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The structural Dynamics' Nature of Innovative Development of Russian Economy in the Framework of its Technological Diversity

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ABSTRACT

The relevance of the research problem is conditioned by the lack of developments in the field of management of transformational processes in modern economic systems in conditions of globalization and development in the framework of the trends of the world economy. The purpose of this paper is to substantiate directions of innovative development of the Russian economy in the context of sector technological structures' concept. The main research method of this problem is the comparative analysis of indicators of economic and innovative development, allowing estimating of the parameters of the innovation process at the macro and mezzo levels. The paper presents the systematization of industries' sectors in accordance with existing technological structures; reveals the characteristic tendencies of sectors' development on the Russian economy in the sphere of innovation activity taking into account the characteristics and dynamics of changes in the proportions of reproduction of its technological diversity. The findings can be used in the formation of priority directions of innovative development at the Federal and regional levels in the context of regulation of proportions of technological structures, as well as in the process of development of programs for perspective innovative development of industries of the Russian economy.

KEYWORDS
Innovative activity, innovative development, technological way, the transformation process, structural economic dynamics

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Introduction

In modern conditions, one of the most urgent tasks facing Russia to ensure its dynamic growth and significant position in the global economic system the formation of an innovative economy should be recognized as special form of economic relations based on the flow of innovation and continuous technological

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improvement, which implies the existence of a developed innovation infrastructure, high innovation culture, development of science and, as a consequence, high rates of economic growth and quality of life of the population. The need for active innovative development is conditioned by the significant technological gap between Russia and developed countries.

At the same time, it should be emphasized that the criterion of depth of innovation development in modern conditions can be considered not only the growth of activity in the field of innovation activities of economic entities in existing industry sectors, but the dynamic development of breakthrough technology areas, which form the core of the following (in this case, the sixth) technological structure based on the formation of new industries. The vector of economic development and innovative mechanisms of transformation processes taking into account the globalization and the inevitable alignment of growth, are determined by global trends in markets, technologies and international environmental, technical and other requirements' changes. Following the global trends should contribute to the creation of new elements of the economy, and this is the thing on which is based, in our opinion, modern transformation processes. In turn, the development of the world economy takes place within technological paradigms, each of which is characterized by a certain level of production.

Methodological framework

Theoretical base of research

The theoretical basis of the present study are fundamental and applied works of Russian and foreign scientists specializing in the study of problems of innovative development of economic systems as well as transformation processes in the modern economy. The object of the study is transformation processes in the economy due to innovative development of economic subsystems. The subject of the research is presented by the set of economic parameters and innovative indicators of transformation processes of the Russian economy.

Research methods

During research the following methods were used: theoretical (analysis; synthesis; comparison; formalization; generalization; analogy); empirical (the study of official statistical documentation); methods of descriptive statistics.

The stages of the research

The research problem consisted of the following stages:

1. Systematization of industrial sectors (economic activities' kinds) according to the criterion of referring to a particular technological system.

2. Determination of economic parameters of the sector structure and technological diversity of the Russian economy.

3. The dynamic comparative analysis of innovative development of industries of Russian economy and the generalization and systematization of the results obtained.

Theoretical and practical significance of research results

The theoretical significance of this study is to justify the necessity of reduction in the diversity of the Russian economy, reducing the share of the mining sector, active development of fifth and transition to new sixth technological way of life.

The practical significance of research results consists in possibility of their use in the formation of priorities of innovation development at the Federal and regional levels in the context of regulation of proportions of technological structures, as well as in the process of programs' development of perspective innovative development of industries.

Results

Systematization of economic activities in accordance with the classification of technological modes

For analysis of the level of technological development of the economic system, in our view, it seems reasonable to distribute the types of economic activity allocated by the Federal state of statistics service (Rosstat), in groups according to mentioned earlier the concept of technological structures. The results of this grouping are presented in table 1.

Table 1. The distribution of industrial sectors according to technological paradigms (is systematized by the authors using a common classification of types of economic activity of the Federal state statistics service)

Technologicalway	The types of economic activity (industry)
Second	Textile and clothing manufacture Manufacture of leather, products made of leather and footwear
The third	Manufacture of food products, beverages and tobacco Manufacture of wood and of products of wood Pulp and paper production; publishing and printing Mining and quarrying, except of energy Metallurgic production and production of finished metal products Production and distribution of electricity, gas and water
The fourth	Extraction of fuel and energy minerals Production of petroleum products Chemical production Manufacture of rubber and plastic products Manufacture of other non-metallic mineral products Manufacture of machinery and equipment Production of vehicles and equipment
The fifth	Manufacture of electrical, electronic and optical equipment

Based on government statistics on the volume of products shipped by the enterprises, the following distribution of industrial production in Russia in technological paradigms can be got presented in figures 1-a–1-b.

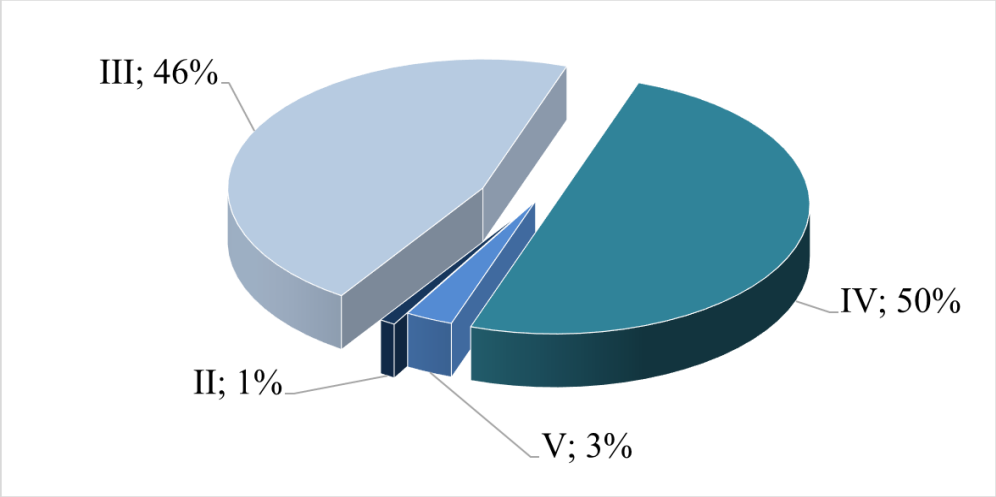

Figure 1a. The structure of technological multiculturalism of the Russian economy in terms of the volume of products shipped by industry in 2005 (calculated by the authors according to the Federal state statistics service)

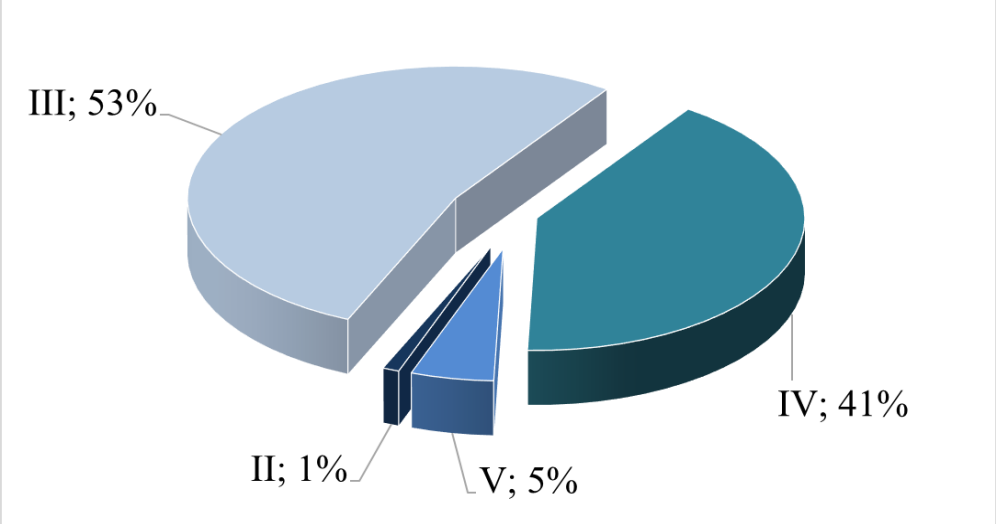

Figure 1b. The structure of technological multiculturalism of the Russian economy in terms of the volume of products shipped by industry in 2010 (calculated by the authors according to the Federal state statistics service)

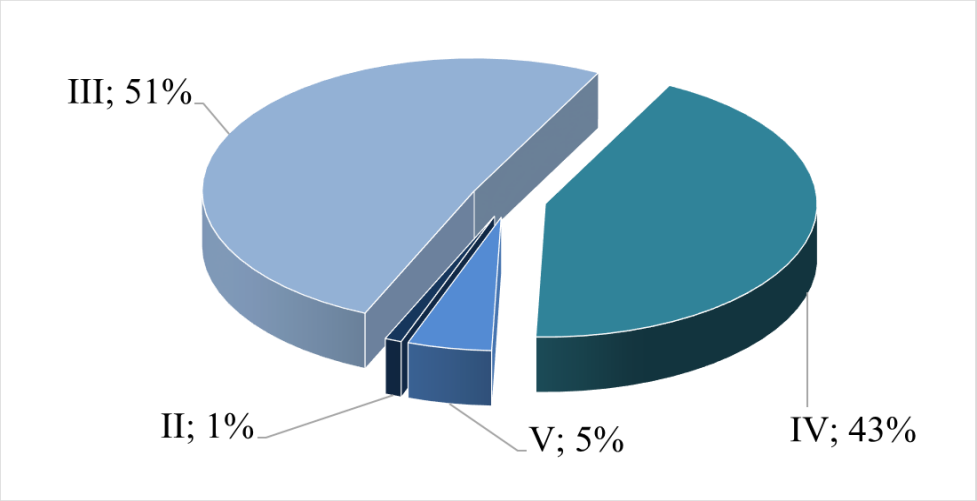

Figure 1c. Structure of technological multiculturalism of the Russian economy in terms of the volume of products shipped by industry in 2015 (calculated by authors according to the Federal state statistics service)

Further analysis allows concluding about a significant dominance in the structure of Russian industry of branches of the third (51%) and fourth (43%) technological structures, represented mainly by the food industry, metallurgy and production of vehicles and equipment. The contribution of high-tech industries, represented by the fifth technological structure, is very little, though there was a slight increase over the past 10 years.

In conditions of Russian economy only the sphere of production of electrical, electronic and optical equipment can be attributed to this group among the represented in the statistics of types of economic activity. At the same time, it should be noted that there are other high-tech industries in Russia, information on which was not dedicated offline statistical handbooks published by the state statistics bodies, which somewhat distorted the results of the study. Thus, in the sector structure of the Russian economy the share of branches of the fifth technological structure at the end of 2015 was up 5% (+2% to the value of 2005).

The value of this indicator is extremely low, because according to the criteria of developed countries economy can be called innovative if the share of high-tech sectors in the structure is at least 15% (Russian innovation index, 2011).In turn, the high-tech sectors are those, the share of expenditure in which for industrial science is about 4.5-5%, and they currently include aerospace, electronics, computers' production, office equipment and software, communication, manufacture of medical, optical-electronic equipment, chemical-pharmaceutical industry and others (Science and Engineering Indicators, 2008).

The attention is also should be paid to the reduction in 2015 in the share of the fourth technological structure in the general structure of domestic production by 10% compared to 2010 and by 13% compared to 2005 while the growth in the share of the third technological order by 10% compared with the level of 2010.This fact characterizes the negative trend in the technological development of domestic economy, as the technology gap is increased relatively

to other countries, and additional tasks are generated to change the situation in management of innovation development, requiring rapid radical approach in their decision.

Analysis of the structure of industrial production in Russia

Russian industry at the present stage of development lags significantly behind developed countries in terms of technological development, which predetermines the necessity of active development of breakthrough technologies. With this purpose it is necessary to clearly identify the strategic priorities, using the most effective system of forecasting, through analysis of global trends in markets' changes, technologies and international environmental, technical and other requirements and focus on a few key trends to keep ahead of the world leaders in the long term.

In the context of globalization of the world economy and the widespread development of promising technologies of the new technological order, the formation of these technological areas is the main strategic objective of any country's economy. The essential condition is the existence of a favorable climate for the development of high-tech sector that necessitates the implementation of qualitative and quantitative transformation of the economic system. To determine the depth of the necessary transformation processes and the possibility of the formation within the Russian economy of high-tech sectors is necessary to assess its industry structure and related indicators of innovative development of the latter. For this purpose statistical data provided by Rosstat can be used.

The Russian economy is traditionally characterized by the dominance of raw materials sector in the structure of industrial production, due to the presence of rich natural resources area. In the Message to the Federal Assembly in 2001, the President of the Russian Federation (RF) Vladimir Putin called the Russian economy the rental one and not productive, as the main state budget revenues are carried out due to exports of mineral resources – oil, gas, metals and other raw materials. These trends have not lost their relevance today. Remaining the main source of revenue to the state budget of the Russian Federation, the revenues from foreign economic activities are still generated primarily by exports of mineral resources, and if at the beginning of the 2000s, the share of the raw materials' sector in the structure of Russian export amounted to slightly more than 50%, today the figure is closer to 70% that is illustrated in figure 2.

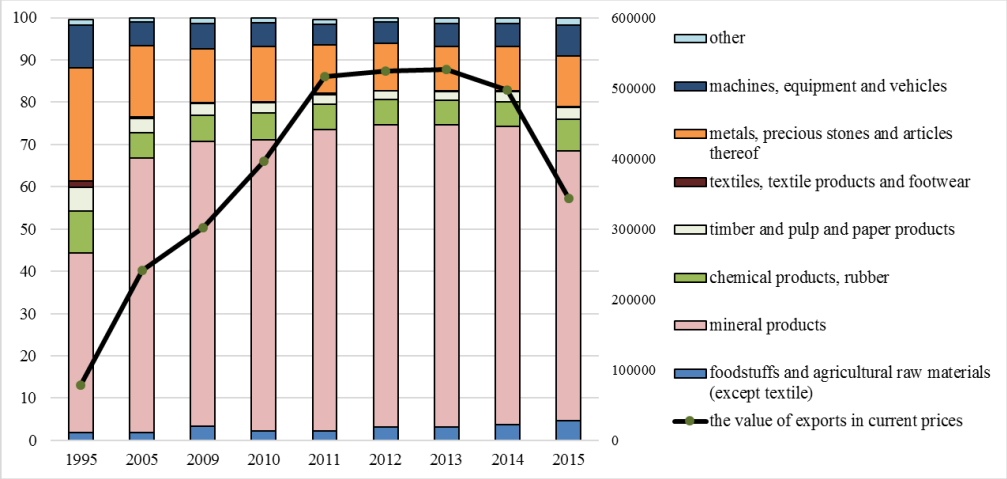

Figure 2. Commodity structure of export of the Russian Federation (in current prices), mln.$ (compiled by the authors according to the Federal state statistics service and Federal customs service of Russia)

There is a shift in proportions between production volumes and the value of exports of oil and oil products. So, in 1990, for exports was sent 19% of oil extracted with production volumes of 108.7 million tons per year. By 2005, the amount of extracted oil increased to 470 million tons, slightly more than 50% of which was exported to countries near and far abroad. However, in 2014, there was a reduction in oil exports relatively to the previous year in real terms (223.4 mln. tons in 2014 against 236,6 million tons in 2013) and in percentage to production volume (42% in 2014 against to 45% in 2013).At the same time, as it is noted by Glazjev (2011), natural resource rent, which is formed in the Russian economy by exporting of energy and raw minerals, is not used for economic restructuring on a new technological basis, going for the repayment of external debt, the accumulation of the stabilization Fund and solution of current socio-economic challenges. In the best case, the funds are invested in the resource sector, which hampers innovative development of Russia. Therefore, despite its policy of modernization, Russia has not changed its position on the world market, being a country with mineral recourses-dependent economies, resulting in increasing of the dependency on the world market, predetermining instability and concomitant high risks of development of high-tech industries.

This trend is also evident in the sector structure of industrial production in Russia, presented in figure 3.

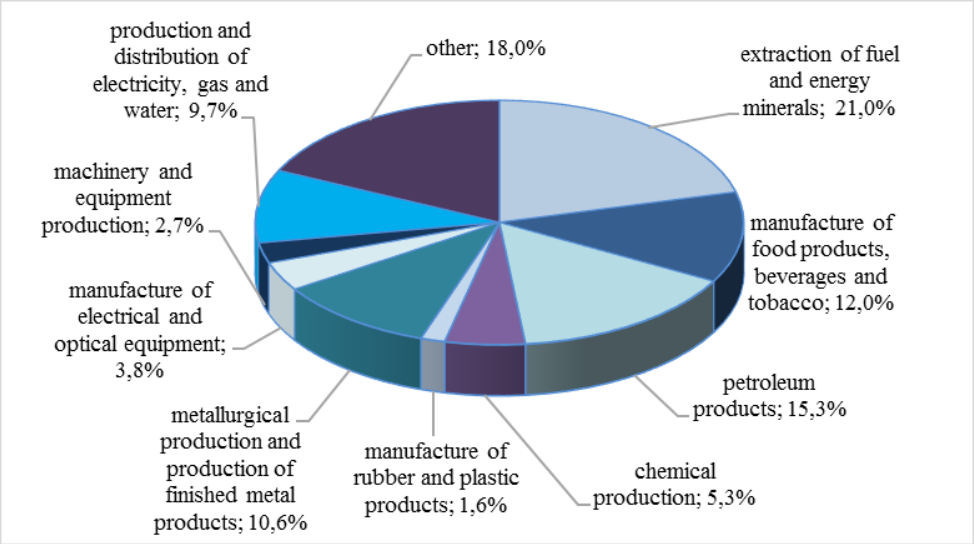

Figure 3. Structure of industrial production in Russia (by volume of products shipped) in 2015, % (compiled by the authors according to the Federal state statistics service)

Here there is a significant dominance of fuel and energy complex (about 46%), as well as industries that form the basis of the initial technological structures (for example, metallurgy – by 10.6%, food industry – 12%, etc.).The contribution of high-tech industries in the total volume of shipped products is very insignificant (for example, manufacture of machinery and equipment was 2.7%).In general, the stability of the sector structure of Russian industry in time should be noted, because from 2005 to 2015 significant changes were not observed in the proportions between groups of industries. There was only a steady growth in the share of petroleum products in the total volume of production (10.7% in 2005 and 15.3% in 2015), which also confirms the previously noted trend of increasing the share of the recourses sector in the industrial structure of the economy.

Evaluation of the comparative dynamics in the development of Russian industry in the sphere of innovations

According to the method of statistical reports provided by Rosstat and research University "Higher school of Economics" (RU HSE), indicator of innovation activity of a country reflects the share of organizations engaged in innovation in the total number of organizations in this country operating under separate economic activities. The aggregate level of innovative activity of Russian enterprises in 2010 was 10.9%, which was much lower than in other countries. For comparison, in Israel, this indicator reached 75%, South Africa - 74%, Germany- 66%, France – 53%, great Britain – 50%, Bulgaria – 28%, etc. In addition, there is a negative dynamics of the indicator as a whole on the Russian economy (-0,1 p. p.), and in individual spheres. Such a low indicator is a very important signal about the inability of the Russian economy to meet the global trends of innovative development, and may be an indicator of a low level of economic environment hampering innovative initiatives.

Figure 4 shows the innovation activity of enterprises by types of economic activity. It should be immediately said that the study analyzed only data on the

mining and manufacturing industries. The field of communication, connected with using of computers and information technology, separately allocated in the framework of statistical handbooks, during the analysis was not taken into account.

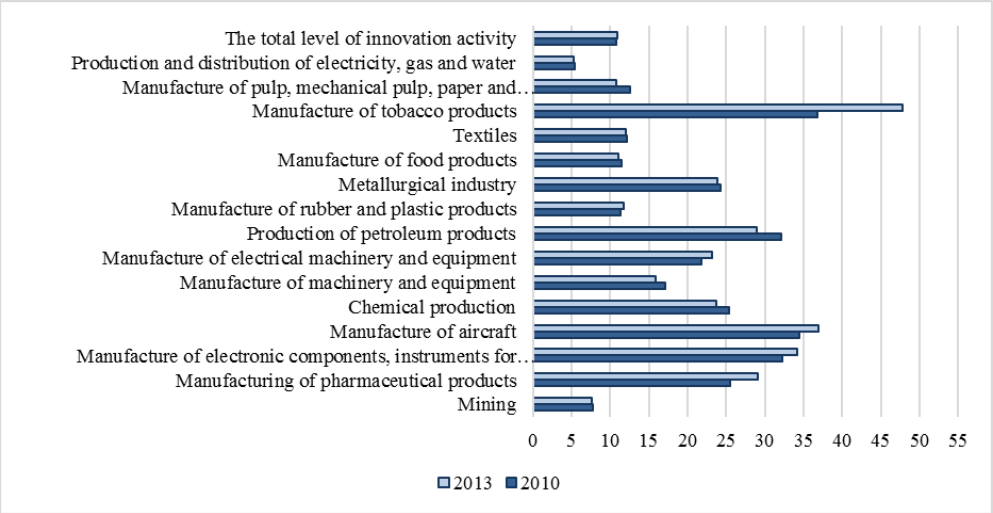

Figure 4. The level of innovative activity of Russian enterprises, % (compiled by the authors according to the Scientific Research University "Higher school of Economics" and Federal state statistics service)

Of course, by the greatest innovation activity are characterized enterprises, constituting the high-tech sector -30,4% on average. Especially it concerns spheres of production of electronic components, equipment for radio, television and communication (34,2%) (+2 to the level of 2010), as well as the production of aircraft, including spacecraft (37%).However, a small number of industries that constitute the high-tech sector, as it was noted earlier, determined the low share of these industries in the total number of innovative enterprises - only 14.4 percent.

Among average technological industries with high percentages of indicators are the chemical industry (23,7%), production of petroleum products (29%), manufacture of electrical machinery and equipment (23.1 per cent), rubber and plastic products (11.7 per cent).

Overall, among manufacturing industries by the highest values are characterized the very enterprises belonging to a petrochemical complex of the fourth technological order. At the same time, among enterprises engaged in the mining, innovation is carried out by only about 8%, and in the production of electricity, gas and water – just over 5%.

Interesting, in our opinion, are the relatively high indicators of innovative activity among the enterprises of metallurgy in 2013 (23.8 percent), and tobacco manufacturers (47,8%) as the sectors of the third technological order. At the same time, in the common set of innovation-active enterprises in Russia when considering their structure, the specific weight of these sectors is quite small (3.4% and 0.4% respectively).The maximum share in a specified structure are the production of machinery and equipment (9.3 per cent), electrical machinery (down 5.8%), chemical production (4,8%), metallurgy (3,4%), rubber and plastic

products (2.8 percent). The field of oil refining, marked by high indicators of innovative activity (29%), in the share of common structure is only 1.2%.

To the greatest extent innovation activity in Russia is natural for large enterprises with more than 10 thousand people (75.5% of the total number of such enterprises) and from 5 to 10 thousand people (72.3 percent), due to the higher availability of investment resources for the implementation of new risk projects to create innovative product. In turn, innovation activity of Russian small enterprises (with the number from 50 to 100 people) is low – only 7%. Taking into account the trends of the developed countries, where, despite the high risk, small businesses are at the peak of scientific and technological progress and provide up to 50% of innovations (according to the NSA, 2008) in Russia, this figure is extremely low, which certainly has a negative impact on aggregate indicators of innovative development. To a greater extent, small innovative enterprises in Russia at the modern stage operate in the field of improving of innovation, upgrading of products produced by large enterprises, as well as carry out developments in the field of software, marketing research etc. The need for small businesses largely exists in the field of scientific research in research institutes engaged in development of fundamentally new areas of scientific knowledge.

Innovation activity of enterprises should also be differentiated and in the form of ownership. Thus, the enterprises of mixed forms of ownership have significantly higher values of the studied indicator (19.5 per cent) than private (11.3 percent) or state (11,6%). This fact may be considered as evidence of the effectiveness of public-private partnership in Russia. It should also be noted that regardless of the size and form of ownership, Russian enterprises mainly perform technological innovation (9.7 percent) than marketing and organizational (2.1 and 3.1% respectively).

Regarding specific types of innovation activities implemented by industrial enterprises, its more common types at the end of 2013 were the acquisition of machinery and equipment (66% of innovatively active companies) and acquisition of software (26%).In other cases, the proportion of enterprises implementing innovations is much lower: in the field of acquisition of new technologies – 10%, acquisition of rights to patents and patent licenses – 7%, marketing research – 6%, personnel training – 17%, etc. Moreover, in the dynamics significant decrease is observed. This is especially true of marketing innovation, the value of the index of which, compared with 2000 decreased by 14%.

Directly in research and developments about 37% of innovation-active enterprises was occupied, which is quite important relatively to other activities and is characterized by stability in time. However, in absolute terms this figure for a while had downward trend. So, at the end of 2013, there were about 3.6 thousand organizations engaged in research and developments that is 454 of the organizations (or 11%) less than in 1995. The absolute maximum in number of such organizations in the last decade was reached in 2007 (4 thousand organizations), but in subsequent years there was predominantly negative dynamics of the indicator. A similar trend is observed in the number of researchers employed in the process: 727 thousand in 2013, which is -2% compared to 2010 and -18% compared to 2000.

Considering the question about the possibility of using open models of innovation processes in the domestic economy, it should be emphasized low activity of the Russian scientific research organizations with regard to their cooperation with external research groups (37.4% of organizations carried out joint projects for research and development in 2013, which accounted for an increase of 1% compared to 2010).Almost all of them are implemented in the country, while the most urgent is to establish close cooperation to carry out joint research projects with foreign countries.

These negative tendencies of innovative development of the Russian economy once again prove the low efficiency of endogenous environment for the mastering of new directions of scientific-technical progress and the creation of new sectors of the economy. In particular, the problem may be explained by insufficient state attention to the issue of technological development. So, it is necessary to dwell separately on the structure of sources of financing innovation. According to statistics, in Russia innovation activities are financed mainly by own funds of enterprises (63,4% of the total cost of innovation at the end of 2013), while the share of funds of the state budget is only 6.5%.This figure is extremely low, taking into account the declared at the state level the priority of the innovative activities in Russia. Although it is possible to note a slight increase in this indicator compared to the previous periods: +3,6 p. p. 2001.

At the same time indicators of the state financing of innovative activity in Russia is seriously inferior to other countries. In particular, the proportion of organizations that have received budgetary funds for financing of innovations in Russia in 2013 amounted 22.9%, while in Mexico this figure reached 55%, in Finland - 35%, in Austria - 40%. Consequently, even noting the growing state cost for implementation of innovation since 1995, a similar proportion can be seen as one of the key factors hampering innovation development. The situation is similar with financing from extra budgetary funds, whose share in the structure amounted at the end of 2013 not more than 0.5%, even despite their wide distribution in Russia. In 2013, the proportions in the structure of funding sources has shifted to the so-called "other sources" (29.5% in 2013 against 5.5% in 2000), to which can be referred the credit resources (including authorized government investment banks), financial resources of various commercial structures (investment, insurance companies, financial-industrial groups, etc.), income from the sale of shares, etc.

A number of positive trends of innovative development of the Russian economy should be noted. So, as the number of manufactured innovative products, (a measure in 3 times exceeds the level of 2000 in comparable prices) and so the value of its exports (+7.3% in 2014 compared to 2010 and more than 5 times the level of 2000)are characterized by positive dynamics, which occurs mainly in the far abroad countries (about 90% of total exports). The share of innovative products in total industrial production amounts to a very small value (about 8.7%), although there has been a small increase.

The growth of the intensity of costs is also should be noted (from 1.55 in 2010 to 2.9 in 2013), which is a qualitative indicator of innovation processes and can be considered as the indicator of effectiveness (it is calculated as the ratio of incurred costs to the amount of shipped innovative products).The positive fact, in addition to the positive dynamics is worthy position of Russia among other countries of the world where Russia is situated marginally after Denmark (3,45),

Sweden (2,98) and Finland (2,93), and ahead of other developed countries, such as Germany, Spain, France, Czech Republic etc. The highest values of the intensity of costs among the considered types of economic activities at the end of 2013 had: the production of electronic components, equipment for radio, television and communication (6,8), manufacture of medical devices (6,2), aircraft manufacturing (5,6).It is necessary to tell about some changes in this list since 2010, when by significant levels were characterized the production of measuring and control instruments and processing of secondary raw materials.

At the same time the largest share of expenditure on innovative activities in the industrial structure is carried out by the enterprises of a petrochemical complex. Among them are manufacturers of petroleum products – 26% of the costs, the enterprises engaged in mining of fuel and energy minerals – 11,2%, chemical industry – 8.3%, electricity, gas and water – 9.6 per cent. In terms of size of companies most actively the investing in innovative activity are carried out by enterprises with the number from 1 to 5 thousand employees - 44% of all the cost made in 2013 for innovation, while enterprises with more than 5 thousand people – only 24%.

With regard to the allocation of costs for previously mentioned types of innovation activities the situation is as follows. Increasingly, the companies had costs for the purchase of machinery and equipment (2013: 59% of costs), and on research and development only 20% of the total expenditure on innovative activities was directed (+5% compared to 2010).It should be said that in most European countries (France, Finland, Austria, Norway, etc.) is the opposite situation, where the share of expenditure on research and development is more than half of the costs. A very important indicator characterizing the quality of innovative activity is the degree of novelty of the produced innovative products and processes. Data on this indicator characterize the extremely low share of fundamentally new or significantly improved innovative products, the analogues of which do not exist in the internal market (territorial innovation). In 2013, in Russia such goods were produced a little more than 1% of the total number of shipped goods. New or fundamentally improved innovative products which were novelty solely for the implementing organizations (local innovation), in 2013 also a small number – 5% was noted. In both cases, the index is seriously lagging behind in cross-country comparison, and allows making an assumption about the underlying implementation in Russia of slightly improved products that do not represent a fundamental innovation for the domestic market.

Discussions

As it was already noted, for any economic system in modern conditions the most preferred would be the increase in the number of high-tech industries. A.P. Stakhov (2009) in his study notes that according to forecasts by international analysts, the growth of high-tech industries in developed countries in the near future will reach 10-30% per year. As it is noted by B.N. Kuzyk (2009), if at the present stage, the ratio of high-tech and energy commodities' markets is 4:1, then in the future it is planned to increase indicators to the ratio of 10:1, which causes the formation in the developed world of the knowledge economy. As for Russia, it is better to agree with the opinion of academician S. Glazjev (2013), stating that "now when the trajectory has not yet formed, and there is a competition of alternative technologies, there is a chance to take the lead in

promising directions for the formation of a new technological order, and thus "to ride the" thermals of new long wave for economic growth."

The very appearance of the concept "technological order" is associated with the name N.D. Kondratjev who proposes the concept of "long waves", with in which each wave is characterized by a corresponding level of development of the productive forces or the so-called "technological way" (Kablov, 2010).In the framework of the classical definition proposed by S.Y. Glazjev (1993), technological structure is considered as a set of conjugate technology industries, covering a closed circuit of reproduction – from natural resources to non-productive consumption, which is characterized by a single technological level of its constituent industries (the core of the technological structure), linked by flows of qualitatively similar resources. In this case, economic development is a continuous process of technological modes' change. In this case forming the core technological innovations are called "key factors", and industries that intensively use the key factor, are the carriers contributing to the spread of technological order (Glazjev & Kharitonov, 2009). The last statement has led to the fact that in subsequent studies V. Belousov (2010) defines technological structure in a somewhat narrow sense, namely as "complex of mastered breakthrough, revolutionary innovations (inventions), providing a quantitative and qualitative leap in the development of the productive forces of society."

There is a division of technological structures in the pre-industrial and industrial.The processes underlying the pre-industrial way of life, relied on the use of human muscle power and animal, and all the inventions of that time boiled down to its strengthening.The emergence of industrial structures occurred in the late XVIII – early XIX centuries, and today six successive technological structures has been formed. At the same time B. N. Kuzyk (2009) mentions a projected seventh way in which a human should be the Central object of technology.

General characteristics of the technological structures is presented in table 2, which shows that the duration of the ruling period of each technological structure in the economy tends to decrease, which may be due to a gradual intensification of innovative activity at all levels of the national economy and improvement of its performance.

Table 2. Characteristics of technological orders

The number of the technological order	I	II	III	IV	V	VI
Period	1770-1830	1830-1880	1880-1930	1930-1970	1970-2010	2010-2050

The core of the order	Textile industry Textile machinery The smelting of iron Processing of iron The construction of canals Water engine	Steam engine Ferrous metallurgy The coal industry Railway construction transport, engineering, parentstate)	Electricity (electrical engineering, power lines) Heavy machinery Inorganic chemistry	The internal combustion engine (automobiles, aircraft, etc.) Non-ferrous metallurgy Organic chemistry Petrochemical industry	Microelectronics Informatics Fiber-optic equipment Innovative materials Telecommunications Robotics Alternative energy sources	Biotechnology Nanotechnology Membrane technology Quantum-vacuum technology Information technology
A keyfactor	Textilemachines	Steamengine, machines	Motor, steel	The internal combustion engine, petrochemistry	Microelectroniccomponents	Biotechnology, nanotechnology

Source: B. N. Kuzyk (2009).

In addition, the economy of any country is characterized by diversity that is combined with simultaneous use of technologies from different technological paradigms. This is due to the impossibility of a complete displacement of existing technology by breakthrough ones. The ratio of the used technologies of different technological ways characterizes the level of technological development of the country. Continuing this idea, V.V. Iljin (2009) quite reasonably argues that the domination of several technological modes simultaneously, called multi-structural character is "normal phenomenon under the condition that the lower ways step by step are replaced by the higher ones.

L.A. Gorbach & M.V. Rajskaya (2014) consider that one of the reasons for the lack of progressive development in the Russian economy is the low innovation activity of Russian manufacturers. Another is the imbalance of public spending.

S.M. Rogov (2005), dividing the functions of the state into the traditional (defense, law and order) and modern (the development of intellectual and human resources - expenditure for education, health, science and economic development), notes that the ratio of the cost on the implementation of these functions is 1:3 (5,3% of gross domestic product (GDP) for the implementation of traditional and 17.8% – modern functions), while in Russia the proportions – 2:1 (7.6% of GDP for the traditional and 3.9% for modern functions).Thus, according to N. Orlova (2013), the level of expenditure on the implementation of socio-economic functions in Russia is the lowest in the world, which testifies the minor role of the sector in the economy and explains the reason for its lag in the development of high-tech industries.

Conclusion

Summarizing the obtained results the following positive trends in the innovation sector of the Russian economy can be noted. They are characterized primarily by the growth in the indicators' number of manufactured innovative products of the intensity of expenditure on innovation.

The analysis conducted showed also the presence of a number of negative trends in the sphere of economic activities and in the innovation process. The first relates primarily to hypertrophied and reproducible development of the

resources sector of the Russian economy. The second major trend is associated with a low level of innovation activity of Russian enterprises, the low percentage of expenditure on research and development, low degree of novelty of innovative products and processes, as well as the low level of state financing of innovative activities.

The current situation in the Russian economy under unchanged scenario leaves no hope for the compliance with the world technological development in the long term, predetermining the need to build effective strategies that ensure a technological breakthrough. Taking into account the dominance of the industries of the third and fourth structures with little development of the fifth technological order, it is quite difficult to carry out such innovation breakthrough. With the current trend, a reduction can be assumed in the share of high-tech sector in the Russian economy and the continued implementation of the inertial scenario.

However, despite a number of negative trends in the Russian economy at the present stage, including in the innovation sector, in the future a scenario of technological breakthrough and ensuring of the competitiveness of Russia on the world market can be made. This is achievable, in our view, in case of the right setting of priorities in the framework of the state policy in the field of scientific and technical development. In the context of globalization of the world economy the separate economic systems' movement towards the "inevitable future" must be based on effective managerial decisions within the prevailing of global trends, but not local scripts of individual States or industries. Therefore, first it is necessary to take a course on the formation and effective functioning of the most promising technological trends that form the basis of the sixth technological structure. Moreover, Russia has necessary scientific background in areas such as nanotechnology and biotechnology.

Disclosure statement

No potential conflict of interest was reported by the authors.

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