

Prethodno priopćenje

INNOVATIVE TECHNOLOGICAL GROWTH POINTS AS A NEW TOOL OF DIGITAL ECONOMICS

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ABSTRACT

The development of various innovative technological points as the main driving force of economic growth is the basis of the economy of the new technological order. Digital economy requires the need to shift towards the achievements of the fourth industrial revolution to improve national and international competitiveness of domestic producers. The article describes conditions of limited investment resources for innovative development of the economies of most countries. In order to solve this problem, the authors proposed the modern institutional context of public administration modernisation. The paper indicates the following mechanisms and institutions to support the new economic policy: intellectual resources accumulation and support for innovative entrepreneurship (business).

Keywords: *digital economy; economic policy; innovative technological point of growth; institute; public administration*

1. INTRODUCTION

As practice shows, the volatility of prices for raw materials, energy and currency exchange rates is quite high nowadays. In this regard, the strategic task of the Russian government is to find and create a new model of social economic development which is able to ensure Russia a significant place in the modern world (Glazev, 1993).

In the past, Russia managed to cope with the emerging challenges, whether it was global or domestic (Osipov, Skryl, Nevskaya, Shavina, 2016). Nowadays we can observe a qualitatively new level of instability dramatically reducing the possibility of predicting the near future. Under these conditions, we should refer to the distribution of budget and its effectiveness with special attention and concentration. Nevertheless, the carpet budgetary financing of the social policy should remain at the same level, thereby contributing to maintain a social stability in the whole country. The cost of industrial policy should become more differentiated and targeted, in accordance with the potential of the Russian regions, where the new mechanisms and institutions of industrial policy will be introduced (Silvestrov, Zeldner, Osipov, 2015).

The domestic scientific researches note the uselessness of any digital industrial strategy, as the market works effectively and puts everything in its place (Osipov, Skryl, 2016). In other words, in a bitter competitive struggle, the manufacturers and investors reveal a comparative advantage relative to business activity on their own without any support from the state. However, there are sectors of the economy where the social component may exceed the private benefits. Therefore, there may be a need for employment subsidies or investment outside of the sector to close this gap. The digital industrial policy should aim to identify and support those sectors that have the greatest potential and allow creating additional value chain in the country (Osipov, 2016).

In the scientific community, there is a debate about what level should be explored and supported in the processes of implementation of new mechanisms and institutions of digital economy: the federal, regional or corporate (Drucker, 2003). As part of the goal stated above, the economy should strive to diversify domestic production and create jobs in the country. According to the canons of the protectionists, the state should join in this process and act as a driver (North, 1990).

If we consider the potential of a particular region, then the regional authorities do not have valid and effective tools for the development of control systems, creation of an investment climate and others.

Currently there is not virtually any Russian region, which is itself integrated into the system of global value chains and thus, is rapidly developing. The exception is the Moscow region and partially St. Petersburg together with Leningrad Region. Marked two leaders are characterized by the agglomeration effect, where all the main types

of investments, new technologies, the processes of producing goods and services are concentrated. However, most other regions are gradually turning into an obstacle for the development of the whole economy. American theorist of urban planning J. Jacobs argued that agglomeration had a positive impact on the country's economic growth (Jacobs, 2001). This spatial concentration of specialized areas, united by intense economic, institutional, human, cultural and community connections, is the driving force for the development of scientific - technical progress and the success of business activities.

2. MATERIALS AND METHODS

The digital economic policy in most developed countries in terms of stimulating the industrial sector is based on the formation of localized points (zones) of growth with the release of their differentiated powers (Schultz, 2001). This concept involves the development and implementation of digital strategy, which identifies priorities for the development of each specialized area based on competitive advantages and the needs of the region where the zone is located. Thus, a set of tools and forms of state support is geographically differentiated, which makes this system more flexible and allows quickly adapting to changing conditions; to respond to signals from the internal and external market. The development of a digital strategy consists of several stages: the selection of potential region and the analysis of its socioeconomic development, finding and identifying the stakeholders, forecasting production and technological activities, the definition of a set of tools and forms of support. To determine the effectiveness of the implementation of industrial policy, it is necessary to introduce the system of control and evaluation of strategy implementation. It should be noted that in many EU and Asian countries, the industrial policies based on the formation of innovation and technological growth points have been successfully implemented (Osipov, Skryl, Evseev, 2016).

We would like to focus on the issue of financing of innovative and technological sectors in a number of states. Financing of innovative and technological initiatives receives a considerable attention in most developed countries, with the status of high-tech products' manufacturers or owners of the newest technologies. As we can see from the Table 1, there is a positive trend of growth in the innovation expenditures in the world.

Table 1. Expenditures on innovation and technological activity (R&D) (percentage of GDP)

Country/ year	2008	2009	2010	2011	2012	2013	2014
USA	2,77	2,82	2,74	2,76	2,70	2,74	2,81
China	1,46	1,68	1,73	1,79	1,93	2,01	2,05
Japan	3,47	3,36	3,25	3,38	3,34	3,48	3,59
Germany	2,60	2,73	2,71	2,80	2,87	2,83	2,90
South Korea	3,12	3,29	3,47	3,74	4,03	4,15	4,29
Israel	4,33	4,12	3,93	4,01	4,13	4,09	4,11

Source: Organization for Economic Co-operation and Development.

Table 1 shows the leader of expenditure on innovation, Israel, followed by South Korea and Japan. It is interesting that the first line related to financing innovative – technological component presents the countries of East Asian region. Meanwhile, in the United States, where the most innovative and technological growth points are located (in California (Silicon Valley) and New York), this index is not very high. These American innovative technological and financial agglomerations account for more than a half of the total expenditure of the state. Michael Porter notes that the main success of competitiveness of the U.S. economy was a creation of innovative technological, geographically localized points (Porter, 2008).

In Russia, the share of total expenditure on innovative technological component is much lower than in leading countries, and makes up 1.04% of GDP in 2008 to 1.19% of GDP in 2014. During this period, Russian government created various institutions to support and develop of innovative technologies in the industry. Based on the state initiatives the following projects have been implemented:

- allocation of territories with the status of a special economic zone;
- construction of industrial parks;
- formation of industrial clusters;
- creation of territory of priority development.

We can admit that institutional environment managed to find its way in Russia, but the effectiveness of its implementation mechanisms is in doubt. In our opinion, one of the root causes of poor implementation of mechanisms is the lack of linkages between these institutions, existing production, social infrastructure and the business community.

3. RESULTS AND DISCUSSION

Efficiency as a general indicator depends on many factors, in particular, the degree of mutual compliance with the status and dynamics of sectoral (industrial) and territorial (regional) structure. Generally accepted statement in the analysis of the impact of the digital modernization on the economic system is the close relationship of industrial policy with paradigm shift from structural changes in the economy in terms of diversification. However, we should note that diversification of the economic structure is not the base of sustainability of the entire system of production relations and does not provide the connectivity of structural elements (Osipov, Skryl, Blinova, Kosov, 2017).

The concept of industrial upgrading in most cases involves modifying and improving its technological aspects. Nevertheless, it is not entirely right to reduce all activities to create strong relationships within the industrial complex only to this element (Myrdal, 1956). Industrial upgrading means the modernization of material, technical, innovative and technological base of enterprises in accordance with the latest international standards. According to experts, only a quarter of the industrial structures in different regions of Russia have the level of production development and are technology sufficient for modernization, and, respectively, the change of industrial policy (Kosov, Akhmadeev, Osipov, Kharakoz, Smotritskaya, 2016). If we consider the centre – periphery model of “Four Russia”, most of the technological drivers are concentrated in Russia – 1, which includes Moscow and other megacities, where more than 21 % of Russia’s population (Zubarevich, 2015). This group of agglomerations is represented by major cities with fast development of innovative technological centres, where the society is able to quickly master new technologies and efficiently create new institutions. The main flow of internal migration is directed to this group of cities also. The other three components of the model are Russia – 2 (industrial cities, company towns, primarily specializing in the mining and manufacturing industry), followed by Russia – 3 (small towns and villages, rural settlements) and Russia – 4 (subsidized regions, uniting the republics of the North Caucasus, Tuva and Altai).

In order to change the model of industrial policy and leaving from raw model of development of the economy, we should reallocate accumulated technologies, knowledge, innovations created within Russia – 1 to the industrial cities and company towns, which are included in the category of Russia – 2. Thus, this step will give impetus for further development and modernization of production, suspend internal migration, concentrate financial resources and create innovative technological points of growth.

The dramatic changes in the industrial policy take time and significant costs from the state budget. The creation and diffusion of new technologies can be characterized as follows:

1. Proportion of expenses on innovative and technological component

2. The structure of source of funds of innovative technological activities
3. The location of innovative technological points

In Russia, as already noted above, the share of expenditure on innovative technological component is significantly lower than in most developed countries (see Table 1), but the share of budget expenditures on the creation of new technologies is higher than in the leading countries (see Table 2).

Table 2. The structure of source of funds of innovative technological activities (R&D) for selected countries: 2013

Country	Total R&D expenditures billions dollars	Share (%) of each sector in financing of innovative technological activities (R&D)			
		Government	Business	From abroad	Others
USA	457,0	27,7	60,9	4,5	6,9
China	336,5	21,1	74,6	0,9	NA
Japan	160,3	17,3	75,5	0,5	6,7
Germany	101,0	29,2	66,1	4,3	0,4
South Korea	68,9	23,9	75,7	0,3	1,1
France	55,2	35,0	55,4	7,6	2,0
Russia	40,7	67,6	28,2	3,0	1,2

Source: National Science Board. 2016. Science and Engineering Indicators 2016. Arlington, VA: National Science Foundation (NSB-2016-1)

Analysis of data in Table 2 shows that in developed countries the private business is actively involved in the financing of innovative and technological activities. Business' contribution to the development of new technologies is more than 60% of the total amount of financial support. These indicators are achieved due to the presence of a stable financial system in the country, effective methods of investment attraction, as well as the transparency of relations between state and business. As a part of the new industrial policy in Russia, it is necessary to stimulate a private initiative in the innovative technological sector by creating a favourable and beneficial business environment, including joint projects and increasing public contracts.

Currently, Russia requires a transition from an economy based on a single raw product to the creation of innovative technological point of growth, where technologies are created and accumulated. The technological accumulation should be supported by

the creation of effective state and business institutions. As a successful example of innovative technological growth point, we can highlight the Silicon Valley in California (USA), which did not begin to yield positive results immediately, but only after four decades. As we can see from Table 2, the only competitor of the USA (in particular, the innovative technological point of growth in the Silicon Valley) in terms of the volume of investments in innovative technological activity is China. China also uses the practice to establish territorially localized points of technology development and innovation (Kosov, Akhmadeev, Bykanova, Osipov, Ekimova, Frumina, 2016).

We would like to indicate the following mechanisms and institutes to support a new industrial policy:

a) Intellectual resources accumulation.

At the heart of sustainable development, the role of realization of human potential is objectively more important than the sustainability of global economic growth with the preservation of natural factors of the human society's existence (ecology, climate, etc.). The problem of innovative industrial development strongly depends on the level of public institutions in the context of accumulation and productive use of human capital. There should be an institutional component of the growth's base to achieve the objectives of the new industrial policy. Moreover, this is extremely important in conditions of technological progress of the last decade of the world's transition to the 4th industrial revolution (Marsh, 2012). No matter how the geopolitical situation develops in the world, its integral part should be strengthening the role of new scientific principles and constant innovation. It is not excluded that catch-up development for developing countries would face a new technological barrier. We cannot simply produce, buy and install it —institutions based on the flexibility of human intelligence, new technologies and innovation will be needed as a constant factor. Changing the capital assets every few generations is not applicable in such situation. In a few decades the world will be different, more innovative, and Russia will need a serious effort to go to the second stage and move to the third not in separate industries, but overall. In the future, Russia has the potential to move to the post-industrial phase, avoid the dependence on resources and "trap of an average level of development". To do this, the authors propose to implement the institute of innovative technological growth point, where intellectual resources should be accumulated.

Economists interpret the direction and degree of mutual influence of human capital, institutions and economic development in different ways. D. Acemoglu with co-authors gave unconditional priority to institutional factors as key determinants in his most famous work about the role of European colonists in the development of the countries. However, they also indicated the human capital as an important element of mechanism of action: countries with better institutions provide a higher

investment in human and physical capital and subsequently use these factors more efficiently (Acemoglu, Johnson, Robinson, 2001). In contrast, E. Glaeser with co-authors put the human capital to the forefront, arguing that its quantity has a decisive impact on economic growth and institutional development (Glaeser, La Porta, Lopez-de-Silanes, 2004). In response to these statements, D. Acemoglu and co-authors recently published a study confirming that institutions influence the human capital, not vice versa (Acemoglu, Gallego, Robinson, 2014). It is unlikely that this dispute will end in the near future, but for the purposes of this work it is important that institutions and human development are related to each other, they should be considered in this complexity.

The universities and schools can accumulate the intellectual resources within the innovative technological growth points. Nevertheless, the current model of educational institutions in Russia are not compatible with the government's objectives in terms of creating new jobs in high-tech and innovative sectors of the economy. The activity of most universities is aimed at training and they do not try to be a generator of innovation. To achieve the objectives of a new industrial policy, universities should be a base of creation of new knowledge and technologies. In addition, universities can be mediators in the interaction of business, government and local communities.

b) Support for innovative entrepreneurship (business).

Innovative business creates new markets, products and services. However, the level of development of innovative business varies depending on the region. In this regard, it is necessary to conduct a regionally differentiated industrial policy.

The World Economic Forum in Davos, which has become a reference point for discussion of the nature and stages of development of the global and national economies, in its most recent report (September 2016) put Russia in the intermediate group (on the transition from the 1st stage of development to the 2nd in the classification of countries by stages of development). It means that Russian economy goes from the basis of production factors to the efficiency factors, but there is still a long way to the third stage, based on innovation (see Table 3). The positioning of Russia in the intermediate group (between 1st and 2nd stages), while Argentina, Turkey and Saudi Arabia were sent to more progressive group (between 2nd and 3rd stages), is related to current crisis, which influenced Russia's position in various indexes to be significantly decreased. Government's task is to reach the third stage, where 37 countries are now and whose development is based on innovation. This can be achieved through the creation of innovative technological points of growth. Note that the use of existing development potential of Russia (such as natural resources and human capital) should be based on improving market institutions, competition, stability of property rights, the legal system reliability and reducing corruption.

Table 3. Distribution of countries by stage of development in 2015

Stage 1: on the basis of production factors	Transfer from Stage 1 to Stage 2	Stage 2: on the basis of efficiency	Transfer from Stage 2 to Stage 3	Stage 3: on the basis of innovation
India	Russia	China	Mexico	USA
Pakistan	Nigeria	Brazil	Saudi Arabia	Japan
Bangladesh	Philippines	Indonesia	Turkey	Germany
	Algeria	Iran	Poland	UK
	Vietnam	Thailand	Argentina	France
	Venezuela	Egypt	Malaysia	Italy
	Kazakhstan	South Africa	Chili	South Korea
	Ukraine	Colombia		Canada
		Romania		Spain
		Peru		Australia

Source: Global Competitiveness Report 2016-2017, Davos, Switzerland

The development of national industries using proprietary technology that can compete on world markets is one of the priorities of the innovative technological point of growth. The new state strategy should allocate the main industries, whose development is considered more promising. It is important to reduce dependence of the economy and the state budget from the mining sector, especially oil and gas, simultaneously with an increase in its effectiveness, including raising the role and quality of the manufacturing industry, including the development of modern high-tech facilities in the innovative technological points of growth.

Meanwhile, over the last decade, manufacturing lost some of its weight in the production, but at the same time, public services and real estate operations won (Table 4).

Table 4. Russian economic structure by activity, %, 2002 – 2015

	2002	2007	2010	2015
Gross value added at basic prices	100	100	100	100
Agriculture, hunting, forestry, fishing	6,3	4,4	3,9	4,6
Mining	6,7	10,1	9,6	9,8
Manufacturing	17,2	17,6	14,8	14,2
Production and distribution of electricity, gas and water	3,6	3,0	3,8	2,8
Building	5,4	5,7	6,5	5,9
Wholesale and retail trade; repair of motor vehicles, motorcycles, household goods and personal items	22,9	20,2	20,0	15,8
Hotel, restaurant, transport and communications	11,1	10,7	10,2	8,2
Financial activities	2,9	4,4	4,4	4,3
Real estate, renting and business activities	10,6	10,9	12,2	17,4
Public administration and defense; social security, education, health, municipal services, activities of households	13,3	13,0	14,6	17,1

Source: Russian statistic data center. Author's calculations

As Table 4 shows, the structure of the Russian economy shifts to the mining, but agriculture is coming back. The main issue is that the manufacturing, science and other complex activities remain closed in the restricted areas (including weapon production), where the potential of the global competitiveness is not lost, but the innovative activities lags.

4. CONCLUSION

The uneven development of the Russian economy and society over the past twenty-five years makes us think about which realistic goals to set. The economy requires a change of model and transition to the new digital industrial policy. The basis of the new digital model should be creating an innovative infrastructure, promotion of human capital, formation of a favourable investment climate, balanced regional development and effective state. Since the Russian regions strongly differ on the

level and quality of existing institutions, human capital and implementation level of hi-tech results, it is required to conduct ratings of regions based on their competitive advantages and specializations to create innovative technological points of growth.

The proposed system of actions requires further clarification for specific regions: the prerequisite should be a preliminary identification of the industrial specialization of a region, based on the analysis of demographic, geographic and innovation potential with the subsequent development of relevant measures of state support.

INOVATIVNE TEHNOLOŠKE TOČKE RASTA KAO NOVI ALAT DIGITALNE EKONOMIJE

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SAŽETAK

Razvoj raznih inovativnih tehnoloških točaka rasta kao glavni pokretač gospodarskog rasta temelj je gospodarstva novog tehnološkog poretka. Digitalna ekonomija zahtijeva potrebu prelaska u dostignuća četvrte industrijske revolucije kako bi se poboljšala nacionalna i međunarodna konkurentnost domaćih proizvođača. Ovaj rad opisuje uvjete ograničenih investicijskih resursa za inovativni razvoj gospodarstva većine zemalja. Da bi se riješio taj problem, autori su predložili suvremeni institucionalni kontekst modernizacije javne uprave. U radu se navode sljedeći mehanizmi i institucije za potporu novoj ekonomskoj politici: akumulacija intelektualnih resursa i potpora inovativnom poduzetništvu (poslovanju).

Ključne riječi: digitalna ekonomija; ekonomska politika; inovativna tehnološka točka rasta; institucija; javna uprava

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