The fourth identified problem is a partial awareness of the respondents of the need to respect digital reputation, digital ethics and digital culture, including in trade and economic relations.

The use of Internet technologies in business, allows you to organize new forms of activity in the economy. One of the areas of research in Russia is "International positioning of Russian science and technology, expanding opportunities for Russian organizations for inclusion in global research collaboration and industrial and technological consortium". One of the modern directions of development of the Center for strategic research is the formation of a "Digital ecosystem data". Digital ecosystem data needed to facilitate management. Determined the Economic Council. The working group of the Economic Council of the relevant thematic focus

http://csr.ru/rabochaya-gruppa/. One of the areas of study is "International positioning of Russian science and technology, expanding opportunities for Russian organizations for inclusion in global research collaborations".

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2. Methodological Framework

In order to determine the distribution of advanced production technologies in Russia will use the data of Russian Federal statistics system http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/. Section "Technological development of sectors of the economy" and select the subsection: the System of indicators of Rosstat statistical evaluation of the level of technological development of sectors of the economy. Next, select the attachment in the Science, innovation and advanced production technology. All data shown below are studies from section: Science, innovation and advanced production technology, detailed – "the Number of used advanced production technologies". http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/economydevelopment/#.

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3. Materials and Methods

Returning to the need for the use of advanced production technology, make the slice data of the Rosstat on the number of developed advanced production technologies new to Russia and distribution of production technologies in the sample according to NACE codes. NACE is an all – Russian classifier of types of economic activity (short name OKVED — a document that is part of the all-Russian classifiers of technical-and-economic and social information).

3.1. Identified codes of the Russian classifier of types of economic activity in advanced production technologies

In the modern world, paramount importance is given to advanced manufacturing technology. The number of developed advanced production technologies new to Russia is distributed by types of economic activity. According to OKVED codes OK 029-2007 (NACE revision 1.1) are distributed as follows:

Table 1
Sample NACE codes (NACE revision 1.1)

Name	Code by OKVED OK 029-2007 (NACE revision 1.1)
in total	
from them on types of economic activities:	
mining	C
manufacturing	D
production and distribution of electricity, gas and water	E
activities in the field of telecommunications	64.2
activities related to using of computers and information technology	72

research and development	73
activities in the field of architecture, design engineering in industry and construction (as part of the activities of design and project organizations)	74.20.1
technical testing, research and certification (as part of the activities of testing laboratories and stations)	74.3
• 1. High-tech kinds of economic activities	
• 2. Medium–technology kinds of economic activities	
• 3. Knowledge-intensive economic activities	

Note: According to the annual forms of Federal statistical observation № 1-technology "Information about the development and use of advanced production technology" survey conducted in 2011 (http://www.gks.ru/).

To conduct the study will determine what relates to high-tech, medium–technology types economic activity and to knowledge-intensive economic activities.

High-tech types of economic activity in OKVED OK 029-2007 (NACE Rev. 1.1) include: manufacture of pharmaceuticals (code 24.4); manufacture of office machinery and computing machinery (code 30); manufacture of electronic components, equipment for radio, television and communication (code 32); manufacture of medical devices; measuring instruments, monitoring, control and testing; optical devices, photo and film equipment; hours (code 33); manufacture of aircraft and spacecraft (35.3 code).

To medium–technology types (high level) the types of economic activity in OKVED OK 029-2007 (NACE Rev. 1.1) are: chemical production (without the production of gunpowder and explosives) excludes pharmaceutical products (code 24 (excluding 24.4, 24.61); manufacture of machinery and equipment (without production of weapons and ammunition) (sum of codes 29.1; 29.2; 29.3; 29.4; 29.5; 29.7); manufacture of electrical machinery and equipment (code 31); manufacture of motor vehicles, trailers and semi-trailers (code 34); manufacture of railway rolling stock (locomotives, tram motorcars and other rolling stock); manufacture of motorcycles and bicycles; manufacture of other transport equipment not included in other groupings (total codes 35.2; 35.4; 35.5)). To knowledge-intensive types of economic activity in OKVED OK 029-2007 (NACE Rev. 1.1) include: activities in the field of telecommunications (code 64.2); activities related to using of computers and information technologies (72); research and development (73).

Table 2
Number of developed advanced production technologies new for Russia by types of economic activity in the whole of the Russian Federation

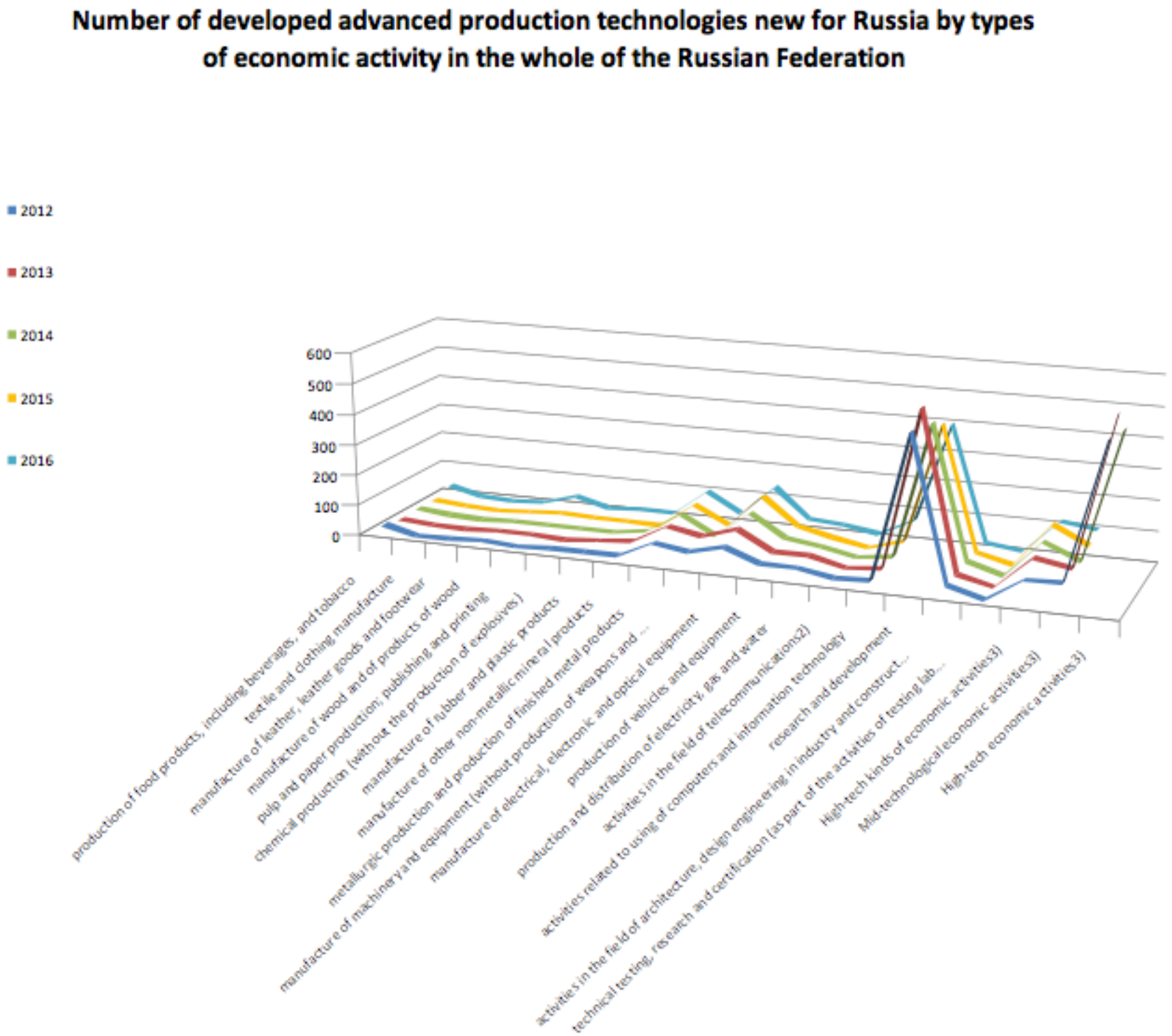
manufacturing industries	**2012**	**2013**	**2014**	**2015**	**2016**
production of food products, including beverages, and tobacco	26	12	16	14	32
textile and clothing manufacture	1	4	5	4	5
manufacture of leather, leather goods and					

footwear	2	1	0	0	0
manufacture of wood and of products of wood	8	8	7	7	8
pulp and paper production; publishing and printing	1	6	6	15	39
chemical production (without the production of explosives)	7	1	5	9	9
manufacture of rubber and plastic products	9	12	5	8	16
manufacture of other non-metallic mineral products	10	22	22	7	18
metallurgic production and production of finished metal products	62	83	89	91	101
manufacture of machinery and equipment (without production of weapons and ammunition)	47	62	31	33	40
manufacture of electrical, electronic and optical equipment	73	99	119	141	140
production of vehicles and equipment	33	37	47	54	44
production and distribution of electricity, gas and water	**32**	**38**	**32**	**28**	**37**
activities in the field of telecommunications2)	**12**	**10**	**10**	**7**	**19**
activities related to using of computers and information technology	**19**	**22**	**24**	**40**	**76**
research and development	**493**	**536**	**461**	**429**	**400**
activities in the field of architecture, design engineering in industry and construction (as part of the activities of design and project organizations)	**30**	**29**	**35**	**28**	**26**
technical testing, research and certification (as part of the activities of testing laboratories and stations)	**0**	**1**	**2**	**1**	**10**
High-tech kinds of economic activities3)	**73**	**107**	**123**	**144**	**120**
medium–technology types - Mid-technological economic activities3)	**77**	**86**	**73**	**88**	**106**

High-tech economic activities3)	**524**	**568**	**495**	**476**	**495**

Distribution of advanced production technologies new to Russia by kinds of economic activities in the Russian Federation is presented in Figure 1.

Figure 1
Figure advanced production technologies new to Russia by kinds of economic activities in the Russian Federation.



In the first place are research and development (73 385 471). In second place – is the medium–technology economic activities. In third place are the high-tech activities. By economic sectors the distribution of advanced production technologies new to Russia the following:

1. Manufacture of electrical and optical equipment (DL 45 67);

2. Metallurgical production and finished metal products (2256);

3. Manufacture of machinery and equipment (without production of weapons and ammunition-38.9 31 34).

An additional indicator of the use of advanced production technologies new to Russia by kinds of economic activities in the Russian Federation is the degree of influence of results of innovation to ensure compliance with modern technical regulations, rules and standards. Issues

of standardization are considered in Russian scientific research (Veretekhina, 2008).

3.2. Research Methods

Research methods have several levels. The empirical level of research are: observation, interview, questionnaire, survey, interview, testing, photographing, counting, measuring, comparing. To experimental no-theoretical levels of research include: experiment, laboratory experiment, analysis, modeling, historical, logical, synthesis, induction, and deduction, hypothetical. Spend experimental theoretical modeling of the development of economic activities in Russia according to the use of advanced production technologies new to Russia by kinds of economic activities in the Russian Federation (figure 2). There is a modernization of the sectors of the economy. To the forefront of out industry associated with the development of electronic and optical equipment. Fiber optic equipment used in various spheres of human activity: broadcasting, medicine, educational institutions, special facilities, marine industry, laboratories, satellite companies, service providers and more. Metallurgical production in importance ranks second after the oil and gas industry. In Russia there are about 28 thousand of various industries related to steel production. High percentage of metallurgical production in the industry of Russia. Export products is pig iron, semi-finished products made of carbon steel, flat-rolled products of carbon steel, raw aluminum, ferroalloys, refined copper, Nickel and other raw. The main regions exporting of ferrous metallurgy: Ural, Central and Siberian districts. These regions are associated with deposits of iron ore. Manufacture of machinery and equipment associated with the structure of the machine-building complex of Russia, namely: mechanical engineering, electrical engineering, heavy power engineering, chemical petroleum engineering, tractor and agricultural mechanical engineering, mechanical engineering for food and light industry, machine tool industry, municipal engineering and so on.

The application of advanced information technologies devoted to the study of domestic and foreign authors. In the works of E.A. Khitskov et al. (2017) "Digital Transformation of Society. Problems Entering in the Digital Economy". E. A. Khitskov (2017) considers the need for a digital transformation of society, for example: «….the relevance of the research topic due to the necessity of identifying the main challenges of the digital transformation of companies. …. terminology of the Digital economy. Selected the best quotes of scientific and public figures defining the need for a digital transformation of society. Conducted in-depth analysis of domestic and foreign research on the digital transformation of companies. The importance of building a parallel digital reality». Svetlana V. Veretekhina et al. (2017), in studies «Evaluation Methodology of the Multiplier Effect for the Region as the Result of the cluster Formation» uses mathematical tools to estimate the multiplier effect for the economy «… assesses the multiplier effect for the region due to the formation of clusters».

Among foreign authors analyzed the scientific work Mkrttchian Vardan. The author examines the need for digital transformation of society and gives priority to the use of information learning technologies to benefit society. Any transformation of society begins with a change of consciousness. Awareness of the need for change. According to the author, digital technologies are educational technologies (Bochkov, Isaev & Khitskov, 2014). None of the projects of high technologies is not possible without a prior learning process and change the minds of people when joining the digital economy. The use of distance learning technologies in the learning process contributes to the highest individualization of the learning process, its focus on self-education, flexibility of its organizational structure. The components of the distance education can be effectively incorporated into the regular education process for performing independent work of students in the form of the introduction of electronic teaching materials or distance learning courses. The organization of such training courses will allow presenting the large size of the educational information compactly, its structure clearly (Altimentova, Mnatsakanyan & Agaltsova, 2017). A model of position and oscillation measurement system was constructed according to state above principles. Tested were several kinds of objects in wind tunnels, open air and magnetically suspended. For wind tunnels position measurements were conducted

through various kinds of optically transparent windows of different thickness (Simonov & Kuzin, 2005). Using the developed model for position and oscillation measurement system significantly reduces the cost of conducting measurements during testing and allows measuring more parameters of the object. Cognitive activity of students It can be concluded from the results of observation based on psychological and pedagogic works that applying of such methods as educational projects promotes the development of student's cognitive activity, self-sufficiency, taking in new informational technologies, required in further career (Mnatsakanyan & Agaltsova, 2016).

The use of advanced production technology new for Russia by kinds of economic activities is a necessary tool for problem solving. Modern business is not possible without the use of Internet technologies. Big data and high performance computing, management with intelligent agents, as digital tools of corporate social responsibility in the field of digital marketing. Manufacturing enterprises are steadily approaching a new one, the fourth industrial revolution. In many ways, the perception of what is happening today in the industry depends on relations to what analysts say, and the fact that they are followed by the suppliers. In turn, the Russian manufacturers are just starting to use them in their daily lives. Developed by the Russian Federation goes digital economy, where the basis for production must be machinery and equipment, and software and technology. Digital transformation promises the growth of the productive forces that gives rise to talk of a new industrial revolution. The use of digital technology gives companies a new impetus for development, changing paradigm of production. In the new reality, the competitiveness of companies is determined by their level of digitization. Realizing this, the company is actively implementing the new tools. Hence the legitimate question: how to become a digital enterprise? The answer is simple - investing in ideas and equipment and implement digital technology. Trends of digital transformation in manufacturing include: analysis of large data sets, machine learning, machine vision, industrial Internet of things, virtual reality, augmented reality, three-dimensional modeling, three dimensional printing, drones and robotics. As a result of digital technologies allow to optimize costs, increase profitability of existing assets and increase profitability. The use of digital technologies can also be a solution to many business problems, such as the geography of the country, quality of transport infrastructure or a shortage of manpower. Before production always have two objectives: to reduce production costs while maintaining high quality, and make a profit. To achieve these goals at all stages of the production process should be fully controlled and transparent. Previously the role of the controller is performed. Today, in the conditions of digitization, the company creates a common information space. In nonstop systems and equipment share big data. With the introduction of digital technologies in the production of new threats. There is a risk that jobs will be cut by half, increase demands on employees, especially in manufacturing. According to forecasts, in 20 years almost half of the jobs will be automated in the modern world.

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4. Results and Discussions

Analysis of the advanced manufacturing technology new for Russia by kinds of economic activities in the Russian Federation shows the development of favorable conditions only for the above-identified industries. From the speech of A. Kudrin that "unfortunately, Russia has only a quarter percent on the world market of high technologies. In the context of work to improve the performance of our economy, its integration until we set ourselves modest goals. Six years later, that is, for the time, which is the planning period, we propose to double this share to reach half a percent. And in 2035, in the most ambitious option would be to have 1%. This means that we will use heavily the fact that the world creates, and use including in our civil and defense industry. If we do not have time even for these moderate trends, we will lose their competitiveness, especially in performance. We will lose the growth rates become smaller economies in world GDP. Gross domestic product (eng. Gross Domestic Product), the conventional reduction — GDP (eng. GDP) — macroeconomic indicator that reflects the market value of all final goods and services. Will become less interesting for our partners and will not

be able to provide their own defenses. This competition of technologies. In the end, it will affect the living standards of our citizens." The forecast is disappointing; however, you must consider that the Foundation is the improvement of available technologies contributing to an increase in the effective labor market (Semin et al, 2016).

5. Conclusions

In conclusion, you want to say that the strategy is stretched in time periodic investment more effective impact on sales strategy than a single investment. Large costs (more risky) can lead to a drop in the level of competitiveness. Small costs lead to stabilization of the level of competitiveness (Mkrttchian & Aleshina, 2017). With the same initial conditions for single (not pair) of the company and the paired companies, the potential market share they have will be different. The modeling showed that the potential market share occupied by a single company, will be less than a pair of competing companies, interconnected via benchmarking (Mkrttchian et al., 2017). This is due to the fact that a single company, especially regional, is not seeking to enter other markets, for fear of not withstand the expansion, as it requires additional costs (Mkrttchian et al., 2014). In turn, the competitive companies have to match the pace of organic growth by expansion into other markets, giving the opportunity to take a large part of the market than companies that are afraid of competition (Mnatsakanyan, 2015). High-tech economic activities, medium–technology (high level) the types of economic activities, knowledge-intensive types of economic activities are determined by the degree of influence of results of innovation to ensure compliance with modern technical regulations, rules and standards. With the introduction of digital technology in different types of economic activities reveals the following trends:

1. Reduced costs due to full automation of production;

2. the use of cloud computing and Big data to improve the quality of production for high-tech industries related to the development and production of electrical, electronic and optical equipment (DL 45 67), metallurgical production and production of finished metal products (2256), production of machinery and equipment (without production of weapons and ammunition -38.9 31 34).

All with production risks are not comparable (are small) compared to the released material, human, financial and natural resources. The increase in staff requirements of the productive sectors of the economy will lead to the selection, recruitment and certification specialists do have a high level of professionalism. Where the selection and certification of personnel will be scheduled with the use of psychometric tests and software solutions. High level of professionalism is strictly necessary for high-tech industries, medium – technology types (high level) of economic activities, as well as for knowledge-intensive economic activities.

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