MINISTRY OF ECONOMIC DEVELOPMENT
OF THE RUSSIAN FEDERATION

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HIGHER SCHOOL OF ECONOMICS
NATIONAL RESEARCH UNIVERSITY

CLUSTER POLICY IN RUSSIA:

FROM LOCAL ADVANTAGES TO GLOBAL COMPETITIVENESS

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The report presents a review of the results achieved by the first ten years of cluster policy in Russia. It summarises the outcomes of three cluster support programmes: for pilot innovation clusters, leading clusters, and industrial clusters. The programmes are analysed in terms of the selection process and geographic distribution of their beneficiaries, key performance indicators, and areas of federal support.

The edition also offers a structured description of the leading clusters in the following categories: general information (mission, industry specialisation areas, products and services, key members, contacts); activities of the cluster management organisation; success stories, and invitation to cooperation. Leading cluster profiles have been designed in line with the European Cluster Collaboration Platform (ECCP) questionnaire.

The report is of practical interest to government agencies, cluster management organisations, companies, universities, research organisations, and to anyone else interested in innovative, industrial and cluster policies.

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CONTENTS

INTRODUCTION

The Russian cluster landscape is becoming increasingly varied. Since the approval in 2008 of the Long-Term Socio-Economic Development Concept for the Russian Federation through 2020 [Government of the Russian Federation, 2008], which established the basic principles of the cluster policy, more than 110 cluster initiatives[1] have emerged, bringing together more than 3,000 organisations and providing about 1.3 million jobs. Over the past ten years, the cluster policy agenda has occupied an important position in the Russian Government's action plans. Today, half of the cluster initiatives receive various kinds of public support.

Cluster policy in Russia is implemented by two nationwide agencies: the Ministry of Economic Development and the Ministry of Industry and Trade (figure 1). Since 2010, the Ministry of Economic Development has provided subsidies to regional authorities for establishing and supporting cluster development centres (CDCs) [Government of the Russian Federation, 2014]. The programme's budget from 2010 to 2016 amounted to 1.06 billion roubles (US$ 25.55 million)[2]. As a result, 34 CDCs were established in 33 Russian regions by 2016. They support cluster initiatives by providing consulting and organisational services (such as market research, organising educational and information-sharing events, trade fairs and exhibitions, publicity campaigns, assisting in the development of business plans, strategic documents, etc.) to the small and medium-sized companies that are cluster members.

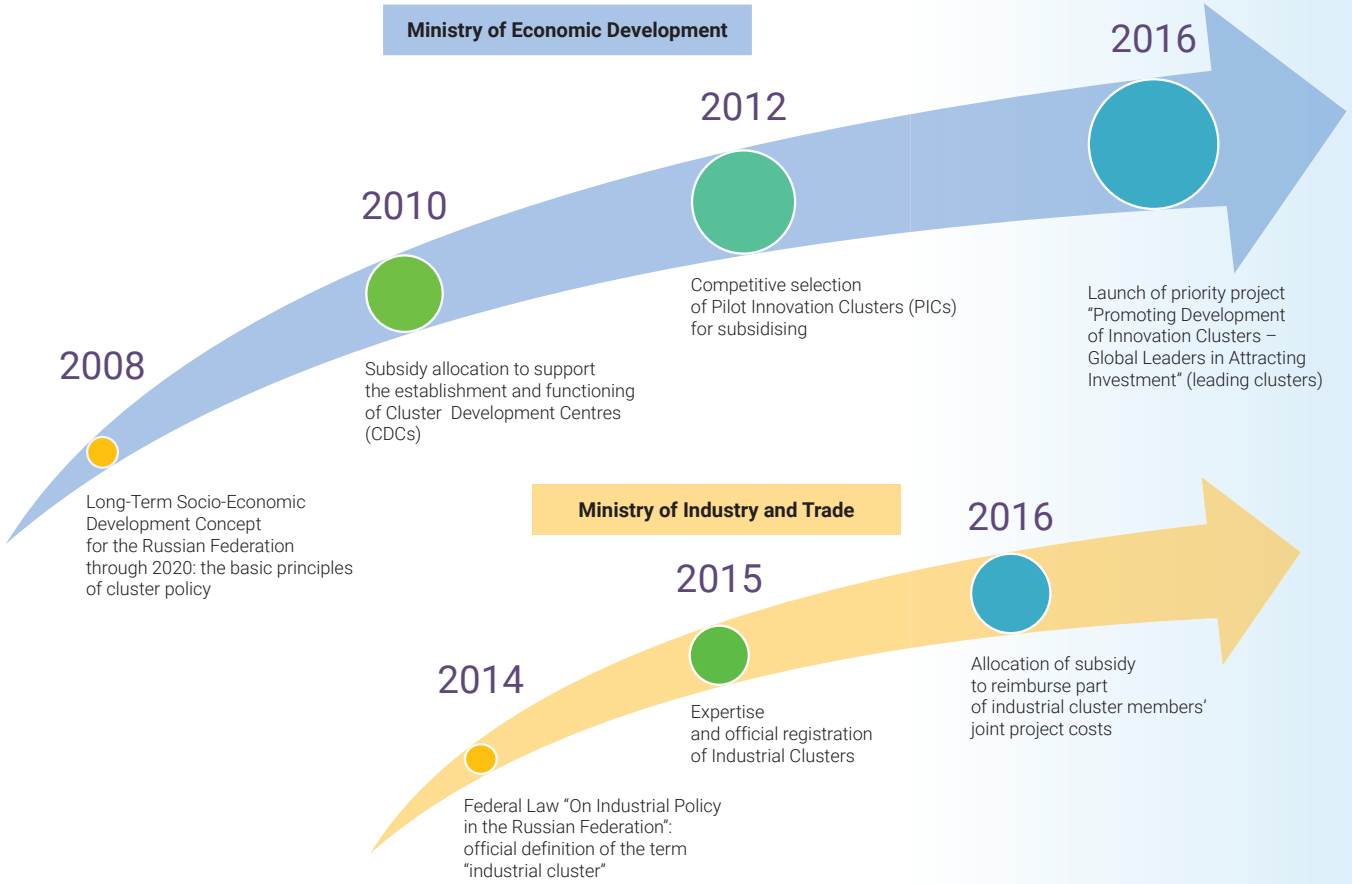
In 2012, the Ministry of Economic Development launched the first (and so far the largest) programme to support pilot innovation clusters (PICs); from 2013 through 2015, its total budget is in excess of 5 billion roubles (US$ 112.51 million). The programme was targeted to enhance the cooperation among enterprises, research and educational organisations of clusters, and foster the development of their home regions.

In 2016, the Ministry of Economic Development has moved on to supporting clusters on the basis of project management principles. The new priority project "Promoting Development of Innovation Clusters – Global Leaders in Attracting Investment" (the priority project; leading clusters) was aimed at achieving accelerated growth rates

[1] A cluster initiative is defined as "organised efforts to increase the growth and competitiveness of a cluster within a region involving cluster firms, government and/or research community" (Sölvell et al., 2003, p. 31). Hereinafter, the terms "cluster" and "cluster initiative" are used as full synonyms, as the term "cluster" is most frequently applied in federal support programmes.

[2] For all currency equivalents (roubles – US dollars), the annual average exchange rate of the Central Bank of the Russian Federation was used for the respective year. For multiannual periods, each year's annual average exchange rates were summed, and then the arithmetic average was calculated. In 2010–2016, the exchange rate was 41.48 roubles per US$ 1; in 2013–2015, the exchange rate was 44.44 roubles per US$ 1; in 2015, the exchange rate was 62 roubles per US$ 1; in 2016, the exchange rate was 66.35 roubles per US$ 1; in 2017, the exchange rate was 58.09 roubles per US$ 1; in 2016–2017, the exchange rate was 62.22 roubles per US$ 1.

Figure 1. Cluster policy evolution in Russia



Source: compiled by the authors

by using more efficient mechanisms to support innovation, while promoting integration of Russian companies into global chains of added value.

A new cluster policy vector was set in 2014 with the adoption of the Federal Law dated December 31, 2014 № 488-FZ "On Industrial Policy in the Russian Federation". For the first time in Russian practice, the law provided an official definition of the term "industrial cluster" and described various steps to further the activities of such clusters. Beginning in late 2015, the Ministry of Industry and Trade has implemented a programme to support industrial clusters. The participating clusters that meet the Ministry's criteria may claim subsidies to recover part of their joint project expenses incurred producing products that replace imported ones.

The report presents a review of the results achieved by the first ten years of cluster policy in Russia.

The first section summarises the outcomes of three cluster support programmes: for pilot innovation clusters, leading clusters, and industrial clusters. The emphasis is on analysing the design and results of the priority project and on outlining the key performance indicators for the leading clusters, and the main forms of support extended to them.

The second section offers a structured description of the leading clusters. Data about each cluster is presented in the following categories: general information (mission, industry specialisation areas, key members, products and services, contact information); activities of the cluster management organisation; success stories and invitation to cooperation. Leading cluster profiles have been designed in line with the European Cluster Collaboration Platform (ECCP) questionnaire.

The authors hope this report will be useful to to government agencies, cluster management organisations, companies, universities, research organisations, and to anyone else interested in innovative, industrial and cluster policies.

ABBREVIATIONS

CDC	Cluster Development Centre
CT	Closed Territory
ECCP	European Cluster Collaboration Platform
EPCM	Engineering, Procurement, Construction Management
GIS	Geographic Information System
GLP	Good Laboratory Practice
GMP	Good Manufacturing Practice
HSE	National Research University Higher School of Economics
IAEA	International Atomic Energy Agency
ICT	Information and Communication Technology
ISSEK	Institute for Statistical Studies and Economics of Knowledge
JSC	Joint-stock Company
LLC	Limited Liability Company
OECD	Organisation for Economic Co-operation and Development
PIC	Pilot Innovation Cluster
R&D	Research and Development
RAS	Russian Academy of Science
RCO	Russian Cluster Observatory
RVC	Russian Venture Company
S&T	Science and Technology
SEZ	Special Economic Zone
SME	Small and Medium-sized Enterprise
SOE	State-owned Enterprise
TCI	The Competitiveness Institute-Asociación Competitividad
UAV	Unmanned Aerial Vehicle

SHORTENED AND FULL OFFICIAL NAMES OF LEADING CLUSTERS

Shortened Cluster Name Used in the Text	Full Official Cluster Name
Kaluga Pharmaceutical Cluster	Innovation Cluster "Pharmaceutics, Biotechnologies and Biomedicine" of the Kaluga Region
Yenisei Technopolis Cluster of Krasnoyarsk	Innovation Cluster of the Krasnoyarsk Region "Yenisei Technopolis"
Valley of Machine-Building Lipetsk Cluster	Innovative Territorial Cluster for Machinery-Building and Metalworking of Lipetsk Region "Valley of Machine-Building"
Moscow Region Consortium of Innovation Clusters	Moscow Region Consortium of Innovation Clusters
Siberian Scientopolis Cluster of Novosibirsk	Siberian Science Polis Research and Production Cluster
Bashkortostan Petrochemical Cluster	Petrochemical Territorial Cluster Republic of Bashkortostan
BRIGHT CITY Lighting and Optoelectronic Instrumentation Cluster of Mordovia	Innovation Cluster of the Republic of Mordovia "Lighting and Optoelectronic Instrumentation" (BRIGHT CITY)
INNOKAM Cluster of Tatarstan	Kama Innovative Territorial Production Cluster of the Republic of Tatarstan
Samara Aerospace Cluster	Aerospace Innovation Territorial Cluster of the Samara Region
Smart Technologies Tomsk Cluster	Regional Innovation Cluster "Smart Technologies Tomsk"
Ulyanovsk Aviation and Nuclear Technologies Cluster	Innovation Cluster of the Ulyanovsk Region
InnoCity Cluster of Saint Petersburg	Science and Technology InnoCity Integrated Innovation Cluster

1

Russian Cluster Policy: Results of the First Ten Years

1.1. NATIONAL SUPPORT PROGRAMMES FOR INNOVATION AND INDUSTRIAL CLUSTERS

Pilot Innovation Clusters Support Programme

The first Russian national cluster support programme was launched by the Ministry of Economic Development in 2012. Its purpose was to improve cooperation between enterprises and the R&D and educational organisations of pilot innovation clusters; and also to encourage development of territories with the highest potential in science and technology (S&T) and in production.

The programme was designed with the experience derived from the previous support of cluster development centres and also the best international practices [OECD, 2007, 2011; Pro Inno Europe, 2009, Christensen et al., 2012].

In particular, the following programmes were used as benchmarks:

- the German "Spitzencluster-Wettbewerb" (leading-edge clusters). The programme's focus is bridging the gap between science and industry by supporting the strategic development of advanced clusters in knowledge-intensive sectors and the environments in which they are located [BMBF, 2006];
- the French "Pôles de Compétitivité" (competitiveness clusters). The programme aims at building synergies and assisting the best nationwide collaborative public-private R&D projects as well as commercialisation and marketing of their results [DGCIS, 2011].

Both programmes employ a competitive selection process for the cluster projects that will receive subsidies. The clusters benefit from public support over a five-year period. Fifteen German clusters are recognised as leading-edge, and 71 French clusters are designated "Pôles de Compétitivité".

Pilot innovation clusters were selected by tender: there were 25 winning clusters out of 94 applicants. Subsequently their number grew to 27 (map 1). All of them were located in the regions, which feature science towns, special economic zones (SEZs), and closed territories (CTs) among other factors. PICs specialise in the following areas: nuclear and radiation technologies; aircraft and spacecraft construction, shipbuilding; pharmaceuticals, biotechnology and the

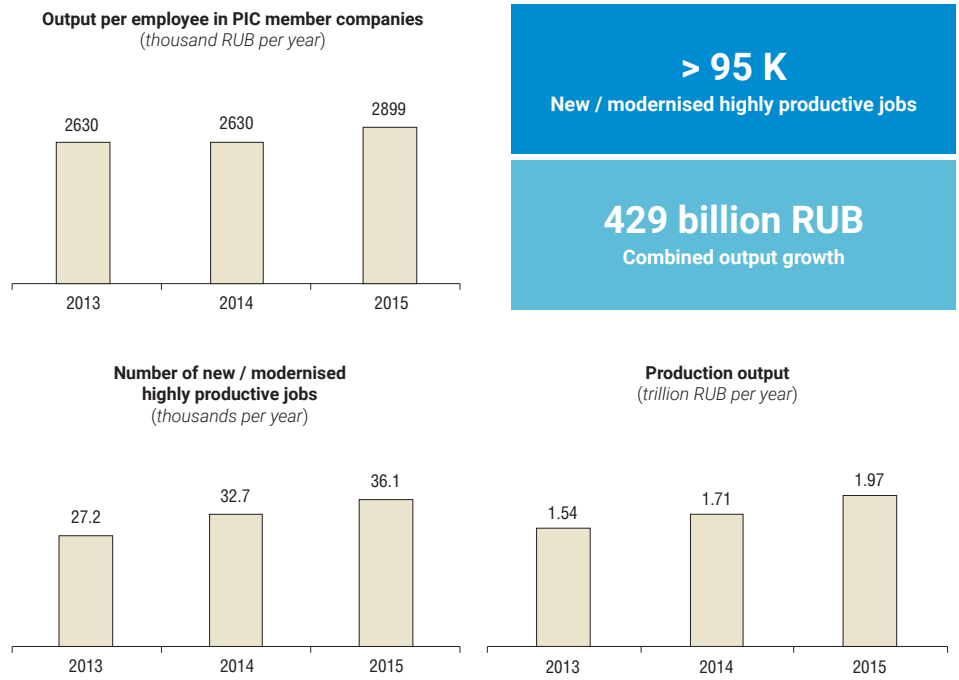
medical industry; new materials; chemistry and petrochemistry; information technology and electronics [HSE, 2013].

From 2013 to 2015, the regions hosting pilot innovation clusters received federal budget subsidies totalling 5.05 billion roubles (US$ 113.64 million). The funding was provided for the following activities:

- developing innovation and educational infrastructure;
- strengthening cooperation, promoting cluster member products, including in external markets (business missions, fairs, exhibitions, publicity events);
- staff training, upgrading qualifications and retraining, and provision of methodological, organisational, expert, and informational services;
- developing engineering and social infrastructure.

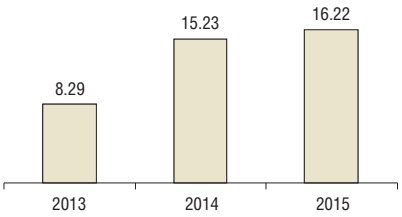
The pilot innovation clusters support programme did contribute to increased cluster member activities (figure 2). According to the Ministry of Economic Development, from 2013 to 2015 the clusters' **combined output** grew by 429 billion roubles, to almost 2 trillion roubles (US$ 32.26 billion).

Figure 2. Pilot innovation clusters' progress in 2013–2015



Source: compiled by the authors based on the Ministry of Economic Development data

PIC members' employees who upgraded their qualifications
(*thousands of people per year*)



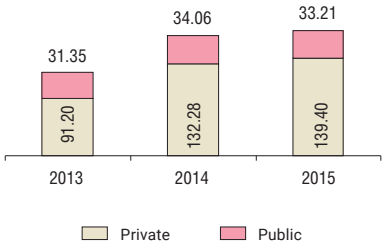
40 K employees
Benefited from staff training

> 75 billion RUB
Total expenditures on joint R&D projects

> 98 billion RUB
Public investment

> 360 billion RUB
Private investment

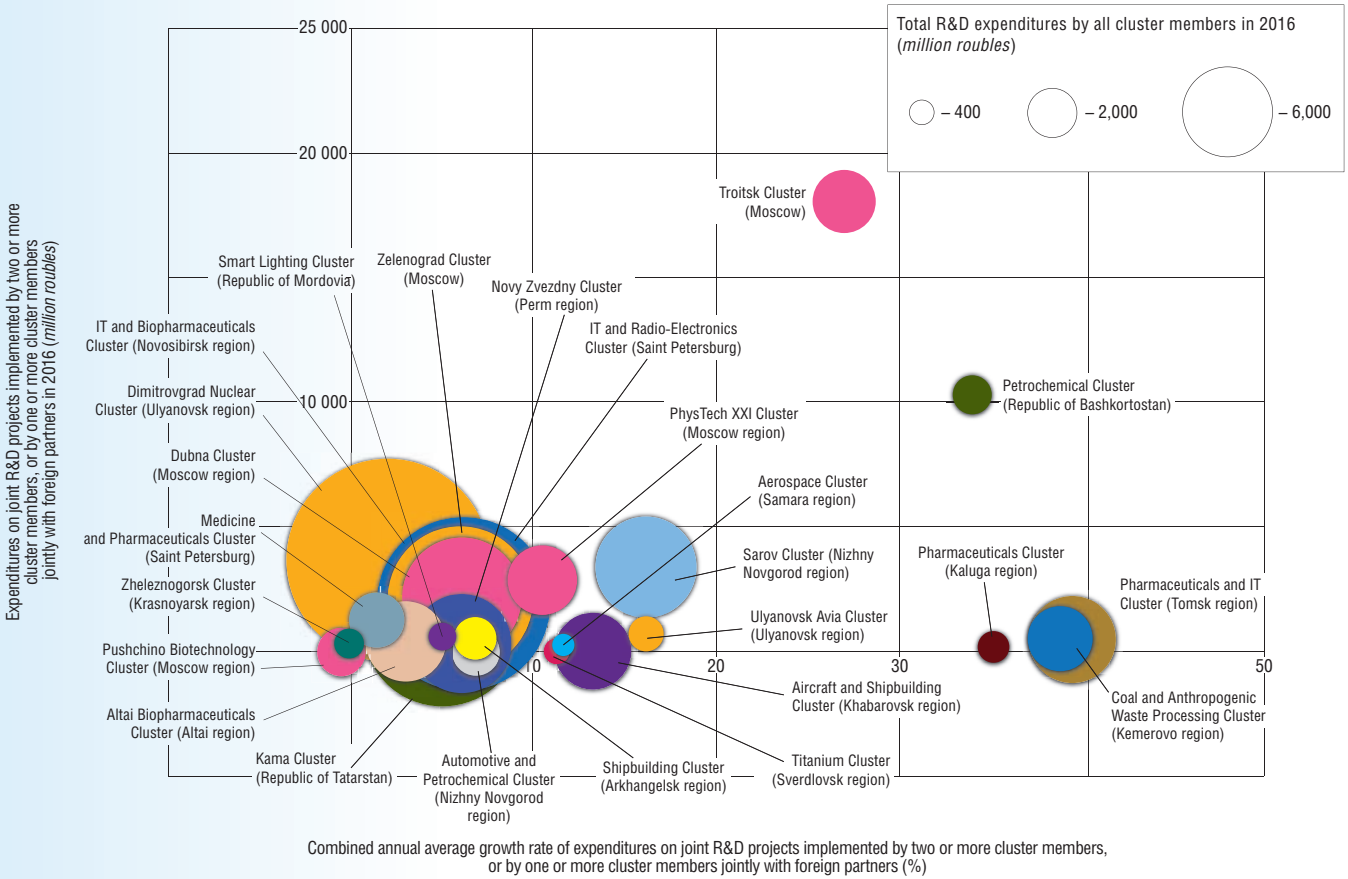
Total investments in PIC development
(*billion RUB per year*)



Against a background of negative economic trends, these companies showed increases in various performance indicators: the number of **new highly productive jobs** grew by more than a third (from 27.2 thousand in 2013 to 36.1 thousand in 2015); 40,000 workers benefited from **staff training** or upgraded their professional qualifications. Development of pilot innovative clusters provided a significant boost to **investment activity:** in just three years public and private investments exceeded 98 and 360 billion roubles (US$ 2.2 and 8.1 billion), respectively. The PIC's main performance indicators are significantly higher than the average ones in their home regions. Specifically, cluster member **export revenues** on average are 20% higher, and **shipment of innovative products** manufactured in-house and provision of innovative services are 60–90% higher [HSE, 2017a].

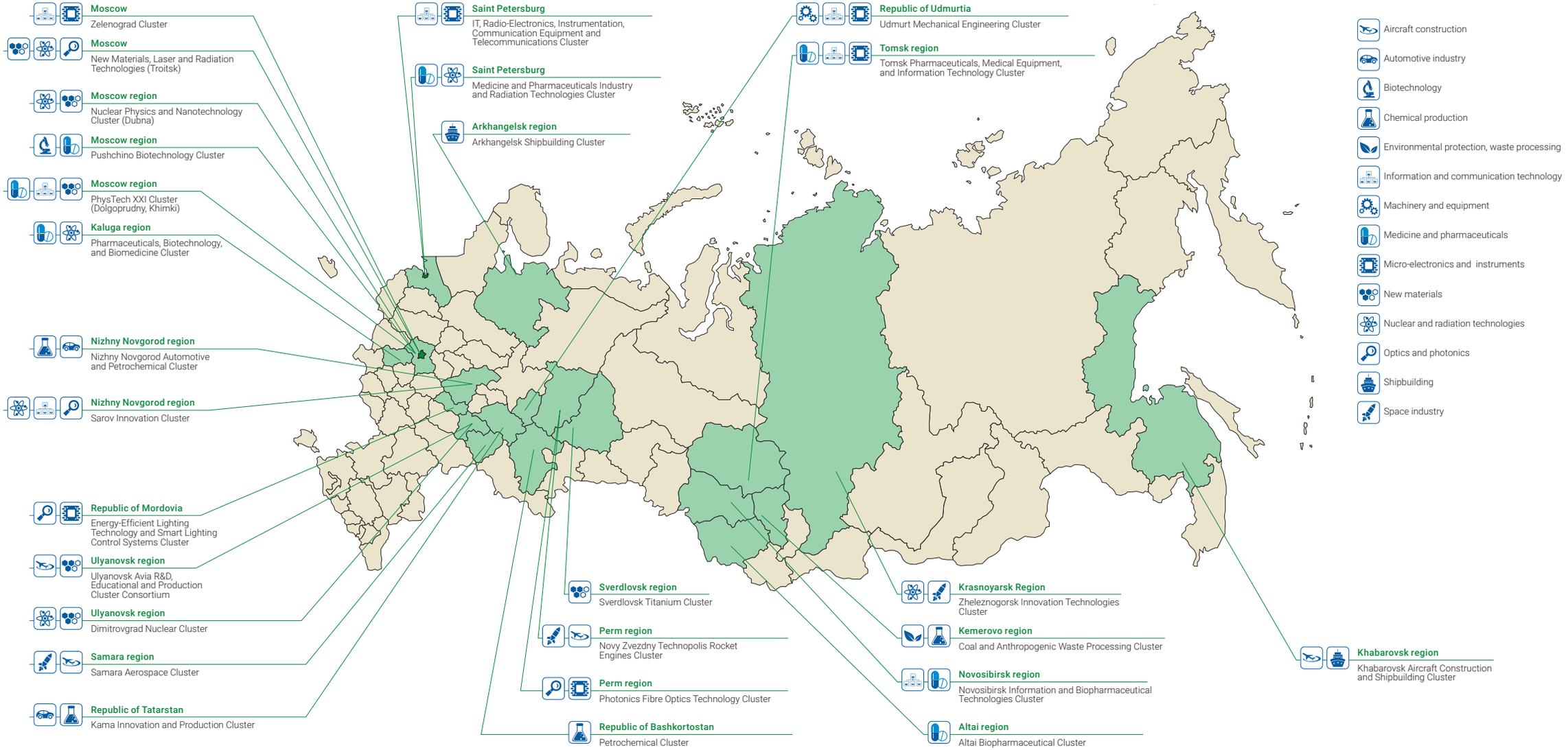
A key indicator of pilot innovation clusters' performance is their **total R&D expenditures**. An increase of R&D cooperation was noted during the implementation of the PIC support programme: total expenditures by all cluster members on joint R&D projects exceeded 75 billion roubles (US$ 1.69 billion) (figure 3).

Figure 3. R&D projects implemented by pilot innovation cluster members



Source: compiled by the authors based on the Ministry of Economic Development data

Map 1. Map of Pilot Innovation Clusters (2015)

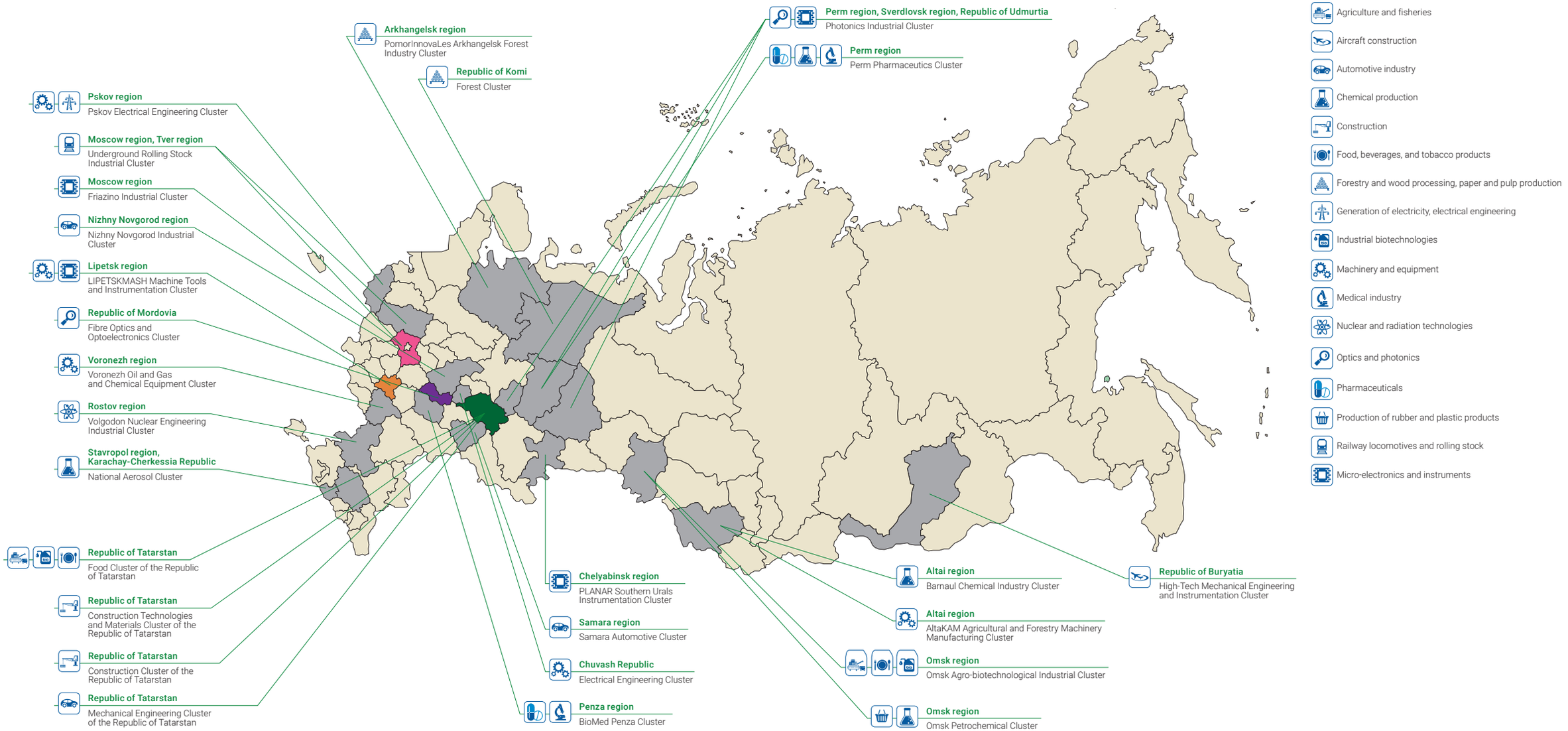


Source: [HSE, 2017a]

Map 2. Map of Leading Clusters (2018)

Source: [HSE, 2017a]

Map 3. Map of Industrial Clusters (2018)



Source: Compiled by the authors based on the Ministry of Industry and Trade data

Priority Project "Promoting Development of Innovation Clusters – Global Leaders in Attracting Investment"

In 2016, the Ministry of Economic Development switched to supporting clusters on the basis of project management principles, launching the priority project "Promoting Development of Innovation Clusters – Global Leaders in Attracting Investment". Its goal was advancing growth points, promoting innovation-based development and export of high technology products, technology commercialisation, productivity growth, creation of highly productive jobs, and strengthening national competitiveness [HSE, 2017a].

The support to leading clusters in Russia was launched simultaneously with the Canadian national cluster programme known as «Innovation Superclusters». The mission was to concentrate efforts on areas of growth nearing critical mass with potential for international visibility, and this is quite similar to the purpose and principles of the Russian priority project. Five Canadian superclusters have been selected to receive assistance in commercialising their platform technologies, launching joint R&D projects, and strengthening the position of national firms in emerging global markets [Government of Canada, 2018].

Russian leading clusters were selected by tender, just as the PICs had been: the 11 clusters that became participants in this priority project were selected out of 22 applicants from 21 Russian regions. In 2017, the number grew to 12 clusters (map 2). The clusters qualified to apply had to belong to one of the following groups: (1) world-class R&D and educational centres working toward utilisation of the full potential of research institutes and universities; and (2) alliances of medium-sized and large innovative companies in which high technology businesses play a leading role.

This priority project benefits from the experience of the pilot innovation clusters support programme, but places the accent on the following key areas:

- achieving technological leadership;
- maintaining an efficient system for commercialising technology;
- supporting fast-growing medium-sized companies ("gazelles");
- promoting modernisation of core companies;
- creating a system for attracting investment from international sources;
- adapting the education and training system to meet cluster member requirements;
- establishing an efficient cluster management system [HSE, 2017b].

The project implementation began with setting down roadmaps through 2020 for use in detecting at an early stage any deviations from the development strategies of the leading clusters and then taking appropriate corrective steps. The roadmaps specify in detail the actions planned at intervals no longer than two weeks. Performance targets, funding sources, and responsible staff members are specified for each of the planned steps [HSE, 2017b].

An important objective of the project is promoting integration into global chains of added value. In 2016, cluster member **exports, excluding raw materials,** reached US$ 5.6 billion and by 2020 are expected to increase by 52%. More than 24,000 **highly productive jobs** were created by cluster members in 2016. By 2020, this figure is expected to increase by 88%. In 2016, their expenditures on **joint R&D projects** amounted to more than 12.2 billion roubles (US$ 183.9 million), but by 2020 this figure

is expected to double. In 2016, leading cluster members received 100 **international patents for inventions;** by 2020 the number of these patents is expected to increase 2.3 times [HSE, 2017a].

A key performance indicator of the investment attractiveness of leading clusters is the **amount of private investments** they have received. In 2016, this figure was 163.9 billion roubles (US$ 2.47 billion), and a 69% growth is planned by 2020 (see figure 4).

Industrial Clusters Support Programme

In 2015, the Ministry of Industry and Trade launched its own cluster support programme. Its main goal was promoting import substitution by fostering development of industrial cluster added value chains.

Those clusters that met the Ministry's criteria and were officially registered would receive support. During 2016 and on through April of 2018, 44 applications were submitted. Following the expertise, 26 clusters were found to meet the criteria (map 3). The selected clusters specialise in the following industries: aircraft construction; automotive industry; forestry and wood processing; micro-electronics and instruments; optics and photonics; the food industry; machinery and equipment; construction; pharmaceuticals and the medical industry; chemistry and petrochemistry.

Companies in the selected clusters may claim federal budget subsidies to recover part of their joint project costs. A necessary condition is that the projects be approved by a tender commission [Government of the Russian Federation, 2017]. The programmes' budget from 2016 and through 2020 is planned to amount to 3.24 billion roubles (US$ 55.78 million). The most common categories of costs specified in subsidy applications included the following:

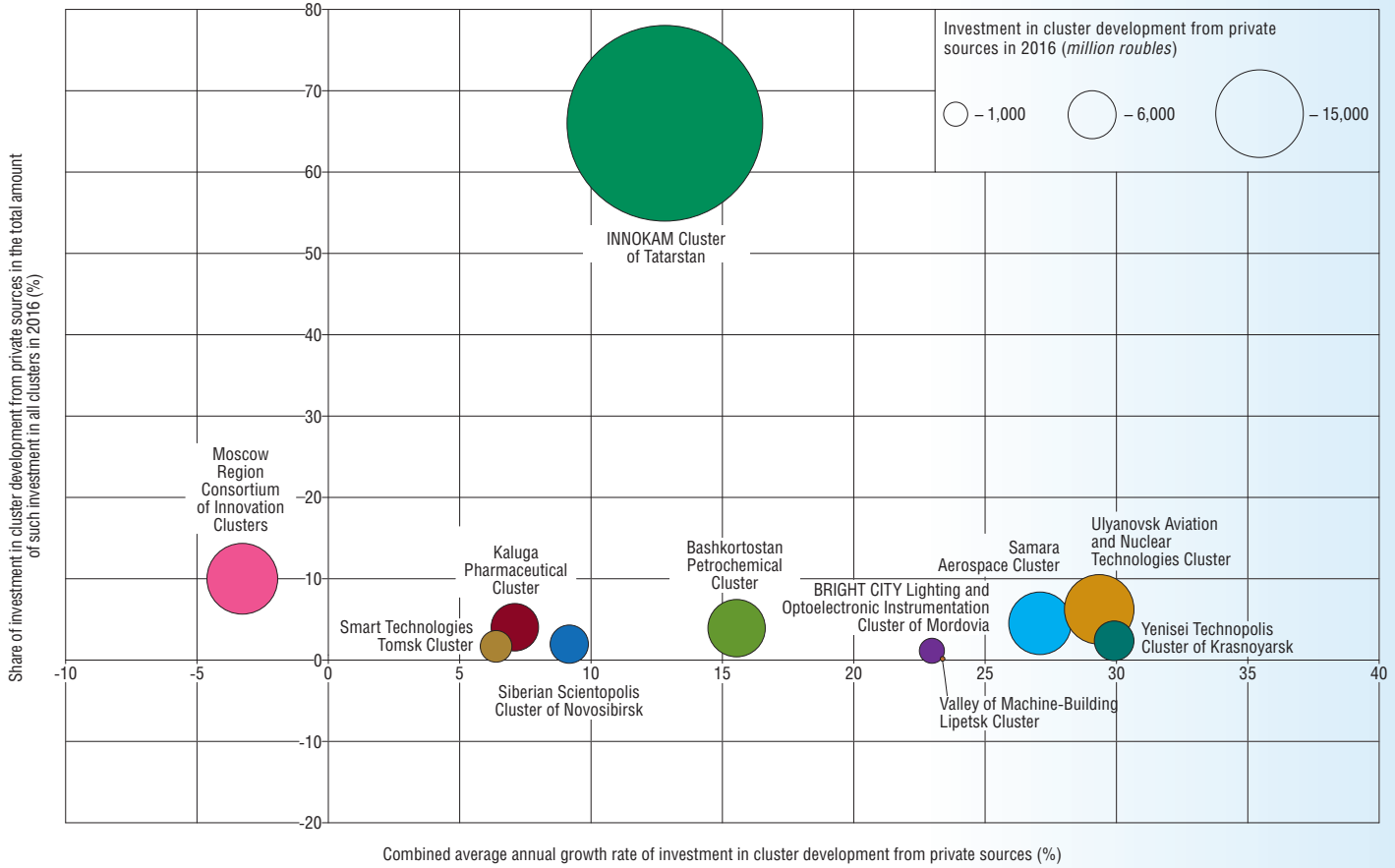
- product control, measurement, and testing; making prototypes, samples, and trial runs;
- preparing design documentation;
- paying interest on loans;
- procurement of necessary production tools for equipment;
- procurement of software;
- licensing and certification costs;
- engineering staff training and upgrading professional qualifications;
- preparing procedural and methodological documentation.

In 2016, the **total number of jobs** at all industrial cluster member companies amounted to about 150,000. In 2018, this figure is expected to increase by 9% for 26 clusters. **Exports** of 19 industrial clusters in 2016 amounted to 94.4 billion roubles (US$ 1.42 billion). In 2018, this figure is expected to increase by 40%. In 2016, companies in the industrial clusters **imported** approximately 96 billion roubles' worth of raw and other materials and finished products (US$ 1.45 billion), which amounts to 27% of their total expenditures on such procurement. By 2018, companies in the industrial clusters expect to increase their import expenditures by just 1.5%.

A major indicator of industrial clusters' performance is the **total volume of shipped products** manufactured in-house and services provided. According to the development programmes of the 26 clusters included in the Ministry of Industry and Trade registry, in 2016 this figure reached 597.7 billion roubles (US$ 9.01 billion). In 2018, it is expected to increase by 30% (figure 5).

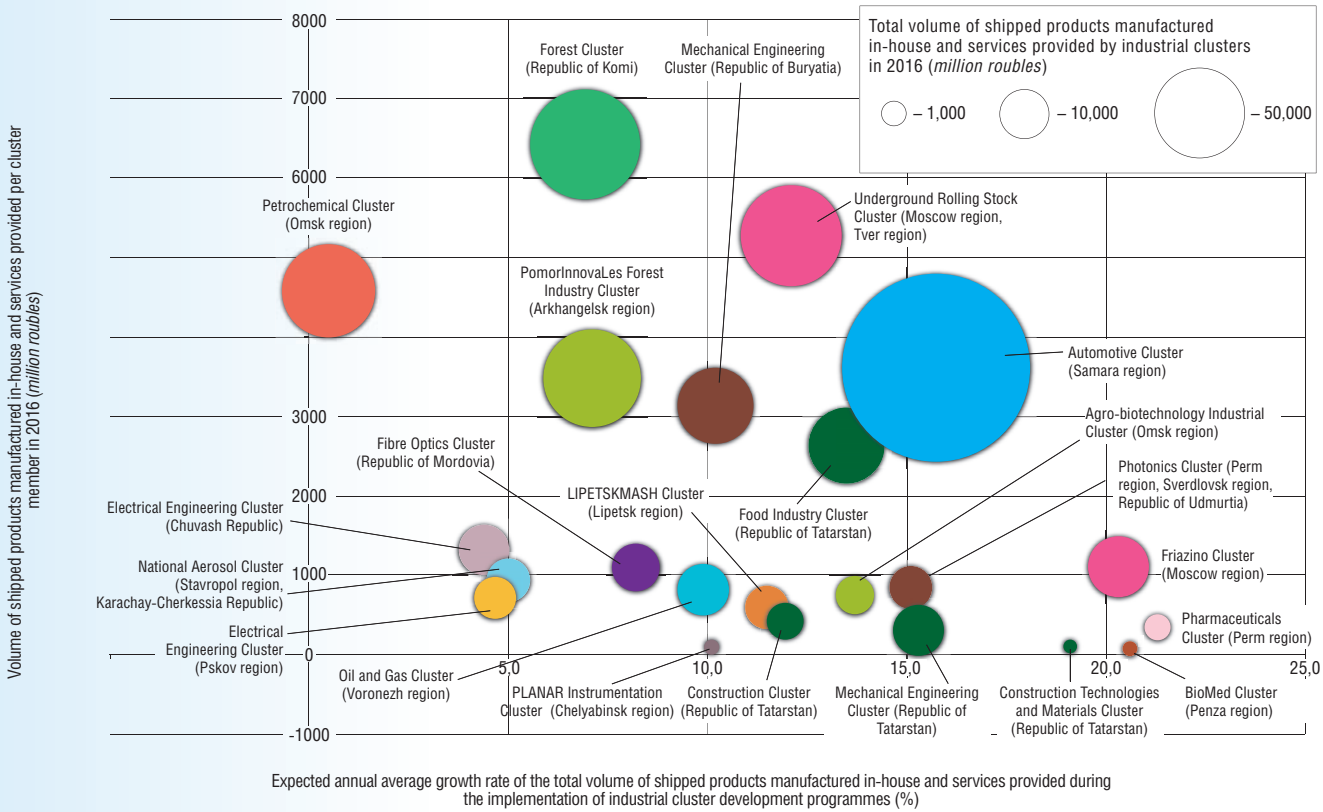
The cluster support programmes are compared in Table 1.

Figure 4. Private investment in the development of leading clusters



Source: [HSE, 2017a]

Figure 5. Volume of shipped products manufactured in-house and services provided by industrial clusters



Source: compiled by the authors based on industrial clusters' development programmes

Table 1. Comparison of Russian cluster support programmes

Criteria for comparison / Clusters that receive support	Pilot Innovation Clusters	Leading Clusters	Industrial Clusters
Supervisor	Ministry of Economic Development		Ministry of Industry and Trade
Term of the programme	Since 2012	Since 2016	Since 2015
Type of support	Federal subsidies to Russian regions for co-funding activities indicated in cluster programmes. Total funds of 5.05 billion roubles (US$ 113.64 million) in 2013–2015	Comprehensive assistance in cluster development (export, attraction of investments, commercialisation of technology, modernisation of core companies, training cluster managers, etc.)	Federal subsidies to cluster members to recover up to 50% of joint project costs. Current funds of 3.24 billion roubles (US$ 55.78 million) from 2016 through 2020
Key support goals	Innovation infrastructure development	o Increase of export volumes o Attraction of investments	o Enhancement of industrial cooperation o Import substitution
Number of clusters that benefit from the support	27 (2015)	12 (2017)	26 (April 2018)
Requirements for cluster members	Not restricted. Pilot Innovation Clusters basically include: – enterprises – universities – R&D organisations	Minimum of 40 organisations, including: – export-oriented enterprises – universities – R&D organisations	Minimum of 13 organisations, including: – 10 industrial enterprises – 1 educational organisation – 2 infrastructure units
Requirements for cluster management organisation	(Co-)established by a regional/ municipal authority	Legal entity with a minimum staff of 5 people	Cluster management organisation is composed of representatives from at least half of the cluster members
Cluster management organisation eligible to be a support recipient	Yes (funding was provided for staff training, and methodological, organisational, expert, and informational services)	No (cluster management organisation is funded either by cluster members, or regional authorities)	
Cluster selection approach	Clusters were selected once. Procedure for updating the cluster short list is not determined.		The Industrial Clusters registry is updated continuously.
Funding allocation procedure	Annual competition of applications for funding among Pilot Innovation Clusters	No federal funding	A contract between the Ministry of Industry and Trade and a cluster project initiator for a 5-year period maximum

Source: compiled by the authors

1.2. PRIORITY PROJECT "PROMOTING DEVELOPMENT OF INNOVATION CLUSTERS – GLOBAL LEADERS IN ATTRACTING INVESTMENT"

Selection of Leading Clusters by Tender

As Russia's cluster policy is refined, its focus is shifting from testing (pilot innovative clusters) and seeding (cluster development centres) formats towards project-based ones. In particular, the standard that innovation clusters are expected to meet is to become global leaders in attracting investment. Applying a project-based approach to shaping and implementing cluster policy is expected to accomplish the following objectives:

- → reduce the time required to get results;
- → use resources more efficiently;
- → improve the transparency, validity, and timeliness of decision-making;
- → increase the effectiveness of cooperation across governmental agencies and administrative levels.

The priority project "Promoting Development of Innovation Clusters – Global Leaders in Attracting Investment" is scheduled to end in 2020 and comprises the following stages:

1) preparing and circulating a tender to select the Russian regions where leading clusters are located;
2) designing a cluster management system meeting international standards (in particular, the requirements of the European Secretariat for Cluster Analysis);
3) providing project participants access to available support initiatives (at the national and regional levels);
4) assisting with design of regional programmes for attracting investment and encouraging innovation and economic development;
5) facilitating entry into global markets (including promotion of innovative product exports) and attracting investment;
6) fostering cooperation with international partners.

The following results are expected by the end of 2020 when the project is completed:

- → per employee output to increase by at least 20% compared with 2016;
- → at least 100,000 highly productive jobs created directly or through modernisation;
- → at least 300 billion roubles (US$ 4.52 billion) of investment to be received;
- → joint (Russian and international) R&D projects to receive at least 100 billion roubles (US$ 1.51 billion) in funding;
- → the number of patents for inventions obtained by cluster members to increase threefold;

- at least 300 technology startup companies to be established with investment put into them;
- cluster members' combined revenues from exports excluding raw materials to double compared with 2016;
- the average share of added value in cluster members' revenues to increase by at least 20% compared with 2016.

In the first stage of the priority project, innovation clusters were selected by tender for inclusion in the list of leading clusters. A Project Board with members from government authorities, development institutes, state-owned companies, leading R&D and educational centres, and business associations was established to select the clusters. The project strategy was elaborated, along with procedures for a tender-based selection of applications and methodological materials for designing leading cluster strategies and roadmaps. The Board received 22 applications from 21 Russian regions.

The clusters were selected through a two-stage process. In the first (distance) stage, the documents submitted were evaluated and expert opinions prepared; in the second (face-to-face) stage, cluster strategies were presented and defended in person. A cluster's current development level, expected growth in performance indicators, and the level of detail and practicality of the steps specified in its development programmes were considered in relation to meeting the project targets.

Each cluster presented several integrated core projects within their development strategies, which were designed to produce a multiplier effect, increase the cluster's ability to attract investment, and enhance its visibility in fast-growing global markets (see Box 1 below).

Box 1. Examples of core projects suggested by participants in the leading clusters tender

Smart Technologies Tomsk Cluster forged six project alliances: active biopharmaceutical substances, technological vision for unmanned aerial vehicles, multifunctional ICT systems for application in regions with extreme climates, industrial robotics, intelligent urban solutions, and digital medicine.

An open innovation R&D centre specialising in oil and gas processing, oil and gas chemistry, and the automotive industry is expected to become a key project of **INNOKAM Cluster of Tatarstan**.

Ulyanovsk Aviation and Nuclear Technologies Cluster launched a series of projects to create companies specialising in new materials, advanced production technologies, transportation of the future, and renewable energy based on the accumulated potential of the region's traditional high technology industries–nuclear technologies and aircraft construction.

BRIGHT CITY Lighting and Optoelectronic Instrumentation Cluster of Mordovia will augment technological competence and enter international markets for fibre optic and photonic products by expanding the engineering centres recently established in those fields.

Moscow Region Consortium of Innovation Clusters merges the S&T potential of the PhysTech XXI and Dubna clusters with the engineering and production facilities of the aerospace centres located in Zhukovsky and Korolev, and biotechnology centres located in Pushchino and Chernogolovka.

In the course of assessing applications, clusters combining global competitiveness and high output growth of member companies with significant S&T potential in local R&D and educational organisations were given preference. Accordingly, 11 such clusters were selected, and one more was added in 2017 – InnoCity Cluster of Saint Petersburg.

Development Targets of Leading Clusters, and Relevant Support Areas

The Ministry of Economic Development's priority project stipulates that the efforts of innovation clusters be aimed at achieving global leadership in terms of attracting investment. Consequently, their performance is assessed primarily on the basis of the amount of **private investment** they receive. According to innovation cluster support agreements signed by the Russian Ministry of Economic Development and by governments of the regions where leading clusters are based, in 2016 the total amount of such investment was 163.9 billion roubles (US$ 2.47 billion). By 2020 it is expected to increase by 69%. The leader here is INNOKAM Cluster of Tatarstan, which is far ahead of all others with more than 109 billion roubles (US$ 1.64 billion). Also worthy of note are Moscow Region Consortium of Innovation Clusters, and Ulyanovsk Aviation and Nuclear Technologies Cluster (both exceeded the 10 billion roubles (US$ 151 million) threshold).

A key objective of the priority project is promoting integration of the leading clusters into global chains of added value. Accordingly, the second major indicator of cluster performance is their exports excluding raw materials. In 2016, these **exports** amounted to US$ 5.6 billion, and by 2020 are expected to increase by 52%. The main contributor here is INNOKAM Cluster of Tatarstan with more than US$ 5.03 billion, or more than 90% of all leading clusters' combined export revenues. Relevant figures for other clusters vary from US$ 4 million (Smart Technologies Tomsk Cluster) to US$ 138 million (Bashkortostan Petrochemical Cluster).

More than 24,000 **highly productive jobs** were created directly or through modernisation in the leading clusters. By 2020, this number is expected to grow by 88%. The leaders here are Samara Aerospace Cluster and INNOKAM Cluster of Tatarstan (more than 4,000 and 6,000 new jobs, respectively).

Leading clusters concentrate on adding to **joint R&D projects**. In 2016, the expenditures on such projects were estimated at approximately 12.2 billion roubles (US$ 184 million), but by 2020 they should increase by 120%. The Moscow Region Consortium of Innovation Clusters is the undisputed leader in terms of expenditures on joint R&D projects – 4.6 billion roubles (US$ 69.33 million). The figures for Siberian Scientopolis Cluster of Novosibirsk, and Bashkortostan Petrochemical Cluster are 1.2 and 2.3 billion roubles (US$ 18.08 and 34.66 million), respectively. Other clusters' R&D expenditures vary between 0.2 and 0.8 billion roubles (US$ 3.01 and 12.05 million).

In 2016, there were 175 **technology startup companies** that belonged to the leading clusters. By 2020, this number is expected to increase by 168%. Currently, about 60% of these companies are registered in Bashkortostan Petrochemical Cluster and in Moscow Region Consortium of Innovation Clusters. No other cluster has more than 15 such firms.

In 2016, organisations within leading clusters received a total of 100 **foreign patents for inventions**. This number is expected

Table 2. Development objectives for leading clusters to be achieved by 2020

Kaluga Pharmaceutical Cluster
Leadership in radiation medicine Increased volume of pharmaceutical production Encouraging global pharmaceutical companies to open R&D centres in the region; launching an S&T park Increasing the potential of the Kaluga State University and the Kaluga branch of MEPhI
Yenisei Technopolis Cluster of Krasnoyarsk
Strengthening positions in fast-growing markets: → next-generation satellites and UAVs → nuclear technologies (back-end) → new production technologies
Valley of Machine-Building Lipetsk Cluster
Developing an innovation ecosystem consisting of universities and small and medium-sized enterprises to serve core companies Achieving an advanced level of technological production, improving product quality, entering international markets
Moscow Region Consortium of Innovation Clusters
Encouraging and supporting cooperation between clusters and science towns, focusing on the National Technology Initiative markets Establishing and enhancing technology application platforms to promote the development of small and medium-sized enterprises Establishing centres for certifying and promoting, exports and engineering
Siberian Scientopolis Cluster of Novosibirsk
Business acceleration, promoting development of high technology companies by expanding successful industrial parks Improving international and inter-regional cooperation, in particular as part of the Siberian Biotechnology Initiative
Bashkortostan Petrochemical Cluster
Upgrading existing petrochemical and high conversion production facilities (plastics, polymers, etc.) and setting up new ones Establishing a petrochemical engineering centre Creating the ChemTerra and Ufimsky industrial zones as infrastructure for new industrial production facilities

(continued)

BRIGHT CITY Lighting and Optoelectronic Instrumentation Cluster of Mordovia
Creating world-class innovation infrastructure
Transfer of technology and attracting high technology investors from abroad
Developing the urban environment, including by testing and application of the cluster's products
Attracting gifted young people
INNOKAM Cluster of Tatarstan
Increasing the share of petrochemical products with high added value
Increasing exports of high conversion products
Expediting joint R&D projects
Samara Aerospace Cluster
Transforming the engineering centre's laboratories into high technology small innovative companies and R&D centres as part of the Gagarin Centre Technopolis
Restructuring production, promoting outsourcing, integrating into global supply chains and recently developing market segments
Implementing key projects, developing new products such as UAV complexes for remote exploration of the earth, delivery systems for bulky cargo, pseudo-satellite groups
Smart Technologies Tomsk Cluster
Scaling up business, increasing exports using the potential of established project alliances: → active pharmaceutical substances → technological vision for UAVs → intelligent urban solutions → digital medicine → industrial robotics → multifunctional ICT systems for regions with extreme climates
Ulyanovsk Aviation and Nuclear Technologies Cluster
Territorial development projects: → Technocampus 2.0 (new type of university) → Technology Valley 2.0 (new industry) → Innovators' and investors' village (new quality of life)
Supporting the emergence of companies specialising in new industries, including aircraft construction and nuclear technologies: new materials, new production technologies, unmanned vehicles, renewable energy

Source: [HSE, 2017a]

Table 3. Main objectives in developing leading clusters and the necessary public support mechanisms

Cluster Development Objectives	Public Support Mechanisms
Clusters formed around core high technology companies	
Developing innovation, production, transport, and energy infrastructure Finding new markets and applications for existing competences; reducing concentration on traditional markets with low growth rates Overcoming dependence on state orders and outdated technology; implementing an open innovation model	Promoting emergence of an "innovation belt" around large enterprises, comprising small and medium-sized companies, universities, and R&D organisations Applying advanced organisational techniques, encouraging outsourcing, creating a system of suppliers Improving existing technology chains by providing support for "optimisation"
Clusters formed around leading R&D centres	
Facilitating "project flows" – emergence of high technology startup companies established by graduates of universities associated with cluster companies Promoting innovation entrepreneurship among young people Achieving world-class competitiveness in education and research, in part by increasing cooperation with leading international universities and R&D centres Increasing the share of breakthrough world-class R&D results Strengthening cooperation with industrial companies	Encouraging large Russian and international companies to set up high technology production that utilises existing human potential and R&D infrastructure Facilitating "serial" innovative entrepreneurship through commercialisation of newly developed technologies Staff training, promoting emergence and development of new research areas Launching advanced cutting-edge high technology production facilities
Clusters formed around small and medium-sized innovative companies	
Developing human potential, attracting highly skilled professionals Encouraging innovation entrepreneurship (including at the early stages) Establishing consortia and joint projects to enter new markets, including orders from large companies and public procurement	Promoting emergence of an innovation ecosystem and shared services, including innovation infrastructure Promoting demand for innovative products of small and medium-sized companies Encouraging intra-cluster cooperation, in particular with R&D and educational organisations

Source: [HSE, 2017b]

to increase 2.3 times by 2020. INNOKAM Cluster of Tatarstan is the champion here (with 35 patents). The Kaluga, Moscow, and Novosibirsk regional clusters each have between 10 and 18 foreign patents, while the others have no more than 6. In most cases leading clusters expect to achieve a quite significant average annual growth rate for this indicator by 2020 (by more than 25%, and even by more than 50% in some cases).

Development objectives for leading clusters to be achieved by 2020 are presented in table 2.

Notably, each cluster came up with a specific set of means to reach their objectives.

The ambitious goals of the leading clusters are to be achieved with the help of various public support mechanisms and in cooperation with companies with state participation, development institutes, and foreign partners. The priority project specifies a number of mechanisms to support leading clusters (see table 3).

The best results from the cluster support mechanisms should be achieved by the inter-cluster projects that involve shared use of equipment and infrastructure, joint procurement and promotion of products in foreign markets, and enhancing the skills of leading cluster management teams. A major factor in expediting cluster development will be ongoing sharing of the best cooperation practices from the clusters, such as in attracting investment, developing innovation infrastructure and mechanisms for commercialisation, promoting exports, and devising advanced R&D projects.

One of the conditions for successfully implementing the full range of planned steps is that the regions in which the leading clusters are located carry out project management synchronised with the Ministry of Economic Development's priority project roadmap, particularly through operational monitoring of the leading clusters.

2

Profiles of Leading Clusters

KALUGA PHARMACEUTICAL CLUSTER

Cluster Mission

To create a network of integrated high technology production facilities and infrastructure in the Kaluga Region for developing, manufacturing, and marketing next-generation medical preparations, pharmaceutical substances, and medical products that meet GMP standards.

Industry Specialisation

- Biopharmaceuticals
- Medical services
- Development and production of ready-to-use drug preparations and pharmaceutical substances
- Nuclear medicine, production of radio-pharmaceuticals
- Biotechnology
- Production of medical equipment and products

Products and Services

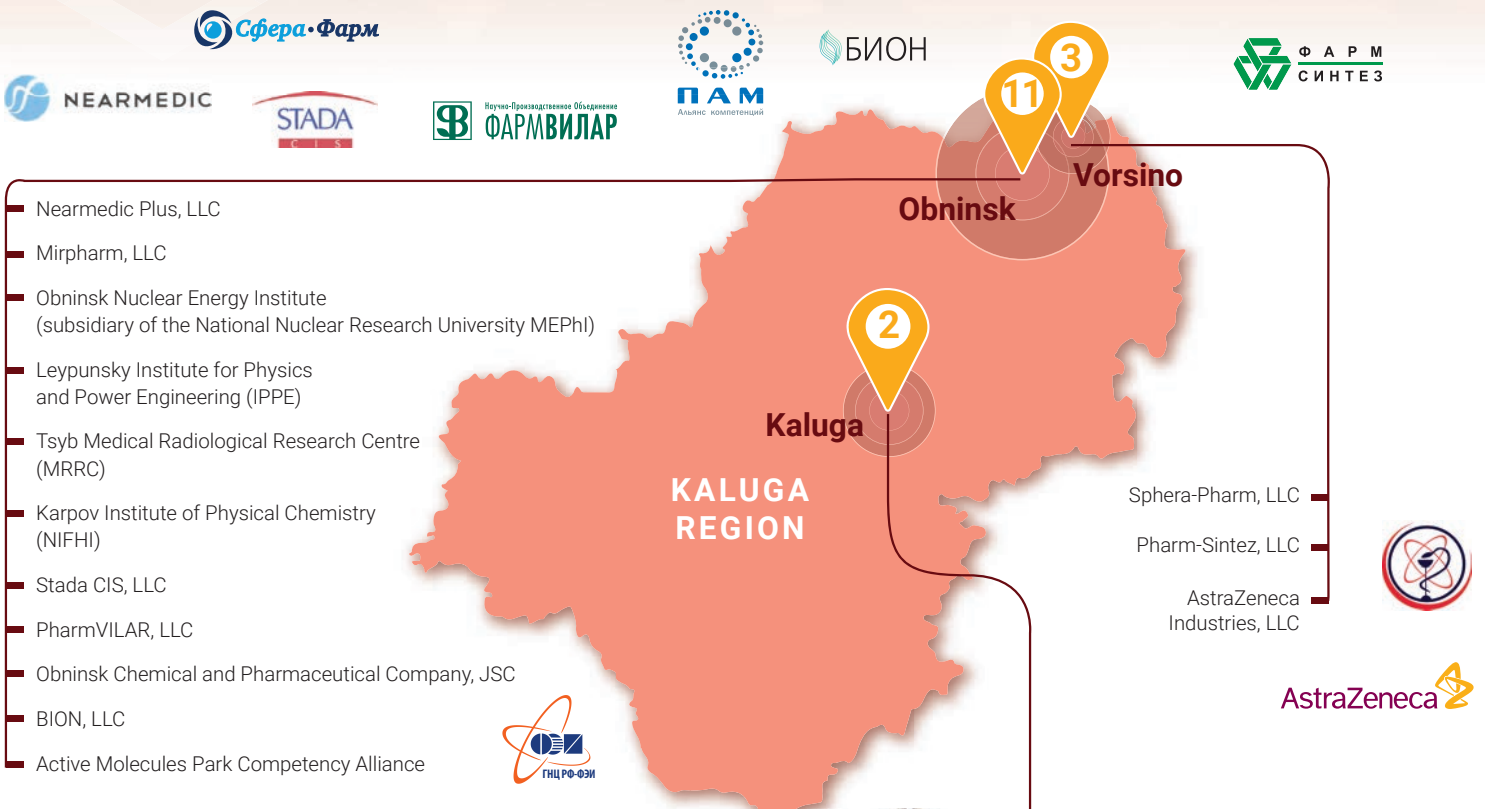
- → Pre-clinical and clinical research
- → Development, synthesis, and production of ready-to-use drug preparations, pharmaceutical substances, and radio-pharmaceuticals
- → Industrial production of ready-to-use drug preparations and pharmaceutical substances for application in most relevant medical fields in demand, such as oncology, cardiology, and rare (orphan) diseases
- → Production of radio-pharmaceutical preparations, infusion solutions, and parenteral nutrition

РСК
Nonprofit partnership

Membership

44 small enterprises
13 medium and large enterprises
6 other participants
63 organisations

Key Cluster Members



- Nearmedic Plus, LLC
- Mirpharm, LLC
- Obninsk Nuclear Energy Institute (subsidiary of the National Nuclear Research University MEPhI)
- Leypunsky Institute for Physics and Power Engineering (IPPE)
- Tsyb Medical Radiological Research Centre (MRRC)
- Karpov Institute of Physical Chemistry (NIFHI)
- Stada CIS, LLC
- PharmVILAR, LLC
- Obninsk Chemical and Pharmaceutical Company, JSC
- BION, LLC
- Active Molecules Park Competency Alliance

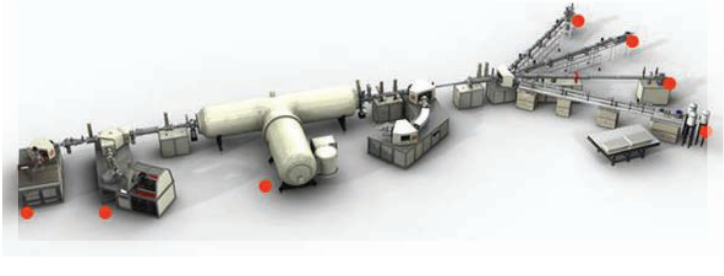
- Sphera-Pharm, LLC
- Pharm-Sintez, LLC
- AstraZeneca Industries, LLC

- Novo Nordisk, LLC
- Berlin Pharma, JSC

Cluster Success Story

Developing technology for, and launching production of an installation for highly efficient proton beam-based radiation therapy

The first Russian proton therapy complex for highly effective treatment of oncological patients was created as part of the project. There are plans for supplying such complexes to other Russian regions and for exporting them abroad. Because of the relatively low cost of services, this unique system is more economical to use than existing foreign-made equivalents. Its capacity is 200–300 patients each year per synchrotron with potential to increase this number to 1,500 patients. A thin computer-controlled proton beam permits scanning targets and performing precision irradiation with almost no damage to healthy tissues.



International Cooperation

Key partnership destinations

China, Finland, France, Germany, Greece, Italy

Partner clusters

Eurobiomed (France)
http://www.eurobiomed.org/

ChemieCluster Bayern (Germany)
http://www.chemiecluster-bayern.de/

C.H.I.C.H.O (Italy)
http://www.clusterchico.eu/

BIOTURKU (Finland)
http://www.turkusciencepark.com/about-science-park/bioturku/

Invitation to cooperation

We invite partners to conduct joint pre-clinical and clinical studies and research using unique high technology equipment:

- the TANDETRON charged particles accelerator, which is the best in its class;
- the unique synchrotron at the medical proton complex of the Tsyb Medical Radiological Research Centre;
- the technetium generator production facility at Karpov Institute of Physical Chemistry (the only one in the country certified to match GMP standards).

Possible cooperation areas:

- producing medical preparations on contractual basis at full-cycle production facilities meeting GMP standards;
- sharing practical experience in applying unique oncological disease treatments such us brachytherapy;
- technology transfer in areas such as development and application of targeted preparations;
- joint production of radio-pharmaceuticals meeting GMP standards (including full-cycle production).

Cluster Management Organisation

Kaluga Regional Innovation Development Agency – Cluster Development Centre
Established: 2010
Number of staff: 9

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YENISEI TECHNOPOLIS CLUSTER OF KRASNOYARSK

Cluster Mission

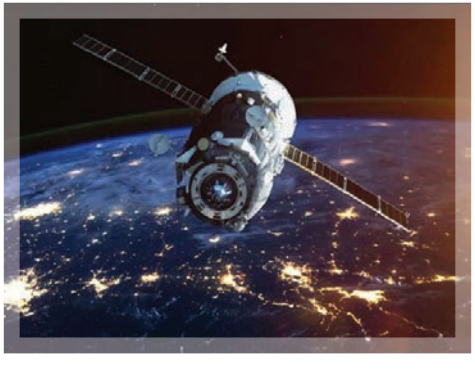
To make the cluster more competitive by achieving global leadership in designing satellite communication and nuclear safety systems, and by contributing to the development of a new national industrial platform aligned with the priorities of the National Technology Initiative.

Products and Services

- Spacecraft, space-based complexes and systems for applications in national defence
- Geodetic satellites
- Complexes and systems for communication, retransmission and television broadcasting purposes
- Full range of technologies and equipment for handling depleted nuclear fuel from energy reactors; closed nuclear fuel cycle
- Satellite communication stations and digital interference-proof tropospheric communication stations; navigation equipment for GLONASS/GPS users
- Precious metals in bars, granules, powder, and in the form of chemical compounds; machine-weaved chains and bracelets
- Catalytic systems, glass-melting devices, thermo electrode wires

Industry Specialisation

- Handling depleted nuclear fuel, closed nuclear fuel cycle (back-end technologies)
- Satellite construction
- Information technology
- Additive technology
- New materials
- Smart energy
- Active pharmaceutical ingredients and biopharmaceutical substances
- Technical vision
- Multifunction integrated information and communication systems for the regions with extreme climatic conditions
- Robotic systems and educational robotics



Membership

32 small enterprises
14 medium and large enterprises
13 other participants

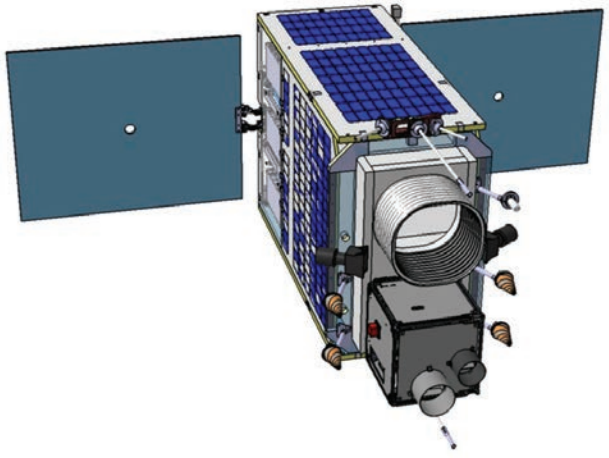
59 organisations

Key Cluster Members

Cluster Success Story

A modular platform for designing small spacecraft

The project aimed at developing a modular platform with specific interfaces (energy, heat, information, and construction) for designing small spacecraft. The platform is applied to manufacture multifunctional satellite groups and develop tailored solutions for satellite constellations with characteristics similar to those of the OneWeb system.



Cluster International Cooperation

Key partnership destinations

Belgium, Canada, Czech Republic, Finland, France, Germany, Italy, Poland, UK, USA

Invitation to cooperation

Yenisei Technopolis Cluster of Krasnoyarsk brings together global leaders in nuclear and space technologies, and world-class research and education centres. They offer partnership opportunities in the following areas:

- launching a high technology production of next-generation satellites and communications, navigation and geo-information systems, and smart energy grids;
- developing telecommunication services (broadband data transfer, mobile satellite communications, remote sensing, and meteorology), infrastructure and equipment for processing depleted nuclear fuel and radioactive waste;
- establishing a world-class R&D and educational core as a source of projects flow based on the cluster members' relevant capacities.

Foreign companies are invited to explore a Territory of Advanced Socio-Economic Development in Zheleznogorsk with its special tax incentives.

Cluster Management Organisation

Zheleznogorsk Innovation Technology Cluster
Economic Cooperation Association
Established: 2014
Number of staff: 9

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http://cluster24.ru/
E-mail: cl_it@mail.ru

http://cluster24.ru/team/

VALLEY OF MACHINE-BUILDING
LIPETSK CLUSTER

Cluster Mission

To scale up the cluster members' activities and promote their innovation-based growth by reaching global competitiveness in the machine-tool industry and thereby becoming more attractive to investment.

Industry Specialisation

- Automotive industry
- Machine tools
- Agricultural machinery

Products and Services

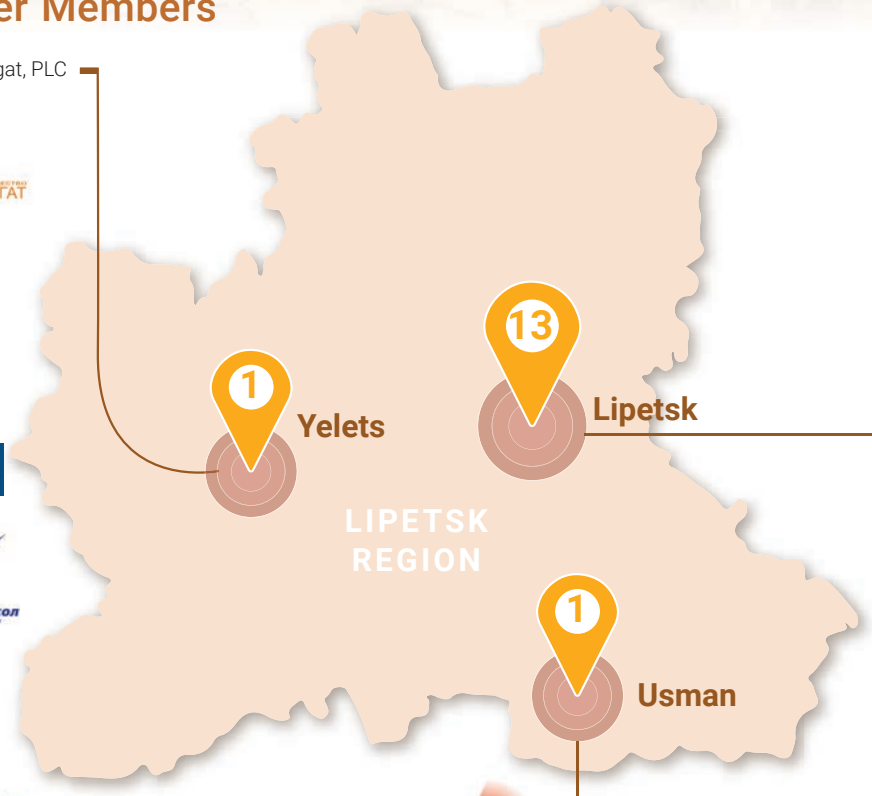
- Automobiles, agricultural machinery, components, and parts
- Metalworking precision casting

Membership

66 small enterprises
19 medium and large enterprises
33 other participants

118 organisations

Key Cluster Members



YeletsGidroAgregat, PLC

Genborg, LLC

- Indesit International, JSC
- Svobodny Sokol Lipetsk Pipe Company, LLC
- INTERMASH, LLC
- Vozrozhdenie Lipetsk Machine Tool Plant, CJSC
- Lipetsk Machine Tool Plant, JSC
- STP – Lipetsk Machine Tool Enterprise, JSC
- NLMK Engineering, Inc.
- Lipetsk State Technical University
- Lipetsk Regional Association of Industrial Enterprises
- Regional Engineering Centre, LLC
- Lipetsk Special Economic Zone, JSC
- Lipetsk Industrial Park
- Lipetsk Regional Innovation and Industrial Policy Department

Cluster Success Story

Genborg Project

The project was aimed at opening a low-voltage electric motor plant. Its main product is three-phase asynchronous and synchronous motors in the 2.2–400 kW power range for general industrial production purposes, application in railway transport and underground trains, and for specialised uses (such as the chemical, petrochemical, mining, cement, steel industries, and in shipbuilding, including explosion-proof engines, engines for ventilation and smoke removal systems), and also in harsh climates. Genborg LLC is projecting 5–8% share of the Russian machine tools market.

The plant produced 334 asynchronous motors in 2017. Several batches of motors in different series are being manufactured at the same time; specialised state-of-the art equipment has been procured and installed for these purposes.

International Cooperation

Key partnership destinations

Belarus, Belgium, Bulgaria, China, Denmark, France, Germany, Iraq, Italy, Japan, Kazakhstan, Moldova, Poland, Portugal, South Korea, Slovenia, Spain, Switzerland, UK, Ukraine, USA

Invitation to cooperation

Valley of Machine-Building Lipetsk Cluster is on a par with leading international clusters. It enjoys advanced energy, engineering, social and transport infrastructure in the Lipetsk Region (a network of highways and railroads, and Lipetsk International Airport), as well as the region's favourable economic environment and geographic position. For many years the Lipetsk Region ranks among top-20 Russian regions in the National Regional Investment Climate Ranking. In 2017, the respected fDi Intelligence publication, which maintains an international ranking of special economic zones, again rated Lipetsk Special Economic Zone as one of the best investment platforms in the world.

The cluster conforms to the Industry 4.0 Concept, particularly in the development of additive technologies. Major Russian and Western European companies that manufacture machine tools and production equipment are principal consumers of the cluster member products.

Cluster Management Organisation

Lipetsk Cluster Development Centre
Established: 2013
Number of staff: 6

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MOSCOW REGION CONSORTIUM OF INNOVATION CLUSTERS

Cluster Mission

To develop and promote world-class microwave electronics, aircraft, medical and pharmaceutical products for global markets.

Industry Specialisation

- Aerospace vehicles and defence
- Appliances
- Biopharmaceuticals
- Downstream chemical products
- Downstream metal products
- Education and knowledge creation
- Electric power generation and transmission
- Food processing and manufacturing
- Forestry
- Information technology and analytical instruments
- Lighting and electrical equipment
- Medical services
- Metalworking technologies
- Light and ultralight aircraft
- Robotic systems
- New materials
- Medical products

Products and Services

Pharmaceuticals:

- Pharmaceutical development of methods for the synthesis and drug design of API`s and FDF`s
- Preclinical safety and efficacy studies on SPF rodents, SPF rabbits, NH primates OECD GLP-grade
- Phase I–IV and Bioequivalence clinical trials and MoH regulatory support
- Pharmacokinetic and stability studies
- Patent research

Medical and biotechnology devices, biotechnology products and related services:

- R&D
- Engineering prototyping
- Serial production
- Certification

Composite and new materials
Energy generation and storage systems
Nuclear and aviation technologies
Digital and microwave electronics

Membership

118 small enterprises
105 medium and large enterprises
15 other participants

238 organisations

Key Cluster Members

1. Dubna Nuclear Physics and Nanotechnology Innovation Cluster; Moscow Region Medical Technology Cluster
2. PhyzTech XXI Innovation Cluster
3. Pushchino Biotechnology Innovation Cluster (in the City of Chernogolovka)
4. Friazino Industrial Cluster
5. Korolev Spaceships Technology Cluster
6. Zhukovsky Aviation Technology Cluster
7. Pushchino Biotechnology Innovation Cluster (in the City of Pushchino)
8. Pharma Valley Cluster (in the cities of Pushchino, Dolgoprudny, Chernogolovka)

ЦАГИ
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pascal' ООО «Паскаль Медикал»
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Яндекс
ТЕНЗОР
ГРАНАТ БИО ТЕХ
МФТИ
СВЯЗЬ ИНЖИНИРИНГ
VALENTA

Cluster Success Story

Joint venture projects in Dubna Special Economic Zone

Aquanova Rus JSC jointly with the German company AQUANOVA AG and RUSNANO OJSC develops and sells unique micelle solutions using the patented NovaSOL® technology. NovaSOL® products include innovative multipurpose chemical compounds containing alimentary, cosmetic, pharmaceutical ingredients, and nutrients.

FRERUS LLC develops and manufactures capillary filters, equipment for haemodialysis and other extracorporeal blood cleansing techniques. Dialysis remains the main treatment for patients suffering from chronic renal insufficiency. The German company Fresenius Medical Care, world leader in haemodialysis technologies, for decades has been meeting the challenge of providing a high quality of life to patients with chronic kidney diseases.

Joint R&D and Educational Centres in Pushchino and Chernogolovka

The R&D and Educational Centres were opened in 2016. The project was implemented jointly by the Moscow State Regional University, the Institute of Problems of Chemical Physics of the RAS, the Institute of Active Substance Physiology of the RAS, and the Institute of Biological Instrumentation of the RAS.
The Centres are the home for advanced laboratories with cutting-edge equipment and facilities. They develop new pharmaceuticals and medical products, pharmaceutical preparations, environmental monitoring and protection technologies. In addition, they conduct cellular technology research to design and apply new diagnostic techniques. The establishment of these centres has enabled combined and coordinated efforts in basic and applied research that were also integrated with the educational process to improve the quality of training for students and researchers, and to engage graduate and post-graduate students and young professionals in R&D.

Cluster International Cooperation

Key partnership destinations

Austria, China, France, Germany, Israel, Japan, Moldova, Poland, Portugal, South Korea, Singapore, Switzerland, Taiwan, USA

Partner clusters

Oberösterreich clusters (Austria)	www.medizintechnik-cluster.at www.kunststoff-cluster.at www.mechatronik-cluster.at www.gesundheits-cluster.at
SILICON SAXONY (Germany)	www.silicon-saxony.de
Clib 2021 (Germany)	www.clib2021.de

Invitation to cooperation

Moscow Region Consortium of Innovation Clusters offers an opportunity to find partners for cooperation, and opens an effective gateway to the Russian market. Most of the cluster members are located in the Dubna or the Istok special economic zones, along with eight other industrial areas that are ready to host high technology companies. The cluster joins the RAS research institutes, educational organisations, industrial companies, and suppliers of equipment and specialised services. Their competitiveness has significantly strengthened because of the synergy that naturally arises in a compact territorial agglomeration with its transfers of technology, the steady flow of knowledge, personnel, and financing. All these factors open up opportunities for carrying out projects with any degree of complexity.

Cluster Management Organisation

Moscow Regional Development Corporation
Established: 2013
Number of staff: 7

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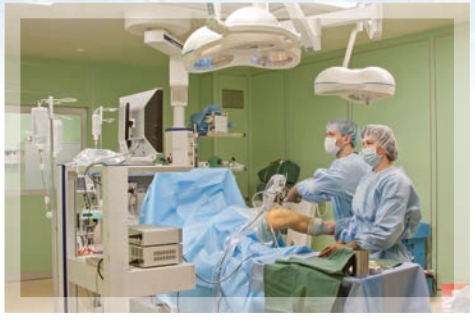
SIBERIAN SCIENTOPOLIS CLUSTER OF NOVOSIBIRSK

Cluster Mission

To enhance the global technological leadership and investment attractiveness of the cluster members, and to use their advanced capacities for greater economic growth and improving the quality of life in the Novosibirsk Region.

Industry Specialisation

- Biopharmaceuticals and biotechnology
- Telecom equipment and services
- Food processing and manufacturing
- Information technology and analytical instruments
- Medical services



Products and Services

Information technology

- Research and modelling software
- Software for mobile devices
- Geo-information systems (GIS)
- Virtual reality systems
- Computer simulators, games
- Software for genetics, biology and medicine
- Telecom equipment
- Production and technological process automation systems, high-performance computing

Biotechnology and biopharmaceuticals

- Pharmaceuticals and vaccines
- Medical diagnostic kits
- Functional food
- Industrial enzymes
- Fodders agents
- Veterinary diagnostic kits
- Pest killers (bioproducts for agriculture and plant protection; veterinary feed; biotech equipment; cells regenerating cosmetics; medical devices, including microdrainage for eye surgery)
- Oil deactivators

High technology medical equipment

- Endoprosthesis and immersion constructions applicable traumatology, orthopaedics and neurosurgery; exoprosthesis
- Biocompatible materials for surgery: tissue-substituting materials, bioresorbable stents, vascular prosthesis, artificial heart valves

Membership

170 small enterprises
40 medium and large enterprises
36 other participants

246 organisations

Key Cluster Members

Cluster Success Story

Siberian Scientopolis: Joining IT and biotechnology capacities

Technopark of Novosibirsk Akademgorodok JSC (Academpark) includes the largest technology incubator in Russia (a complex of business incubators specialising in four areas: IT; instrumentation; biotechnologies and medicine; nanotechnologies and new materials) as well as other facilities. Academpark's unique S&T and business infrastructure offers ideal conditions for creating new innovative companies and for converting R&D results into functional industrial technologies.

BioTechnoPark Koltsovo Infrastructure Complex comprises a shared equipment centre (SEC) and a testing laboratory centre (TLC). The SEC is designed to accelerate technological fine-tuning and development and also to expedite marketing of biotechnology products. The TLC provides versatile laboratory facilities sufficient for a wide range of chemical, biochemical, microbiological, and toxicological tests. BioTechnoPark offers sites for construction of manufacturing facilities and offices, and its residents already include the largest pharma distributor in the country. **Koltsovo Business Incubator** ensures favourable conditions for intensive growth of innovative startups, more than 50 since 2007.

Biotechnological companies of the cluster are united in the **Biopharm Association** with more than 50 members from Koltsovo, Novosibirsk and Berdsk. The volume of manufactured products exceeds US$ 67 million. Anchor biotechnology manufacturers are Vector-Best JSC, Vector-BiAlgam JSC, Sibbiofarm LLC, Vector-Medica CJSC, SFM LLC, and about 30 innovative SMEs. Angioline JSC grew from a resident of the Koltsovo Business Incubator to become a manufacturer of products for cardiology interventions (coronary stents, etc.).

The R&D drivers of the cluster are SRC VB Vector, the Institute of Chemical Biology and Fundamental Medicine of the RAS, the Federal Research Center of the Institute of Cytology and Genetics of the RAS, Novosibirsk State University, Novosibirsk State Medical University, Novosibirsk State Agrarian University, etc. The total amount of research funding amounts to US$ 24 million per year.

Cluster International Cooperation

Key partnership destinations

China, France, Germany, Switzerland, USA

Invitation to cooperation

The Novosibirsk Region has taken the necessary legal and regulatory steps to support a wide range of innovation infrastructure: three technology parks and four industrial parks; business incubators; research and production, innovation and engineering centres; shared equipment and prototyping centres.
In terms of the concentration and capacity of its technology and industrial parks, the Novosibirsk Region is among the leaders in Russia, and most of the infrastructure facility units are members of the cluster.
Participation of the best Siberian universities sets a high standard of education in basic disciplines and in professions relevant to the cluster's areas of specialisation.
Cluster members actively cooperate with international companies, and successfully implement joint projects.

Cluster Management Organisation

Novosibirsk Regional Cluster Development Centre
Established: 2015
Number of staff: 5

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BASHKORTOSTAN PETROCHEMICAL CLUSTER

Cluster Mission

To create a horizontally integrated production network that unites the region's entire industrial potential for oil and gas production, and to facilitate cooperation between different sectors of the economy (oil and gas production and transportation, R&D and education, engineering, construction, etc.).

Products and Services

- Oil and gas production
- High-tonnage petrochemical products
- Low-tonnage petrochemical products
- Transportation of raw materials and end products
- Engineering services
- Construction and installation services
- Oil and gas mechanical engineering
- Geophysical services
- Support services

Industry Specialisation

- Appliances
- Communications equipment and services
- Downstream chemical products
- Education and knowledge creation
- Oil and gas production and transportation
- EPCM
- Geophysical industry and geophysical service
- Development of technologies for oil refining and petrochemistry

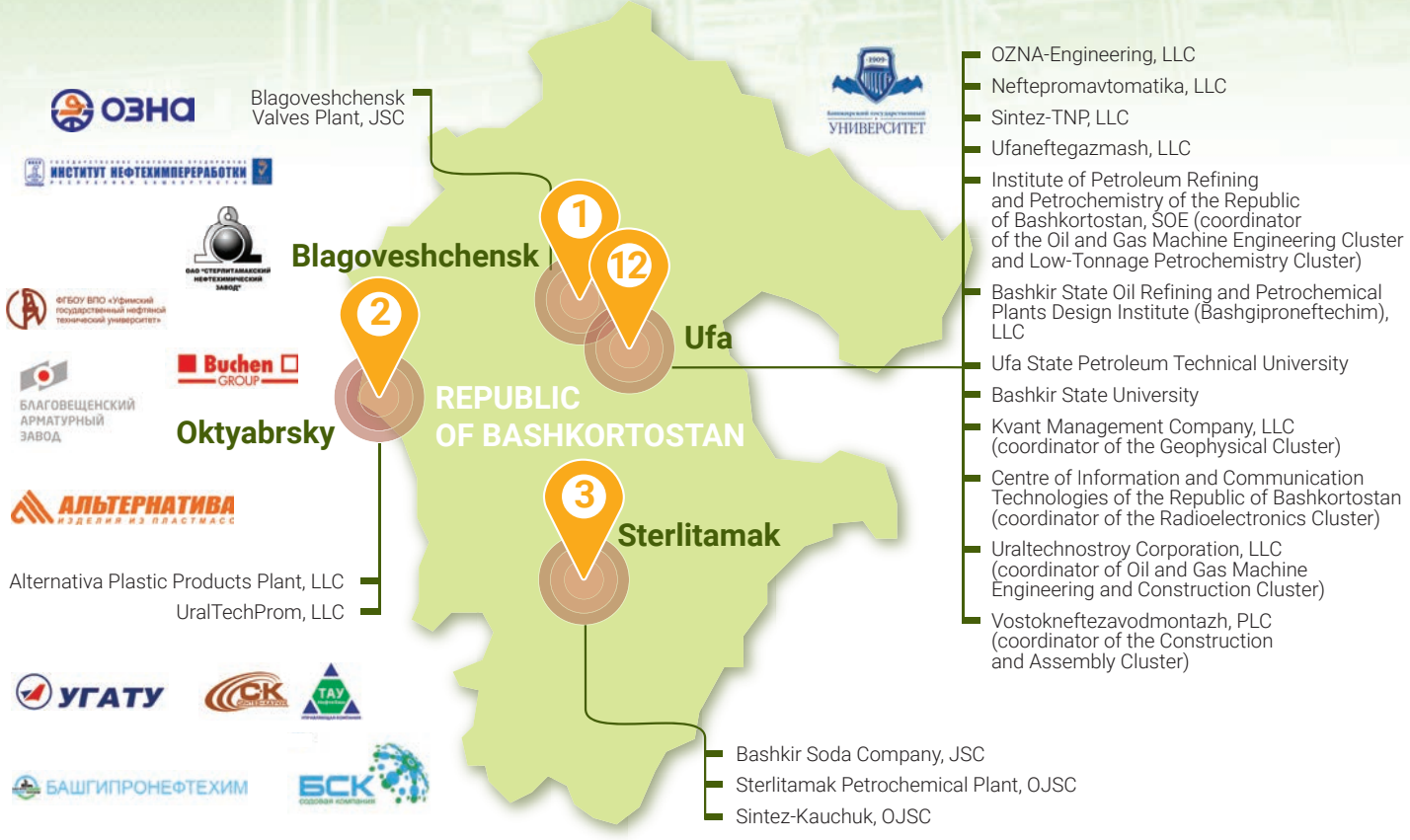
PETROCHEMICAL
TERRITORIAL CLUSTER
REPUBLIC OF BASHKORTOSTAN

Membership

100 small enterprises
30 medium and large enterprises
70 other participants

200 organisations

Key Cluster Members



Blagoveshchensk Valves Plant, JSC

- OZNA-Engineering, LLC
- Neftepromavtomatika, LLC
- Sintez-TNP, LLC
- Ufaneftegazmash, LLC
- Institute of Petroleum Refining and Petrochemistry of the Republic of Bashkortostan, SOE (coordinator of the Oil and Gas Machine Engineering Cluster and Low-Tonnage Petrochemistry Cluster)
- Bashkir State Oil Refining and Petrochemical Plants Design Institute (Bashgiproneftechim), LLC
- Ufa State Petroleum Technical University
- Bashkir State University
- Kvant Management Company, LLC (coordinator of the Geophysical Cluster)
- Centre of Information and Communication Technologies of the Republic of Bashkortostan (coordinator of the Radioelectronics Cluster)
- Uraltechnostroy Corporation, LLC (coordinator of Oil and Gas Machine Engineering and Construction Cluster)
- Vostokneftezavodmontazh, PLC (coordinator of the Construction and Assembly Cluster)

Alternativa Plastic Products Plant, LLC
UralTechProm, LLC

- Bashkir Soda Company, JSC
- Sterlitamak Petrochemical Plant, OJSC
- Sintez-Kauchuk, OJSC

Cluster Success Story

General Oil Refinery Design

The project implementation required the design of various facilities: an elemental sulphur production plant (employing proprietary technology from the Institute of Petroleum Refining and Petrochemistry of the Republic of Bashkortostan); a hydrogen production plant; an ELOU-AT-3 oil refinery complex (an electrical desalting plant and a single-flash pipe still, a diesel fuel hydrorefining plant, general support facilities, and infrastructure).

The project's unique feature was a radically new approach to production, based on cutting-edge, clean hydrocarbon processing technologies.

International Cooperation

Key partnership destinations

Azerbaijan, Belarus, China, Estonia, Finland, Germany, Hungary, India, Indonesia, Italy, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Poland, Spain, Turkey, UK, Ukraine, Uzbekistan

Partner clusters

Klaster Badan I Rozwoju oraz Innowacji (Poland)
http://klasterbri.pl/

Chemie Cluster Bayern GmbH (Germany)
http://chemiecluster-bayern.de/

Omsk Regional Petrochemical Industry Cluster (Russia)
http://npk-omsk.ru/

INNOKAM Cluster of Tatarstan (Russia)
http://innokam.ru/

Invitation to cooperation

Cluster members are open to cooperation with Russian and international partners (R&D organisations, industrial companies, universities) in the petrochemistry, gas and oil refinery areas.

The cluster's unique feature is an integrated approach covering a wide range of activities and competences, from designing petrochemical and gas processing facilities to supplying high quality equipment, construction, installation, and maintenance services. The cluster's high production capacity, its advanced S&T and human potential are the key factors ensuring successful international cooperation.

PETROCHEMICAL
TERRITORIAL CLUSTER
REPUBLIC OF BASHKORTOSTAN

Cluster Management Organisation

Institute of Petroleum Refining and Petrochemistry of the Republic of Bashkortostan
Established: 2015
Number of staff: 16

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BRIGHT CITY LIGHTING AND OPTOELECTRONIC INSTRUMENTATION CLUSTER OF MORDOVIA

Cluster Mission

To foster regional socio-economic development by enhancing the competitiveness of the cluster members and expanding their market share.

Industry Specialisation

- Lighting engineering and lighting control systems
- Fibre optics and optoelectronics
- Instrumentation

Products and Services

Lighting products

- Light sources
- Lighting devices
- Electronic components
- Automated lighting control systems

Fibre optics

- Telecommunication and technical optical fibres
- Special optical fibres
- Optical cables

Optoelectronic instruments

- Fibre lasers and amplifiers
- Fibre-optic sensors
- Monitoring systems for extended objects

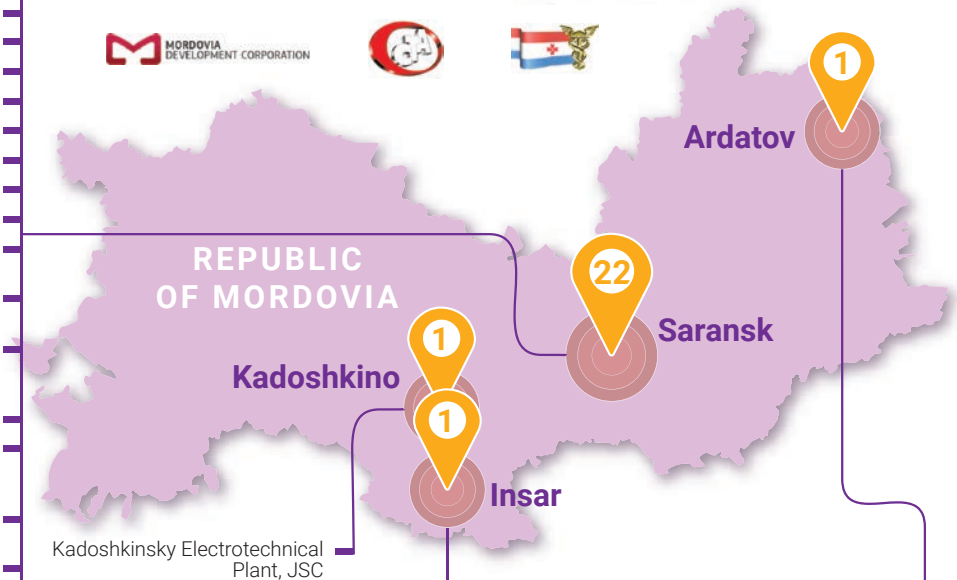
Membership

23 small enterprises
10 medium and large enterprises
17 other participants

50 organisations

Key Cluster Members

- Technopark-Mordovia (Autonomous institution)
- National Research Mordovia State University
- Scientific Research Institute of Light Sources Named A.N. Lodygin, LLC
- Mordovia Republic School for Gifted Children
- Electrovipryamitel, PJSC
- Orbita, JSC
- Optic Fiber Systems, JSC
- Saranskkabel-Optica, LTD
- Lisma, LLC
- NEPES RUS, LLC
- Reflux-S, LLC
- Saransk Television Plant, JSC
- Lighting Devices Plant, LLC
- Helios Resource, LLC
- Saransk Instruments Making Plant, PJSC
- Engineering Center of Energy-Saving Lighting Technology, LLC
- Centre of Nanotechnology and Nanomaterials of the Republic of Mordovia, LLC
- Fiber Optics Engineering Centre, JSC
- Agency for Innovation Development of the Republic of Mordovia (Autonomous institution)
- Mordovia Development Corporation, LLC
- Association of Lighting Devices Producers "Russian Light"
- Chamber of Commerce and Industry of the Republic of Mordovia (Alliance)



Cluster Success Story

The establishment of Energy-efficient Lighting Centre

Energy-efficient Lighting Centre was established on the basis of Technopark-Mordovia to foster the cooperation among cluster members. The Centre provides the following services: design and construction of lighting systems, simulation and prototyping, reverse engineering, large format printing, metalworking, SMD-and DIP-mounting, plastic molding. These services help cluster members to reduce costs and save time on the creation of new products and their market launch.

One of the latest products created in the Centre is Sunlight luminaire of combined light series. It is the first luminaire of such type in Russia, which provides high-quality lighting and compensates the lack of sunlight and vitamin D. The Sunlight luminaire of combined light series was created by the Scientific Research Institute of Light Sources named A.N. Lodygin LLC.

International Cooperation

Key partnership destinations

Burundi, China, Finland, France, Germany, Hungary, Iran, Italy, Kazakhstan, the Netherlands, South Korea, Spain, Sudan

Invitation to cooperation

The Cluster strategy includes four long-term initiatives to make Saransk a centre for advancing and consolidating knowledge; a platform for projects; a hub for attracting investment; and a city of sports and a healthy lifestyle. The initiatives are connected with the cluster's strengths:

- Developed innovation infrastructure: Technopark-Mordovia (group A+) with two main divisions: the Information and Computing Complex (the first data centre in Russia to receive TIER IV Design Documents from Uptime Institute) and the Innovative Production Complex, which covers the whole production chain from generating ideas to their implementation. There are also Agency for Innovation Development of the Republic of Mordovia, and the Export Promotion Centre of the Republic of Mordovia.
- High R&D and educational potential: National Research Mordovia State University, Mordovia Republic School for Gifted Children, Quantorium Children's Science Park.
- Investment attractiveness of the region: Mordovia Development Corporation LLC; Ruzayevka Priority Socio-Economic Development Zone; Svetotekhnika Industrial Park. Successful joint ventures: TLLINNO (Burundi), NEPES RUS, LLC (South Korea). Saransk is one of the 2018 FIFA World Cup venues, and cluster members are involved in arrangement activities. For example, NEPES RUS LLC equips Mordovia-Arena stadium with lighting systems, and National Research Mordovia State University runs the Volunteer Centre.

Cluster Management Organisation

Technopark-Mordovia
Established: 2009
Number of staff: 91

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INNOKAM CLUSTER OF TATARSTAN

Cluster Mission

To promote high technology and high value-added production, and to ensure that the cluster members' industrial capacity contributes to a higher quality of life throughout the Republic of Tatarstan.

Industry Specialisation

- Automotive
- Automotive components manufacturing
- Downstream chemical products
- Major organic goods production
- Metalworking technologies
- Information technology and analytical instruments
- Downstream metal products

Products and Services

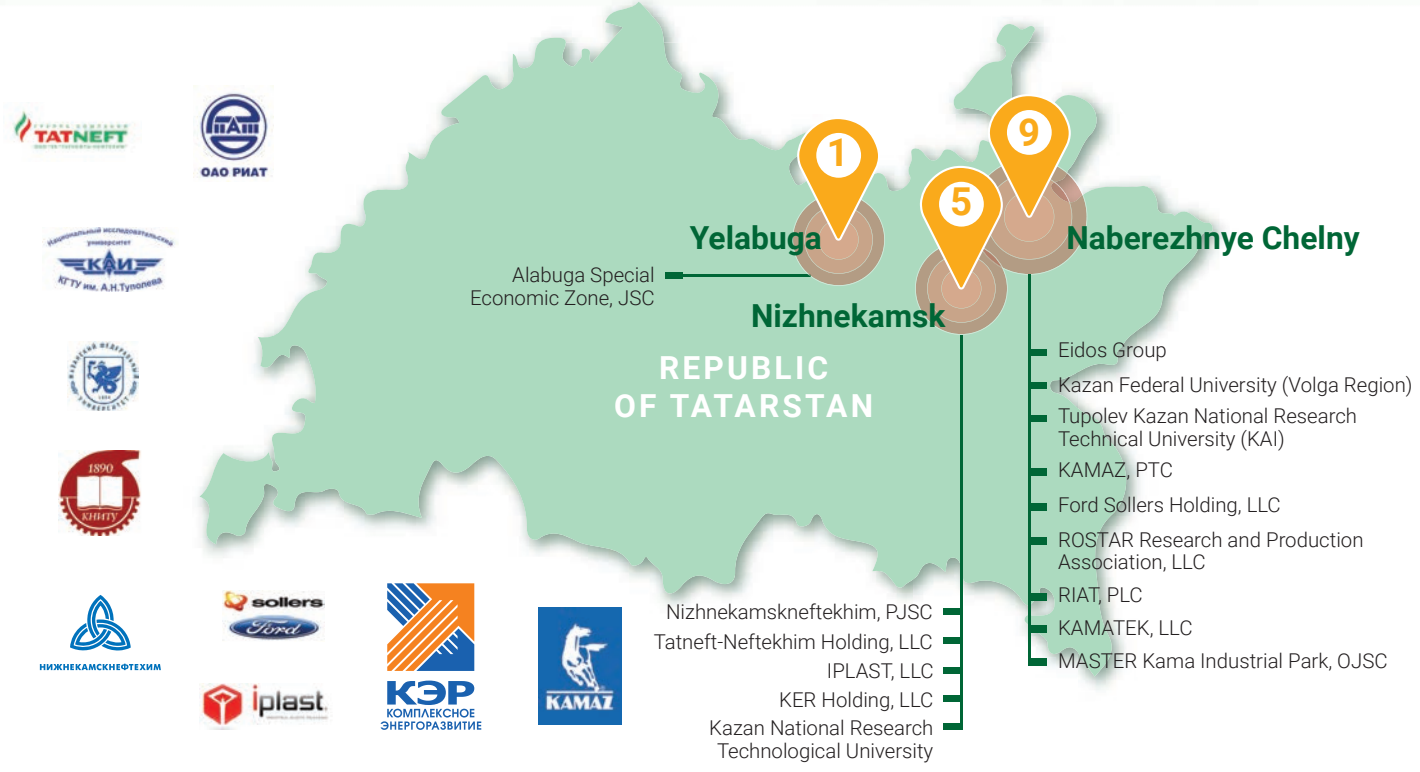
- Lorries with gross weight between 8-40 tons
- Special automotive vehicles and superstructures
- Bus chassis, small and large buses
- Heavy vehicle trailers
- Automobiles
- Tires (for lorries, cars, agricultural and industrial vehicles)
- Rubber, plastics, monomers and other petrochemical products
- Petroleum products
- Fertilisers and nitrogen compounds
- Chemical products suitable for technical, reagent and pharmacopeial applications
- Materials for construction, road-building, and heat insulation
- Specialised products made of synthetic sapphire
- Fibreglass products
- Composite materials
- Automotive parts
- Plastic products
- Lubricant and coolant liquids, and technological additives
- Mechanical processing of metals, casting, blanking
- Aluminium profiles and parts of any complexity
- Die and foundry tooling
- A wide range of mechanical engineering products
- Engineering and prototyping services
- Energy efficiency services

Membership

176 small enterprises
36 medium and large enterprises
70 other participants

282 organisations

Key Cluster Members



Cluster Success Story

Development of Russian innovative green transport systems

A project to develop electrical buses in both the large and very small classes was implemented from 2014 to 2016. These vehicles are radically new and conform to international environmental, safety, and energy and resource conservation standards.

The buses are ready for small-scale production: prototypes successfully passed operational tests in Innopolis University (Tatarstan) and were handed over for controlled operation to potential customers (in Moscow, the Moscow Region, and Saint Petersburg). Widespread application is expected to begin in the near future.

International Cooperation

Key partnership destinations

Austria, Belgium, China, Czech Republic, Finland, Germany, Hong Kong, Kazakhstan, Poland, South Korea, Slovakia, Sweden

Partner clusters

ChemSite-Initiative (Germany)
http://www.emscher-lippe.de/chemsite/

AMAPLAST (Italy)
www.assocomaplast.org/en/

German Association of the Automotive Industry – VDA (Germany)
http://www.vda.de/en

Plastics Industry Trade Association (USA)
www.plasticsindustry.org/

Invitation to cooperation

Foreign investors are actively involved in the cluster's large-scale projects. The Republic of Tatarstan has established joint ventures with leading global producers such as Ford, Rockwool, the Hayat Group, Daimler, 3M, Bosch, Schneider Electric, Air Liquide, etc. These ventures are mostly concentrated in the Alabuga Special Economic Zone, and the Naberezhnye Chelny Territory of Accelerated Socio-Economic Development. Resident companies enjoy tax exemptions and many other benefits.

International clusters and companies in oil refining, petrochemistry, and the automotive industries are invited to cooperative ventures and joint R&D projects in INNOKAM Cluster of Tatarstan.

innokam

Cluster Management Organisation

INNOKAM Association
Established: 2012
Number of staff: 12

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SAMARA AEROSPACE CLUSTER

Cluster Mission

To contribute to the global leadership of the Russian Federation, and the Samara Region in particular, in the development, production and sales of advanced aerospace technology and equipment.

Industry Specialisation

- Production of aerospace equipment, machinery and components
- Defence industry
- Propulsion engineering

Products and Services

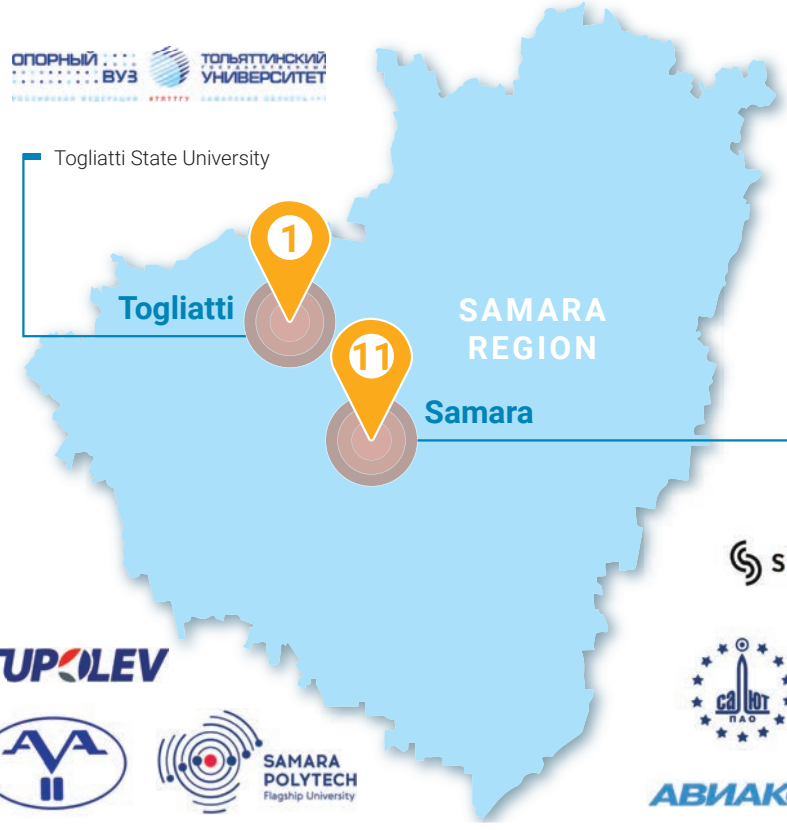
- Spacecraft
- Aviation and rocket engines
- Aircraft aggregates, components and parts
- Maintenance and repair of aircraft and power units

Membership

26 small enterprises
16 medium and large enterprises
25 other participants

67 organisations

Key Cluster Members



- Progress Rocket and Space Centre, JSC
- Kuznetsov, PLC
- Aviaaggregate, JSC
- Aviakor Aviation Plant, JSC
- Metallist Samara, JSC
- Saliut, PLC
- Tupolev Design Bureau, PLC (Samara Branch)
- Technodynamika Holding Company
- Korolev Samara University (National Research University)
- Samara Regional Cluster Engineering Centre
- Samara State Technology University (Samara Polytech)

ТЕХНОДИНАМИКА

SAMARA UNIVERSITY

РКЦ ПРОГРЕСС

TUPOLEV

KUZNETSOV UEC

САЛЮТ ПАО

SAMARA POLYTECH Flagship University

АВИАКОР

МЕТАЛЛИСТ САМАРА

Cluster Success Story

Multilevel Online System for Earth Remote Sensing

A pilot project implemented by cluster members in the Samara Region comprised:

- building an integrated group of UAVs for online remote monitoring of the Earth's surface including ground-based, water and underwater objects (Space – Air – Earth – Water);
- creating a regional database of remote sensing data;
- developing a system of ground-based stationary and mobile monitoring laboratories;
- developing software for operating the integrated group of UAVs and processing the monitoring data.

International Cooperation

Key partnership destinations

Armenia, Austria, China, France, Germany, Hungary, India, Italy, Kazakhstan, Spain, Sri Lanka, USA

Partner clusters

Campania Aerospace District – DAC (Italy)
http://www.daccampania.com/

Helice, Andalusian Aerospace Cluster (Spain)
http://helicecluster.com/

Hungarian Aerospace Cluster (Hungary)
http://www.haif.org/

Skywin Aerospace Cluster of Wallonia (Belgium)
http://www.skywin.be/

Eurasian Aerospace Clusters Partnership (Russia, France)
http://www.eac.aero/

Invitation to cooperation

Samara Aerospace Cluster brings together leading companies and related R&D organisations working in rocket and space engineering, aircraft construction, propulsion and aggregate engineering. The cluster's particular strength is that it encompasses the complete aerospace production cycle within a single region. Cluster members' combined annual output reaches over US$ 1 billion. The total workforce is 45,000, out of which more 21,000 people are engaged in R&D. The cluster has unique competences in aerospace technologies.

Cluster Management Organisation

Samara Regional Innovation Development and Cluster Initiatives Centre
Established: 2010
Number of staff: 75

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www.cik63.ru

SMART TECHNOLOGIES TOMSK CLUSTER

Cluster Mission

To ensure the development of science and education in the Tomsk Region in key technological areas and to scale up joint projects of the cluster members that facilitate high technology businesses.

Products and Services

- Development, production, maintenance, and modernisation of aircraft equipment
- Applied R&D for designing aircraft subassemblies
- Production of short-lived isotopes
- Development of new materials and technological processes for nuclear energy
- Air transportation
- Training of highly skilled personnel
- Technology transfer

Industry Specialisation

- Biopharmaceuticals
- Education and knowledge creation
- Fishing and fishing products
- Forestry
- Creation of active pharmaceutical ingredients and biopharmaceutical substances
- Technical vision
- Integrated information and communication systems for regions with extreme climate conditions

SMART
TECHNOLOGIES TOMSK

Membership

165 small enterprises
6 medium and large enterprises
12 other participants

183 organisations

Key Cluster Members

- Pharmstandard – TomskChemPharm, LLC
- EleSy, JSC
- Micran, JSC
- Artlife, JSC
- Elkomplus, LLC
- Innovative Pharmacological Development, LLC
- Elecard Devices, CJSC
- Inkom, LLC
- AquaVallis, LLC
- Arctic Medical Training, LLC
- Tomsk State University (National Research University)
- Siberian State Medical University of the Russian Ministry of Health
- Tomsk Polytechnic University (National Research University)
- Tomsk State University of Control Systems and Radioelectronics
- Tomsk State Pedagogical University

Cluster Success Story

Registration, certification, production, and sales of a set of instruments for minimally invasive endovideosurgical operations on the bladder, using pneumovescioscopy technique

The set of instruments developed within the project uses endoscopic intervention for bladder surgery and achieves the same results as in open surgical operations. This treatment causes significantly less trauma of tissues and reduces both the risk of postoperative complications and the length of postoperative convalescence.

The instruments provide reliable access to the bladder for surgical treatment of children's vesicoureteral reflux using a pneumovescioscopy technique. They also enable surgical interventions in the bladder cavity of adult patients, including minimally invasive operations to remove stones and treat urethrocele.

The product was tested in several clinics for treatment of vesicoureteral reflux; the tests proved that the design was adequate, and that the minimally invasive operations were appropriate and efficient.

International Cooperation

Key partnership destinations

Brazil, France, Germany, Israel, Italy, Japan, the Netherlands, Poland, Singapore, South Africa, Switzerland, UAE, UK, USA

Invitation to cooperation

The cluster's competitive advantages include:

- prevalence of R&D and educational organisations, especially the leading universities embedded in a highly effective innovation infrastructure;
- a high proportion of students and skilled young people in the region, creating a favourable environment for further innovation;
- thriving small and medium-sized enterprises along with an absence of large corporations. Several high technology companies generate revenues in excess of 1 billion roubles a year (US$ 16.13 million). This has encouraged horizontal integration in the Tomsk Region, which is becoming an excellent environment for growing future champions.

SMART
TECHNOLOGIES TOMSK

Cluster Management Organisation

Tomsk Regional Cluster Development Centre
Established: 2013
Number of staff: 16

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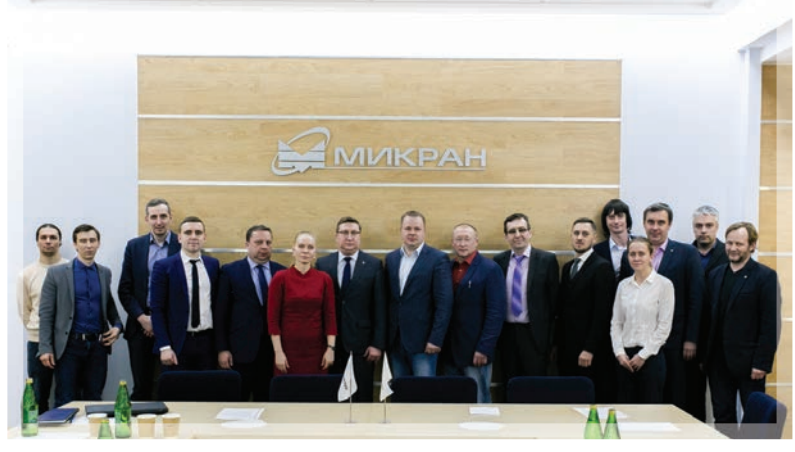

ULYANOVSK AVIATION AND NUCLEAR TECHNOLOGIES CLUSTER

Cluster Mission

To contribute to the regional economy transition from an outdated industry-based model with large companies focused on public procurement contracts and slowly growing traditional markets to an innovation-based model with high technology SMEs seeking global emerging markets, including those of the National Technology Initiative.

Products and Services

- Development, production, maintenance, and modernisation of aircraft equipment
- Applied R&D for design of aircraft subassemblies
- Production of short-lived isotopes
- Development of new materials and technological processes for the nuclear energy industry
- Air transportation
- Training of highly skilled personnel
- Technology transfer

Industry Specialisation

- Aerospace, defence
- Alternative energy
- Nuclear energy and radiological medicine
- Education and knowledge creation

Membership

93 small enterprises
8 medium and large enterprises
24 other participants

125 organisations

Key Cluster Members

Cluster Success Story

ULNANOTECH
Ulyanovsk Nanocentre

ULNANOTECH is an area for launching new technology startups. The Nanocentre is designed as an engineering complex that incorporates startup offices, laboratory buildings and a pilot production facility. It houses laboratories for molecular-genetic diagnostics and new tests development, high-performance concrete and construction materials, functional thin-film coatings, metal-matrix composites, and electronic devices development. ULNANOTECH has attracted a significant pool of technical experts and businessmen who work jointly on projects. It enables the creation of high technology startups, development of competence centres in different industries.

International Cooperation

Key partnership destinations

Belgium, China, Czech Republic, France, Germany, Japan, South Korea, Sweden

Invitation to cooperation

The Ulyanovsk Region has a substantial S&T potential, which can assist in the development of almost any kind of high technology industry. Ulyanovsk Aviation and Nuclear Technologies Cluster brings together Russian aircraft construction, aviation instrumentation, automotive and machine tool companies, and research institutes specialising in nuclear energy and aviation industry. It also comprises two major international airports, the Special Economic Zone (home to one of the world's leading air cargo companies – Volga-Dnieper), and one of the largest assembly plants of Russia's United Aircraft Corporation. The Research Institute of Atomic Reactors (the world's largest nuclear industry R&D centre and one designated an International Research Centre by the IAEA) is a prominent participant of the cluster's activities. The cluster also includes vocational training organisations for secondary and higher education.

The cluster incorporates the two pilot innovative clusters of the Ulyanovsk Region:

- Ulyanovsk-Avia Research, Educational, and Production Cluster Consortium specialising in aircraft and spacecraft production and new materials;
- Dimitrovgrad Nuclear Innovation Cluster specialising in nuclear and radiation technologies and new materials.

The cluster's key feature is that it brings together:

- large industrial companies, which have relocated in the region during the last ten years;
- innovative, high technology small and medium-sized enterprises and startups operating in IT, new materials, transportation of the future, renewable energy, and eHealth.

Cluster Management Organisation

Ulyanovsk Regional Cluster Development Centre
Established: 2009
Number of staff: 5

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INNOCITY CLUSTER OF SAINT PETERSBURG

Cluster Mission

To enhance regional cooperation, R&D and production capacities of the cluster members as well as to develop innovation infrastructure for increasing the global competitiveness of Saint Petersburg's core industries.

Industry Specialisation

- Appliances
- Biopharmaceuticals
- Communications equipment and services
- Education and knowledge creation
- Information technology and analytical instruments
- Medical services
- Radionics
- Telecommunications
- Biomedicine
- Pharmaceuticals
- Scientific research activities
- Marine robotics

Products and Services

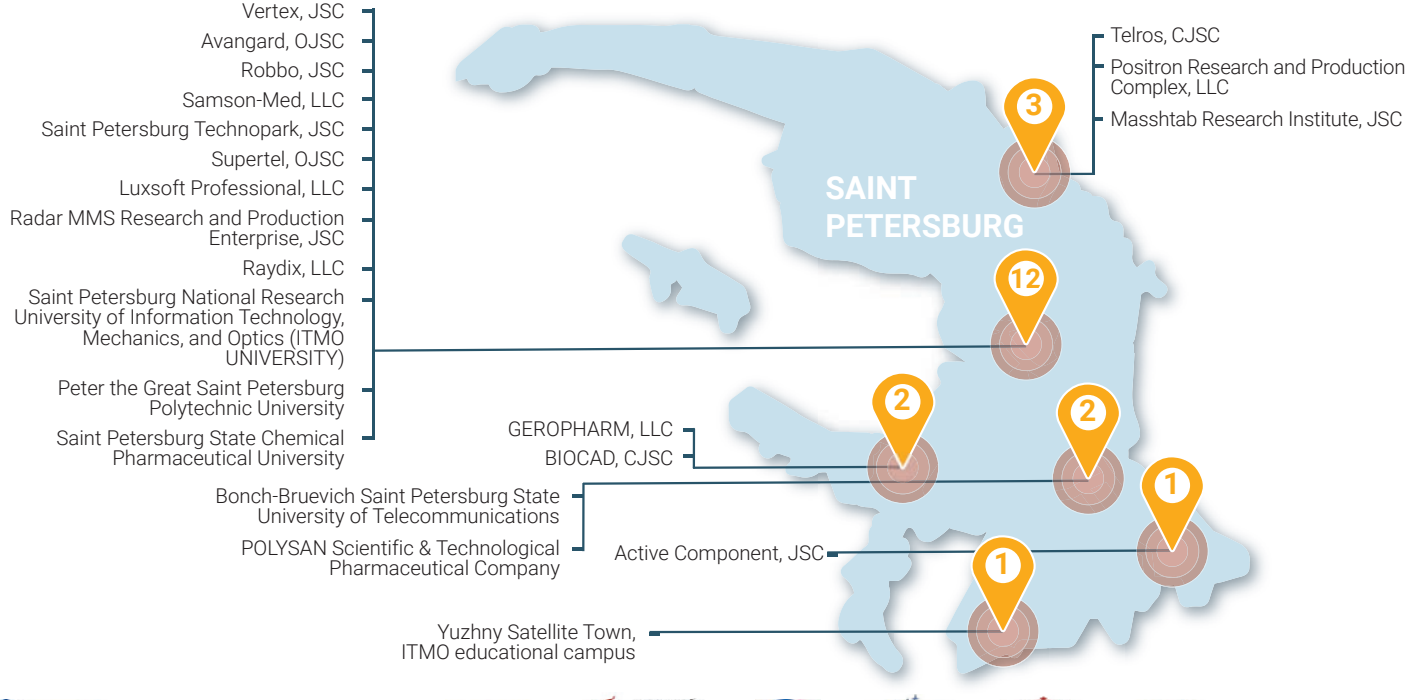
- Automated integrated security and energy efficiency systems for industrial and municipal facilities
- Radio-electronic systems for monitoring and controlling the weight of special transport vehicles and urban passenger transport
- Vehicle identification systems
- Sea and river vessel navigation systems
- Data protection systems
- Development and production of radio-frequency identification systems
- Development and production of support systems based on space-time coordinates
- Secure telecommunication and information systems for application in management and administration
- Development of military and special-purpose electronic components and radio-electronics
- Development and production of digital TV equipment
- Development and industrial production of more than 100 varieties of ready-to-use medical preparations and pharmaceutical substances in the following treatment groups: bacterial infection, cardiovascular and psychoneurological diseases, pain management, antipyretic agents, anti-inflammatory agents, vitamins, etc.;
- Setting up technology platforms to manufacture innovative Russian peptide-structure active pharmaceutical substances and gestagenic drugs using biotechnological processes
- Conducting R&D to develop innovative medical preparations and medical products

Membership

144 small enterprises
80 medium and large enterprises
36 other participants

260 organisations

Key Cluster Members



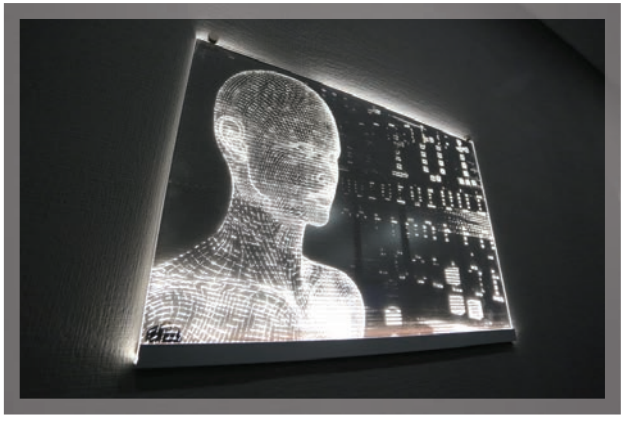
Cluster Success Story

Security Systems for Information and Cyber-physical Systems Regional Engineering Centre (REC SafeNet)

The project was aimed at building a technology and business infrastructure to help companies in radio-electronics, communication systems, and information technology bring non-military products to high technology SafeNet markets.

The project resulted in:

- provision of technical equipment for prototyping new solutions for trusted execution environments and products based on geographically distributed data processing centre with quantum protection;
- supporting participation in major related projects (Development of National Bio-identification System, Beijing-Helsinki Great Quantum Road);
- shortening the R&D operational cycle by up to 2.5 times;
- promoting investments, reducing operational costs.



International Cooperation

Key partnership destinations

Australia, Belarus, Brazil, Canada, China, Czech Republic, Finland, Germany, India, Israel, Kazakhstan, South Korea, the Philippines, Sri Lanka, Thailand, Turkey, UK, USA, Vietnam

Invitation to cooperation

Saint Petersburg is not just a major multimodal transport hub and a leading Russian industrial centre. More than 10% of the national R&D potential is concentrated here: more than 300 research organisations, 70 of which belong to the RAS and other state academies. There are 10 state R&D centres, and more than 160 non-military tertiary and secondary vocational educational organisations.

Saint Petersburg's highly sustainable R&D and human potential creates a favourable environment for high technology businesses. Numerous Saint Petersburg companies are included in the Top 100 in the Russian National Ranking of Emerging Technology Companies, and they are leaders in industries such as pharmaceuticals, medical equipment, electronics and instruments, information technology, mechanical engineering, industrial production equipment, and advanced materials. A high concentration of unique resources, R&D, technological and commercial competences, and project management experience in the city provided the basis for establishing InnoCity Cluster of Saint Petersburg. Its core members include industrial enterprises, and R&D and educational organisations that are leaders in advanced production technologies, IT, R&D, and the National Technology Initiative.

The projects implemented within the Cluster have the potential to become drivers of the Russian knowledge and innovation-based economy, and to help the country advance to a leading position in high technology and innovative product markets.

SAINT PETERSBURG TECHNOPARK

Cluster Management Organisation

Saint Petersburg Technopark
Established: 2007
Number of staff: 5

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RUSSIAN VENTURE COMPANY

The Russian Venture Company (RVC) is the biggest venture fund in Russia, with capital of approximately US$ 1 billion. Besides being a venture fund it is also a "development institution" responsible for the enhancement of the national innovation ecosystem. RVC is the main driver for the National Technology Initiative, a public-private partnership aimed at developing emerging technologies. High technology sectors supported by RVC include unmanned transportation, advanced manufacturing, new materials, smart grids, neuroscience, and digital healthcare.

RVC is actively engaged in the development of innovative infrastructure, providing support to technology universities, innovative clusters and business incubators. RVC also develops educational programmes, aimed at increasing the number of technology entrepreneurs among students.

Since 2014, RVC has been involved in cluster policy design and implementation acting as the Ministry of Economic Development Project Office. The company's key cluster-related activities include:

- expertise of cluster programmes, and their KPIs monitoring;
- issue of analytical reports, methodical guidelines on cluster development, as well as cluster promotion content;
- arrangement of strategic sessions and matchmaking events aimed at fostering cluster advancement, improving the quality of cluster management, enhancing cooperation among cluster members, and increasing Russian clusters' internationalisation.

HSE ISSEK RUSSIAN CLUSTER OBSERVATORY

The Russian Cluster Observatory (RCO) was founded in 2012 as a part of the Institute for Statistical Studies and Economics of Knowledge at the National Research University Higher School of Economics.

Key facts about RCO:

- leading cluster-specific research and consulting centre;
- comprehensive expertise in cluster excellence, regional studies, innovation and industry-related policy design;
- a wide-range offer of services from legal acts drafting to cluster management training, and from policy makers consulting to cluster evaluation;
- single access point to data on clusters and cluster organisations throughout the country – Cluster Map of Russia;
- TCI Network member.

Since 2012, RCO actively contributes to governmental cluster-related efforts.

The Observatory provides methodological assistance and expertise to the Ministry of Economic Development and the Ministry of Industry and Trade. RCO has been involved in the analytical work dedicated to performance evaluation of innovation

clusters, engineering centres and technological platforms, and drafting the recommendations for their development. The Observatory experts are also engaged in the development of legal framework regulating the launch and activity arrangements of industrial clusters.

One of the priority activities for RCO is the annual edition of Russian Regional Innovation Ranking, which provides individual regional profiles and a complex overview of innovation processes based on a multistage evaluation system.

The Observatory also hosts Cluster Map of Russia (https://map.cluster.hse.ru/), which is a national online, free and user-friendly platform that accumulates all the up-to-date information about clusters and their members, specialisation, management, products and services, cooperation proposals, strategic documents and contacts. At the moment, more than 110 clusters are registered on the map.

All relevant information about clusters, federal cluster policy and support measures, as well as the latest academic papers, cluster policy reviews, and legal acts is available at the official web-site of Russian Cluster Observatory (https://cluster.hse.ru/).

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