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Cluster Development of the Region on the Basis of Innovation Under the Sanctions (Case Study of the Petrochemical Complex in the Samara Oblast)*

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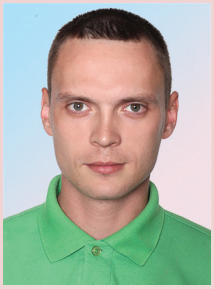

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Abstract. In modern conditions, ensuring rapid economic development is a priority task for industrial policy, but its achievement is hampered by the sanctions imposed on Russia. Russian oil industry has become an object of special attention to the countries that initiated the sanctions. The goal of the paper is to substantiate a set of practical measures that promote cluster development through innovation as an opportunity to facilitate economic growth in the region under the sanctions. In the framework of the goal we achieve the following objectives: we substantiate the cluster approach as a theoretical framework for the innovation-driven development of the industrial complex; we explore the current state and the value of the petrochemical complex in the economy of the Samara Oblast; we justify the stages of formalization of the industrial cluster on the basis of innovation. Scientific novelty of the research consists in the fact that it expands the existing system of knowledge about economic sanctions not only as a tool of political pressure, but also as a resource for priority development of regions. The application of the research findings is associated with substantiating a set of practical measures to achieve priority development taking into account economic specialization of the region. The goal is achieved with the use of logical, systematic and statistical analysis of the regional economic system, and the data is taken from publicly available official sources. We prove that the nature of the sanctions is similar to that of economic crises, and the sanctions can and should be used to promote advanced growth in regional economies. We point out that one should not underestimate the role and importance of the raw materials sector in economic development in the regions where it can serve as a driver of development for manufacturing industries. The Samara Oblast is one of such regions; it has a petrochemical cluster, which in fact is an archaic system of a territorial-industrial complex. The paper reveals opportunities and proposes a set of practical measures to facilitate priority development of an emerging petrochemical cluster in the Samara Oblast on the basis of innovation. The prospects for further research include a search for new opportunities to accelerate innovative development of regions under the sanctions.

Key words: clusters, innovation development, industry, region, sanctions.

Introduction

Since 2014 the Russian economy has been under the sanctions imposed by Western countries, due to which the already unfavorable economic situation in the regions is becoming even worse [18; 19]. Under the circumstances it seems necessary to work out practical measures to engage internal resources for the purpose of providing economic growth in the regions on the basis of scientific research into effects of the sanctions.

International economic sanctions are a means of political pressure, but their effect is not always unambiguous [17]. Originally introduced by the U.S., supported by the EU and other countries and intended more as political action against certain politicians and officials, the sanctions have later adopted a clear economic nature and caused debates and controversial opinions on the subject. Scientists such as A.N. Barkovskii, S.S. Alabyan, and O.V. Morozenkova [2] point out "the necessity to restore economic cooperation between the EU and Russia". In contrast to this approach, S.Yu. Glazyev [5, 6] suggests we should shift from external to internal sources of development. When pointing out a possible long-term negative impact of the sanctions on the Russian economy, researchers M.V. Klinova and E.A. Sidorova propose a more vigorous development of market mechanisms for the formation of new business models "with the use of tools of fiscal and monetary policy and mechanisms of partnership between the state and private capital" [10].

Due to the existence of controversial views on this issue, we have set ourselves the goal of substantiating a range of practical measures on innovation-based cluster development as an opportunity to ensure economic growth in the region under the sanctions.

We achieve the goal by implementing the following tasks: 1) we substantiate the cluster approach as a theoretical basis for the development of the industrial complex on an innovation basis; 2) we explore the current state and the value of the petrochemical complex in the economy of the Samara Oblast; 3) we substantiate the stages of formalization of the industrial cluster based on innovation. The principal novelty of our viewpoint lies in the fact that we expand the existing system of knowledge about economic sanctions not only as a tool of political pressure, but also as a resource for priority development of regions. The applied use of the research results is related to the justification of a set of practical measures aimed at priority development of a region taking into account its economic specialization, which determines the originality of our ideas.

The Russian economy that depends heavily on the mining sector was meant to be seriously damaged and put into a prolonged recession[1], according to the intent of those who designed the sanctions. It should be noted that the sanctions, just as the fall in oil prices that accompanied them, had a negative impact on innovation activity in Russia. In 2015 in comparison with the previous period the innovation activity of organizations remains low: 9.3%, compared with a target value of 11.3%. Expenditures on technological innovation in the manufacture of coke, petroleum and chemical products decreased by 33.5% and 20.5%, respectively. Industrial production experiences a reduction in the proportion of innovative products for the second year in a row. However, expenditures on technological innovation in the extraction of fuel and energy resources increased by 11.1%[2]. From 2016 onward, we can say that the effect of the sanctions is mitigated (in the first place we mean inflation targeting regime and direct government programs to support industries), which increases the sustainability of the corporate oil and chemical sector. As a result, the volume of investments in fixed capital has come very close to the 2013 level, and we observe certain growth in mining and chemical industry: by 114.4% and 109.6%, respectively, compared to the 2015 level.

In 2016–2017 we can point out the following sanctions-driven conditions that can establish trends promoting the integrated development of oil and chemical industry in the form of a cluster:

1. In 2016 the chemical industry is one of the drivers that can take the Russian economy out of recession by providing a growth of 107% on average. The volume of shipped goods in the chemical industry increased by 25.4%[3], labor productivity increased by 23.5%, which is a proof of modernization of production in this sector. Chemical production and "oil and petrochemical companies with resource base" play a major role in import substitution[4].

[1] Weiss A.S., Nephew R. *The Role of Sanctions in U.S.-Russian Relations*. 2016. Available at: http://carnegieendowment.org/2016/07/11/role-of-sanctions-in-u.s.-russian-relations-pub-64056 (accessed: 10.03.2017).

[2] *Official website of Rosstat. Science and innovation*. Available at: http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/science_and_innovations/science/# (accessed: 11.03.2017)

[3] *Official website of Rosstat.* Industrial production. Available at: http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/enterprise/industrial/# (accessed: 27.07.2017).

[4] Plants themselves will concoct something. *Rossiiskaya Gazeta. Federal Edition,* 2016, no. 6996 (128). Available at: https://rg.ru/2016/06/14/dolia-importa-v-himicheskoj-promyshlennosti-upala-na-tret.html (accessed: 27.07.2017).

2. The imposition of the sanctions incited oil companies to take steps to reduce their dependence on imported equipment and technology, including software. For example, Rosneft has updated its corporate program for import substitution and localization of engineering and technology, which includes three priority goals: strategic agreements with leading manufacturers, launching the assembly of high-tech equipment on the territory of Russia, and achieving the level of localization of 70 to 100%. If in 2014 the share of foreign purchases was 22%, then in 2015 it reduced to 17%.

A new package of restrictive measures as of July 2017 jeopardizes the implementation of international investment projects in the oil and gas sector, affecting the interests of a wide range of domestic and foreign participants (investors, creditors, suppliers and consumers of goods or services for Russian export projects). It can be assumed that the implementation of a new package of sanctions will to a certain extent stimulate additional domestic demand in the oil sector for high quality products and services of technological, industrial, engineering, logistics and service companies and financial institutions that were previously provided by American and European companies.

In our opinion, the sanctions, together with unfavorable trends in oil prices are not just a challenge, they can become an efficient driver of innovation in the economy of Russian regions by promoting the conditions for accelerated development and implementation of measures for priority innovation development.

We can support this viewpoint with the opinions of M.V. Ershov [9] who says it is necessary to use internal resources to enhance the role of national market; A.G. Aganbegyan [1] who points out it is advisable to boost investments in fixed capital and human resources by allocating funds to technological renovation of existing production. We probably are already on the verge of a "new industrial revolution" [11], but in pursuit of high technology we must not forget about the powerful industrial production systems of the petrochemical sector and its huge potential market, including the export market.

E.V. Romanov [13] expresses a different opinion concerning the commodity sector, which, in his view, represents significant potential for funding future re-industrialization, because it allows its processing segment to be enhanced. In turn, S.D. Bodrunov [3; 4], R.S. Grinberg, and D.E. Sorokin [4] see the problem in the fact that the level of development of the manufacturing sector is lagging significantly behind that of the raw materials extracting sector. According to S.Yu. Glazyev, the Russian economy has all the capabilities for priority growth, but they are currently impeded by insufficient utilization of production capacities, low efficiency in the use of the raw materials base and science and technology potential [5]. The time has come for structural reforms, in the course of which it is certainly necessary to develop the mining sector, which must become a source of finance, raw materials and technology for establishing production of goods with high added value not only in petrochemical industry, but also in associated industries (mechanical engineering, aircraft building, etc.). According to the Plan for development of gas- and petrochemical industries in Russia for the period up to 2030, per capita consumption of polymers for the next 20 years will increase considerably and will exceed the current European indicators,

which provides significant opportunities for the development of domestic production[5]. It is of interest that the above numbers refer to the country as a whole. Unfortunately, at the regional level there is a clear gap in the research dedicated to development of regions under sanctions. The present study aims to understand the role of sanctions from the perspective of opportunities for regional economic growth. The task becomes more complicated due to a high differentiation of the regions by level of their socio-economic development and specialization, which denies the application of common approaches to the development of practical measures to ensure economic growth in regions under sanctions. At the same time the Samara Oblast is among the old industrial Russian regions with a developed petrochemical complex. Therefore, our study is important to researchers, specialists, representatives of the authorities involved in the development of strategies and regional development programs in the period of the sanctions pressure on the Russian economy.

Research methodology

The system approach and the methods of logical, systematic and statistical analysis form the methodological basis of our study. We have chosen these methods because, first, they allow us to describe qualitatively the state of the analyzed object, and second – to ensure the comprehensiveness and completeness of coverage of all elements of the regional economic system.

The method of logical analysis helps us justify the use of the cluster approach to innovative development of the region under the sanctions and to work out the stages of formalization of the cluster. We use the method of statistical analysis to confirm the findings on the current state of the petrochemical cluster in the Samara Oblast. In this paper we also use the following general research methods: induction, deduction, analysis and synthesis. Through the use of these methods we ensure the scientific nature of the study.

The results of the study

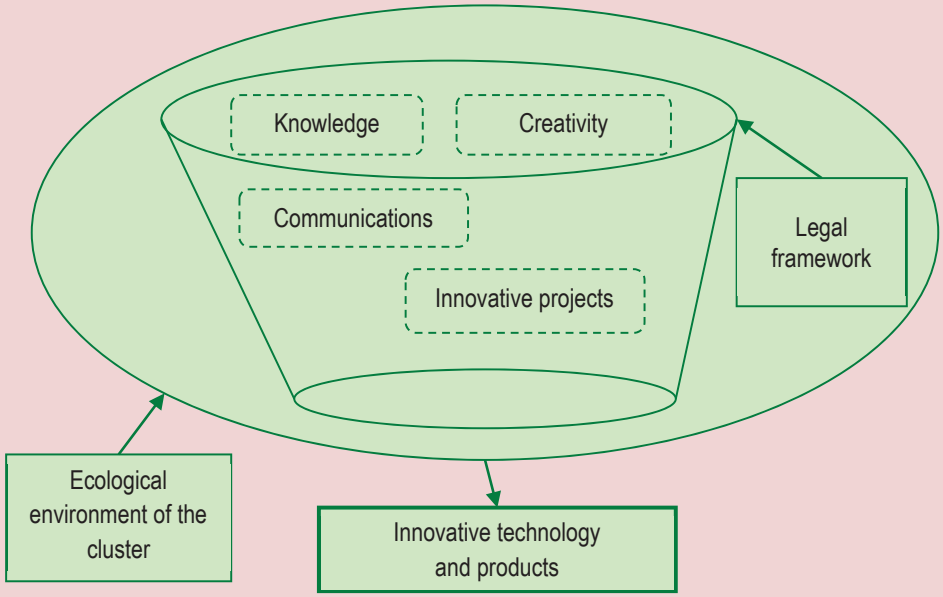
International theory and practice of ensuring competitiveness of regional economy motivates the development of Russian industry on the cluster basis due to a more comprehensive use of regional competitive advantages, extension of vertical and horizontal links between participants and promotion of innovation activities [12; 16; 21]. In this case it is the very innovation activity that comes to the fore and becomes a driver to fill the entire economic space and the base that forms an ecosystem of the cluster in which creativity, knowledge, communication, and regulatory environment are vital to such innovation *(Fig. 1)*.

In a general sense, clusters are a concentration of positively interacting economic entities located in close proximity to each other. The Federal Law "On industrial policy in the Russian Federation" defines the industrial cluster as "a set of actors in the industry that are connected through the relationships in this sphere due to territorial proximity and functional dependence and located on the territory of the same constituent entity of the Russian Federation or on the territories of several constituent entities of the Russian Federation"[6]. The definition of "industrial cluster" limits the concept of cluster

[5] *Plan for development of gas- and petrochemical industries in Russia for the period up to 2030 approved by Order 79 of March 1, 2012 by the Ministry of Energy pf the Russian Federation*. Available at: http://www.consultant.ru/cons/cgi/online.cgi?req=doc;base=EXP;n=588708#0 (accessed: 11.03.2017).

[6] *Federal law 488-FZ of December 31, 2014 "On industrial policy in the Russian Federation"*. Available at: http://base.garant.ru/70833138/ (accessed:11.04.2017).

Figure 1. The funnel of innovations in a cluster



Source: compiled by the authors.

to a group of industrial entities only and does not include other participants who carry out support functions, an innovation component among them.

In contrast to the Russian practice, the EU Commission for state support of research and innovation has included the creation and development of clusters in one of the methods for stimulating innovation activity and defined the term "cluster" as "a system of interconnected enterprises and research institutes located in the same place" [23].

Thus, the development of the cluster cannot be considered in isolation from innovation activities of enterprises participating in the cluster, since it is the very innovation activity that becomes the foundation for further development of the cluster.

Taking into consideration the voluntary nature of interaction between cluster members, we note that coordination of their economic interests is a factor that ensures stability of the whole cluster system. Therefore, it is advisable to pay attention to technology platforms as a new instrument of state regulation, introduced just over 10 years ago in the countries of the European Union with the aim of harmonizing cross-national interactions.

Technology platforms were identified as the sites where the strategy for science and technology development is elaborated, which then becomes the basis for specific programs and projects of the EU Framework Program for Research [8]. It should be noted that in Russia certain industries already have technology platforms; a list of 27 of them has been approved by the Government Commission on high technology and innovation[7]. Petrochemistry has two technology platforms: "New polymeric

[7] Innovations in Russia: official website of Rosstat. Available at: http://innovation.gov.ru/ru/taxonomy/term/2331 (accessed: 15.04.2017).

composite materials and technologies", and "Deep processing of hydrocarbon resources and the disposal of oil refinery waste".

Technology platform is a communication tool designed to boost the work on creating new advanced technologies and products. Technology platform is a sort of site (not connected to any territory) for sharing resources, engaging stakeholders to implement joint projects, and it can be used as a mechanism of interregional cooperation in the functioning of a cluster in the implementation of innovative projects.

Another tool of innovative development actively supported by the government in recent years is the national technology initiative, in particular: "TechNet" and "EnergyNet". The national technology initiative, which Russian President declared to be a response to the sanctions imposed against Russia and a priority of governmental policy when delivering his Address to the Federal Assembly on December 4, 2014, is a program of measures for creating fundamentally new markets and establishing conditions for global technological leadership of Russia by 2035[8].

The development of the petrochemical cluster in the long term must be linked to the "roadmaps" of technology platforms and the national technology initiative.

In cases when cluster activities intersect with the activities of technology platforms and the national technology initiative, we can recommend the following:

– link the activities within cluster initiatives to the activities within technology platforms;

– organize cooperation between representatives of technology platforms, the national technology initiative and stakeholders (participants. – Author's note) of the cluster in the implementation of research projects and technological developments.

We agree with I.G. Dezhina [8] who points out that technology platforms can serve as a tool to enhance network interactions within the cluster and between clusters. This is justified by the fact that the sites of technology platforms in the elaboration of strategic development areas serve as centers of attraction for experts in their fields, but are not tied to specific territories.

A little over ten years ago, G.R. Khasaev was one of the first in Russia to launch cluster policy in the Samara Oblast, and he supported the succession of clusters as an alternative model of territorial-industrial complexes [14, 15]. It is for a reason that the Samara Oblast is one of Russia's first regions that started to study and use the cluster approach in regional development management.

In order to create a full-fledged petrochemical cluster in the Samara Oblast it is necessary to implement a coordinated development of oil refining, petrochemical, and chemical enterprises and the enterprises that use base polymers as petrochemical feedstock for further processing.

Both an advantage and disadvantage can be found in the prevailing value added chain in the Samara Oblast, from mining to the production of finished products. The segment of production of secondary products like solvents, plastics, rubber, etc. is less developed. There is a large number of industrial design and educational organizations. It is an advantage since the region already possesses all the basic entities of a cluster, an established base and infrastructure. The drawbacks can be found in

[8] The session of the Presidium of the Council on Economic Modernization and Innovation Development of Russia under the President of the Russian Federation. Available at: http://government.ru/news/26436/ (accessed: 17.04.2017).

the traditional production cycle and resource-driven production, they will be significant obstacles to the development of the cluster of a new type, based on innovations. High oil prices until 2014 provided a margin sufficient for a comfortable existence of oil companies and impeded the transition of the sector to innovative development, which can be linked to the Groningen effect[9]. A "double blow" on the Russian economy expressed in the decline in world oil prices and the imposition of economic sanctions aimed mainly at the oil and gas sector necessitated a revision of the tools for development of the industry.

In this regard, in the Samara Oblast there is an understanding that the development of clusters should be carried out only with the support of their "innovativeness"[10]. When considering the petrochemical cluster, we must take into account its specific features, which consist in the vertical integration of the corporation – the core of the cluster (PAO NK Rosneft), which extends geographically beyond a single region as an administrative-territorial unit, which makes it difficult to carry out organizational-economic regulation of the cluster development on the level of regional administrative decision-making. However, cluster policy in the petrochemical sector implemented on the basis of innovation is a priority in the Samara Oblast.

So, currently the draft Strategy for socio-economic development of the Samara Oblast for the period till 2030[11] in which the strategic prospects for development of the oblast are directly related to the petrochemical cluster, one of the three priority clusters. The Resolution of the Government of the Samara Oblast "On the approval of the state program of the Samara Oblast "The creation of favorable conditions for investment and innovative activity in the Samara Oblast for 2014–2018" determines that "the main prospective task for the Government of the Samara oblast is to work on a system basis in order to form and implement innovative projects, promote innovative products on the domestic and world markets, develop cooperation in the innovation sector, ensure coordinated work of innovative development institutions, and promote the implementation of cluster initiatives and projects"[12].

The oil industry in the Samara Oblast has special competitive advantages in comparison with other regions. First, it is because oil raw materials go through the entire production chain – from extraction to commercial production – on the territory of the oblast. Assessing the dynamics of production and processing in 2013–2016 we note a growth of production alongside a decline in the volume of processing *(Table)*.

Positive dynamics of oil production are associated with the fact that innovative technology in recent years was introduced in this sector due to major investments of oil-producing companies. For instance, in the period from 2012 to 2015, investment in the oil

[9] The Groningen effect (Dutch disease) is a negative effect caused by the strengthening of national currency due to high prices for exported raw materials, which contributes to the development of commodity sectors in the economy. This effect was observed in the Russian economy since the beginning of the 2000s. For more information see: Humphreys M., Sachs J.D., Stiglitz J.E. *Kak izbezhat' resursnogo proklyatiya* [Escaping the Resource Curse]. Moscow: In-t Gaidara, 2011. 464 p.

[10] The Order of the Ministry of Industry and Technology of the Samara Oblast "On approval of the Plan for development of the petrochemical complex of the Samara Oblast for the period until 2018" No. 170-p of December 22, 2015.

[11] The draft Strategy for socio-economic development of the Samara Oblast for the period up to 2030. Available at: http://economy.samregion.ru/

[12] The Resolution of the Government of the Samara Oblast "On approval of the state program of the Samara Oblast "Creation of favorable conditions for investment and innovation activity in the Samara Oblast for 2014–2018" dated November 14, 2013 No. 622. Available at: http://www.innovation.gov.ru/sites/default/files/documents/2016/71103/6364.pdf (accessed: 17.05.2017).

Dynamics of oil extraction and refining in the Samara Oblast (2013–2016)*

Year	Extraction		Refining	
	Volume, mln tons	Growth, %	Volume, mln tons	Growth, %
2013	15.2	-	22.0	-
2014	15.6	2.6	22.1	0.45
2015	16.5	5.8	20.8	-5.9
2016	16.7	1.2	19.7	-5.29

* Compiled by the authors with the use of the data of the Ministry of Economic Development, Investments and Trade; Samarastat.
Sources: Scenario conditions for socio-economic development of the Samara Oblast for 2015 and for the planning period of 2016 and 2017; Scenario conditions for socio-economic development of the Samara Oblast for 2016 and for the planning period of 2017 and 2018; Natural resources and environmental protection: Samara statistical yearbook. 2015. P. 234.

industry in the Samara Oblast was 10.34 billion rubles. In 2016–2018 it was planned to allocate additional investment in the amount exceeding 63.4 billion rubles.

Oil processing in the Samara Oblast is carried out at three major refineries within OAO NC Rosneft: JSC Novokuibyshevsk Refinery, JSC Kuibyshev Refinery, and JSC Syzran Refinery. The capacity of the three refineries of the Samara group of Rosneft exceeds 21 million tons per year. The largest share in the processing of crude oil belongs to Novokuibyshevsk Refinery. The reduction in the volume of refining is due mainly to a reduction in the volume of oil received for processing. In the circumstances and in connection with reducing exports of oil products by 23% in 2016 – to the level of 2013 (six million tons), more importance is attached to the questions of increasing the efficiency of refineries through the introduction of new technology that improve the depth of refining. The value of this indicator in the Samara Oblast in 2016 amounted to 74%. In 2018, the figure is planned to increase up to 90%[13].

In order to increase the depth of refining and improve environmental and industrial safety the petrochemical industry constructs new and upgrades existing processing units. For example, in 2016–2019, Domanik Oil AS company in the framework of a pilot project will drill and test at least three horizontal exploratory wells; it will also carry out an advanced research at the license subsoil blocks of JSC Samaraneftegaz, one of the largest petrochemical enterprises in the Samara Oblast. JSC RITEK, a subsidiary of LUKOIL is a specific scientific and technological facility for testing new progressive technologies of oil production. Many small deposits in the Samara Oblast contribute to the testing of new developments in the oil industry.

The chemical industry is actively developing and it is one of the backbone industries in the region, since it provides 14% in the structure of regional industrial production. In 2016, unlike other types of activities, the chemical industry shows a 104% growth compared with the level of 2015 due to a situation favorable for import substitution[14].

The development of the chemical industry in the Samara Oblast is promoted by the implementation of investment projects at major chemical plants and at the industrial site of the specialized Industrial Park Togliattisyntez. Despite the fact that the petrochemical sector

[13] The results of socio-economic development of the Samara Oblast for January – August 2016 and the expected development outcomes for 2016. Available at: http://economy.samregion.ru/upload/iblock/c28/2_itogi_2016.docx (accessed: 14.04.2017).

[14] Ibidem.

has long occupied a stable position in the economy of the Samara Oblast and it currently comprises more than 30 companies, it is still premature to identify their joint activity as a cluster, because the structure and model of interaction between industrial enterprises, universities, and support organizations were established quite a long time ago and they are now developing in the framework of current economic needs. In order to achieve breakthrough development of the petrochemical cluster on the basis of innovation it is necessary to develop and implement practical measures aimed to streamline economic and administrative relations on the basis of creativity, creation and use of knowledge, networking and communication in the process of joint implementation of innovative projects, including those in related fields.

Relying upon the works of leading Russian scientists (A.G. Aganbegyan [1], I.V. Pilipenko [12] S.D. Bodrunov [3; 4], R.S. Grinberg, Yu.V. Yakovets [4], and others) and foreign scientists (M. Porter [21; 22], M. Enright [16], etc.) devoted to regional industrial development, we believe that all the work on cluster formalization should be arranged so as to bring the petrochemical cluster of the Samara Oblast in line with the world's leading petrochemical clusters and make it a highly integrated industrial environment for the sector in which many partners (suppliers, contractors and customers) provide the most efficient innovation-based interaction within the chain of business processes. We suggest that practical measures for the development of the petrochemical cluster on the basis of innovation should be implemented in several stages *(Fig. 2)*.

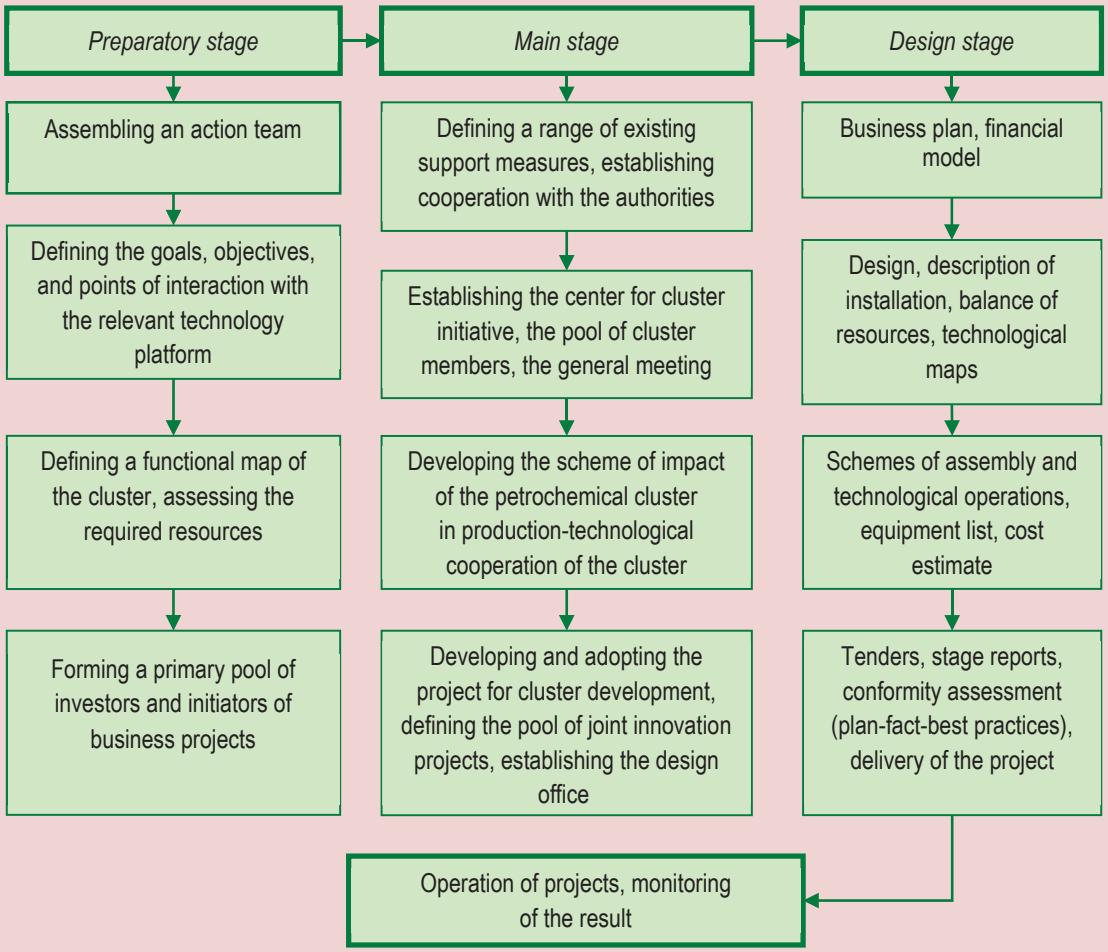
Preparatory stage. It is necessary to form an action team from among organizations that are technologically united by core and support business processes. Any of the large petrochemical enterprises that work in the Samara Oblast, namely OJSC Samaraneftegaz, JSC Kuibyshev Refinery, JSC Novokuibyshevsk Refinery, JSC Novokuibyshevsk Petrochemical Company, JSC Syzran Refinery, PAO KuibyshevAzot, OJSC TogliattiAzot, LLC SIBUR Togliatti, JSC Promsintez and others can be initiators of the cluster formalization.

Research support to the petrochemical complex is carried out by the following specialized research institutes: JSC Giprovostokneft, OJSC SamaraNIPIneft, PAO Samaraneftehimproekt, PAO Srednevolzhsky Research Institute for Oil Refining, JSC Togliatti Institute for Nitrogen Industry, etc., and the following educational institutions: Samara State Technical University, Togliatti State University, etc.

Main stage. A necessary condition for the formation of the petrochemical cluster in the Samara Oblast consists in providing support to the project by federal and regional authorities. Along with addressing organizational issues the action team should determine the goals and objectives of the cluster formation, areas of its development, points of its interaction with a relevant technology platform, prospects of cooperation with the national technology initiative, and develop a draft functional map of the cluster.

In order to coordinate the work on innovative development of the cluster, it is necessary to create a management company (a center for cluster initiative) in the form of a non-profit organization or association. Centers for cluster initiatives should aim to identify the needs of both industry and academia and serve as a means to satisfy the need for collaboration with the help of a supportive regional ecosystem.

Figure 2. Stages of innovation-based formalization of the petrochemical cluster



Source: compiled by the authors.

Financial assistance to the coordinator organization is provided at the expense of contributions paid by cluster participants and also through paid services provided by the management company of the cluster in the interests of its members and the cluster infrastructure. The main functions of the management company are related to the rendering of organizational, methodological, expert, and analytical and information support to cluster members for the purpose of its progressive development.

Working jointly, cluster participants develop the scheme of influence of the petrochemical cluster on its production-and-technology cooperation that is a graphic diagram of the changes in cooperation between the participants in the joint activities within the cluster. The draft Strategy for socio-economic development of the Samara Oblast for the period up to 2030[15] contains

[15] The draft Strategy for socio-economic development of the Samara Oblast for the period up to 2030. Available at: http://economy.samregion.ru/ (accessed: 10.04.2017).

an implementation chart for development of the cluster of oil production, refining, petrochemical and chemical production in the Samara Oblast.

Cluster members develop a program (project) for development, which includes a pool of joint projects, the implementation of which aims to develop the participants taking into account necessary support from the authorities. Preference should be given to innovative projects and to projects that address import substitution and innovative development issues. In order to boost efforts for creating promising commercial technology, new products (services) and attracting additional resources for research and development by involving all stakeholders (business, science, government, civil society) it is advisable to use the technological platform "New polymeric composite materials and technologies", and "Deep processing of hydrocarbon resources and the disposal of oil refinery waste".

At the preparatory and main stages one should use the guidelines developed by the Ministry of Industry and Trade of the Russian Federation, and National Research University "Higher School of Economics"[16]. The guidelines contain quite a detailed description of organizational and methodological support to establishing a cluster.

Design stage. It involves the establishment of a design office as part of the center for cluster initiatives; the office will be responsible for planning, methodological support and monitoring of joint projects implementation. In the composition of the design office it is possible to allocate a group of research projects (enterprises, universities, research institutes, grant makers), a group of industrial projects (with the involvement of engineering companies FEED, PMC, EPC contractors) and a group of service and infrastructure projects.

We should note that the Samara Oblast has all the preconditions for the petrochemical cluster to be established and developed. The oblast is included in the federal program for development of petrochemical industry. The oblast has a stable and favorable investment climate and is among the top ten subjects of the Russian Federation in terms of investment potential. The leadership of the oblast considers the establishment of a petrochemical cluster as a priority activity for a long time.

Upon the initiative of the Samara Oblast Government a system of infrastructure organizations for support and promotion of innovative developments was created with the use of regional budget funds and federal funds. The system includes the Innovation Fund of the Samara Oblast, the Regional Center for Innovation and Technology Transfer, the Regional Venture Fund, the Center for Innovation Development and Cluster Initiatives, a technology park, five business incubators, the Guarantee Fund, the Information and Advisory Agency, the Association of Small Innovative Enterprises of the Samara Oblast, microfinance and other organizations.

Among the achievements in this direction we can name two industrial chemical parks that are to be opened in the oblast. One of them is under the control of SIBUR, a Russian chemical colossus. The parks will be able to accommodate successful Russian and

[16] Methodological guidelines on the creation of industrial cluster. The project dated December 1, 2015. The Ministry of Industry and Trade, National Research University "Higher School of Economics". Available at: http://spbcluster.ru/files/proekt_metodicheskih_rekomendacij_po_formirovaniyu_promyshlennogo_klastera_23_11_15.pdf (accessed: 10.04.2017).

international companies. Furthermore, the development of the petrochemical cluster is held with the involvement of NK Rosneft – a major player in the industry – in the framework of the adopted and regularly updated cluster strategy.

Analysis and explanation of the obtained results

Thinking about the ways to advance Russia's development in conditions of a global crisis, S.Yu. Glazyev in his monograph points out that "for any country, a necessary condition for successful recovery from a crisis is to have its own strategy focused on the preservation of its economic potential and rapid creation of preconditions for the growth of new industries" [6].

The results obtained extend scientific ideas concerning the fact that sanctions are not the only a source of negative impacts on the economy, but they also provide opportunities for advancing innovation development in regions. It is justified by the following.

First, sharing the viewpoint of leading Russian scientists (S.Yu. Glazyev, S.D. Bodrunov, R.S. Grinberg, etc.), we prove that under economic sanctions the raw materials sector needs to be developed in associated processing industries.

Second, it is necessary to shift from regional pseudo-clusters that in fact represent an archaic structure of territorial-industrial complexes (like the petrochemical complex of the Samara Oblast) to clusters of a new formation (the relevant international experience has already been accumulated) that are based on the network interaction of participants in the implementation of innovative projects in close cooperation with the national technology initiative according to the specialization of the clusters.

Third, taking into account current experience, new institutions for innovative development, such as the national technology initiative, and with regard to regional specifics of the structure of the petrochemical complex, we propose the stages of formalization of the petrochemical cluster on the basis of innovation, which will, in our view, give new impetus to its development.

The development of the petrochemical cluster is of fundamental importance for future economic development of the Samara Oblast, because according to forecasts it has a significant potential market that provides a higher rate of growth compared with other industries, such as the automotive industry that has dominated in the region until recently. In addition, it employs a significant part of the workforce.

Summarizing the above, we note the following key opportunities for innovative development of the cluster:

– providing support to cluster initiatives on the federal and regional levels;

– implementing the national technology platform, a set of programs on import substitution, technological development, since the chances of participation in them increase with the implementation of major joint innovative projects;

– integrating the petrochemical industry of the Volga region with oil refining and petrochemical enterprises of the Samara Oblast, allowing to produce a large number of products, which is a competitive advantage over the enterprises located in Western Siberia[17];

– enterprises are located in close proximity, which helps optimize logistics.

[17] The Samara Oblast is recreating its petrochemical cluster. Available at: http://tlt.volga.news/article/216413.html (accessed: 02.05.2017).

Controversy concerning the results

Successful innovation activity in clusters requires a proper ecosystem; moreover, the presence of transparent relationships between stakeholders is a necessary condition. Russian regions have only recently embarked on a course of cluster development, while Western countries have already accumulated sufficient experience in this regard [24], positive as well as negative, which leaves room for scientific debate in our country. For example, Ch.R. Østergaard and E. Park [20] in their study show certain skepticism about the developmental role of the cluster and prove that in case of unexpected changes in technologies and market conditions the clusters are reduced, and one of the reasons for such reduction is the work of multinational companies that are capable of taking out considerable resources in the short term. Such results must be considered, and moreover, the issue concerning negative effects of the cluster requires deeper study, but apparently it is a matter for the future.

In our study we use the Samara Oblast as an example to show the process of identifying opportunities for development of regional economy under sanctions, taking into account regional specialization. The proposed practical measures of formalization of the petrochemical cluster can be used by regional authorities and interested business entities in the course of innovative development of the region, and not only in the Samara Oblast, but also other regions with similar specialization. It appears that cluster development is not a panacea in conditions of sanctions, and it is necessary to study promising opportunities for innovative development of regions under sanctions while taking into account specific features and specialization of the regional economy.

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