

Analysis of the Functional Transformation of Industrial Complex Infrastructure

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Abstract: In this study, the level of Russia's industrial development in the period between 2005 and 2015 has been assessed. The gross domestic product and gross added value have been calculated by economic activities as well as the indices of industrial production by economic activity in the Russian Federation and labor productivity indices in the national economy and in the main branches of industry. A comprehensive analysis of the level of fixed assets wear in the economy and in the main branches of industry has been carried out. The dynamics of industrial output indices by economic activities and the dynamics of the share of innovative goods, works, services in the total volume of shipped goods are presented in retrospect. The study examines the Foreign experience of developing the industrial infrastructure on the examples of India, China and Brazil. The results of the company EY survey on the current state of the Russian infrastructure policy and the possibilities for its further development have also been analyzed.

Key words: Industrial development, industrial complex, infrastructure, transformation investment, innovation, development

INTRODUCTION

Progress of the Russian economy demands restructuring of the national economy of the country, transition from orientation mainly to production of natural resources to formation and development of innovative production. Innovative social production can't do without the corresponding infrastructure which is providing his normal functioning and acting as that one of the most important elements of modern economy. For successful performance of the function infrastructure has to have the high level of development, however, in Russia she doesn't meet these requirements yet. So, extremely low is level of updating of production capacities of infrastructure (2-4% a year). As a result wear of fixed assets in the sphere of infrastructure makes over 50% (for example in gas transmission branch on average 56%, oil pipelines 54.8% in power industry 57.3% in transport system 55-70%. Big degree of moral and physical wear of fixed capital of infrastructure divisions and his slow

updating reduce efficiency of their functioning at the present stage of development of the Russian economy (Petrova *et al.*, 2014; Romanova and Buhvalov, 2014; Rudnev, 2011; Ribakov, 2011).

MATERIALS AND METHODS

Information and empirical basis of the research was statistical, methodological and analytical data of Federal State Statistics Service, the Internet Corporation Trading Economics, United Nations Organization for Economic Cooperation and Development, Statistical Office of the European Communities, National Research University, Higher School of Economics and several other scientific and public organizations. Also, used in Russian legislative and normative acts in the field of industrial activities.

The methodological basis of the research presented the key requirements of the system approach. In the course of the study were used such methods of

economic research abstract-logic, economic-statistical, monographic, experimental, settlement-constructive, economic mathematical and several others.

The choice of the applied techniques and methods research was carried out largely in the context of adequate implementation of the basic requirements of the scientific and practical validity of results, identified trends and developed practical proposals.

RESULTS AND DISCUSSION

Assessment of modern level of industrial development:

Considering specifics of the role played by the industry in modern economy of Russia for ensuring active social and economic growth high relevance the research problem of factors of its accelerated development acquires (Latinina, 2013; Malitskaya, 2014). The indicators illustrating change of an indicator specific various sectors of economy in formation of the Gross Domestic Product (GDP) and the Gross Value Added (GVA) by types of economic activity by types of economic activity on the industry in general and by its sectors in particular during 2005-2015 are presented in Table 1.

At the same time indexes of industrial production as in general on an industrial complex and on primary branches, though had a positive indicator in the majority of years but since, 2009 not to time the barrier did not exceed 5% and besides has negative dynamics of a gain (Table 2).

Even more regrettable situation takes place in the analysis of an indicator labor productivity, here, it in 2014, both on production of useful indicators and on production and distributions of the electric power, gas and water was negative and according to settlement indicators of researchers of study in 2015 only worsened (Table 3).

It should be added that one of the key factors defining indicators of development of industrial sector of economy in modern conditions is productivity. The indicator of labor productivity pays off Federal State Statistics Service in the form of the index representing private from division of indexes of physical volume of the Gross Value Added (GVA) and an index of change of cumulative expenses of work in an equivalent of full employment. Indexes of change of VDS are calculated proceeding from absolute values of these indicators in real terms. Indexes of change of cumulative expenses of work are defined on the basis of labor expenses on all types of works including additional work and production for own consumption, brought to conditional workers in an equivalent of full employment.

Leaning on the conclusions of leading experts (Amosenok, 2011; Musostova, 2014; Chernovalova, 2014; Chibisova, 2014) analyzing dynamics of indexes of labor productivity on economy in general, one may say that, in the last decade steady delay of a gain in productivity of work in domestic economy is observed.

Table 1: A gross internal product and gross value added by types of economic activity (in the current prices, billion rubles)*

Parameters	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014**	2015**
GDP in market prices	17027.2	21609.3	26917.2	33247.5	41276.5	38807.2	46308.5	55967.2	62176.5	66190.1	71406.4
VDS in basis prices	14858.8	18517.7	22977.3	28484.5	35182.7	33813.3	40040.1	47718.9	52982.9	56896.1	61089.4
Agricultural industry, hunting and forestry	773.4	864.2	981.3	1 194.8	1 486.6	1 504.4	1 451.5	1 986.3	1 979.6	2 178.3	2 424.5
Fishery, fish breeding	61.7	55.5	58.1	61.6	62.7	80.6	97.0	98.6	103.1	112.2	124.1
Mining	1 411.6	2 064.3	2 509.4	2 865.5	3 284.6	2 885.4	3 842.8	5 110.7	5 826.1	5 893.9	6 306.0
Processing productions	2 590.9	3 388.5	4 116.0	5 025.2	6 163.9	5 005.3	5 934.7	7 433.5	7 877.7	8 588.9	9 536.2
Production and distribution of the electric power, gas and water	548.3	608.4	727.0	855.9	1 034.0	1 388.7	1 527.1	1 797.7	1 824.2	1 975.6	2 075.4
Construction	847.1	989.9	1 202.0	1 633.9	2 225.3	2 101.5	2 587.8	3 517.5	4 061.7	3 994.3	3 964.5
Wholesale and home shopping service and so forth	3 012.2	3 610.5	4 673.6	5 745.0	7 137.7	6 060.5	8 021.0	9 115.2	9 693.3	9 887.5	10 575.2
Hotels and restaurants	139.9	167.8	206.7	286.3	358.0	343.7	403.3	466.9	533.3	595.6	636.8
Transport and communication	1 642.4	1 897.0	2 247.6	2 750.9	3 258.3	3 249.6	3 662.5	4 114.7	4 699.7	5 098.9	5 333.0
Financial activity	474.1	701.2	977.2	1 253.8	1 537.8	1 707.2	1 773.5	1 956.1	2 397.5	2 847.3	3 243.8
Operations with a fast estate, rent and rendering of services	1 408.0	1 828.8	2 287.6	3 102.8	3 959.4	4 220.6	4 901.5	5 509.4	6 240.4	6 860.0	7 459.9
Public administration and ensuring military safety; social insurance	802.5	959.1	1 189.2	1 466.4	1 884.4	2 203.2	2 423.5	2 673.1	3 364.6	3 794.4	3 984.3
Education	400.1	493.2	619.3	769.9	970.7	1 134.2	1 226.0	1 387.8	1 550.3	1 774.1	1 823.0
Health care and providing social services	472.6	564.7	765.5	950.5	1 197.8	1 360.3	1 487.3	1 758.6	1 936.8	2301.0	2 529.0
Providing other municipal, social and personal services	273.8	324.7	417.1	522.1	621.5	586.0	700.6	792.6	894.3	994.0	1 073.8
Activity of households							0.0	0.0	0.1	0.1	0.1
Taxes on products	2 352.1	3 248.2	4 090.1	4 977.6	6 323.8	5 202.1	6 462.6	8 463.3	9 411.8	9 510.9	10 550.8
Subsidies for products	183.7	156.1	150.2	214.5	229.7	226.2	194.1	215.0	218.2	216.9	233.8
Pure taxes on products	2 168.4	3 092.1	3 939.9	4 763.0	6 094.2	4 975.9	6 268.5	8 248.3	9 193.6	9 294.0	10 317.0

*Table is made by the researcher on the basis of data: A gross internal product and gross value added by types of economic activity URL: gks.ru/free_doc/new_site/vvp/tab10.xls; ** Data for 2014 and 2015 are submitted taking into account data on the Crimean Federal District

Table 2: Indexes of industrial production by types of economic activity in the Russian Federation*

Parameters	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Industry	108.0	105.1	106.3	106.8	100.6	89.3	107.3	105.0	103.4	100.4	101.7
Including by types of economic activity											
Mining	106.8	101.4	102.8	103.3	100.4	97.2	103.8	101.8	101.0	101.1	101.4
Processing productions	110.5	107.6	108.4	110.5	100.5	84.8	110.6	108.0	105.1	100.5	102.1
Production and distribution of the electric power, gas and water	101.1	100.9	103.4	99.4	100.6	97.3	102.2	100.2	101.3	97.5	99.9

*Table is calculated and made by researchers on the basis of data; Production indexes by types of economic activity of the Russian Federation. URL: http://www.gks.ru/free_doc/new_site/business/prom/ind_prom_okved.xls

Table 3: Labor productivity indexes on economy and primary branches of the industry*

Parameters	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
In general on economy including by types of economic activity	106.5	105.5	107.5	107.5	104.8	95.9	103.2	103.8	103.0	101.9	101.1**
Mining	107.3	106.3	103.3	103.1	100.9	108.5	104.3	102.7	100.0	96.9	96.7**
Processing productions	109.8	106.0	108.5	108.4	102.6	95.9	105.2	105.6	103.1	105.5	105.3**
Production and distribution of the electric power, gas and water	100.7	103.7	101.9	97.5	102.1	96.3	103.0	99.8	100.8	99.2	99.7**

Table 4: Degree of wear of fixed assets on economy and primary branches of the industry*

Parameters	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
All fixed assets	43.5	45.2	46.3	46.2	45.3	45.3	47.1	47.9	47.7	48.2	48.9**
Including by types of economic activity											
Mining	54.8	53.3	53.3	53.4	50.9	49.6	51.1	52.2	51.2	53.2	53.5**
Processing productions	47.8	47.1	46.8	46.0	45.6	45.7	46.1	46.7	46.8	46.8	47.1**
production and distribution of the electric power, gas and water	55.6	52.2	51.4	52.7	51.2	50.7	51.1	50.5	47.8	47.6	47.9**

*Table is calculated and made by the researcher on the basis of data; Fixed assets//Federal State Statistics Service.-URL: http://www.gks.ru/free_doc/new_site/business/osnfond/STIZN_ved.xls; **-The indicator of 2015 is calculated by the author on the basis of preliminary data FSGS

So, in pre-crisis 2003-2007 in general on economy the annual gain of labor productivity for 5.5-7.5% was observed. In 2009 labor productivity in general on economy decreased by 4.1% in comparison with 2008. In post-crisis 2010-2012 annual rates of a gain of labor productivity were only at the level of 3.1-3.8%.

Similar in character but a little excellent according to contents, dynamics of labor productivity was observed also in industry sectors. So, the general decrease in annual growth rates of indexes of labor productivity by all sectors of the industry allows to establish results of monitoring. At the same time the closest both on character and according to contents to general economic dynamics is dynamics of labor productivity of the processing productions and the loudspeaker of labor productivity of the extracting and generating productions has some differences. So, growth rates of labor productivity in the sphere of production and distribution of the electric power, gas and water were initially low. At the same time in 2007, 2009 and 2012 negative values of a gain were observed. The maximum values of a gain were noted only at the beginning of the period 2003 and 2005. In turn growth rates of labor productivity of the extracting productions at the beginning of the considered period (2003-2005) were on an average for economy level. Then, growth rates were considerably slowed down and in 2012 negative rates of a gain of labor productivity were for the first time noted here.

The analysis of degree of wear of fixed assets on economy and primary branches of the industry: Despite insignificant decrease in degree of wear of fixed assets on industrial branches, the general degree of wear of fixed assets in the Russian Federation for 2004-2014 increased both during growth of economy till 2008 and during transformation in 2008-2014 that is visually shown in Table 4.

The contradictions revealed on the basis of complex, structurally functional and index methods of the analysis in development of production infrastructure of an industrial complex allowed to formulate elements of infrastructure character for formation of the new program of the public industrial policy in the direction of stimulation of the positive and smoothing negative factors of development of industrial production infrastructure, strengthening of its contribution to intensive development of an industrial complex. In relation to production and infrastructure activity in various industries as the priority directions it is offered: preservation of continuity between infrastructure areas of sphere of action for the industries functioning within both the existing and already arising technological way localization of subjects of production infrastructure of a production and service orientation in industrial agglomerations with simultaneous development of channels of an overflow of production and infrastructure

orders between them priority of use of the existing objects of production infrastructure of an industrial complex with simultaneous increase in return from them and formation support by the advancing rates of new forms of production infrastructure of the industry.

From Table 1-4, it is possible to see that in general industrial outputs for the considered period of time increased by 56.4%. And the greatest image production in the sphere of processing industry-increased by 74.2%. In the sphere of mining industry production increased by 49.0%. In the sphere of the generating industry only for 13.9%. At the same time the general nature of dynamics of change of productions was similar in sectors of the industry that is visible from the analysis of chain indexes. However, it should be noted that stability of the extracting and generating sectors in crisis of 2008-2009 was higher, than processing.

At the same time the general nature of dynamics of change of investments into fixed capital in general and by industry sectors in particular was similar in economy that is visible from the analysis of chain indexes. From an overall picture only indicators on the generating industry sector where various state and private programs of the accelerated modernization of fixed assets were actively carried out are beaten out. At the same time it is necessary to notice that in recent years chain indicators demonstrate to delay of investment process that can especially clearly be observed by data for 2012-2013.

Results of calculation of average duration actually of hours worked of average annual number occupied by types of economic activity in 2009-2012 are presented in Table 4. The assessment presented in the table is private from division of an indicator of number actually of hours worked in a year on all types of works on production of goods and services on an indicator of average annual number occupied in economy of Russia by types of economic activity. Despite insignificant differences of the presented assessment from an official technique of the Federal State Statistics Service counting the average actual duration of working hours of workers of a payroll of the organizations for industry sectors, the presented approach allows to analyse average degree of employment of a manpower on production by types of economic activity.

At the same, time if to compare average duration actually of hours worked of average annual number occupied in industry sectors with this indicator occupied in other spheres of economic activity, then, it will become visible that the sector of the processing productions lags behind sector of transport and communication-economy sector where the shortest duration actually of hours worked of average annual number occupied is observed,

except for, respectively industry. At the same time duration actually of hours worked of average annual number occupied in agricultural industry exceeds a similar indicator in sector of the processing productions by 2, 5 times.

Within the last four decades the advanced countries of the world on the technological level of development treated the fifth technological model based on electronics and computer facilities, telecommunications, robotics information services. Leaders within this way are Japan, the USA, Germany, Sweden and some other countries the EU. So, in 2013 in army of the USA on arms several thousands of fighting UAVs with elements of artificial intelligence and a full-fledged set of arms consisted. According to tendencies and forecasts of development of armament industry by 2030 robots will make about 25% of staff of army of the USA.

Because the majority of the countries actively finance development of military industrial production, it acts as the driver of scientific progress (Jukov, 2014). Besides, often the advanced technologies applied during the developing and production of arms gain dual character and are applied in public life. The sixth technological way actively develops in the present time in the called countries.

Meanwhile, transition of Russia to new technological way is accompanied by certain difficulties. The main system analysis of historical stages of transformations of economy of Russia shows that at compliance of development of its industrial sector to tendencies of development of the leading countries, entry into new technological way happened to big lateness. During, the pre-revolutionary period national production of industrial output was at the level of the advanced industrial states.

However, uneven placement of the industrial enterprises in our country is characteristic of this period. In capitalist Russia sharp discrepancy of degree of industrial familiarity of the European part and east areas was observed. So, about 77% of all production while in Siberia with it's rich raw material and fuel and energy resources only 2% of industrial production of the country functioned were the share of productions of Northwest, Central and Southern districts. East areas together with the URALS did not provide also 10% of gross output.

Irrationality of placement of industrial production was deepened by technical and economic dependence of Russia on the foreign capital which went for development and operation of natural resources that provided the highest profits. Thus, placement of productive forces of that period was caused only by a pursuit of the greatest profit.

Dynamics of size of volume of industrial output by types of economic activity: Now the level of development of the industry of Russia is much lower than in developed countries. It is connected with insufficient development of the branches forming the sixth technological way (Table 5). In volume of industrial output of only 5% about 30% to a share of the fourth level and over 60% on a share of the third fall to the share of technologies of the fifth level. The Russian experts agree in opinion that within the next 10 years (till 2015-2020) in economy of Russia the fourth technological way having development potential in branches of power and electro technical, chemical and oil mechanical engineering in machine-tool construction and in instrument making will prevail.

Development of global competitive advantages can be the solution of the designated problem. As an example, it is possible to give history of formation of Holland as powers with one of the world’s largest fleet thanks to opening of an opportunity to transform wind power on windmills to progress. In the history there is a lot of similar examples.

The Russian competitive advantage-existence of considerable stocks of raw material resources-on the one hand is the factor which is slowing down transition to new technologies but with another, it acts as material resources of this transition (Pervov, 2012; Hmeleva, 2012).

Dynamics of specific weight of innovative goods, works, services in a total amount of the shipped goods in a retrospective: Transition to new way causes need for new technological productions, the research centers and laboratories, system of protection of the national market. According to Glazyev, a kernel of the sixth technological way are: nanoelectronics molecular and nanophotonics; nanomaterials and the nanostructured coverings nanobiotechnologies, nanosystem equipment. At the same time primary characteristics of the sixth technological way in comparison with previous it is possible to call low power consumption and a material capacity of production and also a possibility of designing of materials and organisms with in advance set properties.

The data characterizing dynamics of specific weight of innovative goods, works, services in a total amount of the shipped goods of the performed works, services during the period from 2011-2015 are presented in Table 6. From the Table 6, it is visible that the specific weight of innovative goods, works, services in a total amount of the shipped goods, the performed works, services in economy in general in 2015 was at the level of 9.2% and since, 2009 this value increased twice. At the same time the specific weight of innovative goods, works, services in a total amount of the shipped goods, the performed works,

Table 5: The volume of industrial output by types of economic activity in 2015

Types of economic activity	Volumes (bln.rub.)	Percentage
Extraction of fuel and energy minerals	5464	19.8
Mining, except fuel and energy	748	2.7
Production of food stuff	3195	11.6
Textile and sewing production, production of footwear	180	0.7
Processing of wood and production of products from a tree	254	0.9
Pulp-and-paper production, publishing and printing activities	588	2.1
Production of coke and oil products	3485	1.6
Chemical production	1409	5.1
Production of rubber and plastic products	479	1.7
Production of other nonmetallic mineral products	805	2.9
Metallurgical production and production of finished metal products	3357	12.2
Production of cars and equipment	939	3.4
Production of electric equipment, electronic and optical equipment	1032	3.7
Production of vehicles and equipment	1645	6.0
Other productions	414	1.5
Production and distribution of the electric power, gas and water	3616	13.1
Total	27610	100

services of the organizations of industrial production in 2015 was at a little smaller level, than on economy in general 8.9%. As well the gain was shown slightly more weakly, than on economy in general 1.9 times. However, at the same time the specific weight of innovative goods, works, services in a total amount of the shipped goods, the performed works, services of the organizations of service trade is at noticeably higher level, than in the industry 11.2% and for the considered years this indicator increased by 3.5 times.

Thus, following the results of the carried-out analysis, it is possible to draw a conclusion that the sector of industrial productions taking the important place in national economy and developing the advancing rates at the beginning of 2000th years faced in recent years a number of problems among which prevail the general decrease in production efficiency and labor productivity. The negative impact of these factors in the long term can only amplify that follows from delay of investments into fixed capital and decrease in growth rates of total amount of industrial production. Meanwhile, the qualitative solution of these problems can be promoted by development of branches of new technological way. This step demands active development and deployment of innovations in real production. At the same time need of implementation for this direction of actions on a national level is staticized.

Foreign experience of development of production infrastructure: Over the last 10 years, Russia attracted more Direct Foreign Investments (DFI), than Brazil and India but it is much less, than China. On the PII level to

Table 6: Dynamics of specific weight of innovative goods, works, services in a total amount of the shipped goods, the performed works, services during 2011-2015

Variables	2011	2012	2013	2014	2015	Growth rate (time)
Specific weight of innovative goods, works, services in a total amount of the shipped goods, the performed works, services	4.5	4.8	6.3	8.0	9.2	2.0
Specific weight of innovative goods, works, services in a total amount of the shipped goods, the performed works, services of the organizations of industrial production	4.6	4.9	6.1	7.8	8.9	1.9
Specific weight of innovative goods, works, services in a total amount of the shipped goods, the performed works, services of the organizations of service trade	3.2	4.0	8.3	9.6	11.2	3.5

GDP (3.3%) Russia only slightly lags behind the leader of BRICS group-China (3.7%) but significantly advances Brazil (2.4%) and India (1.4%). On investments into fixed capital Russia took more modest place (the third on a share to GDP), having left behind only Brazil. The insufficient volume of investment into infrastructure for the last 10-20 years rejected Russia on the 93rd place in the world on an indicator of quality of infrastructure according to the report on global competitiveness for 2013-2014 prepared by the World Economic Forum. China and India take in rating the 74th and 85th positions, respectively. At rather high level (the 31st place) in Russia there is only railway infrastructure. In other areas (quality of highways infrastructures of ports infrastructures of air transport, power supply) improvements are necessary. In Russia the numerous strategies and programs aimed at the development of infrastructure are developed. Having analysed them, specialists of EY made the card of the planned projects, having classified them by several parameters. For the last 5 years it was declared 325 infrastructure projects which are at different stages of realization now. Though more than a half of the analyzed projects pass a realization stage, actually most of them are postponed and extent of their performance is not confirmed.

As experience of other countries testifies, development of infrastructure has favorable consequences among which the following is most often specified: decrease in production expenses; growth of national production/GDP; expansion of access to a manpower; competition strengthening increase in inflow of investments; land use reorganization; possibility of development of earlier inaccessible territories. The problem of development of infrastructure came to the forefront in economic policy of Russia as by the beginning of 2014, it became clear that large-scale internal investments are necessary for growth of national economy, especially such which will allow to diversify it and to reduce dependence on the extracting branches. In the first quarter 2014 GDP growth was expected only at the level of 1.4%. At the same time determination of the authorities to direct efforts to increase in internal investments and control of inflation is obvious. The latest

events exerted negative impact on economy, having caused capital outflow along with depreciation of ruble. It caused the compelled increase in internal interest rates. Besides, higher rate of inflation is expected. At least in the short term improvement of investment climate in the private sector is represented improbable.

At this conjuncture the Russian government seeks to intensify process of implementation of infrastructure projects even more: the investments directed to this sphere will help to support economy. Most likely, special attention will be paid to the reforms necessary for increase in private investments as it became clear as far as it is important. Besides, the power will be promoted by implementation of projects of the Public-Private Partnership (PPP) in this connection it is necessary to expect emergence of new interesting opportunities for investments. The Minister of Economic Development Alexey Ulyukaev announced funding plans of seven new large infrastructure projects from resources of the National Welfare Fund (NWF) recently. Successful performance of these and other already begun projects is capable to improve significantly the business environment and also to raise a level of living in the country in general. The gain in productivity, reduction of terms of trips, access to the new markets and the new directions for trade and investments is only some advantages which the people living and working in Russia can receive as a result of development and improvement of its infrastructure.

The analysis of results of poll of the EY company about current state of the Russian infrastructure infrastructure policy and opportunities of its further development: Research objective is studying of current state of the Russian infrastructure infrastructure policy and opportunities of further development. The EY company conducted survey and generalized opinions of representatives of the business environment and branch experts. The group of respondents can be divided into three subgroups: branch specialists, government employees and representatives of investment community and also the large foreign investors working in Russia. The received results in general show similarity of answers

in different subgroups, however in case of their divergence differences are distinguished and in detail analyzed and a question of whether strategy and the direction of development of infrastructure in Russia are clear to them, most of respondents (60%) answered in the affirmative, however having noted that not in all areas. From this it is possible to conclude that they understand strategy in general but not all its aspects are clear to them. The share of such answers is in the range from 52% (government employees and representatives of investment community) to 67% (large foreign investors). In general the share of affirmative answers made 78% (yes or yes but not in all areas). It demonstrates that business considers development of infrastructure by one of important questions and that the participants of a research representing various groups are quite well informed concerning strategy. There are two main views of a question of whether will give infrastructure investments a powerful impulse to development of the Russian economy. Branch specialists and also government employees and representatives of investment community in general agree that infrastructure investments will accelerate economic development (81% answered in the affirmative or told that they agree but not in all areas). At the same time the main part of respondents of all group (45%) hold that opinion that investments can be effective only in certain areas. Branch experts showed more scepticism of rather universal impact which infrastructure investments exert on economic growth: 50% gave the affirmative answer with the reservation, 34% the affirmative answer. At the same time answers in subgroup of government employees and representatives of investment community were distributed more evenly: 37 and 39%, respectively.

Generally respondents find it possible to use National Welfare Fund for financing of investment projects, however, only 17% of respondents specified that such answer is suitable for all cases. The majority 52% was emphasized that the projects financed by National Welfare Fund have to meet strict requirements. The smaller but essential number of participants of a research (15%) answered that it is necessary to consider only projects of federal importance. It should be noted that large foreign investors showed much more smaller readiness to raise resources of the National Welfare Fund (22% against use of means of NWF), than branch experts and also government employees and representatives of investment community (13%).

Results of a research say that the main improvements are necessary in the sphere of planning and regulation of projects. According to 69% of respondents including 78% of the largest foreign investors, ensuring

transparency and competition of tender procedures would be made by investments into the Russian infrastructure more effective. Besides, 57% consider that improvement of quality of training and the choice of projects will make favorable impact on efficiency of investments.

Government employees and representatives of investment community and also large foreign investors emphasized importance of improvement of quality of selection of projects and preparation for them (respectively 78 and 66%). At the same time 53% of branch experts assign a leading role to increase in transparency and competition of tenders. About a third of respondents consider useful the following measures: improvement of mechanisms of attraction of public financing or support, simplification of an order of coordination with public institutions of projects with participation of the foreign organizations having experience of implementation of similar projects. The opinions expressed by respondents demonstrate existence of an opportunity for improvement of public policy and structure of regulation. At the same time persons, responsible for decision-making will be able to exert the greatest impact if concentrate attention on workmanship: carefully planned projects realized as a result of transparent and competitive tender procedures are capable to increase considerably efficiency of infrastructure investments to provide economy of public funds during implementation of projects and acceleration of economic growth in the long term

According to most of respondents (51%), participation of private partners or investors in infrastructure projects (including with use of the mechanism of PPP) would increase their efficiency. It should be noted that this generalized opinion: completely only 45% of branch experts agree with it while most of government employees and representatives of investment community (59%) and also large foreign investors (61%) consider involvement of private investors useful. Smaller but nevertheless the essential number of respondents (31%) indicate that private investments are capable to bring benefit but not really big. Only 15% of respondents believe that involvement of private investors will not exert positive impact on efficiency of the state investments into development of infrastructure.

Each next long wave of economic development washes away from economy only a part of former products and branches. Remaining in a different measure modernizations are subject.

The question of interrelation of technologies and branches of different long waves is important for development of structural and scientific and technical policy of transition to technological base of a new long

wave. It is considered that, the innovative growth as the strategic direction of development of global economy in the forthcoming decades will be mainly provided due to convergence of technologies. Besides the competition of old and new branches for resources it is necessary to consider the following types of interindustry communications: Mature branches a source of initial material and financial resources (the initial capital) for new productions. Mature branches show primary (besides military industrial complex, non-productive consumption, export) demand for new production. Thus, there is the first contour of accumulation in new branches.

In process of strengthening of these branches the role of their own demand for new production increases, the second contour of accumulation in new branches (a self-accumulation contour) is formed. Accuracy of ideas of regularities of a stream of investments into the technologies and branches representing a new long cycle depends on the width of coverage of these communications.

Coexistence and interaction of the branches embodying different long waves of technological development one of factors of observed reduction of amplitude of these waves. Expansion of the passing fund of technologies very important cumulative process of long-term technical and economic development acts as some kind of damper of this development keeping, nevertheless, its wave character. Therefore it is possible to expect that for the next (6th) technological way this influence will be stronger, than for the previous waves. As it was already noted, along with branches of a kernel of new (6th) technological way the health care, agricultural industry, a number of the bearing branches will be involved in its development. From these branches crucial importance for development of a domestic nanoscience and nanotech industry has mass demand for nanotekhnologichesk of technology and production.

Elimination of backwardness of our economy in the bearing branches of the 5th technological way is therefore one of prime. The world depression endured now affected all its leading branches including high-tech. The industry of high technologies which main part is made by productions of the fifth technological way endures the most serious crisis about the history. Falling of production affected even such monopolists as Microsoft long time symbolizing modern technological way.

However, at all aspiration of firms to preservation of the innovative potential in some cases reductions affect the divisions occupied with researches and developments. Involvement of foreign experts in technologies where lag as a measure of the catching-up development is observed has more chances of success in

conditions of the crisis which is followed by an economic depression in the leading countries. The aspiration to development of mature branches is justified if it provides accumulation of investment potential, strengthens technological base for the subsequent movement up a development ladder.

Proceeding from a role of separate branches in formation of a new long wave (new technological way), the following classification of perspective technologies is possible: technology solutions which commercialization represents innovations of the next (arising) long developments for the improving innovations (technologies or products) of already existing productions that they could provide the arising productions of a new long wave with qualitative material resources technology solutions for the improving innovations and the increases in efficiency of the branches acting as milk cows of national economy, making a big contribution to its investment potential developments for the improving innovations and increase in competitiveness of already existing branches which demand for production of the next long wave helps to realize scale effect in production of this production.

During formation of new way the priority attention has to be paid to its production having the best prospects of mass demand in rather close prospect. At the expense of it the scale effect in production can be reached and reduction in cost of new production will promote development of the formed way on its own basis. An important factor of formation in Russia of new (6th) technological way is demand for its production and technologies from already competitive branches and branches which increase in competitiveness is rather real. A big role can play defensive productions here (aviation, ship-building, the space-rocket industry, etc.) and civil it is high and srednetekhnologichny branches (electronic engineers, civil aircraft industry, automotive industry, etc.).

CONCLUSION

The analysis of specifics of innovative development of the enterprises and organizations of production infrastructure allowed to draw a conclusion that it completely depends on the level of innovative development and activity of the industrial production served by them and indicators and criteria for evaluation of innovative activity of the enterprises and organizations of production infrastructure can significantly differ from traditionally applied indicators of an assessment of innovative activity of the enterprises of industrial production. The revealed specific features of economic activity of the enterprises and organizations of production

infrastructure leave the mark on processes of formation and development of the market competition in this sphere, practically excepting its opportunity. Practical lack of the competition in branches of production infrastructure is natural and with objective need leads to lack of motivation, requirement and a susceptibility, first of all to technological innovations.

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