Linking Russia to the ERA: Coordination of MS’/AC’ S&T programmes towards and with Russia

Deliverable Title: D 1.1.1 – The Russian S&T system

Deliverable Lead: CNRS
Related Work package: WP1 – Preparing the analytical ground for coordinating EU MS’/AC S&T and innovation programmes towards Russia or with Russian programme owners
Author(s): Archimedes, CNRS, HSE, ICISTE, KIAE, ZSI
Dissemination level: Public
Due submission date: 31/05/2009
Actual submission: 30/09/2010
Project Number: FP7-226164
Instrument: Coordination Action (CA)
Start date of Project: 01/02/2009
Duration: 48 months

Project funded by the European Community under the International Cooperation activity of the Capacities Programme of the 7th European Framework Programme for RTD (FP7).
Abstract

This report was prepared in the frame of the ERA.Net-RUS project. Partners from the Higher School of Economics (HSE), the International Centre for Innovations in Science, Technology and Education (ICISTE) and the Russian Research Centre – Kurchatov Institute (KIAE) contributed to the report, as well as the Archimedes Foundation, the Centre for Social Innovation (ZSI) and the French National Centre for Scientific Research (CNRS). The report is aimed at raising the awareness of the European R&D policy makers and programme owners on the Russian S&T system, in view of future joint activities targeting and with Russia.
# Table of Contents

**EXECUTIVE SUMMARY** ............................................................................................................. 5

**INTRODUCTION** ......................................................................................................................... 9

1 **S&T STRATEGY AND GOVERNANCE** ............................................................................... 13
   1.1 National priorities in S&T ................................................................................................. 14
   1.2 Legal basis for S&T policy ............................................................................................... 22
   1.3 Governmental and other S&T decision-making bodies .................................................. 25

2 **S&T LANDSCAPE** .................................................................................................................. 33
   2.1 Scientific Excellence in Russia ....................................................................................... 34
   2.2 Research and Innovation Infrastructures .................................................................. 37
   2.3 Human potential ............................................................................................................. 47
   2.4 Geographical distribution & regional research potential ......................................... 51
   2.5 Distribution between education and research ............................................................... 52
   2.6 Organisation of public and private sector ................................................................. 57
   2.7 Effects and Efficiency of reforms in the S&T sector .................................................. 62
   2.8 Output indicators: number of publications and patents .............................................. 69

3 **MAIN ACTORS IMPLEMENTING S&T POLICY AND PERFORMING R&D** .... 72
   3.1 Actors implementing S&T policy at federal level ......................................................... 72
   3.2 Main actors at regional level ......................................................................................... 79
   3.3 S&T funding organisations ............................................................................................ 82
   3.4 State corporations ........................................................................................................ 100
   3.5 Research performers .................................................................................................... 111

4. **INTERNATIONAL COOPERATION** ............................................................................. 121
   4.1 S&T cooperation agreements ....................................................................................... 121
   4.2 International programmes and initiatives .................................................................. 123
   4.3 Indicators ....................................................................................................................... 142
5. CONCLUSIONS .......................................................................................................................... 147

BIBLIOGRAPHY .................................................................................................................................. 150

ANNEX 1 : LIST OF TECHNOLOGIES CRITICAL FOR THE RUSSIAN FEDERATION ................................................................. 157

ANNEX 2 : LIST OF THE 12 MAJOR INNOVATION PROJECTS OF NATIONAL IMPORTANCE, CONTRACTED IN 2003 ..................................................................................... 159

ANNEX 3 : OBJECTIVES OF MES IN RUSSIA ................................................................................. 160

ANNEX 4 : OVERVIEW OF RESEARCH INFRASTRUCTURES IN RUSSIA ........................................... 162

ANNEX 5 : UNIQUE INSTALLATIONS CREATED AT INSTITUTIONS OF DIFFERENT BRANCHES OF RAS .......................................................................................................................... 176

ANNEX 6 : NEW RESEARCH TECHNOLOGIES IN RUSSIAN REGIONS ................................. 179

ANNEX 7 : LEADING INDUSTRIAL SECTORS AND R&D INVESTMENT IN RUSSIAN REGIONS ................................................................................................................................. 184

ANNEX 8 : RAS FACTS & FIGURES ON FUNDING ACTIVITIES BY SCIENTIFIC DISCIPLINES ................................................................................................................................. 192

ANNEX 9 : RAS AGREEMENTS ON INTERNATIONAL S&T COOPERATION.................................. 194

ANNEX 10 : RUSSIAN BUSINESS GROUPS AND MULTINATIONAL COMPANIES (CASES) ............................................................................................................................... 196
Executive Summary

As a global player on the political and economic stage and as the European Union’s largest direct neighbouring country, Russia is considered as one of the main strategic international partners of the EU. According to the Country Strategy Paper 2007-2013 of the European Commission for the Russian Federation, “EU cooperation with Russia is conceived in terms of, and is designed to strengthen, a strategic partnership founded on shared interests and common values.”

One of the main objectives of the EU-Russia roadmap for a common space of Research and Education is “to support joint elaboration and harmonization efforts for the creation of a EU/Russia common space in the field of research.” The EU-Russian S&T agreement which was renewed on 30 March 2009 is one of the major legal frameworks at Community level. The 7th Framework Programme for Research and Technological Development (FP7), and especially its ERANET scheme of the specific programme “Capacities”, also provide useful instruments for addressing the joint interests of EU and Russian S&T programme owners and for planning a sustainable S&T programme for mutual benefit.

The first task of the ERANET-RUS project’s work programme is to prepare the analytical ground for coordinating EU MS’/AC’ S&T and innovation programmes towards Russia or with Russian programme owners. In this respect the present analytical report provides an overview of the structure of S&T in Russia, Russian strengths and national priorities in S&T; main S&T institutions, present state of international cooperation with emphasis on EU MS/AC.

The main conclusions of the present report are the following:

1. Economic background

Russia’s economic structure is very different from most European countries – there is a predominance of large companies, focused on mining and heavy industry, and an almost complete lack of high-tech and consumer goods industries. Therefore Russia’s innovation system also has quite distinctive characteristics. Historically, Russia, as part of the former Soviet Union, has been characterized by a developed system of public R&D institutes. During the transitional period, this sector of the innovation system experienced severe trouble: low level of financial support from the State budget and industry, decreasing salaries for scientists and engineers and de facto stagnation of the R&D activity.

Overall, the major characteristics of the R&D system in Russia are1:

- 61% of funding comes from the federal budget (2006). Starting from 2002, its share is growing annually.
- 73% of organisations conducting R&D are state-owned (they are in federal property).
- 77% of all R&D personnel work in state-owned R&D organisations.

---

Therefore domination of government-owned, budget-funded institutions in the Russian S&T sector represents the main difference from the science systems of EU Member States and of other industrialized countries. It is also one of the major challenges in the future restructuring of the Russian science system with a view to making it more competitive at international level.

2. Research expenditure

In 2006, the share of Gross R&D expenditures (GERD) was 1.08 % of the Gross Domestic Product (GDP), which is low in comparison with the EU (1.76 %), the USA (2.62 %), and Japan (3.39 %). Over the last twenty years the Russian GERD declined from 2% of GDP in 1990 to 1.12% in 2007.

Nevertheless, financial input from the government into the development of the Russian R&D system was significant in relative terms over the last few years and reached 0.66 % of GDP in 2006 (including 0.36 % for civil science). In comparison this indicator was slightly above EU level, which reached 0.61 % of GDP, and only slightly below the USA with 0.77 %. In contrast, low R&D funding from the business sector is an issue often raised by top officials of the Russian Federation.

The two main recipients of the civilian State R&D budget are the Russian Academy of Sciences, which is still the major actor, and the Federal Space Agency (Roskosmos).

3. Legal and policy framework

The Russian S&T system is still policy-driven at national level. The Ministry of Education and Science (MES Russia) elaborates a federal strategy for scientific and technological development. The most recent strategy-making document is the “Strategy for the development of science and innovation in the RF for the period until 2015.”

At implementation level, two main agencies used to be in charge of supporting R&D by means of Federal Targeted Programmes, which are the new tools designed for funding R&D in a competitive way:
- the Federal Agency for Science and Innovation, which implemented the main competitive funding programme for S&T, the “Federal Targeted Programme R&D in Priority Fields of the S&T Complex of Russia 2007-2012”,
- the Federal Agency for Education.

Since March 2010 these two agencies have been closed, and MES Russia has taken over their functions.

4. Scientific excellence

The cross-country comparison shows that absolute figures of S&T human potential bring Russia to the fourth place in the World, right after China, Japan and the USA. Russia also ranks among the leaders by certain indicators like scientific publications, although regarding the latter its ranking is regularly falling (14th in 2007 instead of 7th in 1995).

However, for important comparative indicators such as citations or patents, Russia is obviously not at the forefront. Despite the considerable scope of human potential, its dynamics shows an overall decrease of R&D personnel, although the pace of such decrease has slowed in the past years.

Russia benefits from scientific excellence in basic research fields such as physics, chemistry, etc. and in certain applied research areas such as nuclear or space research.

5. Higher Education and Research
Russia has a particular division between organisations in charge of research and education. Research was historically performed at research institutes of the Russian Academy of Sciences (RAS), and higher education at universities. The new “Federal law on integration of science and education” (2007) aims at boosting S&T and innovation activities in Higher Education Institutions and establishing close links between HEIs and research institutions. One of the recent achievements here is the new statute of National Research Universities assigned to leading Universities on the basis of a call for tenders.

6. Innovation policy

The number of federal and regional bodies and public corporations involved in the formulation and implementation of innovation policies has increased over the last years.

At the same time, the National Innovation System (NIS) suffers from the heritage of the Soviet Union and the social, political and economic transition of the nineties. According to the MES itself, the main NIS weaknesses are:

− Insufficient coordination between the public and private sectors in the development of priorities and financial support measures for R&D.
− Low level of implementation of adopted measures aimed at promoting innovation activity in the enterprise sector to solve the problems linked with the industry's technological lag.
− Fragmented nature of policy aimed at improving inter-agency transfer of knowledge and technology, low level of inter-ministerial coordination of innovation activity.
− Low level of support for small innovative enterprises at all stages of development, lack of large innovative companies in the country and as a consequence, lack of promotion of real-life experience and innovative entrepreneurship.

Therefore Russia has to overcome a large scope of problems and barriers to introduce and develop an efficient and competitive NIS. The effect of the practical measures provided by the Government on the reorganisation of national S&T during the last 15 years are visible, but still too limited. Changing the situation will strongly depend on the success of measures aimed at improving the overall business environment, economic stability, and respect of the law.

7. International cooperation.

According to its national strategy for the development of science and innovation, Russia is willing to create favourable conditions for international S&T co-operation. Importantly, the Federal Targeted Programme "Research and Development in Priority Fields of S&T Complex of Russia for 2007-2012" allows for participation of foreign entities.

The agreement on cooperation in science and technology between the EU and the Government of the RF, renewed on 30 March 2009, is a formal basis of the cooperation in S&T between the EU and Russia. Russia had the highest participation in the FP6 (2002-2007) of all Third Countries. Entities from the Russian Federation participate in all thematic and sub-programmes of FP7, including coordinated EU-Russia calls in several thematic priorities. Russia has signalled its interest in an associate status to the FP7.

Data for co-publications between Russian and foreign scientists exhibit a significant trend of bottom-up bi- and multi-lateral cooperation, especially in fundamental research. The

---

2 The term “Third Countries” relates in the context of the EU Framework Programme to countries, which are neither EU Member States, nor Associated Countries to the Framework Programme.
Russian Foundation for Basic Research is the major player which provides support for international cooperation on a joint and competitive basis.

8. Overall, the Russian S&T sector shows an ambiguous picture: Despite the high rate of economic growth achieved before the global crisis which began in 2008, the stagnation of the S&T sector is evident. Indicators such as R&D expenditure calculated as share of GDP, scientists’ publication activity, innovation activities of enterprises, etc. remained comparatively low. Large parts of the S&T sector still operate in an old Soviet mode, where funding is distributed with no or only limited competition and accountability, and private business does not show much interest in innovation.

On the other hand, the Russian R&D personnel has stabilised and financial input into S&T has significantly improved over the last years. Important reforms have been achieved in that operational independent Funds for R&D support have been established and competitive funding programmes have been introduced. Priority has been given to innovation support and several support measures have been devised.

Although some obstacles regarding internal regulations remain to be tackled, Russia has the research potential, the resources, the instruments, and finally the willingness to make a new step to strengthen S&T cooperation with EU member states for a mutual benefit.
Introduction

Until the collapse of the USSR, and even a few years afterwards, the Russian innovation system existed only in a narrow research–technological sense. Scientific results and innovation were created and implemented (as a rule) on the basis of centralized decisions by the government, and were closely linked with the State’s interests. Only during the last years of the painful socio-economic transformation was the key role of innovation better understood.

1. The transition of Russian S&T and innovation policies can be divided into four main stages. The first one, in the early 1990s, was driven by reformers' hopes for a quick transfer to a market economy. These hopes were not fulfilled. On the contrary Russia entered into a crisis, which had serious repercussions on its S&T sector. Effects included a reduction in S&T funding, the shedding of human resources, the disbanding of scientific organisations during the first wave of privatisation. The consequences of this crisis have not yet been overcome.

During the next stage, in the middle and at the end of the 1990s, the S&T sphere fell into stagnation. The changes in the S&T system were lagging far behind the economic reforms. Government initiatives were reduced to urgent measures to slow down the definitive disintegration of S&T. Huge work was undertaken to implement previously non-existent mechanisms and connections determining an S&T model corresponding to the market economy. A series of changes were undertaken in a very short period of time: decisions such as the privatisation and commercialisation of certain segments of the S&T sector were taken and partially implemented; contract-based R&D schemes were adopted; a number of measures to protect and commercialise intellectual property were taken, a set of documents was published to define objectives and areas of the national S&T policy; a legal framework for international S&T cooperation was developed; attempts to restructure academies of science were made. And importantly, Foundations were established which started distributing funding for S&T in a competitive way. This constituted a paradigm shift away from an S&T funding allocation based solely on planning and centralised decision-making to a more competitive allocation of S&T funding, based on evaluation and excellence.

In the early 2000s, during the third period, the favourable market situation, macroeconomic and political stability allowed to develop and implement measures to put together a modern National Innovation System (NIS) and support high-technology sectors of the economy. The broad understanding of innovation and the new approach to NIS evolved and were established in key documents of state policy at the beginning of the current century, like Basic directions of the Russian Federation's policy on S&T development until 2010 and subsequent period (2002).

The fourth stage, lasting from the mid 2000s to the present, is characterised by complex sets of measures adopted by the Government. The key stated goal is a transition towards an innovative model of national economy. All attempted measures of the current period can be divided into two groups. The first one is the creation of a structured NIS policy framework. The second is the implementation of policy mechanisms for efficient regulation in

---


4 Three Foundations were created: the Russian Foundation for Basic Research, the Russian Foundation for Humanities and the Foundation for Assistance to Small Innovative Enterprises.
the main areas of government activity: national priorities, performance-based budgeting, restructuring of the government R&D sector, human resources and infrastructure development, etc. During that period, yet another cycle of programme development took place, producing new documents describing a platform and the main development areas – for the medium and long (ten years) term: *Strategy for the Development of Science and Innovation in the RF for the Period till 2015* (2006): the Ministry of Education and Science basic report “The development of innovation system of Russian Federation” (2008). At the beginning of 2010, several re-organisations in R&D areas were carried out to boost the implementation of the Government’s modernisation agenda. According to Prime Minister Vladimir Putin, the Government would spend more than 10% of the state budget in 2010 on fundamental and applied science, higher education, high-tech medicine and dereal programmes in aviation, space and nuclear energy.

2. **Russia’s economic structure** is very different from most European countries – there is a predominance of large companies, a concentration on the mining and heavy industries, and almost a complete lack of high-tech and consumer goods industries. Therefore Russia’s innovation system also has a quite distinctive outlook. Historically, Russia, as part of the former Soviet Union, has been characterized by a developed system of public R&D institutes. During the transitional period, this sector of the innovation system experienced severe trouble: low level of financial support from the State budget and industry, decreasing salaries for scientists and engineers and *de facto* stagnation of R&D activity.

Overall, the major characteristics of the R&D system in Russia are:

- 61% of funding comes from the federal budget (2006). Since 2002, its share has been growing annually.
- 73% of organisations conducting R&D are state-owned (they are in federal property).
- 77% of all personnel in R&D work in state-owned R&D organisations.

Considering the above-mentioned data, it is obvious that the Russian R&D sector is mostly government-owned and government-financed. It also means that the Russian business enterprise sector in S&T is mostly represented by enterprises and organisations that are under direct or indirect government influence (through controlling shareholdings).

In 2006, the share of R&D expenditure was 1.08 % of GDP, which is low in comparison with the EU (1.76 %), the USA (2.62 %), and Japan (3.39 %). Nevertheless, financial input from the government into the development of the Russian R&D system was significant in relative terms in recent years and reached 0.66 % of GDP in 2006 (including 0.36 % for civil science). In comparison this indicator was slightly above EU level, which reached 0.61 % of GDP, and only slightly below the USA with 0.77 %. In contrast, low funding for R&D from businesses is an issue often raised by top officials of the Russian Federation.

3. **As a global player** on the political and economic stage and as the European Union’s largest direct neighbouring country, Russia is considered as one of the main strategic international partners of the EU. The Partnership and Cooperation Agreement of 1997 forms the legal basis of EU-Russian cooperation. At the St. Petersburg Summit in May 2003, the EU and Russia agreed to create four ‘Common Spaces’: a Common Economic Space, a Common Space for Freedom, Security and Justice, a Space for Cooperation in the field of External Security and last but not least a Common Space for Research and Education.

---

5 Quarterly Report of the EU Delegation to Russia, Moscow, January- March 2010
ERA.Net RUS – FP7-226164

A set of roadmaps towards the Common Spaces was agreed at the St. Petersburg Summit in May 2005. According to the Country Strategy Paper 2007-2013 for the Russian Federation, “EU cooperation with Russia is conceived in terms of, and is designed to strengthen, a strategic partnership founded on shared interests and common values.”

The roadmap for the fourth Common Space on Research, Education and Culture – believed to facilitate the first Common Economic Space – identifies as one of its main objectives the “further development of a dialogue to support joint elaboration and harmonization efforts for the creation of a EU/Russia common space in the field of research.” To take full advantage of the rich potential for S&T cooperation between Russia and Europe, a long-term, coordinated and sustainable framework between the EU and Russia is fundamental. This includes both complementarities or even joint tools and instruments for an effective S&T cooperation to be offered by the Community Member States and Russia. The EU-Russian S&T agreement which entered into force in May 2001 and was renewed on 30 March 2009 is one of the major legal frameworks at Community level. The 7th Framework Programme for Research and Technological Development (FP7), and especially its international dimension through the specific programme “Capacities”, also provides useful instruments for strengthening the participation of Russia in Community programmes. The ERANET scheme is one of these instruments.

Against this background the ERA.Net-RUS project addresses joint interests of EU and Russian programme owners and aims at planning a sustainable S&T programme for mutual benefit. The first task of the project’s work programme is to prepare the analytical ground for coordinating EU MS’/AC’ S&T and innovation programmes towards Russia or with Russian programme owners. The present analytical report on the Russian S&T system is an achievement in this respect.

4. **The report** has been designed as follows:

The first chapter is devoted to the **strategy and governance of the whole Russian S&T system**. The national priorities, the main federal programmes, the legal frame and the main features and instruments of the innovation policy are reviewed. The detailed description of the R&D programmes are out of the scope of this document, they are the subject of a subsequent report. Special attention has been paid to the description of the different levels of governance - higher, executive, coordinative and operational- of the national governance system of S&T.

The **Russian S&T landscape** is depicted in Chapter 2. After reviewing the current status of the human S&T potential and of the research and innovation infrastructures, the report addresses the issues of R&D distribution between higher education and research institutions, and of the organisation of the public and private R&D sectors. The main analytical content of the report is concentrated in this chapter, with relevant indicators and a discussion on the effects and efficiency of the reforms of the S&T sector.

In Chapter 3 the **main actors of the S&T system**, which have been outlined in Chapter 2, are described in more detail. Actors implementing S&T policy and R&D performing organisations have been gathered into five categories:

---


8 Road Map for the Common Space of Research and Education, including Cultural Aspects, p. 46, [http://ec.europa.eu/external_relations/russia/summit_05_05/finalroadmaps.pdf](http://ec.europa.eu/external_relations/russia/summit_05_05/finalroadmaps.pdf)
The first category includes actors dealing with S&T policy implementation at federal level, which are in fact government bodies. The second category gives a brief overview of the main regional players providing funding for S&T (e.g. Moscow). The third subchapter introduces S&T funding organisations, which distribute funding on a competitive basis (e.g. the Russian Foundation for Basic Research). The fourth category includes state corporations, which are either S&T funding bodies (e.g. Rusnano) or mainly R&D performing organisations (e.g. Rosatom). The fifth and last category focuses on research performers, including public R&D organisations (e.g. Russian Academy of Sciences), Higher Education Institutions and the business sector.

The last chapter compiles the **Russian international S&T cooperation partnerships and activities**. The report focuses on cooperation with EU countries within the Framework Programmes for Research and Technological Development and other European programmes or institutions. Bilateral cooperation is only briefly mentioned as it is the subject of another analytical report within the ERA.Net RUS project. Finally some indicators regarding brain circulation and joint publications are presented.

The **report finally presents the main characteristics of the Russian S&T system that can be derived from the analysis**. Although the report cannot be considered as a scientific publication on the Russian S&T system, it is expected to raise the awareness of the European R&D policy makers and programme owners in view of future joint activities targeting and with Russia.
1 S&T strategy and governance

The first recent contribution to the Russian S&T strategy is the document on “Strategy for the Development of Science and Innovation in the RF for the Period until 2015”, approved on 15 February 2006 by the interdepartmental commission on science and innovation policy, chaired by the Minister of Education and Science. The mid-term objective of this strategy was “the creation of a balanced R&D-effective innovation system to promote technological modernisation of the economy and enhance its competitiveness through cutting-edge technologies and the development of scientific potential into a major resource for sustainable economic growth”.

Another important milestone in the innovation policy is the “Integrated Programme of Scientific and Technological Development and Engineering Modernisation of the Economy of the Russian Federation until 2015”. It was developed by the Russian Ministry of Education and Science in 2007 and was designed to encourage a comprehensive and focused effort by the government, private business and civil society institutions to promote S&T development and technological modernisation of the Russian economy. The programme was elaborated in accordance with the basic principles of the Russian Federation in the field of S&T development until 2010 and onwards, as well as the main directives of the RF Policy in terms of innovation until 2010, development of critical technologies in the RF, Strategy for the Development of Science and Innovation in the RF for the Period until 2015.

These documents were consolidated and widened in the “Concept of a Long-Term Socio-Economic Development of the Russian Federation until 2020” (CLTD, 2008) elaborated under the guidance of the Ministry of Economic Development and following the Russian State Council session on July 21, 2006. This document is in line with greater long-term socio-economic and S&T development priorities, affected both by global trends and national specific limitations and potential.

All economic actors feel an urgent need for greater efforts towards the development of the country's R&D and innovation systems, as well as the improvement of appropriate government policies. The pressure of legal, administrative, financial and other limitations and barriers affects their operational efficiency and hampers the economy's transition to an innovation-driven growth. A major result of the implementation of the Concept (including a long-term forecast of socio-economic and S&T development) is the consensus between society and the economy regarding an unquestionable need to shift the national economy from heavy reliance on exports of raw materials to innovation-driven, socially-oriented development.

Actually, for the first time in Russia, the Concept uses a modern definition of NIS including its basic elements: (1) interconnected structures dedicated to the production and/or

---

10 Developed in 2007 in accordance with the Order of the President of the Russian Federation of 13 July 2006 # pr. 1184 and Order of the President of the Russian Federation of 18 July 2006 #MF-P7-3582
12 Approved by the Decree #576 of the President of the RF, 30 March 2002
13 Approved by the Order #2473n-I7 of the RF Government, 5 August 2005
14 Approved by the Decree #843 and #842 of the President of the RF, 21 May 2006.
The Concept is based on three main elements:\(^1\)

- **policy framework** – the Concept brings together key policy orientations and establishes connections between NIS development policies and other spheres (educational system, high-tech, environment protection strategies, the health system, regional development etc.);

- **“roadmap” for reforms** – this component of the Concept sets out the structure of each orientation as well as a basic plan of action. For the NIS it comprises six initiatives such as developing of human resources for the benefit of innovation, supporting infrastructure, encouraging demand for innovation, etc. For the first time in the history of Russia, this document confirms a strong commitment to an innovation-driven growth model and defines restrictions, opportunities and strategies to achieve it;

- **target indicators** – a statistical tool for tracking macro-effects to monitor the progress of reforms. Several indicators have been proposed to achieve the NIS’s development goal: GERD-to-GDP ratio, labour productivity, and other indicators for the high-tech industries, etc. Some of them are presented below (see Table 1).

| Table 1: The key CLTD target indicators for the development of the NIS\(^17\) |
|-------------------------------------------------|-----|-----|
| GERD to GDP ratio, %                           | 1.12 | 2.7 |
| Labour productivity growth rates, %            | 6–7  | 9–10|
| Share of high-tech sectors in value added, %   | 10.9 | 17–19|
| Share of high-tech products exports in the world’s total, % | 0.3  | 2.0 |
| Share of innovative products in total sales, % | 5.5  | 25–35|
| Share of industrial enterprises engaged in technological innovation, % | 13.3 | 40–50|
| Share of knowledge economy and high-tech sector in GDP, % | 10–11 | 17–20|

### 1.1 National priorities in S&T

#### 1.1.1 Priority areas for the development of Science and Technologies

The selection of S&T priorities started at the federal level in the middle of the 1990s, and has since been updated on a regular basis. National S&T priorities are formulated in two

---


\(^{17}\) Source: CLTD, 2008
lists – priority S&T areas and critical technologies\textsuperscript{18}. The list of priority S&T areas for the Russian Federation sets the general trends of the country’s S&T development and represents the S&T areas believed to provide new technologies and facilities to contribute to the development of the national economy and society. These priorities are specified in more detail in the \textit{List of Critical Technologies of the Russian Federation}, a guide for decision-making.

The first list of eight priority areas was approved by the Government Commission on Scientific and Technological Policies in 1996. In 1999, it was submitted to a large-scale examination by more than 1000 leading experts. The analysis revealed an urgent need to reconsider the system of priorities in “breakthrough” areas. In 2000-2001, new lists of nine S&T priority areas and 52 critical technologies were elaborated. The main changes consisted in the optimization of the number of priority areas and in concentrating resources in the most important fields of innovation.

In 2002, the Russian President approved the \textit{“Basic directions of the Russian Federation’s policy in S&T development”}\textsuperscript{19} for the period 2010 and onwards. This document has become an important element of Russia’s social and economic development strategy, aimed at promoting innovation-based economic development, creating an efficient national innovation system and making S&T one of Russia’s key priorities. The S&T priorities and critical technologies approved within that document resulted in a list of research areas. But these areas were still too broad to select specific technologies for priority government support and for private investment.

For this reason Russia’s Ministry of Education and Science immediately revised and corrected the lists. The revision of S&T priorities was carried out in 2003—2004, during a period of sustained economic growth and great improvement of the state government system. The updated list of priorities was approved by the Russian President on May 25, 2006. This list includes 8 priority areas, \textit{“The Priority Areas of S&T Development for the Russian Federation, 2006”}\textsuperscript{20}:

- information and telecommunication systems;
- nanosystems and materials industry;
- life sciences;
- rational use of the environment;
- energy and energy saving;
- transport, aviation and space systems;
- security and counterterrorism;
- advanced weapons, military and special equipment.

The evolution of the S&T priorities in Russia over the past years is shown in Table 2 below:

\textsuperscript{18} Priority S&T areas are areas with a potential to make a major contribution towards providing the country with more security, faster economic growth, greater competitive capacity of Russian companies through the development of the technological foundations of the national economy and R&D-intensive production facilities. Critical technologies are considered as sets of technological solutions that create potential for further development of various technological areas, and which offer a broad range of innovative applications in various sectors of the economy.

\textsuperscript{19} Letter of the Russian President of 30 March 2002 # Пп-576.

\textsuperscript{20} Source: \url{http://www.miiris.ru/docs/rtf/prior_2006.doc}

Table 2: Evolution of Scientific and Technological Priorities in Russia

<table>
<thead>
<tr>
<th>1996</th>
<th>2002</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>2002</td>
<td>2006</td>
</tr>
<tr>
<td>Basic research</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information technologies and electronics</td>
<td>Information and telecommunication technologies and electronics</td>
<td>Information and telecommunication systems</td>
</tr>
<tr>
<td>New materials and chemical technologies</td>
<td>New materials and chemical technologies</td>
<td>Nanosystems and materials industry</td>
</tr>
<tr>
<td>Life sciences</td>
<td>Life sciences</td>
<td>Life sciences</td>
</tr>
<tr>
<td>Ecology and rational use of the environment</td>
<td>Ecology and rational use of the environment</td>
<td>Rational use of the environment</td>
</tr>
<tr>
<td>Fuel and power engineering</td>
<td>Energy saving technologies</td>
<td>Energy and energy saving</td>
</tr>
<tr>
<td>Transportation</td>
<td>New transportation technologies</td>
<td>Transport, aviation and space systems</td>
</tr>
<tr>
<td>Manufacturing technologies</td>
<td>Manufacturing technologies</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prospective armaments, military and special equipment</td>
<td>Advanced weapons, military and special equipment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Security and counterterrorism</td>
</tr>
</tbody>
</table>

It is obvious from this comparison that broad priorities have not changed much over time. A significant change concerns “Security and counterterrorism”, which was included in the 2006 list, reflecting international trends and ongoing troubles in the northern Caucasus region. “Nanosystems”, a priority which also appeared on the list in 2006, has been the object of serious measures and investment via a specific Federal Targeted Programme for Nanotechnologies. The state investment corporation “Rusnano” has been established, and a network of scientific organisations for nanotechnologies has been set up. The vast and very general “Basic Research” and “Manufacturing Technologies” categories have been taken out, as the list is now limited to broad thematic priorities.

The more detailed list of 34 critical technologies reflects the most advanced Russian technological areas. It refines the broad thematic fields of national priorities and includes specific technologies such as nuclear energy, genomics, etc. The current list of critical technologies is presented in Annex 1. A regular revision of critical technologies takes place every 3-4 years; it started in 2009 and will lead to a revised list, which will be published in 2010.

---

21 Sokolov A., ISSEK / HSE
The new rules for the development, revision and implementation of priority S&T areas in the RF and the list of the RF’s critical technologies was set by Order of the Government of the RF dated 22 April 2009 # 340. The Order sets a 2-stage process: (1) development of a long-term forecast of S&T development of the RF and other comprehensive analysis of S&T development of the RF and foreign countries; (2) development of suggestions on the composition and revision of priority areas and list of critical technologies on the basis of expertise and subsequent proposals.

The Ministry for Education and Science is in charge of the process, which involves multiple stakeholders and creates interdepartmental working groups. The suggested priority areas and critical technologies are presented to the governmental Commission on High Technologies and Innovations.

The lists of national priorities and critical technologies are of key importance for S&T funding in Russia, because governmental support will be granted to these officially approved national priorities for S&T and innovation development. This selective support will lead to the production of more innovative goods, thus promoting accelerated economic growth.

Several technology foresight exercises have been conducted over the past years in Russia, involving numerous Russian scientists and experts. These exercises have strengthened knowledge about technologies which should be Russia’s priorities. In a more distant future (until 2025), according to Russian experts, emphasis will be put on technologies aimed at creating complex intellectual management systems (risk assessment and emergency planning in transport, communications and energy infrastructures; computer monitoring and forecasting dangerous climat conditions and natural disasters, etc.), as well as bio-information technologies and nanoelectronic devices.

In his address to the Federal Assembly on 12 November 2009, President Medvedev named the 5 priorities for modernisation of the Russian economy and Russia’s technological development: introduction of advanced medicine, nuclear energy, information technology, development of space and telecommunication systems, and dramatic increase of energy efficiency. The presidential Commission on Modernisation and Technological Development of Russia’s Economy approved a list of projects in all five priority areas with detailed action plans, which are being implemented.

On the other hand the Presidium of the Academy of Sciences identified five priority areas of research in January 2010: support will be allocated on a competitive basis for basic research in molecular biology (193 MoRUB ~ €5M), and nano-materials (185.6 MoRUB ~ €4.75M). The other priority areas are fundamental medicine (74.3 MoRUB ~ €2M), biodiversity and environment & climate changes (66.9 MoRUB ~ €1.7M).

1.1.2 Federal Targeted Programmes

Federal Targeted Programmes (FTP), have been put in place in Russia over the past years as financing tools for specific policies and urgent reforms. Such Programmes are usually elaborated and financed by ministries and agencies. Several FTPs are specifically designed to support R&D, while others cater for R&D expenses within their respective programs.

---

25 http://www.kremlin.ru/transcripts/5979
26 Quarterly Report of the EU Delegation to Russia, Moscow, January- March 2010
The Programmes mostly focus on the development of cutting-edge technologies, housing, transport infrastructure, the Far East, rural economy, social infrastructure, safety and security, Russia’s regions and state institutions.

Table 3: Volumes of budget appropriations to FTP (million RUB)\(^{27}\)

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of FTP</th>
<th>No. of sub-programmes</th>
<th>State capital investments</th>
<th>R&amp;D</th>
<th>Other costs</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>46</td>
<td>91</td>
<td>41 043.31</td>
<td>34 907.08</td>
<td>258 601.81</td>
<td>703 943.21</td>
</tr>
<tr>
<td>2009</td>
<td>52</td>
<td>99</td>
<td>455 792.33</td>
<td>72 634.43</td>
<td>231 760.31</td>
<td>760 187.08</td>
</tr>
<tr>
<td>2010</td>
<td>55</td>
<td>100</td>
<td>456 933.83</td>
<td>80 944.89</td>
<td>134 298.54</td>
<td>672 177.26</td>
</tr>
<tr>
<td>2011</td>
<td>50</td>
<td>83</td>
<td>412 818.33</td>
<td>61 656.97</td>
<td>71 645.77</td>
<td>546 121.07</td>
</tr>
</tbody>
</table>

The 2010 budget foresees a substantial cut in the FTP’s budget – by an average of 40.3% of state funding\(^{28}\).

The main programme for the support of S&T was the Federal Targeted Programme “R&D in Priority Directions of S&T Progress in 2002-2006”\(^{29}\). It contained basic guidelines for the implementation of science, technology and innovation policies. It was substantially revised in 2004. The Programme was elaborated with a view to stimulating the commercialisation of research findings and was, therefore, composed of three parts: generating knowledge, promoting technology and commercialising technology findings.

The FTP objectives were to: gain new knowledge; provide scientific and technological support to the industry in its transition towards improved technological standards; enter the domestic and international advanced-technology markets; develop Russia’s scientific and technical intellectual potential; preserve the leading scientific schools and organisations; maintain Russia’s priority in a number of important areas of science and technology.

Within the framework of the FTP, support was given to 1574 projects (mainly selected through competitive examinations), 250 scientific schools, 37 joint centres, over 250 young scientists’ research projects and over 500 training courses. In 2005, a network of National Information and Analytical Centres (NIAC) was launched to monitor the following priority areas of science and technology:

- Ecosystems.
- Nanosystems and materials.
- Information and telecommunications systems.
- Energy production and saving.
- Ecology and rational nature management.
- Life safety.

The current major competitive Federal Targeted R&D funding programme “R&D in Priority Fields of the S&T Complex of Russia”\(^{30}\) is based on a bill of the Russian government dated July, 6, 2006. It covers the period 2007-2012 with the following objectives:

- Speeding up the development of the S&T potential according to the list of critical technologies of the Russian Federation;

\(^{27}\) [http://fcp.vpk.ru/](http://fcp.vpk.ru/)


implementing priorities driven by large scale projects of technology commercialisation;
- consolidating and focusing resources through an extension of public-private partnerships;
- attracting young specialists in R&D, developing scientific higher schools;
- fostering research activities in universities;
- supporting innovative SMEs and their integration in the S&T system;
- developing a basis of competitive fundamental and applied research performing organisations, including universities;
- developing efficient "building blocks" of innovation infrastructure.

The programme has a budget of RUB 195 billion (~ €5.7 billion)\(^{31}\) partly financed out of the state budget; an important contribution of approximately 30% is expected from private sources.

The programme is de-facto designed following the example of the EU’s Framework Programme and will support applied research, technology development and commercialisation. It consists of six main "building blocks" namely:

1. "Generation of knowledge" (€1.0 billion), i.e. applied research in the areas of
   1.1. Medium- & long-term forecast of S&T development,
   1.2. Life Sciences,
   1.3. Nanosystems & Materials Industry,
   1.4. Information & Telecommunication Systems,
   1.5. Sustainable use of Environment,
   1.6. Energy & Energy Efficiency,
   1.7. Conferences & Seminar in the above areas,
2. Technology Development (€3.0 billion, in the same thematic areas as in 1.),
3. Technology Commercialisation (€1.0 billion),
4. Institutional basis (infrastructures) for R&D (€0.2 billion),
5. Innovation infrastructures (€0.5 billion),
6. Programme management.

Several other new competitive funding programmes have been established to stimulate specific scientific fields or players of the innovation system\(^ {32}\). The main ones are:

- the FTP “National Technological Basis” for 2007-2011, which aims at developing advanced technology-based and clean national industries to create competitive products. It includes a section devoted to the development of electronic chips.
- the FTP “Development of the Nuclear Energy Complex“ for 2007-2010, and until 2015, will ensure energy security of Russia through setting up new nuclear power plants, and will foster spreading of the Russian nuclear technology on the world market.
- the FTP “Development of Nano-Industry Infrastructures” for 2008-2010 is devoted to developing Russian nano-industries through support of modern infrastructures for the national network of nanotechnologies.
- FTPs relevant for R&D are also running for space, aviation, IT and electronics sectors, and environment.

---

\(^{31}\) As regarding the currency exchange rates, it was decided to use the rate at the end of the year to which the amount belongs, according to the European Central Bank conversion rate: [http://www.ecb.int/stats/exchange/eurofxref/html/index.en.html](http://www.ecb.int/stats/exchange/eurofxref/html/index.en.html)

New programmes tackling the burning issues of bridging education and research and upgrading capacities of the universities have been developed meanwhile.

A competitive tool to support innovative universities was set up in the framework of the “Innovative Universities” programme, according to a decree of the Russian Government of 14 February 2006. 17 universities were chosen in 2006, and they were awarded public financial support of RUB 10 billion (€285 million) for 2006 and 2007. In 2007, the programme budget was doubled so that 40 other universities could be selected and supported. Consequently, 57 universities benefited from state funding of RUB 30 billion (€834 million) over the years 2006-2008.

A second programme to establish top level university centres has been launched: the “Federal Universities” programme. Two university centres, the Siberian and Southern Federal Universities have been created in Krasnoyarsk and Rostov at Don, with the support of this programme. Over the period 2007-09, financial resources of RUB 6 billion (€140 million) were invested into the two institutions from the state budget, with substantial co-funding from regional and business sources. The creation of five new Federal Universities shall be effective by 2010. The ambition is to upgrade the performance of these universities to allow them reaching the top 100 universities worldwide by 2015-2020.

A third recent programme for universities, the “Research Universities” programme will strengthen the research capacities of selected universities. A competition was held in summer and autumn 2009, whereby 12 leading Russian universities were selected for funding. Under the 2010 call, fifteen new National Research Universities have been selected. Funding of up to RUB 1.8 billion (€41 million) will be provided for each selected university over the period 2009-2013.33

A fourth important programme relevant for the university sector is the FTP “Scientific and Scientific-Pedagogical Human Resources for an innovative Russia”. It will run from 2009-2013 and invest an approximate amount of €2.3 billion out of the state budget in order to attract and retain talented people, especially the youngest, in science. The programme is designed to tackle the problem of the Russian scientific personnel ageing. More than 50% of funds will be devoted to research projects involving young scientists and students or which are performed by young scientists. Another important part of the programme is intended to upgrade housing infrastructure for students and scientists.

1.1.3 Innovation policies

The low innovation activities of Russian enterprises and the insufficient level of cooperation between the scientific and business communities are serious challenges to be addressed in innovation policy initiatives.

Since 2003, direct financing of innovation projects is provided through the federal budget. In 2003 the Ministry of Education and Science granted RUB 9 billion (€260 million), of which RUB 3.68 billion (€106 million) from the state budget, to 12 Major Innovation Projects of National Importance34. These projects were funded from budgetary as well as non-budgetary funds, budgetary support being restricted to pre-development stage of the projects. Large scale production of high-tech products were expected to start within 2-3 years.

33 See for more information: http://www.ed.gov.ru/priorprojectedu/niu/
34 http://mon.gov.ru/ruk/ministr/dok/3231/

As of 2006, the cumulative annual sales of goods reached RUB 5 billion (€146.6 million). After completion of the projects cycle, the sales would reach at least RUB 30 billion (€680 million).

In 2010 the Government plans to stimulate the development of innovative clusters primarily set up at the initiative of local authorities. In addition to support provided through programmes for SMEs, subsidies will be allocated through regions to offer grants of up to RUB 500 000 (€12 800) to entrepreneurs to start an innovative company. Subsidies of up to RUB 5 million (€128 000) will be given for R&D, production planning, equipment, patents and technical audits.

Over the past years the government tried to consolidate the forces of major domestic R&D entities and producers by merging them into State Corporations. This concerns the “United Aircraft Corporation” embracing the country’s main aircraft manufacturers and designers, or the state corporation “Russian Technologies” integrating RosOboronExport and AvtoVaz for the technologies and automobile sectors. A third example is “Rosatom”, a state-owned nuclear corporation, which has replaced the Federal Atomic Energy Agency (Rosatom) as its full-fledged successor, and incorporates all civilian and military nuclear facilities, research institutes and organisations in the field of nuclear energy.

Regarding specific thematic stimulation, several measures were taken in the field of nanotechnologies, which is a top priority for the Russian government (see above). In 2007, the State Corporation “ROSNANO” was established to support nanoinfrastructure, innovative projects in nanotechnologies and other initiatives. It is designed to be close to the market, bridging the gap between mature and tested R&D results and market ready high-tech products. It therefore concerns investments into commercialisation of nanotechnology.

Nowadays the Economic Development Ministry has developed a plan to reform the state corporations, following the President’s order to dismantle them in their current legal form by 2015. Rosnano would be transformed into Joint Stock Company by the end of 2010, Russian Technologies by 2014, while a decision on Rosatom will be made after 2011.

In the context of the analysis of innovation policy, the Foundation for Assistance to Small Innovative Enterprises (FASIE) takes a prominent position. The Foundation has developed a wide range of different programmes and their number has been growing over time. Initially the Foundation provided funding to small innovative enterprises that were at the stage of commercial production. The aim was to support R&D in these enterprises to give them a boost for further development (such as the creation of new products or technologies, widening the market share, entering in a new market, etc.). This approach was chosen in order to lower the risks, an important criterion in a time of economic instability. The strategy was passive in the sense that the Foundation did not directly stimulate the creation of new companies. But this strategy has changed and support for start-up companies is now a quite important activity within FASIE’s portfolio of support programmes.

The Russian Foundation for Technological Development was created in 1992 to provide financial support to applied R&D in accordance with the priority directions and critical technologies approved at the federal level. As of 2010, due to the absence of certain legal provisions, primarily those setting the financial sources, the Foundation faces certain difficulties.

---

35 Quarterly Report of the EU Delegation to Russia, Moscow, January- March 2010
36 Quarterly Report of the EU Delegation to Russia, Moscow, January- March 2010
37 Dezhina I. & Peltrova K.-K., International learning in Innovation Area: Finnish Experience for Russia
The infrastructural side of innovation in Russia is implemented through three main instruments: Special Economic Zones, Technology Parks, and Science Cities.

**Special Economic Zones (SEZ)** are government-defined territories within the Russian Federation, which are subject to special enterprise laws. The Law on Special Economic Zones took effect on 1 January 2006. SEZs have to comply with one of the following three types: Industrial-productive, Technological-innovative, or Tourist-recreational zone. The law stipulates significant tax and customs benefits for SEZ businesses and residents; for example, Unified Social Tax is reduced from 26 percent to 14 percent in technological-innovative SEZs. Residents of industrial-productive SEZs are exempted from land tax and income tax for five years. In addition, all imported technical equipment and materials are exempt from customs duties.

The concept of “**Technology Park**” encompasses the entire development and production chain of a product: idea > development > prototype > production planning > production > market introduction > sales. Technology Parks are environments using new financing models for the promotion of technological innovation and the use of risk capital. Small and Medium-sized Enterprises (SMEs) are the primary target group of Russia’s Technology Parks.

In the former Soviet Union, Science Cities (naukogrady) were created as part of closed-off, large-scale military and industrial complexes (‘closed cities’). They subsisted entirely on public funding. This system has been reformed in recent years. The title naukograd is assigned by the Government of the Russian Federation. Science Cities dispose of highly qualified personnel, of science, infrastructure and development concepts, as well as a range of special subsidies. The funding of Science Cities is ensured by the federal budget, the budget of subjects of the Russian Federation (e.g. regions), and others sources. Material and technical infrastructures can also be financed by the local budget.

By the beginning of 2010 President Medvedev made a new step for stimulating innovation technologies in Russia. He launched the initiative of a “**Russian Silicon Valley**”, that is a high-tech city for young, creative scientists and entrepreneurs to be built from scratch in the Moscow region town of Skolkovo, presently hosting only a business school. The new town will follow five presidential priorities for modernisation: energy, IT, telecommunications, biotechnology and nuclear technology. The project, which would cost up to 4 billions USD, will be funded from the Government’s modernisation and innovation budget. It will have to overcome the difficulties of creating innovation centers under “hothouses conditions”, for example in the form of SEZ, which have proved to be largely unsuccessfull.

### 1.2 Legal basis for S&T policy

#### 1.2.1 Major laws relevant for S&T policy making, for regulating the S&T sector

The main law which regulates S&T policy is the Federal Law No.127-FZ "**On Science and State Policy in S&T " of 1996**. The Law regulates relations among various actors of

---

39 Quarterly Report of the EU Delegation to Russia, Moscow, January- March 2010
40 Federal Law "On Science and State S&T Policy" of 23 August 1996 # 127-FZ.
S&T sphere, state authorities and consumers of S&T outcomes. It defines scientific activity as activity aimed at obtaining and using new knowledge. The Law also sets the legal status of S&T personnel and S&T organisations. Importantly, the law sets the status of the Russian Academy of Sciences. It was amended more than a dozen times over the period 1998-2009.

The law “On Protection of Competition”, adopted by the Federal Assembly of the Russian Federation in late 2005, plays an important role in activating competition and encouraging innovation activity in big enterprises. Russian legislation on competition moved a great deal towards EU standards in regulating the use of market power by Russian companies.

In 2006, Russian research and education policy entered a new era with a number of important laws and the first measures to implement the National Priority Project in Education (PNPO). The Russian President Dmitry Medvedev, in his former position as Vice Prime Minister, was responsible for this programme. The main laws and documents of relevance for science adopted in 2006 were:

- The federal law on the introduction of a Unified State Examination at the end of secondary education
- Amendments to the federal law “on science and state policy in science and technology”
- The federal law “On Autonomous Institutions” which allows for establishing new kinds of government ‘autonomous’ institutions
- Section 4 of the Civil Code on the “protection of intellectual property”

The federal law “On introducing changes to selected legislative acts of the RF creating favorable fiscal conditions for financial support to innovation activity” came into force on 1 January 2008. The Law, as well as amendments to the second part of the Tax Code, are aimed at creating favourable tax conditions for funding innovative activities. Article 25 of the Tax Code of the RF raises the ratio of R&D expenditures, eligible for deductions of taxable income, to company’s gross receipts from 0.5 to 1.5%.

In addition two federal laws concerning the development of SMEs were adopted. The federal law #209 on SMEs development, dated 24 July 2007, set the criteria for considering enterprises as SMEs, as well as key goals and principles of state policy. Federal law #217, dated 24 July 2009, allowed state educational and scientific organisations to found commercial entities for commercialisation of their results.

Among other important features of the Russian legislation on S&T and innovation, the transition towards performance-based budgeting and performance evaluation needs to be emphasized. This transition is based on decrees of the Ministry of Education and Science on individual performance-based bonuses and on measuring the performance of R&D institutes. The implementation of these reforms is slowly in progress. For example, the Governmental Decree “On performance evaluation of scientific organisations, implementing civil scientific research, engineering and development activity”, adopted in 2009, should lead to the definition of an evaluation methodology by the Ministry of Education and Science in cooperation with other federal ministries and state academies.

---

1.2.2 Intellectual Property Rights (IPR)

Over the last years, Russia’s government has continued to improve the legal framework for Intellectual Property Rights (IPR) in general and the allocation of IPR in Russia’s public research sector in particular. Amendments to the Russian legislation on IPR created with public support have been worked out in order to stimulate and speed-up respect of such IPR in economic activities.

In July 2004, the Ministry of Education and Science developed “Guidelines for Heads of Enterprises and Organisations on Legal Protection and Use of the Results of Intellectual Activities Sponsored by the Federal Budget” in order to raise the level of legal awareness among economic actors.

In November 2005, the Government of the Russian Federation approved the Order “On ownership on scientific and technological results achieved with budgetary funding”. It determines the ownership of results achieved with budgetary funding by public R&D organisations (public contractors). According to the Order, a public contracting authority has the right to use such results for state needs on the basis of a royalty free non-exclusive license. State scientific and educational organisations funded from basic budget are declared legal owners of the results they have achieved. R&D results concerning national defence and security have been excluded from this regulation, as they belong in any case to the public contracting authority.

The current regulation of IPR in Russia is defined by the provisions of Part 4 of the Civil Code of the RF “Rights for results of intellectual activity and means of individualisation”, adopted in December 2006, and entering into force in 2008. The Law pays special attention to rights of protectable results’ creators (authors, performers, inventors, etc.), as their interests may contradict both the societal demands for a wider and free usage of results, and the interests of more powerful commercial entities. This is particularly relevant when creative work’ results become subject of multiple and constantly widening market turnover.

Part 4 of the Civil Code of the RF sets the key principle of asserting IPR for budgetary (public) funded results: the general rule is that IPR belongs to executor (contractor), which is important as about 95% of all objects of industrial property in Russia were created with the use of budgetary (public) funds. Part 4 of the Civil Code of the RF assures the regulation of rights in Russia, as well as disposal of these rights for technologies, created fully or partially with the use of budgetary (public) funds. The law regulates relations of various economic actors on holding intellectual property objects, and thus, creates the legal basis for activating technology transfer.

Chapter 77 of Part 4 of the Civil Code of the RF “Rights of the Russian Federation and Subjects of the Russian Federation on Technology” regulates for the first time the right to use intellectual activity results as a single technology. The chapter’s provision are applied to the sphere of establishing, transfer and disposal of rights for technologies of civil, military and special or double purpose, created fully or partially with the use of budgetary (public) funds, allocated through governmental contracts, income and expenditure budget, as well as subsidies.

45 Order of the Government of the RF “On ownership on scientific and technological results received for budgetary funding” of 17 November 2005 # 685.
The Federal Law "On Transfer of Rights on Single Technologies", adopted in December 2008, aims at encouraging researchers to create technologies, as well as removing the existing administrative and financial barriers for commercialisation. The law specifies that a single technology, invented with financial support from the federal budget and with consolidated rights belonging to the Russian Federation, may be transferred to private investors through open tenders or in exchange for commitments to its commercialisation. If the IPR belong to an R&D organisation, the Civil Code provides the inventor with the full rights on the technology, including negotiating with the private sector, the conclusion of license agreements, contracts on alienation, etc. There are only general framework conditions, specified by the State that the parties must follow.46

Besides consolidation of the IPR legislation in the Civil Code of the RF, certain measures have been taken for its advancement:

- The Civil Code of the RF involves not only traditional, but also new legal IPR institutions. Some of them are related to widely used objects of legal protection, such as know-how and trade names, which were, nevertheless, not covered by unified legal regulation. Other institutions are totally new for the Russian legislation, for instance, related rights (right to keeping database, and right of publisher of works of science, literature and art), as well as right in means of individualisation (brand and domain name).
- Amendments and additions to the current legislation have been put forward, in order to tackle deficiencies of legal regulation in the sphere of intellectual property, identified in the course of application of the current legislation, for instance regarding patenting and licensing agreements. Actually a system of legal protection of patented IPR has been created, including seven governmental acts and laws, in particular the Law on Technology Transfer and the Law on Patent Attorney.
- Codification tasks have also been solved, satisfying the need for provision of full and exact correspondence of the Russian IPR legislation with existing international obligations of the Russian Federation in this sphere, as well as its accession to the Agreement on Trade-related Aspects of Intellectual Property Rights (TRIPs), in view of Russia’s expected accession to the World Trade Organisation (WTO).

Improvement of regulation of IPR is not limited to normative legal acts, developed for the implementation of the fourth part of the RF Civil Code. It concerns also administration, budget legislation, legislation on non-profit organisations, the law on economic societies and the law on accountancy, tax legislation (such as the above mentionned Federal law "On introducing changes to selected legislative acts of the RF for creating favorable fiscal conditions for financial support to innovation activity ").

1.3 **Governmental and other S&T decision-making bodies**

1.3.1 Decision processes regarding S&T policy among the relevant actors

The national governance system of S&T and innovation in Russia may be divided into four levels: higher, executive, coordinative and operational.

*The higher level of governance includes:*
The **President of the Russian Federation** coordinates all state authorities, defines key directions of state S&T and innovation policy in his decrees and orders. The annual S&T priorities of the President are outlined in annual messages to the Federal Assembly of the Russian Federation, and then feed legislative actions of the Parliament and the Government.

The President gets advise from consultative bodies, the **State Council of the Russian Federation** and a more narrowly focused **Presidential Council on Science, Technology and Education**. The latter undertakes expertise of federal bills and other regulatory acts on state S&T and innovation policy and, subsequently, formulates its proposals. It develops recommendations to the President after consultation of the Russian Academy of Sciences (RAS), sectoral academies, other Russian S&T and educational organisations, foreign and international S&T and educational organisations and joint cross-border projects.

The **Federal Assembly of the Russian Federation**, composed of two chambers – the **Council of the Federation** and **State Duma** - also belongs to the higher level. The State Duma of the RF (lower chamber) approves federal laws, including the law on the federal budget of the RF, which are then considered and approved by the Council of the Federation (upper chamber), and finally go the President of the RF for signature and promulgation.

The legislative activity on S&T and innovation is coordinated by the thematic committees of both chambers:
- Committee of the State Duma of the RF on Science and R&D;
- Committee of the State Duma of the RF on information policy, information technology and communication;
- Committee of the State Duma of the RF on education;

*The executive level of governance* ensures unified national policy on science and education, as well as sets precise policy tasks, development of work programmes, coordination and oversight for the implementation of decisions.

The executive level involves: the **Government of the RF, federal Ministries and agencies, as well as the Russian Academy of Science**.

*The Government of the RF* develops the federal budget and proposes it to the **State Duma**. It monitors the execution of the S&T budget, and ensures a consistent state S&T policy. **The Prime Minister of the RF** defines the directions and organizes the work of the Government. Regulatory work in the area of S&T remains the responsibility of thematic ministries.

**Figure 1: Organogramm of the Russian R&D system**

---

47 The right of legislative initiative belongs to the President of the RF, Council of the Federation, members of the Council of the Federation, deputies (members) of State Duma, Government of the RF, legislative (representative) bodies in Russia’s regions, Constitutional Court of the RF, Supreme Court of the RF and Higher Arbitrary Court of the RF.

48 Inter alia, this committee deals with legislative provisions: continous and additional education; S&T and innovation activity; state S&T policy; IPR in the area of S&T; state financial support to education and science professionals, budgetary funding for education and S&T, etc.

49 Source: Structure flowchart, ERA-WATCH Report on Russia; update by Manfred Spiesberger on April 2010
The Ministry of Education and Science of the RF (Minobrnauki or MES Russia) plays an important coordinating role in the area of S&T and innovation policy-making. The Ministry assures normative and legal regulation in the area of education, S&T and innovation activity, and on IPR. It is responsible for the development of federal science and high-tech centres, state science centres and science cities. The Ministry submits to the Government federal bills, drafts regulatory acts, and develops federal targeted programmes.

Until early 2010, MES Russia was responsible of the coordination and control of four federal services or agencies:

- Federal service for intellectual property, patents and trademarks (Rospatent);
- Federal service for oversight in the field of education and science (Rosobrnadzor);
- Federal agency for education (Rosobrazovanie);
- Federal agency for science and innovation (Rosnauka or FASI). Rosnauka was in charge of state policies’ implementation, provision of state services, management of state property in the field of scientific, S&T and innovation activity, including the activity of federal science and high-tech centers, state science centres, leading scientific schools, national research computer network of new generation and information support to S&T and innovation activity.

As of March 2010, both federal agencies, Rosnauka and Rosobrazovanie, were dissolved by decree of President Medvedev. MES Russia took over the functions of its formerly subordinate agencies. At the same time a new Department of science, high technology and education was established in the Government of the Russian Federation, by decree of the Prime Minister Vladimir Putin50.

MES Russia executes its activity in cooperation with other federal executive authorities, executive authorities of Russia’s regions, local self-governance bodies, civil society and other organisations. It closely cooperates with the Ministry for Economic Development (MED) and Ministry for Industry and Trade (MIT), as well as agencies subordinate to these ministries.

Thematic departments of the Government Office are in charge of the Government’s activity, as well as interaction with thematic federal ministries and federal agencies. Four thematic departments are responsible for the governance of S&T:

- Department of culture and education of the Government of the RF;
- Department of defence industry and high-tech of the Government of the RF;
- Department of sectoral development of the Government of the RF;
- Department of priority national projects of the Government of the RF.

The Federal Space Agency (Roscosmos) is an important authority in the S&T management at the executive level. It assures regulatory and legal activity, provision of state services and management of state property in the space field, implementation of international joint projects and programmes for space, R&D in the field of military rocket-and-space equipment. Roscosmos is not subordinated to any ministry, but directly to the Government of the RF.

The executive level also includes the Russian Academy of Sciences (RAS). The Academy is a self-governed non-commercial governmental organisation, which organizes and undertakes fundamental research, contributing herewith to the technological, economic, and social development of the RF. RAS provides annual reports of its scientific activity and

achieved results to the Russian President and the Government, and proposes priority directions for development of fundamental and applied sciences.

*The coordination level of S&T governance* develops S&T related programmes and Federal Targeted Programmes (FTPs), and defines the tasks for developing the S&T system in general, as well as particular high-tech industries. Specific measures for implementation of S&T and innovation policy are also developed at this level, including tasks for particular project institutions and organisations, distribution of budgetary funding to organisations implementing FTP, monitoring of measures foreseen by the S&T Development Strategy and of FTP implementation.

The coordination level of S&T governance includes particular *departments of ministries and agencies*, which place state orders (contracting authorities) and FTP coordinators, as well as governing bodies of *state corporations* (e.g. United Aircraft Corporation, state corporations “Rosttechnologii”, “Rusnano”, etc.).

*The operational level of S&T Governance* includes specific S&T institutions, educational centres, universities, commercial and non-commercial organisations, which are key contractors and sub-contractors of national projects and FTPs adopted by the Government of the RF.

In the following, the functions and decision-making process of some of the most important decision-making bodies listed above are reviewed in detail.

### 1.3.2 The Higher level of S&T Governance. The Presidential Council on Science, Technology and Education

The Presidential Council on Science, Technology and Education was founded in 2004\(^1\). It is an advisory board to the President of the Russian Federation, who chairs the Council. Members are not elected, but the final list is approved by a Presidential Decree. Currently, the Council consists for the most part of academicians of the Russian Academy of Sciences (RAS) and rectors of Higher Educational Establishments. The Council is governed by the Constitution of the Russian Federation, federal laws, Presidents’ Decrees.

The main tasks of the Council are the following:

- The Council advises the President on key actions required for the implementation of S&T, innovation and education policy.
- It provides the President with regular updated information on the current state of science, technology and education in Russia and abroad.
- It performs expertise on drafts of federal laws and other normative legal acts concerning S&T and education policy.
- It solves any issues regarding State prices of the Russian Federation in the field of science and technology, in particular it organizes the application procedure and expertise for the State prizes, and proposes award nominates to the President.
- It advises the President on international cooperation of the Russian Academies of Sciences and other Russian S&T organisations with foreign science and educational organisations.
- Upon request of the President, the Council considers other questions of importance in the area of science, technology and education.

---

\(^1\) It replaced the Council for Science and High Technologies, which was established in 2001.
The Council can request and receive S&T related materials from federal governmental bodies, public authorities of the subjects of the Russian Federation, and science and other organisations, institutes and officials. It may invite representatives of such organisations to its sessions and can solicit expert advice. Representatives of the Council participate in S&T related seminars or other events.

1.3.3 Executive Level of S&T Governance. Ministry of Education and Science

The Ministry of Education and Science of the Russian Federation (Minobrnauki or MES Russia) was established on March 9, 2004 by Decree of the President of the Russian Federation N 314. MES Russia is a federal executive body, responsible for the implementation of state policy and legal regulation in education and youth policy, in science, technology and innovation, and of IPR. The competences of Minobrnauki also cover the development of federal centres of science and high technology, state scientific centres and so called "science-cities". In education, its responsibility includes social support and social protection of students and pupils of educational institutions.

The Ministry is responsible for negotiating at the federal level R&D and education funding within the State budget. It is also responsible for overall R&D budget supervision. Decisions on R&D budget allocation and distribution are under the competences of the Ministry of Finance.

Minobrnauki co-ordinates and controls the work of its subordinate agencies: the Federal Service for Intellectual Property, Patents and Trade Marks (Rospatent), the Federal Service for Supervision of Education and Science (Rosobrnadzor), the Federal Agency for Science and Innovation (Rosnauka) and the Federal Agency of Education (Rosobrazovanie).

The work of the Ministry is governed by the Constitution of the Russian Federation, Federal Constitutional Laws, Decrees by the President of the Russian Federation, international agreements signed by the Russian Federation as well as the Statute of the Ministry of Education and Science of Russia. The Ministry works in cooperation with other federal executive bodies, executive bodies of the subjects of the Russian Federation, local authorities, public associations and other institutions.

MES Russia has the following objectives and responsibilities:

- To guarantee quality education for all layers of Russian society as a basis for social mobility and essential means to decrease socio-economic differentiation.
- To secure training of professionals with required qualifications for current and forthcoming social and economic needs of the society, and ensure the development of continuous education.
- To ensure active participation of children of all education establishments in economic, social, political and cultural spheres of society.
- To provide all necessary measures for the development and effective use of S&T potential.
- To secure all necessary measures for innovation development.

In accordance with the objectives mentioned above, see the table in Annex 3.

Four (of seven) departments of MES Russia are S&T related:

- Department of state S&T and innovation policy,

---

52 Minobrnauki took in 2004 over the competencies in education and science from the abolished Ministry of Education and Ministry of Industry, Science and Technology.

53 These bodies are reviewed in Chapter 3.1.
- Department for strategy and prospective projects in education and science,
- Department for international cooperation in science and education,
- Department for complex coordination of programmes in the filed of science and education and organisation of budget process.

The Ministry has a number of permanently acting advisory bodies, including the Interagency Commission on Science and Innovation Policy formed by the Ministry of Education and Science in 2004, and the Public Council founded in 2006.

The Interagency Commission on Science and Innovation Policy is a coordinating body for various state actors.

The Public Council[^54] was established by Decree of the Minister #346 on 28 December, 2006. It takes part in the preparation of relevant decisions for the development of education, science and youth policy of the Russian Federation. The Council also performs public evaluations of the drafts of regulatory legal acts prepared by MES Russia. The Public Council consists of representatives of public associations, mass media, Russian academies of science, scientists and specialists in the field of education, science and youth policy in Russia.

1.3.4 Coordination Level of S&T Governance.

There are a number of consultative and coordinative bodies in the governance of the RF interacting with federal executive authorities, executive authorities of Russia’s regions and other organisations in order to implement the state policy in the field of S&T and innovation. The following commissions are part of the S&T governance system:
- Council on Competitiveness and Entrepreneurship
- Governmental Commission against Violations of Intellectual Property
- Government Commission for High-tech and Innovations;
- Military Industrial Commission by the Government of the RF;
- Governmental Commission on Investment Projects of National Importance.

The Council on Competitiveness and Entrepreneurship was formed in 2004. It is an advisory board to the Government of the RF chaired by the Russian Prime-Minister. Members of the Council are nominated by the Government and currently include top managers of the biggest Russian state and private sector companies, heads of federal ministries and agencies, as well as business associations. The Council provides for coordination between governmental bodies, business and the scientific community in order to establish effective mechanisms for improving the economy’s competitiveness and for the development of business in the Russian Federation.

The Council evaluates the situation regarding competitiveness and entrepreneurship and formulates proposals in the following directions:
- improvement of linkages between governmental bodies and business;
- modernisation of industry and evaluation of competitiveness of national production on the basis of implementation of new technologies, augmentation of high-technology export;
- implementation of S&T and innovative policy taking into account competitive advantages of the RF;
- strengthening the competitive position of Russian organisations on the domestic and international markets;
- development of competitiveness and restriction of monopolies;
- improving conditions for development of business;

- decrease of administrative intervention in business;
- involvement of business in the development and support of the social sphere.

- **The Government Commission against Violations of Intellectual Property** (IP) was formed in 2002. It is a coordinating authority which supports cooperation of Federal Agencies, Government executive bodies, subjects of RF, state and other organisations for the implementation of a coherent state policy against violations of Intellectual Property. The Commission is governed by the Constitution of RF, by federal constitutional laws, federal laws, Presidential decrees and orders.

The main objectives of the Commission are the following:
- guarantee a coherent national policy against violations of IP in the Russian Federation
- guarantee an effective cooperation and coordination of federal executive bodies, Government bodies, subjects of the Russian Federation, state and other organisations against violation of IP in the RF
- recommendations on the development of appropriate normative legal base of IP
- development of a legal culture of IP
- policy development on measures against illegal circulation of subjects of IP
- development of international cooperation against violation of IP

The Commission performs the following duties:
- to provide analysis of the situation of IP in the RF, and develop recommendations in this domain
- to coordinate federal executive and Government bodies, subjects of Russian Federation, state and other organisations to prevent violation of IP in the RF
- to analyze projects of federal laws and other normative acts of IP
- to determine key actions to protect IP rights
- to address and advise the Government and President of Russian Federation on the development and implementation of measures against violation of IP
- to control the implementation of RF Presidents’ and RF Government decisions related to IP.

The Commission has the right to request information on issues within its competence from federal executive and Government bodies, subjects of the Russian Federation, state and other organisations. The Commission can organize expertise of projects and programmes dealing with intellectual property. It can form expert and working groups among representatives of state authorities, scientists and specialists, and organize conferences, working meetings and briefings on intellectual property

- **The Government Commission for High-Tech and Innovations** was created by Resolution of the Government dated 12 September 2008 N 667. It is a standing body aimed at coordinating federal executive bodies and executive bodies of Russia’s regions, state academies of science, civil society organisations, scientific organisations and other stakeholders in development of proposals in key areas of state policy on S&T and national innovation system55. PM Vladimir Putin took the lead in the Commission in the beginning of 2010.

---

55 Terms of reference for the Commission on High-Tech and Innovation, [http://www.government.ru/content/coordinatingauthority/ivanov/psamt/polosheni/](http://www.government.ru/content/coordinatingauthority/ivanov/psamt/polosheni/)
The Commission tackles the issues of S&T sector reform, funding, legal and regulatory provisions. Decisions of the Commission within its mandate are obligatory for all state bodies.

Information and analytical support to the Commission’s work is provided by the Ministry of Education and Science of the RF, and all the administrative work is done by the office of the Government of the RF.

The Commission is composed of representatives of all federal ministries and agencies, which deal with civil and defence S&T (Ministry of Education and Science, Ministry for Economic Development, Ministry of Defence and other), Ministry of Finance, Office of the Government, Russian Academy of Sciences, business associations and business groups, state corporations and other development institutions (Russian Venture Company, Rusnano, etc.), universities, Russia’s regional administrations and Russian Parliament.

The issues which fall under the responsibility of the Commission are:
- Long-term S&T forecast (foresight);
- Development of nanotechnologies and nanoindustry, a market for nanoproducts and nanoservices;
- Stimulation of demand from the real economy for high-tech and innovation;
- Development and raising the effectiveness of R&D; coordination and efficiency of R&D funding;
- Increase of investment attractiveness for innovation and high-tech sectors of economy;
- Advancement of Public-Private Partnership (PPP) mechanisms for high-tech and innovations.

2 S&T landscape

In 2007, Russia’s research sector encompassed 3957 R&D organisations, employing about 801 000 R&D personnel, of which 49% were researchers (see Table 4 below). Most R&D organisations and personnel belong to the business enterprise sector. It should be mentioned that in Russia this sector is composed to a large extent of R&D institutes, which are organised as companies and which are wholly or partly publicly owned. In addition several research intensive companies are also publicly owned and accounted for in this sector. Therefore, the state de facto dominates not only funding, but also the performance of R&D. The Russian Higher Education sector employs a rather low number of R&D personnel: in Russia around 6% of R&D personnel is employed in Higher Education, while this indicator reaches an average value of 45% for the EU 27.

<table>
<thead>
<tr>
<th>Sector</th>
<th>Number of R&amp;D organisations,</th>
<th>R&amp;D personnel (in persons)</th>
<th>Share in total number of R&amp;D personnel, (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government</td>
<td>1193</td>
<td>1483</td>
<td>282 166</td>
</tr>
<tr>
<td>Business enterprise</td>
<td>2345</td>
<td>1742</td>
<td>726 568</td>
</tr>
<tr>
<td>Higher Education</td>
<td>511</td>
<td>616</td>
<td>52 065</td>
</tr>
<tr>
<td>Private non-profit</td>
<td>10</td>
<td>116</td>
<td>245</td>
</tr>
<tr>
<td>Total</td>
<td>4059</td>
<td>3957</td>
<td>1 061 044</td>
</tr>
</tbody>
</table>

Scientific and research institutes have traditionally dominated the structure of Russian science and make up 52.5% of R&D organisations (see Figure 2 below). Unlike most developed countries, industrial enterprises, providing for the transfer and commercialisation of scientific results and technologies, constitute only 6.5% of the total number of organisations performing R&D. Among R&D performing organisations the growth of higher education institutions – from 9.7% in 1995 to 13.7% in 2008 – is worth noting. The share of R&D institutions, belonging to the higher education sector, also showed a marked growth.

Since 1995 the overall number of organisations almost remained the same, while the number of public R&D organisations increased by 24% and the number of private non-profit organisations increased ten fold. Similarly, the share of R&D personnel employed in the government sector grew by 7.5%.

**Figure 2: Organisations performing R&D by type and by sector of performance**

### 2.1 Scientific Excellence in Russia

#### 2.1.1 Scientific fields of excellence

In the SCOPE-EAST project, funded within FP6, an analysis of the Russian national R&D strengths and potential for cooperation was performed. It is common knowledge that physics and chemistry predominate over many disciplines in Russia. Domination and excellence in these fields was also confirmed by the study. Some figures about Russian publications in the World Scientific Journals are illustrated in Figure 3.

**Figure 3: Articles of the Russian Authors in the World Scientific Journals (Web of Science)**

---

57 S. Zaichenko, HSE calculations as of 15.01.2009 based on data of the Russian Federal Service of State Statistics
The SCOPE-EAST analysis was undertaken using the example of the most advanced Russian research institutes and was presented in the project report “Identification of targeted research areas in which substantial contribution by Russian S/T institutions to the specific programme “Cooperation” might be expected”\(^{58}\). For the purpose of this study, the citation rate of publications authored or co-authored by Russian scientists was taken as criterion for the selection of the most advanced institutes\(^{59}\). Traditionally the publications of Russian researchers are distributed among the 22 ISI subject categories as follows: Physics (28.18%), Chemistry (21.76%), Engineering (8.78%), Geosciences (6.79%), Materials Science (6.17%), Clinical Medicine (4.56%), Mathematics (4.36%), Biology & Biochemistry (4.08%), Space Science (3.02%), Plant & Animal Science (2.33%), Molecular Biology & Genetics (2.17%), Microbiology (1.28%), Computer Science (1.14%), Social Sciences, General (1.04%) – the ranking is based on the share of publications in the total number of publications.

A short list of the top thirty institutes was used for a detailed analysis of the subjects of their most frequently quoted articles\(^{60}\). The categories of the analysed publications can be ranked as follows (in descending order):

- Biochemistry & Molecular Biology
- Particles & Fields Physics
- Multidisciplinary Physics
- Cell Biology
- Genetics & Heredity
- Astronomy & Astrophysics
- Physical Chemistry

\(^{58}\) The Report was prepared in January 2008, see project web-site [http://www.scope-east.net/](http://www.scope-east.net/).

\(^{59}\) The database of Russian experts was developed at the Institute for Statistical Studies and Economics of Knowledge (ISSEK) on the basis of the data extracted from the ISI resources - Web of Knowledge (Thomson Corporation) and the Web of Knowledge itself were used as the source of data. The database includes the top Russian scientists whose publications are cited frequently. Those articles were taken into consideration for which the citation rate is above the average citation frequency for a certain scientific discipline.

\(^{60}\) Detailed information about the analysed institutes, including the research fields, subject categories and topics of the most highly-cited articles, title of journals in which the articles were published, references to FP6 projects and addresses of the institutes are presented in Annex 1 of the SCOPE-EAST report, published at [http://www.scope-east.net/](http://www.scope-east.net/).
While Russia is mostly known for excellence in basic research, the fact that Russia has achieved remarkable know-how in applied fields such as space and aviation research or nuclear research should not be overlooked. And of course it is an important international player in military research and equipment.

Russia has good chances to occupy a niche on the market of medium and long-distance civil airplanes. United Aircraft Corporation selected a number of models, which are currently being developed or which have recently entered into service, namely TU-204, AN-148 and Superjet-100. The first sample of Superjet was ready and officially presented in 2007. In the sphere of military aviation Russia has a 15—16 % share of the world market, based on national know-how, which is of interest to foreign customers. An example of leading Russian research centers in aviation is the “State Research Institute of Aviation Systems” (State Science Centre).

Due to state support, the military & defence industry grew by 4% in 2009. In 2010, state orders will increase by 8.5% to RUB 1175 billion (€27.6 million). Overall state support for high-tech industries in 2010 will amount to over RUB 400 billion (€9.4 billion), of which over RUB 100 billion (€2.35 billion) for the space industry, over RUB 96 billion (€2.26 million) for the nuclear industry, and RUB 22 billion (€0.5 million) for aviation.

2.1.2 Centres of excellence

In 1993, some of the best and largest industrial R&D centres with unique equipment and infrastructure were selected from the overall group of industrial R&D institutes to become centres of excellence.

State Science Centres (SSCs) were established by Decree of the President of the RF of 22 June 1993. In line with the Decree, this status was awarded to enterprises, scientific organisations, and higher education institutions. This status does not imply a change in the legal form of an organisation. It is awarded by the Russian Government on the proposal of the Intergovernmental Steering Commission on S&T Policy. This status of SSC comes with additional federal support in the form of block funding. In most cases, the Centres also receive support from their supervising Ministries.

On 16 December 2009 the State Duma adopted amendments to article 5 of the Federal Law “On Science and State S&T Policy” detailing the SSC status. The new provision allows “to lift restrictions to the right of scientific organisations, which implement tasks of state importance and in the state interests, to claim SSC status, which previously existed for institutions subordinated to federal executive authorities or the state academy of science and

---

61 http://strf.ru/organisation.aspx?CatalogId=221&d_no=13282
63 Decree #939 “On state science centres of the RF” (with amendments of 25 February 2003)
its regional branches”. Thus, the SSC status may be awarded to an organisation regardless of its ownership.

This form of state recognition is aimed at promoting priority R&D directions and highly qualified research groups. Before the performance evaluation of December 2006, there were 58 SSCs in Russia, but following the evaluation 6 centres lost their status\(^6^4\). Currently, there are 52 SSCs which are mostly oriented towards applied research in the areas identified as government priorities. Among the 52 SSCs, 32 are located in Moscow, 10 in St.Petersburg, 5 in Moscow Oblast, 2 in Kaluga Oblast, and one in Krasnodar Krai, Novossibirsk Oblast and Ulianov Oblast.

The centres’ activities are performed in accordance with workplans approved by stakeholder ministries and agreed by the Ministry of Education and Science. The workplans comply with the terms of reference (ToR) on state support conditions, which allows for effective control over budget money, as well as avoiding double funding of the same research programmes. The targeted R&D funding of centres is allocated by the Ministry of Education and Science for the implementation of basic and applied research, experimental and engineering works. This funding is also aimed at sustaining and supporting R&D capacities and infrastructure, renovation of production assets, education and re-qualification of staff in higher education institutions, participation in international S&T cooperation, etc.

Those SSC, which are budgetary institutions\(^6^5\), may perform their own commercial activity in order to use standby capacities; they may also offer advanced training for managers and specialists of industrial enterprises and S&T organisations. Their effectiveness is assessed by the governmental Commission on High Technologies and Innovations. In 2008 the total volume of works, performed by SSCs was estimated at RUB 52 billion (€ 1.5 billion).

The **Association of State Science Centres** is the umbrella organisation of the 52 Scientific Centres of Russia\(^6^6\). The association is a non-profit organisation, which ensures S&T coordination, represents its members’ interests and guarantees their commercial activity.

### 2.2 Research and Innovation Infrastructures

#### 2.2.1 Research Infrastructures

- **Major research infrastructures in Russia**

  Russia disposes of a range of major research infrastructures, especially in physics.\(^6^7\) As a leading scientific power in nuclear energy, military technologies and in aeronautic and space research, respective research infrastructures have been built. Some of the main installations are located:
  - at the Kurchatov Institute in Moscow (synchrotron center, neutron reactor, beam technology),

---


\(^6^5\) Budgetary institutions are state (and municipal) institutions created by state authorities (at federal, regional or municipal level). Their functions, including service provision to physical and legal persons based on state/municipal order, are carried out with budget funding and based on budget cost sheet. See Chapter 3.3

\(^6^6\) Association of state science centres: [http://www.agnc.ru/](http://www.agnc.ru/)

\(^6^7\) For an overview of selected research infrastructures see Annex 4.
at the Joint Institute for Nuclear Research in Dubna (Moscow region – neutron reactor, beam technology),

- at the Budker Institute of Nuclear Physics in Novosibirsk (synchrotron center, beam technology),

- at the Physics Energy Institute in Obninsk (Moscow region – fast reactor)

- at the Scientific Research Institute of physical problems in Zelenograd (Moscow region – synchrotron center),

- at the St. Petersburg Institute of Nuclear Physics in Gatchina (Leningrad region – high flux beam reactor),

- at the Institute for Innovation and Fusion Research in Troitsk (Moscow region),

- at research institutions of the Russian Academy of Sciences in Chernogolovka (Moscow region)

- at institutions for space research, such as in Korolev (Moscow region) and Baikonur (in Kazakhstan),

- in formerly closed scientific cities such as Sarov (Nizhny Novgorod region),

- etc.

At the beginning of the 1990s Russia launched a programme of public support to unique research and experimental installations of national importance. To implement the programme a special administrative mechanism was developed to identify unique scientific facilities. In case a facility fell into that category, it subsequently received financial support at federal level.

The list of unique installations adopted in 1996 contained 221 facilities, including 72 in the field of fundamental physics and astronomy, 9 for ecology research, 23 - life sciences and biotechnology, 35 - fuel energy, 10 - new materials and chemistry, 33 – for basic research in higher schools, 16 - machine-building complex, 5 in geo-metallurgical and housing, 18 in medicine and social science.

Taking into account the changes that have taken place within the Russian scientific community since then, the content of this list is no longer up to date due to the decommissioning of some installations or reorientation of activity in some research centers. Nevertheless, the importance of increasing the efficiency of unique installations as well as optimizing the costs of their exploitation has attracted the attention of public authorities in charge of science management. That is why the authorities have allocated funds to dedicated studies, with the aim of making an inventory of existing research infrastructures. These studies will include the classification of infrastructures and their effective use for the benefit of scientific communities, including international cooperation.

More than a third of unique scientific installations belong to the institutions of the public academies of science. The Russian Academy of Sciences and the other public academies of sciences have drawn up their own list of unique facilities. The list now includes 26 infrastructures 68. Some universities, for example Moscow State University, and organisations subordinated to federal agencies and state corporations, such as Rosatom69, have similar facilities.

According to the results of studies recently conducted at the request of the Ministry of Education and Science, unique facilities and installations – as part of the infrastructure of science – should be seen as elements of the scientific and technical potential. The main objective of unique facilities and installations is to facilitate the development of a certain field

---

68 The list may be found in Annex 5.

69 T. Kuznetsova, Autonomous institutions in the area of science: assesment of highly valuable assets, Foresight 45 № 4 (4) 2007.
of research and to provide conditions for achieving world class scientific results. The unique character of the infrastructures is verified by applying the following criteria:

- possibility to achieve world class scientific results, which cannot be reproduced under other conditions;
- technical complexity of the equipment;
- economic characteristics of the equipment (high cost, duration of construction);
- specificity of conditions under which the scientific infrastructure was established (botanical gardens, collections, scientific museums, observatories, etc.).

- Modernisation of research infrastructures

In 2004–2006 financial support of unique research facilities was conducted on a competitive basis within the Federal Targeted Programme “Research and development in priority directions of S&T progress”. Calls were published on scientific-methodical, organisational and material support of ongoing operations of unique facilities and installations for research, developmental and technological activities within the programme priorities.

In 2006, 214 applications from scientific institutions and higher schools (with budgets from RUB 1 to 10 million) were reviewed within a call published in the framework of the programme activity «Infrastructure development». Among the organisations selected for funding as a result of this call were the Kurchatov Institute, Special Astrophysical Observatory, Ioffe Physical-Technical Institute, Arctic and Antarctic Scientific Research Institute, Troitsk Institute of Innovative and Thermonuclear Research, etc.

In the follow-up Federal Targeted Programme «Research and development in priority fields of S&T complex of Russia for 2007-2012», activity 1.8 is foreseen for infrastructure. In this funding line research equipment and projects at unique installations are supported with RUB 2 to 10 million (around € 50,000 to 270,000) usually for a two year period. 410 applications were submitted to calls for funding of this activity and 135 facilities received financial support (see Annex 4). These selected 135 facilities represent a more recent list of relevant research installations in Russia, although it is certainly not exhaustive considering the number of applications submitted.

Another important programme for upgrading infrastructures in Russia is the Federal Targeted Programme "Development of the nanoindustry infrastructure in Russia for 2008-2010". The objectives of the programme, coordinated by the Ministry of Education and Science, are:

- to provide special experimental, diagnostic, metrological, scientific-technological and industrial equipment, other equipment and devices as elements of the national nanotechnology network
- to enable effective operation and use of experimental infrastructure for the interests of Russian scientific organisations, educational institutions performing vocational training activities in the area of nanotechnologies and nanomaterials

Funds available within the Federal Targeted Programme "Development of the nanoindustry infrastructure in Russia for 2008-2010" for upgrading infrastructure are detailed in Table 5 below.

---

70 Activity 1.8 Research undertaken with the use of unique facilities and installations, as well as unique objects of scientific infrastructure.
### International cooperation on research infrastructures

Russia cooperates with international partners on research infrastructures; for example it participates as an observer in CERN and it is a member of the international ITER consortium for the development of a fusion reactor. It has also pledged an important contribution of around € 250 million for the XFEL project, an X-ray Free-Electron Laser facility to be constructed in Germany.\(^\text{72}\)

### Measures to improve the innovation Infrastructures

In the context of Russian innovation policy, one should mention technoparks, science cities and special economic zones (SEZs), as well as Technology Transfer Centers (TTCs) and Innovation and Technology Centres (ITCs). Technoparks are micro-level instruments for technology transfer, while science cities and SEZs are macro-level mechanisms for balancing the responsibilities of local and federal authorities in knowledge transfer (and support) activities. Technology Transfer Centres and Innovation and Technology Centres provide assistance to scientists, entrepreneurs and investors to strengthen links between science and business.

### Technoparks and business-incubators

The first Technology Park in the Russian Federation was founded in 1990 – the “Tomsk Scientific-Technological Park”. Technology Parks are founded in Russia by a variety of players, including universities, scientific centres, industrial enterprises and private companies, as well as public authorities, banks, and municipal bodies. On 10 March 2006, the Federal Programme “Creation of Technology Parks for Advanced Technologies in the Russian Federation” was launched. The programme is coordinated by the Ministry of Information Technology and Telecommunications. The programme aims to ensure accelerated growth in the advanced technologies sector, and to turn this sector into the country’s main focus for development. Today, there are 64 Technology Parks in 35 regions of the Russian Federation, of which only 40 are currently active. Technoparks have their umbrella organisation – the Association for the development of technoparks, innovation centres and business incubators – Association ”Technopark”\(^\text{73}\).

---

\(^{72}\) See [http://www.xfel.eu/news/2009/20091130/](http://www.xfel.eu/news/2009/20091130/) The XFEL convention was signed in November 2009; with 23% Russia has the second biggest share in the project after Germany.

\(^{73}\) [http://technoparki.narod.ru/tpark/tparks_russia.htm](http://technoparki.narod.ru/tpark/tparks_russia.htm)
Russian Technology Parks are financed by federal, regional and private sources, and they frequently receive additional funding from outside Russia. On 20 October 2007, a decree of the government of the Russian Federation decided that federal budget funding for the creation of Technology Parks (Technoparks) in the sphere of high technology for 2007 and for the period 2008-2010 would be made available in the form of subsidies by the Russian Federation in order to create Technoparks in the districts of Kaluga, Moscow, Nizhny Novgorod, Tyumen, Novosibirsk, Kemerovo, the city of Saint Petersburg and the Republic of Tatarstan.

Technopark policies face a range of hidden problems. First of all, multiple “loopholes” in the legislation seriously affect the commercial scope of universities and R&D institutions. State universities or government R&D institutions are limited in creating and providing direct support to SMEs. A state university can create a start-up, but cannot provide any funding or facilities for it. That is why Russian technoparks do not operate independently but only as a part of the “host organisation’s” structure (for example as a subdivision of a university, research institute). They lack performance monitoring and mechanisms for the diffusion of best practices. They also suffer from underdeveloped business consulting mechanisms.

One solution is “industry and manufacturing special economic zones” (see below), which allow to significantly reduce taxation and attract investors. There are other solutions such as business incubators and mechanisms to provide financial support for start-ups; the development of conversion and commercialisation mechanisms for defence “dual-purpose” technologies, etc. Another initiative relates to new legal mechanisms. At least three main directions should be mentioned here: federal lands provision for technoparks on a competitive basis (both for ownership and for long-term leasing); direct investments in technopark infrastructure by government bodies; creation of favourable conditions for technoparks investment (construction sites, transport and housing infrastructure funding) and sharing expenditures between federal and regional authorities. Measures to improve the situation are expected.

The small number of Technology Parks actually operating in Russia can be explained by the fact that they were created not so much as a response to market needs but as means of receiving government subsidies. The government did not always base its choice on the commercial viability of the projects. And this government policy continued; an evaluation conducted in 2000 had no effect, neither on tax advantages nor on subsidies. Government money continued to be distributed uniformly to all operating Technology Parks.

In spite of the problems that Technoparks are facing, there are several Technoparks operating smoothly in Russia, such as the Technopark of Moscow State University (MSU Science Park), which has achieved very positive results. One of the educational programmes of the MSU Science Park, “Success Formula”, implemented since 2004 was built upon the experience of similar competitions at Oxford University and the British Council. Annually around 100 MA and PhD students and young scientists from all over Russia take part in the programme, which results in the creation of 2-3 youth innovative small businesses. In 2004-2008 over 1500 persons participated in the programme, over 240 business concepts of innovative ideas, and more than 80 business plans were developed and presented to the jury and investors.

Students’ business-incubator in Tomsk Polytechnic University has actively developed over the past 5 years and moved to a new larger facility in December 2009 in order to

74 http://www.sciencepark.ru/eng/index.htm
accommodate all projects. The new facility boasts 40 workstations equipped with Internet connection and covers 700 square meters (as opposite to 30 square meters for the old facility). Over 5 years students created 8 small S&T enterprises. In the near future the University plans to create an Experimental and Design Institute with pilot-line production, which will develop documentation for production of engineering samples (prototypes) and technologies.

- **Science cities**

  The Soviet system created dozens of so-called “science cities” (*naukogrady*) mainly for military and nuclear research, built in remote areas or in secure compounds alongside civilian cities. Most of the cities have a similar history; they were founded in the mid 1940s, in small settlements.

  A foreign analogy of Russian science cities are technology parks which have been widely established in developed countries in the second half of the 20th century, such as the famous Silicon Valley. The international concept of science cities involves a concentration of scientific potential in advanced and pioneer fields, in combination with a favourable environment for creative R&D activities. About 40% of the Russian S&T potential is still concentrated in science cities.

  The legislative framework for science cities is set by the federal law « On the Status of Science City in the Russian Federation » (adopted in 1999, and amended in 2004), whereby a science city is a municipal entity (at the level of city district) with considerable S&T potential. The science city status was confirmed by the President of the Russian Federation for a period of 25 years.

  In 1996, science cities possessing an official status, as well as other related entities (closed territories, enterprises, and universities) voluntarily regrouped in the non-commercial partnership “Union for the Development of Russia’s Science Cities”.

  Science cities are usually created in support and as part of the existing regional science and industrial system. They obtain funding from the federal budget in the form of grants. A procedure has been determined under which municipal units with the status of science cities of the Russian Federation can obtain grants to finance their social, engineering and innovation infrastructures. The President approves the priorities determined by the Government for the science city as well as the state programme for science development. This programme specifies the form of federal support that science cities may benefit from in accordance with their specialisation. Science city funding, along with logistical and maintenance support, is provided by the federal budget, the regional and local authorities budgets, and other funding sources. In general, science cities are also supposed to attract considerable investment as venture business centres and science, education, technological excellence and integration hubs.

  In order to get the status of *naukograd*, cities must meet the following criteria:

  - no less than 15% of employees working in organisations of the science and research complex on the territory of the municipality
  - No less than 50% of the economic output of the municipality must come from scientific and technical production, or the main funds of the complex used for

scientific and technical production should reach no less than 50% of the economic output of the municipality.

There are seven categories of science cities:
- research on space and rocket and plane construction
- electronics and radio technology
- automation, engine and instrument making
- chemistry, chemical physics and the creation of new materials
- nuclear complex
- energy
- biology and biotechnology

From 1999 onwards, the issue of state support for science cities has been discussed. The main issues include the State’s responsibilities, the efficient creation and use of infrastructures, mechanisms for transition to autonomous development without grant support, etc. The creation of incentives and favourable conditions for the transition of these regions into centres of high technology and advanced R&D is considered to be a major objective of the science city policies.

Today, science cities still have great scientific potential but also face big problems in trying to adapt to the market economy, because of their high specialisation and limited funds. To address this challenge, the Russian Ministry of Education and Science adopted a procedure to confer the status of “science city” on a municipal unit (cities and settlements) in 2005. Under this regulation, the Ministry of Education and Science has the following functions:
- To assess the scientific and technical (innovation) potential of the municipal unit’s research and production facilities and their ability to fulfil the declared task of developing the municipal unit into a science town of the Russian Federation;
- To monitor the achievement of Russia’s science towns’ research and production facilities.

Science cities are populated mainly by researchers and their families. “Mono-orientation” towards scientific activity and specific tasks explains the lack of “traditional” infrastructure elements, such as industry (in some cities) and agriculture. Therefore, after the dramatic decrease in state support in the 1990s, these cities faced extremely difficult economic and social problems. The transformation of the economic infrastructure is the most dynamic process in science cities today. The ultimate goal is to convert state budget organisations into market economy enterprises. It had been anticipated that the great potential in technological development would be helpful for the transition to market economy. Today, a typical science city is a large up-to-date research and industrial complex, including higher education institutions, research institutions, as well as a residential area with cultural and recreational infrastructure.

Currently, 14 out of 65 cities and settlements satisfy the legal requirements of naukogrady as set in the federal law: Biysk (Altai Krai); Dubna (Moscow Oblast); Zhukovsky (Moscow Oblast); Kol’tsovo (Novossibirsk Oblast); Korolev (Moscow Oblast); Michurinsk (Tambov Oblast); Peterhof (St.Petersburg); Puschino (Moscow Oblast); Obninsk (Kaluga Oblast); Reutov (Moscow Oblast); Troitsk (Moscow Oblast); Fryazino (Moscow Oblast); Chernogolovka (Moscow oblast); Protvino (Moscow Oblast).

- Special Economic Zones
There also exist special mechanisms to promote the development of industry-oriented science cities and innovative regions. One such mechanism is the “special economic zone” (SEZ). This instrument was introduced in Russia in 2005 by the Federal Law “On Special Economic Zones in the Russian Federation”. Special zones are Russian Federation territories defined by the government where a special regime for entrepreneurial activity applies. SEZs are intended to promote high-technology industries. The main objectives of the Special Economic Zone are:

- The development of processing and high-tech branches of the economy;
- The manufacturing of new products, imported goods in particular;
- Development of transport infrastructure;
- The development of tourism, sanatoria and health centres.

There are three types of zones: industrial (special tax incentives, favorable investment regime); technology and innovation (outside customs, favorable for imports/exports) and recreational zones (special conditions for tourism). Special economic zones can be created on land owned by the government and/or municipalities. However, official initiatives aimed at developing innovative infrastructure (as well as other mechanisms mentioned above) do not guarantee growth in demand for and/or supply of innovation.

In April 2006, on the basis of the Decrees of the Government of the Russian Federation, the public company “Vneshstroyimport” was reorganised into the “Joint Stock Company Special Economic Zones” to implement federal policies on SEZ founding and create SEZ infrastructures. In 2007, the federal government transferred RUB 11 billion (€314 million) into the company’s fund. The Russian Federation’s three-years state budget (2008-2010) was meant to contribute around RUB 20 billion (€549 million) towards the development of Russia’s Special Economic Zones. But the funding was reduced by half in 2009. The reduction of state funding could be compensated by other sources of funding, in particular private investors. By 2025, overall investments are expected to exceed RUB 600 billion (€14 billion). The resident-companies should create 140 000 jobs and the production output in the SEZ should reach RUB 5 billion per year (€117.6 million).

The SEZs used to be managed by the Federal Agency for Management of Special Economic Zones (RusSEZ)76, which answered to the Ministry for Economic Development (MED). The Federal Agency RusSEZ was dissolved by the Decree of the President of the RF from 5 October 2009 #1107. Its functions were passed over to MED, formalizing the two level governance of SEZ with redistribution of power among MED, JSC “Special economic zones” and Russia’s regions. The simplified SEZ governance structure allows for SEZ development as a unified comprehensive project, making it more attractive to foreign and Russian investments. Furthermore, in order to stimulate the activity of local authorities in SEZ development, the federal authorities may delegate certain functions to Russia’s regions, where SEZ are created, while retaining supervision at the federal level.

There are four official technical-innovative SEZs: Dubna (Moscow region), Zelenograd (in Moscow area), St. Petersburg (Peterhof), and Tomsk. The main characteristics of these SEZs are:
- Technologically-innovative activity
- No more than two locations, with a total area not exceeding three square km (section two, Federal law of 03.06.2006 № 76-FZ ).

76 http://eng.www.rosoez.ru/
They should not be located in territories with more than one municipal entity;
They cannot include the whole territory of any administrative-territorial entity. (section three, Federal law of 03.06.2006 № 76-FZ )
Status for no longer than 20 years

A future option is to create Port Zones. A bill to foster the development of ports and airports in the Russian Federation was first presented to the State Duma (Lower Chamber of the Federal Assembly) in June 2007. A city’s “Port Zone” status is to be valid for no longer than 49 years. The “resident” (investor) will be required to invest no less than € 100 million in the construction and development of a new port. Existing SEZs will enjoy special tax privileges in the ports of the Russian Federation, which will generate positive effects for the ports’ future development.

Technology Transfer Centres and Russian Technology Transfer Network

Technology Transfer Centres (TTC) play an essential role in organising and supporting spin-offs and transfer of know-how from R&D institutes to industry. TTC were founded by RAS institutes, universities, major scientific centres, research organisations and enterprises. The Centers were organised either within the structure of the aforementioned organisations or as independent entities. In 2004-2005, the Ministry of Education and Science initiated and supported the opening of Technology Transfer Centres at the Institute of Energy Problems of Chemical Physics, RAS, in Chernogolovka, the Institute of Bioorganic Chemistry, RAS, in Pushchino; and the Institute of Metallurgy of the Urals Branch of the RAS. The year 2005 saw the emergence of the first two dual-purpose Technology Transfer Centres. Most of the TTC are members of the Russian Technology Transfer Network (RTTN).

The RTTN is an innovative infrastructure tool established in 2002 and dedicated to the effective dissemination of technological information and search for partners for the implementation of innovative projects. It started as a project initiated by the Obninsk Regional Innovation Technology Centre (RITC-Obninsk) and the Innovation Centre Koltsovo (ICK) under the TACIS FINRUS 9804 project "Innovation Centres and Scientific Cities of the Russian Federation" (1999-2002). Under this project, Innovation Centres of Russian scientific cities established partnerships with the European Innovation Relay Centres (IRC), which have recently become the European Enterprise Network (EEN). The network architecture of RTTN is based on adapted methodologies of the EU EEN, thus allowing an easy exchange of technological information with the EEN.

Today the RTTN is a formal network of 52 member organisations including Innovation Technology Centres, Technology Transfer Centres, Technology Commercialisation Offices and other organisations engaged in technology transfer. The members collect information about offered or requested technologies, conduct technology audits and feed these data in a common database of technology offers and requests. RTTN members have close links with various Russian organisations at the federal, regional, and local level, and also with foreign organisations that have information about new technologies and technology requests, and which have an interest in promoting it through the RTTN.

RTTN clients are SMEs and big companies, academic and industrial R&D institutes, universities, individuals engaged in the promotion of technological information and search for partners. The quality of collected and disseminated technological information is ensured by

78 http://www.rttn.ru/
mandatory certification of member organisations. Candidate organisations are subject to examination, in order to see whether their activity meets the criteria required for maintaining a good quality of services provided by the RTTN.

Close similarity of RTTN instruments with those of the European network IRC made it possible to set up a cooperation and exchange technology information with the European relay-centers. An example of such tested mechanism is an international segment of the RTTN network – the French-Russian Technological Network, RFR\(^{80}\), created in 2003. The French national coordinator of RFR is the French national agency – OSEO\(^{81}\), and the Russian coordinator is the Foundation for Assistance to Small Innovative Enterprises (FASIE)\(^{82}\).

Another international segment of the RTTN network is the British-Russian Innovation Network, BRIN\(^{83}\), created in 2005 in partnership with the British company Beta Technology LTD.

Since 12 June 2008 RTTN joined the consortium of three Russian networks to become a participant of Enterprise Europe Network which was created as an integrated network of business support services, based on experience of two networks consisting of 270 Euro Info Centres (EIC) and 250 Innovation Relay Centres (IRC)\(^{84}\).

### Table 6: Results of RTTN activity in 2007\(^{85}\)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual assistance to clients (technological audit, identification of technological requests (demand) and technological proposals (TD/TP), personalized information dissemination on TD/TP, support to expressions of interest)</td>
<td>Around 1000 clients were assisted, including 650 companies and enterprises and 350 R&amp;D organisations and universities.</td>
</tr>
<tr>
<td>United database of TD/TP</td>
<td>Over 500 expressions of interest were received, approx. 400 initial negotiations were held, 50 cooperation agreements were finalized. Information about TD/TP was well structured. As of 01.04.2008 the number of profiles of technological request/technological proposal reached approx. 1600, of which approx. 600 were active.</td>
</tr>
<tr>
<td>Participation in specialized exhibitions and conferences</td>
<td>RTTN was represented at over 20 exhibitions, forums, conferences at the federal and regional level</td>
</tr>
<tr>
<td>Information seminars/ working meeting</td>
<td>RTTN members organized over 50 information events in their regions for existing and potential clients.</td>
</tr>
<tr>
<td>Brokerage events</td>
<td>RTTN was represented at 1 brokerage event in Europe.</td>
</tr>
<tr>
<td>Regular electronic information dissemination among potential partners/ clients</td>
<td>The overall client database (with contact information) only for international segments included over 600 addresses.</td>
</tr>
<tr>
<td>Thematic information newsletters</td>
<td>A regular RTTN newsletter “Transfer and commercialisation of technology” was launched (circulation of printed version – 1500 copies). The newsletter is disseminated to all RTTN members and is available in e-format.</td>
</tr>
</tbody>
</table>

\(^{80}\) [www.rfr-net.org](http://www.rfr-net.org)
\(^{81}\) [http://www.oseo.fr/partenaires/international/les_partenariats_technologiques_bilateraux/la_fasie](http://www.oseo.fr/partenaires/international/les_partenariats_technologiques_bilateraux/la_fasie)
\(^{82}\) [www.fasie.ru](http://www.fasie.ru)
\(^{83}\) [www.brin-net.ru](http://www.brin-net.ru)
\(^{84}\) [http://www.gate2rubin.ru](http://www.gate2rubin.ru)
Innovation and Technology Centres

To create better conditions for technological innovation, 77 Innovative-Technological Centres (ITC) have been set up in Russia, which are involved in international scientific and educational cooperation.

In 2000, the Russian Union of Innovation and Technology Centres (UNITC) was established\(^{86}\). UNITC’s main objective is to improve Russia’s innovation infrastructures, as well as create an information environment to facilitate the efficient interaction of innovation centres. It should also be noted that the union provides the integration of Russian innovation centres into the European Network and establishes close links with federal and regional authorities. One of these projects is the collaboration with the European Business and Innovation Centres Network (EBN). Also, the Union runs a number of projects with the support of the Foundation for the Assistance of Small Innovation Enterprises (FASIE) to support the implementation of the commercialisation and technology transfer projects on an international scale.

Both Innovation and Technology Centres (ITCs) and Technology Transfer Centres (TTCs) support the cooperation between scientists/inventors, entrepreneurs and investors to stimulate the link between science and business. Both have very similar functions, providing all or some of the following services:
- development of business-plans;
- technological expertise;
- consulting and information support to companies and their projects;
- marketing studies;
- legal consulting;
- experimental/technology and design services;
- educational programmes, etc.

Both groups of centers - ITCs and TTCs have their own umbrella organisations: the Union of ITCs and the Russian Technology Transfer Network. However, ITCs usually function as business incubators / technoparks, providing facilities for innovative SMEs - "residents".

2.3 Human potential

By the end of 2008, 761252 people were employed in R&D, which accounts for 0.85\% of the active population, or 0.54\% of the total population of Russia. The number of researchers\(^{87}\) accounted for more than 375000 people. Furthermore, in 2007, 177200 people were working in R&D as their second job and with service contracts, thus reinforcing the staff of scientific organisations\(^{88}\). In 2008, the R&D personnel in Full-Time Equivalents (FTE)\(^{89}\) was equal to 869800 FTE units; the number of researchers amounted to 451200 FTE. Surprisingly and unlike EU countries, Russia’s R&D personnel is higher in terms of FTE than

---

\(^{86}\) [http://rus.unitc.ru/](http://rus.unitc.ru/)

\(^{87}\) Researchers are defined as employees, professionally occupied with scientific research and development (R&D) and directly involved in the creation of new knowledge, products, processes, methods or systems, as well as the management of these activities; they have usually completed higher professional education

\(^{88}\) Of which 122800 people worked as researchers.

\(^{89}\) Full-Time Equivalent (FTE) numbers consider actual working time spent on R&D, by personnel working full-time and part-time.
in absolute head count figures; this indicates that the R&D personnel is often employed in more than one position.

Absolute figures of S&T human potential bring Russia to the fourth rank in the world, immediately after China, Japan and the USA. However, despite the considerable scope of human potential, its dynamics shows an overall decrease of personnel, even if this trend has slowed down in the past years. Over a decade (1995-2008), R&D personnel decreased by 28.25% (or by 298792 people); over the last 8 years (2000-2008) by 14.2% (or by 126477 people); in 2006-2008 the registered R&D personnel decreased at a much slower pace (only by 13135 people). The same tendency can be observed for full-time equivalent R&D personnel. In contrast the share of researchers with degrees grew over a decade, i.e. the share of science doctors grew from 3.5% in 1994 to 6.7% in 2008.

The reasons for the relative stabilisation of R&D personnel in 2006-2008 are as follows: better research conditions (e.g. increased salaries, see figure 4); a stabilised demand for R&D personnel in former R&D intensive industries (in state governance, banking, financial and insurance spheres); remaining motivation of parts of the R&D personnel to engage in scientific careers.

Researchers’ dynamics is characterised by discrepancies between the age groups (see Table 7 and Figure 4 below). One of the most dynamic age groups are researchers below 29, raising from 9.2% in 1994 to 17.6% in 2008. The same dynamics was observed for the older researchers’ age group (70 years and above), which by the end of 2006 amounted to 5.9% of the total number of researchers. The 30-49 age group showed the biggest decrease: in 2008 the relative number of researchers, compared to 1994, significantly dropped (from 55.7% to 31%). It is worth noting that, from 2007 to 2008 the share of researchers aged 30-39 increased for the first time.

These data (Table 7 and Figure 4) illustrate the fact that middle aged Russian researchers have worn thin during the crisis, because of internal migration within Russia to other sectors of the economy and because of migration abroad. A positive sign though, is that the number of younger researchers (below 30 years of age) is growing substantially, 1.3 times from 2000 to 2008, and that R&D institutions are attracting them. This is partly due to a noticeable increase of R&D personnel salaries, compared to both: national average and industry. This is indeed a necessary development to compensate for the loss of middle-ages researchers and retiring scientists.

In 2008, nearly one half of R&D personnel were researchers (49.4%) (see Table 8). 26.9% of researchers had a university degree (doctors and candidates of sciences). Technicians made up the smallest category (7.9%). Russian R&D personnel was mostly composed of men (approx. 58% in 2007).

---


92 In line with the federal statistical survey programme for R&D performance the data about researchers’ age is gathered over four years.
Table 7 Researchers by age groups.

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>2002</th>
<th></th>
<th>2004</th>
<th></th>
<th>2006</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Researchers</td>
<td>Of which</td>
<td>Doctors of science</td>
<td>Candidates of science</td>
<td>Researchers</td>
<td>Of which</td>
</tr>
<tr>
<td>Total</td>
<td>414676</td>
<td>22571</td>
<td>79775</td>
<td>401425</td>
<td>23102</td>
<td>76808</td>
</tr>
<tr>
<td>Under 29</td>
<td>56126</td>
<td>36</td>
<td>2753</td>
<td>61805</td>
<td>18</td>
<td>3126</td>
</tr>
<tr>
<td>30-39</td>
<td>57272</td>
<td>447</td>
<td>9682</td>
<td>52251</td>
<td>379</td>
<td>9965</td>
</tr>
<tr>
<td>40-49</td>
<td>99311</td>
<td>3036</td>
<td>18772</td>
<td>87819</td>
<td>2850</td>
<td>16470</td>
</tr>
<tr>
<td>50-59</td>
<td>111773</td>
<td>6337</td>
<td>22773</td>
<td>111412</td>
<td>6870</td>
<td>22235</td>
</tr>
<tr>
<td>60-69</td>
<td>74322</td>
<td>8140</td>
<td>21085</td>
<td>69736</td>
<td>7857</td>
<td>19309</td>
</tr>
<tr>
<td>70 and older</td>
<td>15872</td>
<td>4575</td>
<td>4710</td>
<td>18402</td>
<td>5128</td>
<td>5703</td>
</tr>
</tbody>
</table>

Figure 4: Russian R&D personnel: salary dynamics and distribution by qualification and age.

Average monthly salary of R&D personnel as a per cent of that:
- in the national economy (= 100%)
- in industry (= 100%)

Distribution by qualification:
- Doctors of science
- Candidates of science
- Others

Distribution by age:
- Below 29
- 30-39
- 40-49
- 50-59
- 60 and over

### Table 8: R&D Personnel by category (people)\(^85\)

<table>
<thead>
<tr>
<th>Category / Year</th>
<th>1995</th>
<th>2000</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Researchers</td>
<td>518690</td>
<td>425954</td>
<td>392849</td>
<td>375804</td>
</tr>
<tr>
<td>Technicians</td>
<td>101371</td>
<td>75184</td>
<td>64569</td>
<td>60218</td>
</tr>
<tr>
<td>Support Staff</td>
<td>274925</td>
<td>240506</td>
<td>208052</td>
<td>194769</td>
</tr>
<tr>
<td>Others</td>
<td>166058</td>
<td>146085</td>
<td>135665</td>
<td>130461</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>1,061,044</strong></td>
<td><strong>887,729</strong></td>
<td><strong>801,135</strong></td>
<td><strong>761,252</strong></td>
</tr>
</tbody>
</table>

One of the key characteristics of the Russian R&D sphere is its scientific and technological orientation. Statistical data shows that the greatest proportion of researchers (62.2%) was working in Engineering and almost one quarter (24.1%) in Natural sciences. Other scientific fields accounted for only 2 to 4% of researchers\(^96\).

Compared to employment data above, in 2007, over 60% of R&D personnel was hired by the business sector, 29.5% by the public sector and almost 10% by the higher education sector. Non-profit private organisations hired less than 1% of R&D personnel. These hiring data underline a trend towards an increasing share of R&D personnel in the university sector\(^97\).

In 2007, the higher education sector employed 6.1% of total R&D personnel and 8.7% of the total number of researchers. This sector has showed a positive increase in personnel during the last few years\(^98\): in 2007 alone, it increased by more than 10%. The share of researchers in higher education reached almost 70%; and around 45% of researchers employed in the higher education sector have degrees. The main characteristic of the higher education sector is the high proportion of employees working there as a second job. In 2007, the number of associate staff working on contracts and colleagues working on service contracts was twice that of members of staff in this sector.

The territorial distribution of the S&T human potential is unequal. Over half the R&D personnel (approx. 52% of total personnel and 53.3% of researchers) are concentrated in the Central federal district (especially Moscow and surroundings). Two other federal districts follow closely: Privolzhsk (Nizhny Novgorod, Kazan, Saratov) and Northwest (St. Petersburg), which account for 15.8% and 13.0%, respectively, of total R&D personnel\(^99\). Each of the remaining districts accounts for less than 8% of total R&D personnel. A similar distribution is observed for researchers. Around 43% of all R&D personnel and 47.9% of researchers are concentrated in Moscow and St. Petersburg; this share exceeds 50%, if the neighbouring Moscow and Leningrad Regions are also taken into account (54.7% of total personnel and 58.1% of researchers).

According to the survey, “Information about employees working abroad in 2002” carried out by Rosstat\(^100\), less than 1% of the total number of researchers worked abroad that

---


\(^{96}\) Medical sciences – 4.3%, Agricultural sciences – 3.5%, Social sciences – 3.5%, Humanities – 2.4%.

\(^{97}\) See table 4 “Total R&D Capacity by Sector of Performance, 1995-2007” at the beginning of chapter 2 “S&T landscape”.

\(^{98}\) Under the conditions of stabilization of its share in the total number of R&D personnel.

\(^{99}\) 13.4% and 14.1% of researchers.

\(^{100}\) The survey covers 2922 researchers, and concerns all legal persons, their subsidiaries, which carried out R&D in the reporting year in all fields of science (with the exception of small enterprises). Science in the Russian Federation (2005) Data Book. Moscow: University – Higher School of Economics.
year. Among researchers working abroad in 2002, 72% were under 50, and about 56% of them were under 40. Over 75% of the total were men. The largest group was men aged 40-49 (nearly one fourth of those sampled belonged to that category). About 74% of researchers who worked abroad were PhDs or PhD students.

2.4 Geographical distribution & regional research potential

2.4.1 Geographical distribution

Geographical distribution of promising technologies within research performed in 2007-2008 (specifically in the area of nanotechnology and materials, ICT, biotechnology & environment) was examined to identify scenarios for S&T development in Russia. According to this study, major industries in each of Russia’s Federal District (FD) are using (and will be using) the results of research for new technologies. In the Central FD for example, these are food industries, energy and car manufactories, machinery, consumer goods and chemical industry. For the North-West FD: food industry, energy and machinery. For the South FD: agriculture, chemical industry and machinery. Both the Volga region and the Ural FD have a wide range of industries: machinery, chemical industry, energy, including atomic energy, food industry, transport and car manufacturers. The Siberian region, in addition to some of the above mentioned sectors, faces high demand for nonferrous metallurgy. The Far East FD needs marine technologies. Transport has to be mentioned separately, as most FD’s demand does not match current research resources.

Regarding the geographical distribution of R&D organisations, they are still concentrated in Moscow, St. Petersburg and other cities – large industrial, scientific and educational centres – such as Rostov in the south, Kazan and Nizhny Novgorod in the Volga Federal District, several big cities in Siberia: Irkutsk, Krasnoyarsk, Novosibirsk, Tomsk, and in the Urals: Yekaterinburg. The share of scientific organisations based in Moscow and St. Petersburg amounts to one third. Moreover, in 2007, the number of scientific organisations based in Moscow grew from 785 to 837, and from 369 to 429 in St. Petersburg.

2.4.2 Regional research potential

Bearing in mind that Russia has more than 70 cities from East to West with a high concentration of S&T, educational and industrial potential, State support for the development of science based production at these locations is provided through various means, namely:

- through the Science Cities development programme (based upon the science city status);
- based upon federal law on restricted territories (e.g. through Special Economic Zones);
- through regional legal acts on territories of innovative development;
- through targeted state programmes at regional level.

---


102 State regional programmes for example: Programme “South of Russia (2008-2012)”; Programme “Economic and social development of Far East and Transbaikalia up to 2013”; “Programme of the development of Kaliningrad region for the period up to 2014”
The Federal District (FD) is an important administrative division of the Russian Federation, which was created in order to support the development of knowledge-based and market-oriented economy and to ensure effectiveness and efficiency of government measures throughout Russian regions. Russia is split for governance purposes into seven Federal districts (FD), namely Central FD, North-West FD, South FD, Volga region FD, Ural FD, Siberian FD and Far East FD. Annex 6 gives an idea of the size of each FD and related oblasts, and indicates the amount of funding received by each of them for the development of the above-mentioned “new technologies” from Federal S&T Targeted Programme in 2007-2008.

Based upon these figures, the leading position of Central FD, North-West FD and Siberian FD is rather clear. Due to their leading positions in new technologies research, these FDs benefit from strong support by educational programmes and various institutions for innovation (science and technological parks, centres for collective research, industrial parks, etc.) with additional State and regional funding for S&T. Diagrams which help to understand leading industrial sectors and associated investment in basic research, applied research and other research in the years 2000-2007 are also featured in Annex 7.

### 2.5 Distribution between education and research

#### 2.5.1 Division of S&T organisations performing research and education

Russia has had a particular division between organisations conducting research and education since Soviet times. Research was historically conducted at research institutes of the Russian Academy of Sciences (RAS) and higher education at universities. However, there were also a few exceptions with top universities conducting excellent research as well.

The Russian Academy of Sciences is the largest and most prominent research organisation in the country. In addition, there are several sectoral academies of sciences, but only two of them are actively engaged in R&D, namely, the Russian Academy of Medical Sciences, and the Russian Academy of Agriculture. The mandate of all these academies is to conduct fundamental research, but they also implement applied research.103

Russian higher education institutions (HEI) traditionally occupy a marginal part in the national R&D landscape, unlike in mature market economies (Table 9). Their central function is to provide education and training, while research is given a lower priority, with the exception of a few elite universities. In 2008, only 44% of higher education institutions performed R&D (in 1995 this value accounted for 52%). In 2006 R&D staff in higher education institutions was half that of 1995. By 2007, only 4% of GERD referred to higher education institutions104.

---

103 See section 3.5 for more details

Table 9: Higher education institutions (HEI)\textsuperscript{105}

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>514</td>
<td>762</td>
<td>965</td>
<td>1088</td>
<td>1039</td>
<td>1046</td>
<td>1071</td>
<td>1068</td>
<td>1090</td>
<td>1108</td>
<td>1134</td>
</tr>
<tr>
<td>HEIs performing R&amp;D</td>
<td>453</td>
<td>395</td>
<td>390</td>
<td>388</td>
<td>390</td>
<td>393</td>
<td>402</td>
<td>406</td>
<td>417</td>
<td>616</td>
<td>503</td>
</tr>
<tr>
<td>HEIs performing R&amp;D, %</td>
<td>88.1</td>
<td>51.8</td>
<td>40.4</td>
<td>35.7</td>
<td>37.5</td>
<td>37.6</td>
<td>37.5</td>
<td>38</td>
<td>38.3</td>
<td>55.6</td>
<td>44.4</td>
</tr>
</tbody>
</table>

Legislative barriers for R&D in HEIs became crucial by the end of the 1990s. Budgetary, tax and property legislation imposed considerable limitations. First of all, universities, as well as research institutions were regarded as budgetary-funded entities with very strict cuts in budgetary funding. In fact state budget funds allocated to universities are almost entirely dedicated to educational purposes and very little is used for scientific research (in 2007, they constituted 0.2% of R&D costs). Secondly, there were strict legal limits concerning educational activities for non-educational institutions: reallocation of budgetary funding in many cases was impossible. A research institution was not authorised to reallocate budgetary funds for education activities and HEIs could not use their budgetary funding for R&D activities. The same problem concerned the use of assets. Furthermore, the legislation did not foresee the integration of education and R&D. But it did not prohibit the creation of any forms of integration.

Despite the serious problems of university science in Russia, facts and figures show that the Russian HEI sector has considerable potential for R&D and innovation. In early 2000s, one third of principally new technologies were created by higher education institutions, although R&D expenditure in the HEI sector did not reach 5% of total GERD (Table 10).

Table 10 Comparison of the RAS’ and Russian HEIs’ R&D performance (2005)\textsuperscript{106}

<table>
<thead>
<tr>
<th></th>
<th>R&amp;D funding, %</th>
<th>Non-budgetary R&amp;D funding per 1 Rouble of budgetary R&amp;D funding, RUB.</th>
<th>New technologies created, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>100</td>
<td>0.98</td>
<td>100</td>
</tr>
<tr>
<td>Higher education institutions</td>
<td>4.3</td>
<td>0.99</td>
<td>32.1</td>
</tr>
<tr>
<td>Russian Academy of Sciences</td>
<td>11.1</td>
<td>0.31</td>
<td>8.9</td>
</tr>
</tbody>
</table>

The new Federal law on science and education integration (2007) was initiated with the aim to serve as a powerful tool for boosting S&T and innovation activities in HEIs and establishing close links between HEIs and research institutions. The law legalizes existing forms of integration and provides a scope of efficient regulations. These regulations should help to avoid serious barriers such as funding restrictions and assets reallocation, combining different education and R&D activities, etc. The main problem was to achieve a compromise between the Government, the HEIs sector and the research institutions sector. As a result, the contemporary version of the law does not satisfy any of these. It makes it possible to solve

\textsuperscript{106} S&T Science Indicators, 2009, Data book. Moscow, University – Higher School of Economics.
some obvious integration problems. But further revisions of the law should make integration not only possible, but also efficient.

2.5.2 Innovative Universities programme

Another important direction of the integration policy is support of the best “innovative HEIs”. The initiative was rolled out in 2006, when 57 of the best 300 universities participating in the national priority project “Education” were chosen to receive state support. One part of the priority project is called “Support Measures for the Education Institution Implementing Innovative Education Programmes” and is devoted to the distribution of competitive grants for the development of innovation (including human resources development, unique R&D and innovation projects, innovation infrastructure development etc.)\(^{107}\). The average annual R&D expenditure of grant-winners was RUB 123300 for all R&D and teaching staff (or about € 3600). But the difference between minimum and maximum (RUB 1 100 and RUB 586 600 respectively, or about €32 and €17200 respectively) was very high. It means that only some winners could really develop a large-scale innovation activity.

At the moment, Russia has about 1200 HEIs (half of which are privately established since 1994). This number should be drastically reduced after the initiated reforms. An important reason for this is the expected decrease of HEI students due to demographic decline. According to Minister Fursenko, instead of the current 7.5 million students, the total number of HEI students may only amount to 4.5 - 5.5 million in coming years\(^{108}\).

2.5.3 National Research Universities

National research universities were created in 2008 under the governmental instruction “Realization of a pilot project on the creation of National research universities”. The programme serves to enhance research capacities at universities. It will attract more international students and professors, as well as more local PhD students.

The RF Government constitutes National Research Universities on a competitive basis for a period of 10 years. The main idea of the National Research Universities is the creation of a system for the training and retraining of specialists in the high-technology sectors of the Russian economy. National Research Universities will be able to increase the level of fundamental and applied science education. Their establishment will promote competitiveness between universities as the status is assigned on a competitive basis.

Two pilot National Research Universities were already nominated by a Presidential Decree dated 7 October 2008\(^{109}\): the Moscow Institute of Steel and Alloys State Technological University created on the basis of the Moscow Institute of Steel and Alloys (“MISIS”), and the Moscow Engineering and Physical Institute, created on the basis of the Moscow Institute for Physics and Engineering (“MIFI”). In October 2009, the Ministry finalized the competition of Russian universities which would be awarded the status of “National Research University” and obtain state funding for the implementation of their innovation-based development programmes. 12 universities were selected\(^{110}\). An amount of up to RUB 1.8 billion (approximately €40 million) will be dedicated to each of the 12 National

---

\(^{106}\) Estimations of HSE Institute for Statistical Studies and Economy of Knowledge, Rospatent data.


\(^{108}\) Quarterly Report of the EU Delegation to Russia, Moscow, January- March 2010


Research Universities for the years 2009-2013\textsuperscript{111}. All the selected universities will have to ensure 20 to 25% of the funding from their own sources.

Under the 2010 call, fifteen new National Research Universities have been selected, out of 128 applicants. The list of National Research Universities as of April 2010 is the following:

- Moscow Institute of Steel and Alloys State Technological University (MISIS)
- Moscow Engineering and Physical Institute (MIFI)
- State University- High School of Economics
- Kazan State Technical University n.a. A.N. Tupolev
- Moscow Institute of Aeronautics, State Technical University
- N.E. Bauman State Technical University, Moscow
- Physical-Technical Institute State University, Moscow
- N.I. Lobatchevski State University, Nizhnyi-Novgorod
- Novossibirsk State University
- Perm State Technical University
- S.P. Korolev StateAero-Cosmics University, Samara
- G.V. Plekhanov State Technical University, St-Petersburg
- Information technologies, Mecanics and Optics State University, St-Petersburg
- Tomsk Polytechnic University
- Belgorod State University
- Irkutsk State Technical University
- Kazan State Technological University
- Mordovia State University, Saransk
- Moscow Institute of Electronic Technology
- Moscow State University of Civil Engineering
- Moscow Power Engineering Institute
- Perm State University
- Russian State Medical University, Moscow
- Gubkin Russian State University of Oil and Gas, Moscow
- Saint-Petersburg State Polytechnical University
- Saratov State University
- Tomsk State University
- Saint-Petersburg Academic University – Nanotechnology Scientific Center RAS
- South Ural State University, Chelyabinsk

It is worth noting that the majority of them are technical or thematic institutions. Although they are not on the list, it will be kept in mind that the two leading state universities of Moscow (Lomonosov) and St-Petersburg have a special status.

\subsection*{2.5.4 Federal Universities}

The first federal universities were founded within the framework of the national “Education” project in 2007, under a decision of the Russian government. They are approved by the Russian President, and the government designates the universities’ rectors for a period of 5 years; in return funding is controlled by officials on different levels. The aim of creating federal universities is to develop a system of higher professional education, which will optimize regional educational structures and strengthen connections between higher education

\textsuperscript{111} \url{http://mon.gov.ru/pro/niu/6072/}
institutions and federal districts’ economical and social sectors. The ambition is to upgrade the performance of universities in order to allow them to rank among the top 100 universities worldwide by 2015-2020. Such ambitions are obviously quite high, though not yet realistic as advancement of the project is rather slow and cumbersome.

Federal universities receive public funding by means of subsidies, which are higher than what other state universities get. Each of them will receive not less than 400 million RUB (€1.05 million) per year. These funds will ensure that federal universities have top IT infrastructure and qualified staff available. One of the objectives is to prepare specialists for large innovative projects and scientists for the development of emerging technologies. Business and regional authorities also contribute to the funding of federal universities.

By 2010 the list of Federal universities is the following:

- Siberian Federal University in Krasnoyarsk
- Southern Federal University in Rostov
- North Federal University in Arkhangelsk
- North-East Federal University in Iakoutsk
- Volga Federal University in Kazan
- Ural Federal University in Ekaterinburg
- Far Eastern Federal University in Vladivostok

Two additional federal universities are to be created in the coming years, in Kaliningrad and the North Caucasus.

Federal universities are focused on a particular region, while national research universities train highly-qualified specialists for different sectors nationwide. National research universities are characterized by a high percentage of university funds earmarked for research and science, effective systems for the commercialisation of scientific research and development activities, and their affiliation with innovation companies.

2.5.5 The Bologna Process

The Russian higher education framework was basically incompatible with the Bologna process: the "lowest" generic degree in all universities since the Soviet era is the Specialist degree, which can be obtained after completing 5-6 years of studies. Since the mid-90s, many universities have introduced limited educational programmes allowing students to graduate with a Bachelor's degree (4 years) and then earn a Master's degree (another 1-2 years) while preserving the old 5-6 year scheme. In October 2007, Russia moved to two-tier education in line with the Bologna process model. The universities inserted a Bachelor’s diploma in their standard specialist programmes; however, the transition to a real Master’s qualification has not been completed yet.

It is worth mentioning that even though Specialists as well as Masters are eligible for post-graduate courses (Aspirantura), bachelors are not. The Specialist degree is now being ended, so new students do not have this option any more. At the same time, while specialist education was free, the Masters part of the six-year programme is not; students graduating in 2009–2010 will have to pay for what was free to their predecessors. The labor market regards BSc diplomas as inferior to "classic" education, thus the Masters stage remains mandatory for most graduates.

---

112 Quarterly Report of the EU Delegation to Russia, Moscow, January- March 2010
The transition to the Bologna Process is in conflict with an article of the Russian Constitution that guarantees a free higher education for every citizen of the Russian Federation. The Master's degree is not free and must be paid for, which is seen as a violation of the Russian Constitution. Some Russian students and professors are afraid that this process might result in ill-prepared bachelors, trying to get a job. At the same time, Russia might lose its educational tradition, which in the past allowed the country to train a wide scope of specialists and brilliant scientists.

The reason why the Bologna process was accepted in Russia is that it became more and more obvious that national higher education systems cannot develop without global processes and tendencies, without meeting the demands of the world’s labour market. For Russia it is an important step towards enhanced cooperation in Higher Education and S&T with European partners. Joint educational standards and similar higher education systems will facilitate important exchanges of students and subsequently of scientific staff.

### 2.6 Organisation of public and private sector

Domination of government-owned budget-funded institutions in the Russian S&T sector remains the main distinction from the science systems of EU Member States and other major industrial countries; it is also one of the major challenges in terms of future restructuring of the Russian science system on the way of making it competitive at the international level. In 2006, 55% of Gross Domestic Expenditure on Research and Development (GERD) in the EU – 27 (average for the 27 EU Member States) was financed by the industry and 34.2% by the governments; for Russia the proportion was opposite – only 29.4% of the GERD was financed by the industry and 62.6% by the Government. As shown in Table 11, in 2007 about one quarter (28.7 %) of Russian S&T organisations were not state-owned (i.e. commercial, non-profit, foreign and mixed)\(^{113}\); this ratio has remained stable since the mid-1990s.

<table>
<thead>
<tr>
<th>Property form/year</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td>73.2</td>
<td>71.3</td>
</tr>
<tr>
<td>Private</td>
<td>13.9</td>
<td>16.1</td>
</tr>
<tr>
<td>Mixed</td>
<td>10.3</td>
<td>9.7</td>
</tr>
<tr>
<td>Foreign and joint</td>
<td>1.4</td>
<td>1.6</td>
</tr>
<tr>
<td>Other</td>
<td>1.1</td>
<td>1.3</td>
</tr>
</tbody>
</table>

It should be noted however that business has growing needs in research and development, as equipment and currently used technologies become obsolete. Evidence of this fact is, for instance, the interest of companies in one of the sections of the federal target programme “Research and development on priority fields of the scientific and

\(^{113}\) Though many R&D institutions de-facto belonging to the state-sector are formally placed by statistic services at the business sector. S&T Indicators: 2009. Statistical Databook. University – Higher School of Economics. 2009.

\(^{114}\) Science indicators (2009) Data book, Moscow State University – Higher School of Economics.
technological complex of Russia (2007-2012)". In the framework of this programme, business enterprises may suggest their own directions for research (research tasks) which can later obtain co-funding from the budgetary sources. One of the conditions, under which co-funding can be obtained is that companies should cover 50% of the respective project costs in case they carry out applied research, and 70% of the respective project costs in the case of commercialisation of related projects. In 2007, such a tender attracted about 400 applications from companies, which was significantly above the capacity of the Federal Agency for Science and Innovation (FASI)\(^{115}\) to co-finance projects. This development shows that companies have both a need for R&I and the resources to co-finance projects.

However, on the whole, Russia is lacking large science-intensive companies on the one hand, and small innovative enterprises on the other hand. The number of small innovative companies is diminishing. The major problems that small companies face in their development are: insufficient financing for seed and start-up stages; lack of innovative infrastructure; lack of intermediaries such as consulting services; high taxes and bureaucratic accounting procedures that increase small firms’ expenditures; difficulties in the creation of small companies as spin-offs of universities and R&D institutes. At present, government R&D organisations can be co-founders of private enterprises but they cannot possess shares, nor can they possess intellectual property in these new enterprises.

### 2.6.1 Public S&T sector

For the majority of state-owned S&T institutions in Russia, the core funding is low and the very survival of institutes or even of entire branches of scientific disciplines as well as the commercial success and financial position of institutes depend on how successful they are in mobilising additional financing and in commercialising their R&D\(^{116}\). At the same time, rights of and incentives for state-owned R&D institutions in conducting economic operations and raising additional funds are limited; as most of the organisations remain too rigid and bureaucratic.

To respond to the identified need in setting up new, more flexible forms of S&T organisation, the Government of the Russian Federation has adopted a federal law “On Autonomous Institutions” (Law #174, 2006) which made it possible to establish new types of government institutions - ‘autonomous institutions’. The new structures would receive funding from various sources, including the government; they will have a certain autonomy and independence in attracting and spending funds from non-government sources, including credits and investments. At the same time, the autonomous organisations would remain government-owned entities.

The implementation of the Law #174 required the adoption of a number of regulatory and legislative acts at federal and regional levels. During the first years, the Law was implemented slowly and unevenly across Russia. In early 2007, the Labour Union of People’s Education and Science of the RF expressed its concern about associated social risks, meaning the absence of guaranteed state funding to newly-established autonomous institutions. On the other hand, some representatives of government-owned foundations said that the possible change of their organisations’ status into “autonomous institutions” would weaken both their authority and connection with the higher echelon of the government which is necessary when a financial issue needs to be resolved. It is therefore early to determine the impact of the adopted legal act in the longer term. As of 2010 there were 2 S&T institutions in Russia which changed their status into autonomous institutions.

---

\(^{115}\) See chapter 3 Main actors implementing S&T policy and performing R&D

• Academies\footnote{See for details section 3.5.1 Academic sector}

Historically the academic sector has played a significant role in the institutional structure of Russia’s S&T. It is quite large as it incorporates nearly 850 R&D institutions. RAS includes 9 sectoral and 3 regional departments, as well as 14 scientific centres at the regional level, and more than 400 leading research organisations throughout Russia. In 2006, its R&D personnel comprised about 144000 people or about 18% of total R&D personnel in Russia\footnote{European Commission, Inno-Policy TrendChart – Policy Trends and Appraisal Report Russia, 2007, p. 2}.

The most unusual feature of the academic sector is its "mixed" legal status, combining the characteristics of a government institution, public association and some other forms (e.g. corporation or alliance). Academies sometimes act as holdings, "owning" non-profit organisations and research institutes. They can manage and control institutions, create and close them. This "mix" of various organisational, legal and administrative forms has no precedent in other countries. An issue under discussion in Russia is the imbalance between the performance and economic results of the R&D carried out by academies and the amount of their public funding.

Given the rapidly-changing context of conducting R&D in Russia and internationally, there is a need to reform the academic sector - the research output of the academic sector is lower than in other sectors\footnote{Science – Research – Education in the Russian Federation – An Overview. Extended and updated edition 2007. Compiled by German Research Foundation (DFG), Helmholtz Association, and German Embassy in Moscow Science Unit, pp 35 - 36.} and the average age of scientists is much higher; i.e., there is too little renewal of R&D personnel in the academic sector. However, as the academy has its institutional structures with long term traditions (which are difficult to change overnight), extensive human and financial resources as well as infrastructure, it is very hard to implement radical reforms due to the high inertia of the academic sector.

• Higher education

The higher education sector currently includes about 500 R&D institutions, among which 400 universities.\footnote{Education in the Russian Federation, 2007. Data book. Moscow, University – Higher School of Economics. S&T Science Indicators, 2009, Data book. Moscow, University – Higher School of Economics} There is a drastic difference in the quality and level of Russian universities: there is a handful of top universities offering high-quality education and often also conducting research that is recognised internationally. But there is another very large group of mostly regional universities working on their local “markets”, which have weak infrastructure and offer much lower quality education. They are usually rather weak also in developing international cooperation. New programmes for strengthening the universities have been developed to address the issues of bridging the gap between education and research and upgrading universities’ capacities.\footnote{See for details the previous chapter 2.5 Distribution between education and research.}

2.6.2 Business S&T Sector

The Business and Enterprise sector performs 64% of GERD in Russia, which is similar to OECD countries\footnote{OECD. Main Science and Technology Indicators (MSTI), 2008-2}. But in the Russian Federation, the business sector includes all organisations and enterprises whose main activity is connected with the production of goods and services for sale, including those owned by the State, and private non-profit institutions serving the above-mentioned organisations. In practice however, R&D performed in this sector is carried out mostly by industrial research institutes other than enterprises. This
particularity reflects the traditional organisation of Russian R&D.\textsuperscript{123} The private non-profit R&D sector is still very small in Russia and includes a few research institutes (see Table 4).

An analysis of the distribution of gross domestic expenditure on R&D by source of funds shows that expenditure incurred by the business enterprise sector fluctuated around 30\% during the last decade with 33.6\% in 1995 and 29.4\% in 2007. The growth of Russia’s GDP from USD 996.4 billion (Purchase Power Parity) in 1996 to USD 1697.5 billion in 2005\textsuperscript{124} should be taken into account.

In recent years, huge \textbf{State corporations} have been created\textsuperscript{125}, with the aim of consolidating major Russian R&D intensive industry sectors. Research institutes and companies have been merged into these new corporations. This consolidation process concerns for example:

- \textbf{Rosatom}, the Russian State Nuclear Energy Corporation. Rosatom was created in 2007 on the basis of the former Federal Agency for Nuclear Energy (also named Rosatom) and now includes uranium production, power plant construction, energy production, nuclear weapons companies, research institutes, and nuclear and radiation safety agencies.

- \textbf{United Aircraft Corporation} was established in 2007. It includes civil and military aircraft production companies, such as Sukhoy and Tupolev, and related R&D institutions.

- \textbf{Russian Technologies} (Rostechnologii) includes the above-mentioned AvtoVAZ for the automobile industry and is an important player in the military-industrial sector.

\textbf{Private companies}

Private business does not show much interest in innovation. Since 2000, the innovation has only made up 9-10\% of their activity. A particular feature of R&D business is that almost all industrial corporations have their own R&D units or research institutes. Usually, R&D units in large corporations are funded by the corporations’ own funds. In contrast, small innovation enterprises cannot afford to have their own R&D units. Support to SMEs is provided by the Government though a variety of means, including the public Foundation for Assistance to Small Innovative Enterprises (FASIE)\textsuperscript{126}. Other institutions, instruments and programmes created by the Government, destined to support business R&D are:

- The Russian Development Bank
- START programme
- The Investment Fund of the Russian Federation
- Russian Investment Fund for Information and Communication Technologies
- The Russian Venture Company
- The state programme “Establishment of High Technology Technoparks in the Russian Federation”
- Special Economic Zones (SEZ)
- Mega-projects (large-scale projects of national importance, etc.

The number of staff employed by private research institutions’ is increasing (+17\% since 2000). It should be noted that the best-performing segments of Russian economy are

\textsuperscript{123} OECD. Main Science and Technology Indicators (MSTI), 2008-2
\textsuperscript{124} Data of the Russian Federal Service of State Statistics \url{http://www.gks.ru}
\textsuperscript{125} See for details chapter 3.4
\textsuperscript{126} See description of FASIE in section 3.3.1.
fuel and energy companies. Many of these, having completed privatization and consolidation processes, started improving the efficiency of their internal management structure, with the creation of R&D units.

As a result, in 2002 oil products manufacturing companies became the most innovative companies (oil industry’s indicator exceeded 33%), while the average indicator for all industries only reached 9.8%. The chemical industry (26% of innovative enterprises), closely linked with oil and gas extraction, came in second position.

The international study “The Research and Development Scoreboard” features the 1250 largest world companies. In 2006 the share of the companies included in the study on the basis of their production volume, amounted to 13.3% of the world GDP. Only one Russian company, “Gazprom” (de facto, a state-owned company) was included in the ranking (compared to 509 companies from the USA, 7 from China). Gazprom’s dynamism was demonstrated in the ranking: 172th place in 2006 compared to 583rd place in 2002.

**SMEs**

The number of small innovative enterprises in the developing SME sector is relatively low – estimated at 25000 – and it is decreasing every year. This is mostly due to the readjustment of the counting system, as well as to the quick growth and merging of some companies, on one hand, and the strong competition and lack of sufficient state support, on the other hand. SMEs mostly concentrate on medicine and pharmaceuticals, machinery and equipment, as well as new materials.

The share of small enterprises performing technological innovations from 1999 to 2005 did not exceed 1.6%; in 2007 it raised to 4.3% (See Table 12). Even for the implementation of small innovation projects, not to mention large-scale innovations, small enterprises lack the necessary financial resources, S&T capacities, qualified researchers, time resources, required to master the new technological processes and return on expenditures.

**Table 12: Innovation activity of small enterprises – manufacturing**

<table>
<thead>
<tr>
<th></th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of small enterprises, implementing technological innovations, units</td>
<td>729</td>
<td>…</td>
<td>779</td>
<td>…</td>
<td>919</td>
<td>…</td>
<td>996</td>
</tr>
<tr>
<td>Increase in the number of small enterprises implementing technical innovations, units per years</td>
<td>56</td>
<td>25</td>
<td>25</td>
<td>58</td>
<td>82</td>
<td>38</td>
<td>39</td>
</tr>
<tr>
<td>Level of innovation activity of small enterprises, %</td>
<td>1.5</td>
<td>…</td>
<td>1.6</td>
<td>…</td>
<td>1.6</td>
<td>…</td>
<td>4.3</td>
</tr>
<tr>
<td>Share of innovation goods, works, services in the total volume of shipped goods, completed works and services, of small enterprises, %</td>
<td>0.6</td>
<td>…</td>
<td>0.3</td>
<td>…</td>
<td>0.3</td>
<td>…</td>
<td>2.0</td>
</tr>
</tbody>
</table>

As a rule small enterprises require comprehensive (financial, intellectual, information) support from the state, large companies, or external investors. In Russia, large and medium enterprises are reluctant to implement their own innovations, and consequently support the innovative activity of small enterprises. The statistical leap in small enterprises’ innovation activity in 2007 was probably linked with the surveys’ changing scope of enterprise
categories. The same reasons lie behind the discrepancy in the S&T and Innovation Strategy indicators, showing an increase of small enterprises, which in 2007 reached only 39 units. Attracting additional resources from SMEs towards the innovation sector obviously requires additional governmental efforts.

SMEs are still not in a position to drive innovation as they do in most EU countries. The situation is to a great extent defined by the insufficient development of small businesses in the Russian economy. Large enterprises in Russia tend to have a more stable financial position and diversified source of revenues. They have the financial means of innovating and they account for the majority of innovation activities currently implemented in the Russian economy. Not surprisingly, more than two-thirds of innovation expenditures are concentrated in two sectors: chemicals and chemical products, and machinery and equipment. In Russia today, large firms rather than SMEs dominate these sectors.127

2.7 Effects and Efficiency of reforms in the S&T sector

2.7.1 Effects of S&T reforms on the economy

Efficiency of reforms in the S&T sector may be assessed through a comprehensive set of target indicators (performance scoreboard). These indicators may characterize the overall effect of innovations on the economy or performance of S&T actors: R&D units and researchers.

Economy-wide, the effect of innovation activity is hardly noticeable. In 2007, the overall level of innovation activity accounted for 10% of organisations (all property forms). At the same time, bigger firms tend to have greater innovation activities with proportions raising from 2.1% for firms with less than 50 employees, to 72.6%, for firms with 10000 employees and over. The share of expenditure for technological innovations in the total volume of produced and dispatched goods and delivered services in Russia is only 1.28% versus 3.47% in Sweden and 0.94% in Spain.

In Russia the share of innovative products and services, which are new to the market constitute 0.4% (2007) of the total volume of produced and dispatched goods and delivered services. A comparison may be drawn with EU countries; in Finland the share is 10.8% and in Great Britain 3.7%.128

Compared to the growing share of the Gross Domestic Expenditure in R&D during the past years129, Russia’s income from technology exports is very modest: it amounted to USD 630.4 mln, while Austria boasts some USD 6.1 billion and the USA an impressive USD 75.4 billion. Similarly Russia’s share in world high tech exports is low: only 0.28%, compared to 3.85% in South Korea and 5.44% in Hong Kong. The innovation activity in Russian industry is rather limited, as Russian companies have no incentive to innovate, making sufficient profits due to protectionist policies and low domestic energy prices. Therefore, commercialisation of inventions and support to science-business partnerships, including those at international level, were defined as a priority by top Russian policy-makers.

2.7.2 S&T and innovation reform strategies

One of the weak spots of the Russian innovation policy is monitoring and evaluation. The analysis of initiated and implemented reforms may become the basis for the evaluation of S&T activities and the introduction of necessary changes to the action plan for the innovation system as a whole. Table 13 below contains key target indicators of S&T and innovation spheres, taken from the strategic documents defining state policy in these spheres. Several strategy documents and respective target indicators have been formulated, which underpin the willingness of policy makers to take on some reforms. But the reality shows a mixed picture, especially as the reform’s effects on an innovative and more diversified economy are still rather limited.

2.7.3 S&T reform trends

Nearly 20 years have passed since the break up of the Soviet Union, which marked a period of turmoil for the Russian S&T sector. During this period the Russian Gross Domestic Expenditure on R&D (GERD) declined from 2% of GDP in 1990 to 1.12% in 2007 (see Tables 14 and 15). This indicator now remains slightly above 1% of GDP. Thanks to strong economic growth, financial inflows into R&D have increased substantially. R&D personnel per 10000 employees has been halved since 1990, but has stabilised and recently (in 2007) shown resumed growth.

Table 13: Target Indicators of S&T and Innovation Sphere Development

<table>
<thead>
<tr>
<th>Documents</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategy for the Development of Science and Innovation in the RF for the Period till 2015 (Passport of the Strategy)</td>
<td>– Share of internal R&amp;D costs in GDP (%); &lt;br&gt;– Share of extra budgetary costs in the internal R&amp;D costs (%); &lt;br&gt;– Share of researchers under 39 years old in the total share of researchers (%); &lt;br&gt;– Coefficient of inventive activity; &lt;br&gt;– Share of intangible assets in the total amount of assets of organisations in the R&amp;D sector (%); &lt;br&gt;– Increase in the number of small innovation enterprises (units per year); &lt;br&gt;– Increase of jobs in high-tech SMEs (% per year); &lt;br&gt;– Share of enterprises which perform technological innovations, in the total number of enterprises (%); &lt;br&gt;– Volume of own R&amp;D costs of Russian enterprises (% per year); &lt;br&gt;– Share of innovative products in the total volume of industrial products’ sales (%); &lt;br&gt;– Share of innovative products in the industrial products’ exports (%).</td>
</tr>
<tr>
<td>Concept of long-term social and economic development of the Russian Federation Advancement of national</td>
<td>– Share of enterprises, performing technological innovations(%); &lt;br&gt;– Russian share of high-tech goods and services on the world</td>
</tr>
</tbody>
</table>


Draft Concept of Long-term Social-Economic Development of the Russian Federation with Annex “Key Foresight Parameters for Social-Economic Forecast of the RF for the Period till the years 2020-2030” (Table composed by HSE)
Patenting activity has been increasing more or less steadily after strong declines in the early 1990s. The technology balance of payments shows an increasing negative tendency, which confirms the weakness of the Russian innovation sector, but also a stronger economy overall, which allows for technology imports. As a result of restructurings, the number of R&D institutions in Russia decreased to 3957 in 2007.

Table 14: Key development indicators of S&T in Russia before 1999 (1990-1999)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Advancement of the national innovation system and technologies</td>
<td>Development of human potential</td>
<td>Education development</td>
<td>market (%);</td>
<td>– Share of Russian high-tech goods in the total world exports volume of high-tech goods (%);</td>
<td>– Gross added value of innovation sector in GDP (%);</td>
<td>– Share of innovation products in the total volume of industrial production (%);</td>
<td>– Internal R&amp;D costs in GDP (%),</td>
<td>– Private sector share in the total volume of internal R&amp;D costs (%);</td>
<td>– Share of costs for scientific research, performed at universities, in the total share of costs, directed towards scientific research (%).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Key parameters of Russia’s social-economic development forecast till 2020-2030, Annex to the Concept of the long-term social-economic development of the Russian Federation Development of science, technologies and innovation Economic parameters of R&amp;D sector’s development</td>
<td>– Share of costs for R&amp;D in GDP (%);</td>
<td>– Share of government’s R&amp;D costs in the total volume of internal R&amp;D costs (%);</td>
<td>– Share of private R&amp;D costs in the total volume of R&amp;D costs (%);</td>
<td>Share of labor costs in the total volume of internal R&amp;D costs (%);</td>
<td>– Average monthly wage (thousand of RUB);</td>
<td>– Growth ratio of wages in S&amp;T sector (times);</td>
<td>– Ratio of average wage in S&amp;T sector and in overall economy (times)</td>
<td>– No. of persons employed in the S&amp;T sector (thousands of persons)</td>
<td>– No. of researchers (thousands of persons);</td>
<td>– Capital-labor ratio (thousands of USD/person);</td>
<td>– Capital investments in R&amp;D as a proportion to the total volume of investments in basic capital (%);</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gross Domestic Expenditure on R&amp;D (GERD) at constant 1989 prices (billion RUB)</th>
<th>10.9</th>
<th>7.3</th>
<th>3.2</th>
<th>3.1</th>
<th>2.9</th>
<th>2.5</th>
<th>2.7</th>
<th>3.0</th>
<th>2.6</th>
<th>2.9</th>
</tr>
</thead>
<tbody>
<tr>
<td>GERD as a % of GDP</td>
<td>2.0</td>
<td>1.4</td>
<td>0.7</td>
<td>0.8</td>
<td>0.8</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Federal Budget Appropriations (FBA) on civil S&amp;T at constant 1991 prices (million RUB)</td>
<td>25.8*</td>
<td>11.2*</td>
<td>9.9*</td>
<td>6.3*</td>
<td>5.03*</td>
<td>4.3*</td>
<td>6.02*</td>
<td>1.8</td>
<td>1.9</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Domestic Expenditure on R&amp;D (GERD) at constant 1989 prices (billion RUB)</td>
<td>3.3</td>
<td>3.9</td>
<td>4.3</td>
<td>4.8</td>
<td>4.6</td>
<td>4.6</td>
<td>4.9</td>
<td>5.6</td>
</tr>
<tr>
<td>GERD as a % of GDP</td>
<td>1.05</td>
<td>1.18</td>
<td>1.25</td>
<td>1.28</td>
<td>1.15</td>
<td>1.07</td>
<td>1.08</td>
<td>1.12</td>
</tr>
<tr>
<td>Federal Budget Appropriations (FBA) on civil S&amp;T at constant 1991 prices (million RUB)</td>
<td>2.0</td>
<td>2.35</td>
<td>2.65</td>
<td>3.22</td>
<td>3.06</td>
<td>4.16</td>
<td>4.54</td>
<td>5.5</td>
</tr>
<tr>
<td>FBA on civil S&amp;T as a % of GDP</td>
<td>0.23</td>
<td>0.26</td>
<td>0.28</td>
<td>0.31</td>
<td>0.28</td>
<td>0.36</td>
<td>0.36</td>
<td>0.4</td>
</tr>
<tr>
<td>R&amp;D personnel per 10 000 employed</td>
<td>138</td>
<td>136</td>
<td>133</td>
<td>130</td>
<td>126</td>
<td>122</td>
<td>122</td>
<td>135</td>
</tr>
<tr>
<td>Patent applications with the indication of Russia in Russia (thousand)</td>
<td>28.7</td>
<td>30.0</td>
<td>29.2</td>
<td>30.7</td>
<td>30.2</td>
<td>32.3</td>
<td>37.7</td>
<td>39.4</td>
</tr>
<tr>
<td>Patents granted (thousand)</td>
<td>17.6</td>
<td>16.3</td>
<td>18.1</td>
<td>24.7</td>
<td>23.2</td>
<td>23.4</td>
<td>23.3</td>
<td>23.0</td>
</tr>
<tr>
<td>Technology balance of payments (million USD)</td>
<td>20.6</td>
<td>-</td>
<td>153.8</td>
<td>361.0</td>
<td>428.7</td>
<td>439.0</td>
<td>564.8</td>
<td>595.0</td>
</tr>
<tr>
<td>R&amp;D institutions</td>
<td>4099</td>
<td>4037</td>
<td>3906</td>
<td>3797</td>
<td>3656</td>
<td>3566</td>
<td>3622</td>
<td>3957</td>
</tr>
<tr>
<td>among them: industrial enterprises</td>
<td>33</td>
<td>31</td>
<td>34</td>
<td>28</td>
<td>31</td>
<td>30</td>
<td>49</td>
<td>–</td>
</tr>
</tbody>
</table>

* Total Federal Budget Appropriations on S&T at constant 1991 prices (million roubles) as a % of GDP.

---

Table 16: The impact of the State in S&T sector in Russia\textsuperscript{134}

| Funding | FBA on civil R&D – 2.25% of federal budget expenditures (2007)  
|         | FBA on civil R&D – 0.37% of GDP (2006)  
|         | Government contribution as source of R&D funding - 61.9%  
| Organisations | 73% of R&D organisations are owned and established by federal and regional governments  
|         | GERD by ownership of R&D institutions (public ownership) – 74.5%  
| Human resources | 78% of R&D personnel work in government organisations (federal and regional)  
| Fixed assets | 86% of R&D fixed assets are public.  

Table 17: R&D Expenditure: International Comparison\textsuperscript{135}

| Positive trends |  
| Increase of GERD | 1998-2007 – more than 20 times  
| | at constant prices – more than 2 times  
| Negative trends |  
| **GERD as a percentage of GDP** | Russia – 1.07% (2006), 1.12 (2007)  
| | Israel – 4.65%;  
| | Japan – 3.39%;  
| | USA – 2.62%; China – 1.42%  
| | 15 times lower than in USA;  
| | 6 – than in Japan;  
| | 3/6 – than in China;  
| | 1.5 – than in Britain  
| **Government budget appropriations on R&D (PPP)** | Russia* – 12 billion $ (2006)  
| | 2-2.5 times lower than in France, Germany, Britain;  
| | 3.5 – than in Japan;  
| | 14 – than in USA  

* Russia – civil R&D.

The current S&T development in Russia is still affected by rather conflicting trends (Table 16). On the one hand, the government R&D funding is increasing (FBA on civilian R&D in 2004-2007 grew by 54% in real prices). About 39% of government funds are allocated to support basic research. Financial support of R&D through contracts, programmes and tenders has also grown. The number of researchers has stabilised (375 000, 49% of R&D

\textsuperscript{134} Calculated by the Institute for Statistical Studies and Economics of Knowledge

\textsuperscript{135} Science Indicators, 2009
The number of staff employed by private research institutions is increasing (+17% since 2000). However, the level of government support still lags behind the world's economic leaders (Table 17). But the most crucial deficiency to be tackled is investment of the private business sector into R&D, which is in international comparison very low.

On the other hand, the stagnation in the S&T sector is evident. It stems from both insufficient demand for and underdeveloped supply of R&D and technologies. Private businesses do not show much interest in innovation. Since 2000, innovation activities have remained at 9-10%. EU economies indicators are significantly higher. By the end of 2008, investment in innovation was considered by private businesses to be more risky and less profitable than investment in mining and quarrying activities. Demand for R&D came mostly from the government, and the federal budget remained the key source of R&D funding (in 1998-2007 it grew 3-fold in real prices).

Despite the high rate of economic growth achieved before the global crisis that started in 2008, Russia could not compete with the world leaders (Table 18). Comparatively low levels of indicators such as R&D expenditure calculated as share of GDP, scientists' publication activity, innovation activities of enterprises, etc. remained almost constant throughout the period of market reforms, including the years of economic growth. For many reasons (very often external to R&D, innovation and even production spheres), companies still are not really interested in the intellectual component of the innovation process. Within the structure of technological expenditures, the main efforts are made on the acquisition of machinery and equipment (in most cases imported from abroad). Successful R&D organisations are forced to collaborate with foreign companies and international organisations. Higher education institutions have (with few exceptions) not yet become important players in the innovation sphere. At the national economy level, the overall effect of R&D and innovation activities is almost invisible. Only high-technology sectors show a certain progress (relatively higher levels of innovation activity and efficiency).

Table 18: S&T and innovation productivity indicators: international comparisons (2007)\textsuperscript{136}

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Russia vs. some other countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share of publication in World Scientific Journals, indexed by the Web of Science (%)</td>
<td>Russia – 2.4, 14\textsuperscript{th} position in the world (1995 – 7, 1980 – 3); China – 9.13, 6\textsuperscript{th} position (1995 – 1.6, 14\textsuperscript{th} position)</td>
</tr>
<tr>
<td>Receipts from technology export (billion USD)</td>
<td>Russia – 0.6, Austria – 2.4, USA – 75.4</td>
</tr>
<tr>
<td>Share in the world hi-tech market (%)</td>
<td>Russia – 0.3 USA - 36, Japan- 30</td>
</tr>
<tr>
<td>Share of enterprises, introducing technological innovations in the total volume of organisation (%)</td>
<td>Russia – 8.5 (9.6 in 2008) EU: from 16.2 in Latvia – to 62.6 in Germany (69,7 in 2008)</td>
</tr>
<tr>
<td>Innovative industrial products, works, services, which are new to the market, as share in the total volume of sales (%), 2006</td>
<td>Russia – 0.5 (0.4 in 2008) Germany – 7.6, Finland – 9.7, France – 6.2</td>
</tr>
</tbody>
</table>

\textsuperscript{136} Science Indicators, 2009
The specificities of S&T and innovation management (including dependence on government support) imply a wide scope of short- and medium-term risks:

- further reduction of entrepreneurs' demand for R&D products; weakening of cooperative interdisciplinary links throughout the whole R&D and innovation cycle;
- limitations affecting the knowledge-generation environment (regarding all kinds of resources and periods of time);
- reduction of the quality of human resources (science, education, high-technology sectors);
- low capabilities of the NIS for international cooperation;
- further downgrading of innovation activities;
- short range and share of non-government funding sources, increasing pressure on the federal budget.

S&T and innovation in Russia, as well as in other developed countries, are based on a rather complex relation between three groups of actors: actors providing knowledge, those controlling and regulating this process, and actors applying the results. Taking into account the above mentioned challenging factors, the primary goals for Government S&T and innovation policies should focus on and enhance the following six components:

1) promotion of technology transfer (protection of intellectual property rights, building innovation infrastructure, organisational innovation, etc.);
2) creating a favourable environment for S&T and innovation activities, and bringing direct support to S&T;
3) development of public–private partnership, incentives for the private sector to co-fund and participate in S&T and innovation projects initiated by the government;
4) promotion of innovation activities and improvement of the innovation climate (support to efficient innovators, creation of a competitive environment, improving legislation);
5) increasing level of professional education, e.g. in the field of innovation management;
6) ensuring the prospects of the long-term sustainable technological development.

The practice of developed countries shows that all efforts to create these as well as other frameworks, and to work out relevant transformation schemes and procedures (including the fundamental reforms of the government S&T sector) appear to be even more efficient than direct budget subsidies to S&T activities. In any case, the effects depend on adequacy of goals, real substance and scales of government initiatives.

The practical measures provided by the Government concerning the reorganisation of national S&T during the last 15 years have not always had a positive effect. They have not resulted in the solid integration of science into the market economy as well as in increasing the impact on the social and economical progress. As a result, many parts of the NIS nowadays still show many features inherited from the centralised economy, while relevant and efficient policies are lacking. Even though policy makers are willing to implement reforms of the S&T sector and certain advances have been made in this direction, a change of situation strongly depends on the success of measures aimed at improving the overall business environment, economic stability, and rule of law.

Some progress has been made in this direction mostly within the policy agenda mentioned above in parts (1) and (2). Some positive shifts exist regarding a more competitive allocation of S&T funding, innovation infrastructure and R&D equipment, within the integration of science and education, the creation of research universities, the introduction of courses for the training of skilled managers for the high-tech sectors (5-th group of the policy
actions). Concerning the other above-mentioned issues, the Russian Government has not shown much interest so far in improving innovation processes. The modest success of S&T and innovation policy (and even its partial collapse) is to a certain extent determined by the lack of coordination between the different elements of such policy, between government bodies dealing with S&T and innovation issues, etc.

In general, specific actions in the areas described in parts (3) – (5) above are planned as part of the CLTD strategy. Their implementation will start in 2009. Implementation of government policies described in the Long-Term Development Concept will ultimately allow dealing with the main systemic problem of the Russian S&T complex – combination of inefficient use of resources allocated to the R&D sector and insufficient demand for innovation by the business sector. This should lead to improvements in quality and supply of domestic R&D products and technologies, as well as to an increased demand by sectors of the economy for technologies and innovations.

### 2.8 Output indicators: number of publications and patents

- **Patents**

In 2007, 39400 patent applications were submitted to the Russian Federal Service for Intellectual Property, Patents and Trademarks (Rospatent). These patent applications include 27500 from Russian applicants and 11900 from foreign applicants. 23000 patents were obtained including 18400 by Russian applicants and 4600 by foreign applicants.

The dynamics of patent applications to Rospatent in 1995-2007 is shown in Figure 5. It is characterized by a noticeable growth of 77.6% (56.7% for Russian applications and 2.6 times for foreign applicants)\(^{137}\). Even if there is an overall increase in the patenting activity of Russian applicants, some ups and downs can be observed. In certain years patent applications declined compared with previous years; this is especially true for the crisis years of 1997 and 1998, where patenting activity of Russian applicants was still lower than in 1995, while foreign applications to Rospatent had increased.

Starting from 2003, the situation significantly changed in favour of foreign applicants\(^{138}\), which in 2007 reached a share of 30% of the overall number of applications submitted in Russia. This indicates that during this period the Russian market and protection of Intellectual Property on this market has gained in importance for exporters to Russia.

The geography of foreign patent applicants is quite vast – 78 countries. The overwhelming majority of patent applications (91%) comes from applicants originating from 30 OECD countries. Nine OECD countries – USA, Germany, Japan, Korea, France, and other – made up the 10 leading countries in 1995 and in 2007. Countries which strengthened their position on the Russian patent market are Japan (129 applications in 1995 and 904 in 2007, 9\(^{th}\) and 3\(^{rd}\) place), Korea (57 and 595 applications, 13\(^{th}\) and 6\(^{th}\) places) and China (2 and 157 applications, 31\(^{st}\) and 13\(^{th}\) place). The share of CIS countries in the total volume of applications submitted by foreign applicants, since 1995 decreased from 16.7 to 10.3%. The greatest activity is shown by Ukraine (621 and 443 patent applications, 3\(^{rd}\) and 8\(^{th}\) place).

---

Figure 5. Patent activity.\(^{139}\)

---


\(^{138}\) Between 2003 and 2007, foreign applicants have been very active, with an annual growth rate of 21.3%. Russian activity has been largely inferior to 2.1% (with a drop between 2003 and 2005 and in 2007, and a raise in 2006).

\(^{139}\) S. Zaichenko, HSE calculations as of 15.01.2009 based on data of the Russian Federal Service of State Statistics.
If we analyze the structure of patent applications submitted in the course of 1998–2007 by the categories of the International Patent Classification\(^{140}\) (see Figure 5), one may conclude that their distribution is almost unchanged. The greatest share is within "Human Necessities", followed by, in decreasing order: "Chemistry; Metallurgy", "Performing Operations; Transporting", "Physics", "Mechanical Engineering, Lighting, Heating, Weapons, Blasting", "Electricity", "Fixed Constructions".

However, Russia accounts for only 0.2% (on average) of all patent applications made by OECD countries abroad. This figure is more than 10 times less than the share of countries such as Germany (2.8%) or the USA (6.2%). In OECD countries, on average, this indicator is equal to 2.3%. Details about Russian organisations’ patent applications are summarised in Table 19 below.

### Table 19: Data of inventory survey of S&T organisations in the Russian Federation for 2007 (patents)

<table>
<thead>
<tr>
<th>Patents</th>
<th>Utility models</th>
<th>Industrial Design</th>
<th>Trademarks</th>
<th>Databases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of applications abroad for obtaining Intellectual Property (IP) protection (no. of units)</td>
<td>196</td>
<td>13</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Number of organisations, which applied abroad for obtaining IP protection (no. of units)</td>
<td>60</td>
<td>6</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Number of IP protection obtained abroad (units)</td>
<td>214</td>
<td>23</td>
<td>2</td>
<td>28</td>
</tr>
<tr>
<td>Number of organisations, which obtained IP protection abroad (units)</td>
<td>63</td>
<td>7</td>
<td>1</td>
<td>10</td>
</tr>
</tbody>
</table>

\(^{140}\) See [http://www.wipo.int/classifications/ipc/en/](http://www.wipo.int/classifications/ipc/en/)
• Publications

Although Russia ranks 6th in the world for its number of researchers (Web of Science, 2007), scientist publications remain rather limited, both in terms of citations (with 1.3% Russia is comparable with Israel) and publications (with 2.4% Russia ranks 14th which is similar to the Netherlands and far behind the USA (30%) and China (9%)). Only 6% of Russian researchers co-authored international scientific articles with foreign scientists (2007)\textsuperscript{141}. Certain international publication indicators are summarized in Table 20 below.

Table 20: Data of inventory survey of S&T organisations in the Russian Federation for 2007 (publications)\textsuperscript{142}

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of scientific monographs published abroad (no. of units)</td>
<td>641</td>
</tr>
<tr>
<td>Number of employees who have scientific monographs published abroad (no. of persons)</td>
<td>7330</td>
</tr>
<tr>
<td>Number of organisations which have scientific monographs published abroad (no. of units)</td>
<td>309</td>
</tr>
<tr>
<td>Number of articles published in reviewed magazines (no. of units)</td>
<td>241070</td>
</tr>
<tr>
<td>Of which in world scientific magazines, classified in the Web of Science database (no. of units)</td>
<td>35417</td>
</tr>
<tr>
<td>Number of employees who have articles published in reviewed magazines (no. of persons)</td>
<td>268133</td>
</tr>
<tr>
<td>Of which in world scientific magazines, classified in the Web of Science database (no. of persons)</td>
<td>52090</td>
</tr>
<tr>
<td>Number of organisations which have articles published in reviewed magazines (no. of units)</td>
<td>2544</td>
</tr>
<tr>
<td>Of which in the world scientific magazines, classified in the Web of Science database (no. of units)</td>
<td>916</td>
</tr>
</tbody>
</table>


3 Main actors implementing S&T policy and performing R&D

In this chapter the main actors implementing Russian S&T policy and performing R&D are described in more details. The S&T policy making bodies have been described in chapter 1 which covers Russian S&T strategy and governance. Foreign organisations, especially from Europe and the USA, which are relevant for funding of S&T in Russia; are presented in chapter 4 on international cooperation.

Actors implementing S&T policy and R&D performing organisations have been gathered into five categories. The first category includes actors at federal level dealing with the implementation of S&T policy. These are in fact governmental bodies (e.g. Federal Agency for Science and Innovation). The second category gives a brief overview of main regional players providing funding for S&T (e.g. Moscow). In the third subchapter, S&T funding organisations are presented. They distribute funding on a competitive basis (e.g. Russian Foundation for Basic Research). The fourth category includes state corporations, which are either S&T funding bodies (e.g. Rusnano) or mainly R&D performing organisations (e.g. Rosatom). The fifth and last category focuses on research performers, including public R&D organisations (e.g. Russian Academy of Sciences), Higher Education Institutions and the business sector.

3.1 Actors implementing S&T policy at federal level

3.1.1 Federal Agency for Science and Innovation (FASI - Rosnauka)

Before its dissolution in March 2010, the Federal Agency for Science and Innovation (FASI) was a federal executive authority enforcing state policy, helping the government, and acting as state-owner in the scientific, research and technology and innovation sectors. FASI main objective was to provide support and assistance to research activities in priority sectors of science and innovation on a competitive basis. A significant percentage of funding provided by FASI was allocated through Federal Targeted Programmes. Funding procedures and budget allocation for each project is regulated by the State (federal) Law number 94 (the latest amendments to this Law were made recently).

FASI carried out 6 main Federal Targeted Programmes, namely (list in the order of priority):

- Federal Targeted Programme R&D in Priority Fields of the S&T Complex of Russia (2007-2012). Total budget planned RUB 194.89 billion (€5.5 million, from which RUB 133.83 billion (€3.8 million) from the federal budget.
- Federal Targeted Programme Development of infrastructure of the nano-industry in the Russian Federation for the years 2008-2010. Total budget planned RUB 27.733 billion (€760 million) from which RUB 24.945 billion (€685 million) from the federal budget.
- Federal Targeted Programme National technological base (2007-2011). Total budget planned RUB 94.485 billion (€2.7 billion), from which RUB 49.549 billion (€1.4 billion) from the federal budget.

143 http://www.fasi.gov.ru/
- Federal Targeted Programme Scientific and Scientific-Pedagogical Human Resources for an Innovative Russia (2009-2013). Total budget planned RUB 90.454 billion (€2 billion) from which RUB 80.39 billion (€1.8 billion) from the federal budget.
- Federal Targeted Programme World Ocean.

Apart from major funding allocated to organisations through Federal Targeted Programmes on a competitive basis via the above-mentioned calls, up to 16% was allocated through other channels which included: direct funding of subordinate research organisations, subsidies to state organisations of particular legal status, international activity, etc.

FASI supported research in five key priority sectors including nanotechnology and new materials, life sciences (including health and biotechnology), energy and energy efficiency, rational use of environmental and national resources, and ICT. Key FTP for priority research is divided into these five thematic sectors in accordance with the R&D stages (initial research, pre-commercial stage of research, R&D with the business community taking charge of the commercial production of results). Certain parts of the FTP are dedicated to the support of scientific conferences, joint research centres, demonstration of S&T excellence within the country and abroad, etc. In 2008, FASI signed 117 R&D contracts for a total amount of RUB 1462.88 million (€123 million). Planned proportions of funding allocated to the five priority sectors are illustrated in figure 6 below.

**Figure 6: Priority S&T sectors for R&D Federal Targeted Programme**
Facts and figures on funding activities for FASI are based upon target indicators specified in each FTP. For example, Table 21 gives the indicators established by the end of 2008, within the main S&T FTP.

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Goal</th>
<th>Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newly added high-tech production value based on developed forefront technologies</td>
<td>Billion of RUB</td>
<td>13-14</td>
</tr>
<tr>
<td>Non-budgetary funding</td>
<td>Billion of RUB</td>
<td>6.5-7.0</td>
</tr>
<tr>
<td>Number of new competitive technologies developed for further commercialisation</td>
<td>Number</td>
<td>16-18</td>
</tr>
<tr>
<td>Added value of high-tech export production</td>
<td>Billion of RUB</td>
<td>3-3.5</td>
</tr>
<tr>
<td>Number of young specialists participating in R&amp;D</td>
<td>Thousands</td>
<td>2-2.5</td>
</tr>
</tbody>
</table>

In order to ensure a coherence of S&T programmes among different budget owners, Cooperative Agreements can be signed for specific tasks. For example, cooperative agreements exist between FASI and FASIE (University –SME programmes) and a cooperative agreement between FASI and RFBR was signed in 2009. With regards to the economic situation in 2009 and forthcoming tasks, the amount of funding (in total RUB) was slightly higher than in previous years. However, for both S&T FTP and Nano FTP, the main challenge will be to ensure the required amount of non-budgetary funding.

3.1.2 Federal Service for Intellectual Property, Patents and Trade Marks (Rospatent)

The Federal Service for Intellectual Property, Patents and Trademarks is a federal executive authority performing control and supervision in the area of legal protection and use of intellectual property objects. This covers patents and trademarks as well as other results of intellectual activities in the economic and public sphere, including those originating from international S&T cooperation.

Activities of Rospatent are focused on the following areas:

- interaction with corresponding ministries and institutions of the Russian Federation for the development of state policy in this field;
- international cooperation;
- financial provision for the execution of the Russian national patent system;
- registration of licenses and agreements;
- certification and registration of patent attorneys;
- coordinating the activities of all structural units of the Russian national patent system.

The mainstream activity of Rospatent consists in enhancing the efficiency of the legal infrastructure in the area of IPR protection, which is in fact the traditional task of a patent institution. Within the period of 2002-2004 the legal base was radically upgraded compared to the ex-Soviet system and further improvement of existing regulations is underway. In particular:

- amendments to the Russian Patent Law;
- Federal Law for the Legal Protection of Computer Software and Databases;
- Federal Law on Copyright and Adjacent Rights;
- Federal Law on Trademarks, Service Marks and Identification of geographical sources of Goods;
- revisions of regulatory acts within the auspices of Rospatent.

At the same time Rospatent is responsible for the development and legalization of registration procedures and control measures regarding the protection of rights and use of scientific and technical results and IPR assets, generated with the support of the federal budget.

Rospatent offers a web-based access to electronic registries on inventions, useful models, industrial samples, names of places of origin, and well-known trade-marks. Since 2005 open access is granted to the trademark application registry which shows their actual paperwork status.

Three organisations constitute the core of Rospatent institutional infrastructure:
- Federal institute of industrial property (FIPS),
- Chamber on patent disputes,
- Russian public institute of intellectual property (RGIIS),

The Federal institute of industrial property (FIPS) \(^{144}\) was created in accordance with a Decree of the Government of Russia in 1997. Activities of FIPS are focused on:
- collecting and reviewing of applications;
- registration of certification papers;
- publication of official information;
- acquisition of information funds;
- providing services such as patent information, etc..

The Chamber on patent disputes ensures the protection of the rights and interests of applicants and owners of patents on industrial IPR assets, as well as the legitimate interests of other individuals and legal entities during the decision-making process concerning patent disputes within its competence. The Chamber proceeds in accordance with the Patent Law of the Russian Federation and the Law of the Russian Federation “About trade marks, service marks and name of the geographical origin of goods”.

The Russian public institute of intellectual property (RGIIS) \(^{145}\) is a public educational organisation operating with a licence from the Russian Ministry of Education and Science of 01.12.2008. Its core activities are the training and upgrading of experts' professional skills in the field of IPR protection, commercial use and social aspects of intellectual property. The institute runs a PhD Department for post-graduate and additional education in the field of intellectual property, and a Research Center carries out research activities on IPR issues of legal and economic reform.

3.1.3 Federal Agency of Education (Rosobrazovanie)

Before its dissolution in March 2010, the Federal Agency of Education (Rosobrazovanie) \(^{146}\) was besides Rosnauka, the second-largest policy-implementation agency of the Ministry of Education and Science. Rosobrazovanie took care of the educational sector, but had also several S&T-related tasks. As a federal executive body, Rosobrazovanie helped


\(^{145}\) \(\text{http://www.riis.chat.ru/}\)

\(^{146}\) \(\text{http://www.ed.gov.ru/}\)
the government, managed state-owned property and had law enforcement duties in the sphere of education. It was established in 2004.

The majority of public Russian Higher Education Institutions (HEI) were directly subordinated to Rosobrazovanie. Higher Education Institutions in Russia are mostly universities, but also include academies and institutes. The number of HEI will be streamlined over the years 2009 and 2010, and around 200 will be closed.\(^\text{147}\) The arguments is that diplomas are easily granted in HEIs, making streamlining necessary.

Private educational institutions and public educational institutions in the medical, agricultural and artistic field were not directly subordinated to Rosobrazovanie. In addition, a number of major leading universities are directly subordinated to the government, such as Moscow State University, St. Petersburg State University and State University – Higher School of Economics (Moscow).

The Agency also looked at the qualifications of the educational personnel. It organized training and re-training of the scientific and educational personnel of public higher-education institutions and of public scientific organisations involved in education.

The Agency coordinated or jointly managed several **Federal Targeted Programmes** (FTP) with other public executive bodies. Most FTPs in which the Agency was involved provided funding for education. But in the following FTPs, which are relevant for the S&T sector, Rosobrazovanie also managed a few activities:

- **Federal Targeted Programme “Scientific and Scientific-Pedagogical Human Resources for an Innovative Russia 2009-2013”** - The programme will attract and retain the young generations in the scientific, educational and advanced technology fields, thus ensuring the perpetuation of scientific and pedagogical staff, in a bid to offset the ageing of personnel. The programme is co-managed with Rosnauka.
- **Federal Targeted Programme “Development of Infrastructure of the Nanoindustry in the Russian Federation 2008-2010”**
- **Federal Targeted Programme “Electronic Russia 2002-2010”**

Besides the Federal Targeted Programmes listed above, Rosobrazovanie also took care of some more funding programmes, which are important for the S&T sector.

The **National Priority Project “Education”**\(^\text{148}\) is the major funding tool for upgrading all different layers of education. It includes components for the S&T sector. Funds are channelled to the educational sector for the improvement of school education and infrastructure, upgrading of IT infrastructure, and establishing small research institutes and laboratories in universities.

A highly relevant and only recently implemented support programme is the **National Research University Programme**, which aims at strengthening the research capacities at selected Russian Universities. Rosobrazovanie is in charge of implementing this programme. A competition was held in the summer and autumn of 2009, and 12 leading Russian universities were selected for funding\(^\text{149}\).

**Presidential Grants**, partly managed by Rosobrazovanie, are other funding tools for the S&T sector. These grants are conceived as excellence grants. An international funding line of presidential grants allows 40 students and 60 PhD students to study or perform research at foreign institutions for a period of up to one year. These grants provide an important support for potential future scientific personnel, allowing them to upgrade their qualifications and develop international contacts.


\(^{149}\) See for more details section 2.5.3
3.1.4 Federal Service for Supervision of Education and Science (Rosobrnadzor)

The Federal Service for the Supervision of Education and Science (Rosobrnadzor) is a federal executive body, which controls and supervises education and science in Russia. The Service was established in 2004 and is based in Moscow.

Rosobrnadzor controls the implementation of legislation on education, science, research and technology.

It takes care of the control of educational quality, the acknowledgement and recognition of equivalent educational documents, as well as academic degrees and titles obtained in the Russian Federation and abroad. An important and much-discussed reform which was implemented over the past years under the supervision of Rosobrnadzor, concerns the Unified State Examination. This identical examination for all pupils at the end of secondary education allows access to Higher Education Institutions. The Unified Examination is an effort to reduce corruption in education and facilitate access to universities for the most talented. A number of university deans, especially in leading universities, expressed their concern regarding this examination, as they prefer to use their own selection and recruitment procedures.

Rosobrnadzor is also in charge of the licensing, certification and state accreditation of educational institutions and their branches as well as of scientific organisations. Finally, the Service is responsible for awarding or withdrawing academic titles. It disposes of an Accreditation board for the academic defence of PhD thesis and for dissertations by doctors or science candidates. It awards or withdraws Professorships, Assistant/Associate Professorship, Doctor of Science and Candidate of Science and issues the respective diplomas.

3.1.5 Russian Federal Space Agency (Roscosmos)

The Russian Federal Space Agency (Roscosmos) is an authorized federal executive agency. The functions of the Agency include pursuance of state policy and legal regulations, helping the State and overlooking its spatial assets, as well as heading international cooperation in joint space projects and programmes, managing the activities of rocket and space industry entities with regard to military space technologies, like strategic missiles. The Federal Space Agency is also responsible for overall coordination of the activities at the Baikonur spaceport.

Roscosmos is based in Moscow and headed by a director and a supervisory body. It leads the tenders and awards state contracts related to orders for goods, implementation of work, services, R&D and engineering activities, for the benefit of the state, in the defined area of the Agency’s activities, as well as for the Agency’s needs. Roscosmos also selects and trains cosmonauts, implements R&D and engineering activities regarding space technologies in the field of human space missions, conducts expert evaluation of space technology design projects, in order to support the development of space technologies.

The main activities of Roscosmos are:
- the establishment of a scientific, technical and technological basis for the development of prospective launches and space vehicles;
- the pursuance of state policy in standardization, unification, metrology and rocket and space equipment quality assurance;

150 http://www.obrnadzor.gov.ru/
• marketing research;
• the validation of new and highly-pure material production of space technologies, the development of space technologies and production of materials with unique properties; scientific research on the near-Earth space, outer space and planets, including near-Earth plasma, by active exposure, as well as space medical research in micro-gravity;
• long-term and short-term forecasts on the rocket and space industry evolution;
• enforcing orbital crew missions, including the activities under the international crew mission programme and implementation of international agreements on the development and support of the International space station (ISS);
• defining / calculating global and high-precision coordinates and time data in any spot of the Earth at any moment in time, enhancement of the existing space navigation system and development of the Unified coordinate and timing data transmission system;
• creation and enhancement of space vehicles, launchers, ground objects of space infrastructure and ground experimental facilities;
• monitoring of the natural environment, control of critical emergencies and accident management, exploration of natural resources and enhancement of the Earth's remote sensing systems.

Roscosmos coordinates and, together with other ministries and state authorities, operates the following **funding programmes** as a state customer:

• **The Global Navigation System Special Federal Programme:**
  The programme is aimed at further evolution and effective application of the global navigation satellite system (GLONASS). The goal is to be achieved by introducing advanced space navigation technologies for the sake of the socio-economic development of Russia and its national security, and in order for Russia to keep its leading role in the satellite navigation area.

• **Russian Federal Space Programme:**
  In accordance with the Space Act, the **Russian Federal Space Programme (FSP)** implements governmental orders, which include the design and utilization of space equipment to achieve scientific and socio-economic objectives.

  FSP has been developed to meet the defined objectives, goals and principles of the space activities and the interests of the citizens of the Russian Federation, as well as the international commitments undertaken by the Russian Federation and the objectives regarding the extension of international cooperation.

  Russia’s Federal Space Programme for the period 2006-2015 envisages the implementation of over **two dozens of scientifically purposed projects**. Among them are full-scale space projects, within which specific spacecrafts equipped with targeted scientific equipment will be created. Moreover, additional scientific equipment will be placed on Russian spacecrafts for national economic purposes, and Russian scientific equipment will be installed on foreign spacecrafts for scientific purposes.

  A particularity of the implementation of scientific space projects is the extensive use of so-called standardized space platforms's target equipment: for scientific research, remote earth sensing, radio communications, etc.

  One of the most valuable Roscosmos functions is to collaborate with other countries in space exploration and utilization, as well as to organize and to coordinate work under commercial space projects. Currently Roscosmos has **intergovernmental space cooperation agreements** with more than 19 states, including the USA, Japan, India, Brazil, Sweden, Argentina and the member states of the European Space Agency (ESA). In addition, there are valid agreements with space agencies and ESA.
Roscosmos contributes greatly to the activities of the U.N. Committee on Peaceful Uses of Outer Space (UNCOPUOUS), the International Committee on Space Research (COSPAR), the Inter-Agency Space Debris Coordination Committee (IADC), the Forum of Space Agencies, the Committee on Earth Observation Satellites (CEOS), the International Astronautical Congress (IAC) and other entities. Commercial launch services represent one of the most competitive areas of Russian activities in the world's space market. The commercial services of Russian space launchers are marketed by the joint ventures of Russia and its foreign partners: "ILS" (Russia – USA), "STARSEM and "EUROCKOT" (Russia - EU).

The strategic activities of Roscosmos may be summarized as follows:
• environmental monitoring, control of critical emergencies and ecological accident management, exploration of the Earth's natural resources;
• implementation of space projects aimed at improving our knowledge of the Earth, the Solar system and the Universe, implementation of fundamental space research in the fields of astrophysics, planetology, solar physics and solar-earth links studies;
• maintaining equal-rights involvement of the Russian Federation in international space programmes and projects, with the purpose of having access to the final outcome of these programmes (projects);
• carrying out orbital crew missions for economical and scientific applications;
• validation of space technologies for the production of new and highly-pure material.

3.2 Main actors at regional level

According to official documents, regional S&T policy will be based upon the interests of the Russian people, their economic needs, and the regional potential of S&T. It aims at the constant development of the S&T potential; its effective and efficient use for the benefit of the social and economic development of the region and high regional competitiveness. The RF’s Constitution and subsequent Federal Law state that the responsibility for S&T is shared between the RF and its citizens.

In accordance to these documents, Russian regions are responsible for:
• the participation in the development and realization of state S&T policy;
• the definition of regional S&T priorities;
• the development of S&T programmes and projects;
• providing funding for S&T programmes and projects from the regional budget;
• the management of regional state research organisations;
• controlling the activities of federal research organisations in the respective regional issues;
• setting up and providing conditions for the effective use of S&T resources;
• setting up and managing regional, multi-regional foundations and other bodies for the support of S&T and technological development;

In order to fulfill these responsibilities, most regions participate in the development of studies for innovation, S&T priority programmes and projects, the development of regional innovation structures along with training programmes for administrators and researchers, and the development of relevant legal and organisational measures to support research and innovation.

Local laws and regional legal acts are also the base for the development of regional S&T and innovation policy. At present, more than 20 regions have their local S&T...
regulations (laws and legal acts); the key message of this regional legal framework is to ensure high priority for S&T development in the region and local budgetary funding. Local S&T policy has to comply with federal policy and medium and long-term strategy developed at federal level.

Definition of S&T priorities in Russian regions is quite an important administrative instrument due to the fact that this is the basis (also legal) for S&T funding from federal, regional and local budgets. The matching list between federal and regional S&T priorities is the basis for the development of joint federal-regional S&T funding programmes. Regional S&T priorities are based on the list of the RF's S&T priorities and the list of critical technologies of the RF, the suggestions and recommendations of local research community, and foresight and prognosis results and data from the socio-economical development programme of the region. Demands from the local industry and other sectors of the local economy also play a crucial role in the selection of priorities.

As a result, regional S&T priorities can be either included in official documents on regional development within a larger framework or can be approved by the regional administration in the frame of a regional S&T programme. Regional S&T programmes have to provide infrastructure support for S&T and innovation, including information provisions, development of expertise for S&T and innovation, certification systems, support for technological production, development of financial and economical measures for S&T support, and "the development of territorial innovation". Support for S&T development can also be provided at municipal level.

In the last 7 years, regional S&T programmes have been approved and consequently provide funding in more than 30 regions, including Moscow, St. Petersburg, the Moscow and Leningrad regions, Murmansk, Tyumen, Orel, Rostov, Kaluga, Lipetsk, Voronezh, Samara, Chuvashia, Astrakhan, Nizhni Novgorod, Chelyabinsk, Penza, Novosibirsk, Tumen, Tomsk, Republic of Buryatia and others. For example, the regional S&T subprogramme “Buryatia. Science. Technologies and innovations (2003-2006)”, “Development of innovative activity in the Chelyabinsk region (2005-2007)”, St. Petersburg targeted programme for S&T development “Development of S&T in industrial sphere (2006-2008)”, “Priorities for development of S&T sphere in Tumen region (2006-2008)”, etc.

Currently regional support is ensured through:

- “Development for science and innovation in Ulyanovsk Region (2006-2010)”
- “Development for science and innovation in Udmurtia Republic (2005-2009)”
- “Programme for S&T development of education in Novosibirsk region (2008-2012)”
- “Development for science and innovation in Kaluga region (2005-2010)”
- “Complex programme for S&T development in Chuvash Republic (2006-2010)”
- “Complex programme for S&T activity in the Republic of Tatarstan (2004-2010)”
- “Complex targeted programme “Activivation of S&T processes in Astrakhan Region (2006-2010)”
- “Development for S&T activity in Orel region (up to 2010)”
- “Development and utilization of S&T potential in Lipetsk region (2005-2010)”
- “Development of S&T and innovative activity in Orenburg region (2006-2010)”
- “Energy efficiency in Kursk region (2006-2010)”
- “Priorities for S&T development in Tyumen region (2006-2008)”
- “S&T development in Kaluga region (2005-2010)”
- “Development and utilization of S&T potential in Lipetsk region (2005-2010)”
- “Programme of Moscow government for creation of industrial districts in Moscow region (up to 2010)”
- “Government support of S&T potential in Tula region (2005-2009)”

In addition to specific regional programmes for S&T and innovation development, other programmes might include clauses for S&T and innovation support, such as the “Programme for social and economic development of the Udmurtia region”, and the “Programme of the Tatarstan republic on effective use of energy resources”.

Due to the fact that regional programmes are developed rather independently with a focus on a particular regional need and as a result might have different scales, target audiences and success indicators, they can hardly be compared. However, Table 22 shows three examples of different regional programmes, approved in St Petersburg, the Chuvash republic and the Murmansk region, to give an idea of the scale of such programmes.

<table>
<thead>
<tr>
<th>Focus</th>
<th>Chuvashia</th>
<th>St. Petersburg</th>
<th>Murmansk region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus</td>
<td>Complex programme for S&amp;T development</td>
<td>Development of innovative technologies in industry</td>
<td>Development of S&amp;T and innovation in Murmansk region</td>
</tr>
<tr>
<td>Funding</td>
<td>Total: RUB 49618.6 million, from which:</td>
<td>Total: RUB 373.3 million,</td>
<td>Total: RUB 332.52 million</td>
</tr>
<tr>
<td></td>
<td>federal budget – 1549.3 (3%)</td>
<td>2006 – 23.45 million</td>
<td>2006 – 92.82 million</td>
</tr>
<tr>
<td></td>
<td>regional budget – 3895.2 (8%)</td>
<td>2007 – 164.1 million</td>
<td>2007 – 118.285 million</td>
</tr>
<tr>
<td></td>
<td>local budgets – 2492.4 (5%)</td>
<td>2008 – 186.75 million</td>
<td>2008 – 121.415 million</td>
</tr>
<tr>
<td></td>
<td>non-budgetary – 41681.7 (84%).</td>
<td></td>
<td>Funded through the federal budget – 210.58 million</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>RFBR – 10.2625 million</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Regional and local budgets – 7.8625 million</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Non-budgetary – 88.715 million</td>
</tr>
</tbody>
</table>

The high figures for the S&T development programme in Chuvashia might be explained by the developed industry (Chemical industry, Hydroelectricity), as well as by a highly-centralized state governance system.

In the last 10 years, Venture Capital Funds to support the development of high-tech products have slowly made their appearance in Russian regions. The creation of regional Venture Capital Funds has been stimulated by a matching funds scheme, whereby federal state funding matches similar regional (budget and private) funding. The most active are in the key industrial and S&T regions of the European part of Russia (St Petersburg, Nizhini Novgorod, Tatarstan, etc.). However, these Funds rarely provide support for R&D as they rather focus on the development of technological industrial processes and early stage industrial production.

In addition to these, targeted programmes for S&T support have been developed in a number of cities, for example the “Municipal targeted programme on cooperation between
city administration and scientific and industrial complex of Novosibirsk aimed at Novosibirsk city development”, and the “Programme of innovation development of Cheboksary till 2010”.

Overall it can be stated that regional and local S&T funding has significantly gained in importance over the last years. The most relevant players in this context are those regions, which host the main scientific centers, e.g. Moscow and surrounding area, St. Petersburg, etc.

### 3.3 S&T funding organisations

There are two types of S&T funding organisations in Russia. The so-called “budgetary” institutions are institutions created by state authorities (at federal, regional or municipal level). Their functions, including services to physical and legal persons based on national/local order, are carried out only with budget funding and are based on budget cost sheets. These institutions are generally named “Foundations” with a different meaning to that used in EU.

The second category gathers “extra budgetary” (EX-B) funds. These funds have strictly limited aims and tasks. Decisions on the creation of EX-B funds are taken by the Federal Assembly of the RF, as well as representative authorities of Russia’s regions and local self-governance. The creation of new types of EX-B funds is determined by the appearance of new investment expenditures for innovations and R&D of public importance, not always eligible for budgetary funding.

The resources of EX-B funds may include budgetary funding, but they are varied, such as special taxes and levies specifically set for the fund, deductions from companies' profits, profit from the commercial activity of the fund as a legal entity, loans,… In 2007, the share of extra budgetary funds in the total volume of national S&T funding amounted to 37.4%, which is lower than foreseen by the S&T and Innovation Strategy.

As of 2010 the future of the Russian S&T Foundations is controversial. According to the Budget Code of the RF revised in 2007, organisations - administrators of budgetary funds (including science funds) may allocate budgetary appropriations only to subordinate organisations, and budgetary institutions may not receive subsidies. Although science foundations allocate competitive funding to leaders of research groups, funds are transferred to S&T institutions, which employ them. S&T institutions thus provide administrative support to grantees, paying all due taxes.

In the legislation, grants were treated as subsidies to institutions, for which, according to the revised Budget Code, state academies of sciences and state universities will be ineligible. This may call the grant system into question. The provisions of the revised Budget Code, including those related to grant funding, came into force on 1 January 2010.

### 3.3.1 Budgetary Foundations

- **Russian Foundation for Basic Research (RFBR)**

  **Objectives**

  The Russian Foundation for Basic Research (RFBR) was established by Decree No. 426 of the President of the Russian Federation of April 27, 1992 to support basic research in all scientific fields and disciplines. The Foundation acts in accordance with the Constitution

---

152 For example, regional S&T development foundation of St.Petersburg

of the Russian Federation, federal laws, decrees and directives of the President of the Russian Federation, enactments and directives of the Government of the Russian Federation, in particular, the Ministry for Education and Science, and in accordance with the RFBR Charter.

RFBR funds are allocated on a competitive basis and are mainly used to cover expenses related to the implementation of research projects, organisation of workshops, publication costs, and travel expenses. In its activity the Foundation adheres to bottom-up principle and gives scientists lots of freedom in choosing research subjects and methods. International cooperation has always been one of the RFBR's priorities.

Its main goal is to provide support and assistance to research activities in all areas of fundamental science on a competitive basis. RFBR enables scientists to select research topics independently, to set up academic teams and to concentrate resources on the most promising research projects. The main goal of the foundation is to organize a competition to identify the most promising projects (and to provide organisational and financial support to these projects) among proposals submitted by scientists.

The Russian Foundation for Basic Research (RFBR) is a self-governing non-commercial government organisation (a federal institution under the jurisdiction of the Government of the Russian Federation). The Foundation’s council (26 well-known scientists representing major areas of science and working in various regions and departments) is responsible for all its scientific and financial policies (see Figure 7).

**Figure 7: The RFBR organisation chart**

![RFBR organisation chart](http://www.rfbr.ru)

**Main activities**

The RFBR supports basic research in eight areas of knowledge including: mathematics, mechanics and information technology; physics and astronomy; chemistry; biology and medical science; Earth sciences; humanities and social sciences; information technologies and computer systems; fundamentals of engineering sciences. Eight separate expert panels represent each of these Departments, respectively, within the RFBR, and all

---

154 [http://www.rfbr.ru](http://www.rfbr.ru)
panels include sections for subdivisions of each area of knowledge. All decisions on the project support are made by the RFBR following peer review.

The RFBR performs over 65,000-70,000 merit reviews annually. The total number of peer reviews by the Foundation reaches about 1 million. Currently, RFBR provides expert panels in all supported areas of knowledge and in targeted initiative-based fundamental research as well. There is also a coordination council for regional competitions.

**Main funding programmes and budget for science**

In 2005-2009, the federal budget appropriations for the RFBR amounted to 11.4-11.7% of the total budgetary funding for basic research. For 2009, it was RUB 9.8 billion, or €222 million (4.1% of the total budgetary funding for civil R&D and 0.02% of GDP). The main part of the funds (over 70%) is dedicated to the support of approved research projects conducted by small research teams (up to 10 members) or by individual scientists (see Figure 8). The foundation also supports a set of programmes (see below).

The Foundation supports research aimed at acquiring new knowledge about nature, human beings and society in the following thematic areas:

1. Mathematics, Computer Science and Engineering;
2. Physics and Astronomy;
3. Chemistry;
4. Biology and Medical Science;
5. Earth Sciences;
6. Human sciences, Environment and Social sciences, as well as
7. Creation and development of information, computer and telecommunication resources for basic research.

During the period of 1992-2008, RFBR has been actively developing a number of support instruments for Russian scientists, listed below in Table 23.

**Table 23: Development of competitive support instruments of RFBR, 2000-2008**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Scientific initiatives (projects)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Creation and development of information, computing and telecommunication resources for scientific research</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Publishing projects</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Expeditions</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Scientific events in Russia</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Participation in foreign scientific events</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Multiple access centers</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Support to research infrastructure</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Support to scientific journals</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>International calls</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Regional calls</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

155 [http://www.rfbr.ru](http://www.rfbr.ru)

156 Initiatives (or initiative-based projects) are projects in basic research in the thematic focus areas 1-6 of the Foundation, which are implemented by small (up to 10 persons) research groups or individual scientists.
From 1993 until 2008, the RFBR evaluated over 220,000 proposals; over 87,000 projects were funded and over 100,000 researchers participated in projects supported by the Foundation. Since 2002, all project proposals are only accepted online. The average grant grew more than 2.5 times during the 2002-2008 period.

In 2007-2008 the RFBR held 14 competitions and one programme:

- Competition for scientific initiatives implemented by small (up to 10 persons) research groups or individuals;
- Competition for projects on analytical review projects;
- Competition for research support infrastructure;
- Organisation of Russian and international events in Russia;
- Competition for expeditions and field research;
- International projects’ competitions;
- Competition on “Support to the Mobility of Young Scientists” programmes;
- Competition on targeted basic research in cooperation with the Russian governmental agencies;
- Regional projects’ competitions;
- Competitions with CIS countries;
- Competition for scientific publications among Russian RFBR grant-holders;
- Competition for urgent support to research;
- Competition for projects on analytical reviews;
- Programme “National scientific e-library”.

---

157 The competitions are aimed at further support to previously supported basic research projects implemented by scientific organisations, in the course of which researchers not only obtained bright basic results, but also identified opportunities for their use.

158 Funding is targeted only to certain expense categories.
Figure 8: Distribution of funding by knowledge area in the initiative-based research projects and other RFBR competitions (2007)

Strategic outlook

In 2009 new trends appeared in the RFBR science policy. Beside the bottom up approach through competitive calls for proposals, steps were taken towards a top down approach. An agreement was signed in March with FASI in order to coordinate calls for tenders by the two main funding organisations. The RFBR then launched three new calls:

- a targeted call to support oriented basic research of specific performing institutions,
- a competitive call to support interdisciplinary research in new emerging technologies,
- a call for workshops aimed at the application (commercialisation) of oriented basic research results.

In the sphere of international cooperation, the RFBR is the main Russian counterpart for the European funding agencies, including exchange of experience in competitive funding procedures and expert evaluation. Although during the last few years the number of international projects doubled, the overall amount of funding remains small, and mostly dedicated to the mobility of researchers. Therefore, the RBFR is now planning to be involved in the support of larger international projects, like European research infrastructures. Progress has been made for the participation of Russia in two important projects in Germany, XFEL in Hamburg and FAIR in Darmstadt.

- **Russian Foundation for Research in Humanities (RFH)**

  **Objectives**

  RFH was founded by a decision of the Russian Federation Government in September 1994 with the aim to provide public funding for the development of humanities, the revival of the Russian humanity research tradition; as well as for the promotion of humanities in society.

  RFH supports research in all fields of social sciences and the humanities. The Foundation supports research projects, the publication of monographs (4000 books have been published so far), the organisation of workshops and conferences, travels, projects aimed at the creation of information resources, the improvement of logistics, and travel grants for Russian scientists participating in workshops abroad.

  **Budget and target groups of funding**
RFH's budget represents 1% of all expenses of the federal budget for civil science, which was equal to €20 million in 2006 and €25 million in 2007 (see information on the budget dynamics in million roubles in Figure 9). About 3500-4000 projects are funded annually, including those selected under the previous years' calls. During the last years the number of proposals submitted to the Foundation has increased. For example, about 7000 proposals were submitted to calls in 2007, the success rate was 25% for research projects and publications.

![Figure 9: The RFH budget 2001 – 2009, million RUB](image)

Target groups for funding are public and private research organisations in Russia. Traditionally, the institutes of the Russian Academy of Sciences used to apply. Now universities and private research organisations are applying more and more. In 2009, 30.4% of organisations that received funding were institutes of the Russian Academy of Sciences, 40.3% were universities, 6.1% other state organisations, and 15.9% other non-state organisations such as private universities and research centres (Figure 10).

![Figure 10: Distribution of Supported Projects by Organisations in 2009](image)
Funding programmes
The RFH proposes the following funding programmes:

- Federal (basic) call: open call to all thematics. About 70% of the total budget of the Foundation goes to the open call.

In addition to the open call, RFH launches thematic calls, such as:

- Special call “Russia in a Multi-Polar World: Country Image”;
- Special call “The theoretical principles of innovative economics”;
- Special call “The Russian culture heritage”, dedicated to the hundredth anniversary jubilee of academician D. Likhachiov;
- Special call “The Russian language in the modern world”;
- Call for publishing popular books (that help to disseminate research results to the general public);
- Call for the support of young scholars;
- Regional calls. Since 1998, RFH has launched 7 regional calls for proposals under the Agreements of the Foundation with the regional authorities of 47 (out of a total of 87) regions of Russia: scientists residing in these regions are eligible, the subject of the projects should be of interest to the region.
- International calls.

Results of funding activity
From 1994-2008, the Foundation received 66 408 applications and funded 29 061 scientific projects, including:

- 14 615 research projects;
- 4 074 projects on the publication of scientific works;
- 1 949 projects on the organisation of scientific conferences, seminars, etc;
- 1 035 projects on mobility;
- 851 projects on the creation of information systems;
- 1 922 projects on the participation of Russian scholars in scientific actions abroad;
- 368 projects on scientific telecommunication development and material for scientific research in humanitarian science.

International Cooperation
The principle of the organisation of international cooperation is the following:

- Call open to all thematics as well as equal access to all scientists regardless of their age, place of work etc;
- Russian scientists and their foreign partners must present a project on a common theme,
- There is an independent expert review of Russian scientists’ projects at the RFH and of foreign scientists’ projects at the RFH's partner organisation (a foreign foundation, Academy of Science etc.), with a common decision by the RFH and its partner organisation;
- parity of financing: the RFH funds Russian participants to the project, foreign partners fund scientists in their country.

The following activities are funded in international cooperative projects:

- research projects;
- projects on the organisation of scientific events (conferences, seminars, etc.);
- projects of mobility;
• scientific publications.

The Foundation's international cooperation strategy includes three target regions: post-USSR countries, European countries, and the countries that have traditionally close relations with the USSR (Mongolia, China, Vietnam, and Taiwan).

**Strategic outlook**

**International cooperation in the humanities field**

There are social problems of global character (common EU-Russia problems) that are topical for researchers from different countries (historical, cultural, ethnical and linguistic relations, etc.). There are prospects for international cooperation in research on global challenges. The RFH’s objective is to create conditions to establish contacts between Russian scientists and their foreign colleagues.

**Coordination of policies and dialogue with Europe**

RFH is willing to be involved in setting joint priorities for international collaboration with the EU and its Member and Associated States and to take part in the design of appropriate multilateral cooperation programmes. So far it was easier for RFH to have relations with national structures on a bilateral basis. RFH does not have sufficient experience of interaction with pan-European structures and of multilateral cooperation. It also lacks knowledge in FP7 instruments.

• **Foundation for Assistance to Small Innovative Enterprises (FASIE)**

**Objectives**

The Foundation for Assistance to Small Innovative Enterprises (FASIE) was created on 3 February 1994. It is a non-commercial state-funded organisation set up by the Russian government's resolution No. 65 of February 3, 1994. The Foundation is based in Moscow and has agencies in 27 regions in Russia. FASIE is headed by a General Director and has a Board as a supervisory body. It provides funding for applied research, technology development and innovation for Small Innovative Enterprises.

The main objectives of FASIE are the following:

• implementation of state policy for the development and support of small innovative enterprises;
• direct financial, informational and other assistance to SMEs, for projects on new high-tech products and technologies;
• establishment and development of infrastructure for the support of small innovative businesses;
• support for the development of the Russian science and innovation sector;
• support the establishment and development of a proper IPR market in the Russian Federation;
• develop mutually beneficial relations with venture funds and other funding bodies in order to ensure project support throughout the innovation cycle of a high-tech product.

To fulfill these objectives, FASIE has rights and responsibilities to provide funding for innovative high-tech projects from small companies with federal, regional and industrial programmes; it controls the proper use of the state funds allocated to programmes and projects; it participates in the development of local, national and international programmes and organisations within its target area of responsibility; it provides funding for relevant research, expertise and the evaluation of projects, regional, national and international...
exhibitions and conferences and other events within its area of responsibility; it provides funding for training programmes aimed at high-tech SMEs personnel, etc. FASIE implements its funding programmes itself and has the necessary application, evaluation and financial facilities.

The Foundation initiates and participates in the development of laws and legislative acts, which are targeted at providing public support for small businesses.

**Budget and target groups of funding**

FASIE is a non-profit organisation. As a consequence, any income which is received by FASIE as a result of its activity has to be returned to the Treasury or used to fulfill the main objectives of the organisation.

FASIE receives a fixed share of 1.5% of the annual state budget of civilian R&D. In 2008, the FASIE budget amounted to RUB 1.57 billion (€43 million). In 2009, the budget was substantially increased to RUB 2.5 billion (EUR 56.6 million); this represent a one third increase compared with 2008 (Figure 11).

![Figure 11: FASIE budget in EURO](image)

In its main programmes, FASIE supports small and medium-size enterprises (SMEs), which are in line with the criteria defined for SMEs in the Russian legislation. In some cases support is also offered to individuals.

**Funding programmes**

The main proportion of FASIE’s budget is used for the support of R&D projects in SMEs. The rest (about 15%) is invested in the support of innovation infrastructures, including the development of innovation-technological centres, technology transfer infrastructure, support for young S&T entrepreneurs, training, and support for the participation of SMEs in exhibitions and seminars.

There are 20 programmes run by FASIE. These include 7 main programmes and their subordinate programmes run in cooperation with high-tech companies (e.g. Microsoft START) and international partners, as well as programmes for the support of innovative infrastructures. Projects funded by FASIE cover all areas of the country’s economy.

---

159 based on data as on [www.fasie.ru](http://www.fasie.ru)
In 2004, FASIE implemented the “START” programme, which aims at creating start-up companies based on high-tech innovations or innovative services. The Foundation provides funding for innovative projects at the initial development stage (“seed funding”). Projects are supported for a three-year period, with an annual evaluation. For the implementation of the project, applicants have to set up their company, if it does not already exist at the start of the project. At the end of the project, it is expected that the production of a new innovative product or provision of service has to be established. During the last five years, over 10295 projects were submitted and 2436 of them were selected for funding.

In 2006, FASIE introduced the «UMNIK» programme, which is targeted at young scientists from 18-28 years of age. Projects are supported for 2 years with moderate financial support, but allow young scientists to realize their innovative ideas. 512 contracts were signed in the 2007-2008 period and 2150 winners were awarded funding.

The Foundation is involved in the Russian government's measures to fight the crisis. In 2009, it has announced an anti-crisis programme providing project-based support to innovative enterprises, which have run into trouble because of credit shortages and falling demand for their products.

Other FASIE programmes include:
- INTER, a programme designed for Small Enterprises located in the Russian Special Economic Zones;
- PUSK, a programme targeted at enhancing the cooperation of Small Innovative Enterprises with universities and sourcing university know-how for the business sector;
- TEMP, which allows SMEs to acquire licenses from R&D institutions, such as universities, academies and branch institutes;
- Stavka, a credit facilitation line;
- Razvitie, targeted at increasing the capitalisation of SMEs.

At national level, the Foundation coordinates its activities with relevant funding bodies for the funding of R&D and innovation such as the Russian Venture Company (RVC), FASI and others. Joint funding activities have been implemented with Russian or foreign enterprises, including recent funding lines with AFK Sistema or Microsoft.

**Results of the funding activity**

More than 16500 projects were submitted to FASIE from its creation until 1 January 2009. More than half of these projects were submitted by applicants from the Russian regions. More than 5500 projects received funding.\(^\text{160}\)

The range of industrial sectors supported by FASIE represents key sectors of SME development. At present, **projects supported by FASIE contribute to 26 sectors**, including car manufacturing, geology and mining, ICT, the health sector, food industry, transport, electronics, the energy sector, the construction industry, new materials and processing. Projects supported by FASIE are usually in natural sciences and engineering disciplines, whereas social science or humanities projects are only very few.

As a result, FASIE has reported on new high-tech products developed by supported SMEs, based on 1270 inventions, with a total value of more than RUB 6 billion (€136 million). The amount of VAT returned to the State is 1.8 times higher than the amount provided by FASIE to those SMEs. Thousands of new highly-qualified work places were created, with an average value of RUB 1.5 million (€34 000) per person.

\(^\text{160}\) Data according to [www.fasie.ru](http://www.fasie.ru), as accessed on 17 July 2009.
Besides usual project support, every year the Foundation supports the participation of over 150 small businesses in specialized medical, engineering, biotechnological, informational and other exhibitions. The Foundation has also financed the establishment of 29 Information & Technology Centers in 14 regions of Russia.

**International Cooperation**

FASIE’s international partners include the Eurasia Fund and the British Council. Strong ties have been established on a bilateral level with similar foundations in France (OSEO), Germany (International Bureau), UK (DTI), the U.S. (CRDF) and others. Joint programmes are aimed at creating informational, marketing and consulting support for small innovative enterprises and at supporting the implementation of innovation in Russia and in the funding partner’s country.

The Foundation is cooperating with various players at European R&D funding level. It hosts the Russian National Contact Point (NCP) for the SMEs programme within FP7 and advises Russian SMEs on their participation to the Framework Programme. FASIE provides support for the project “Gate to Russian Business Innovation Networks” (Gate2RuBIN), which involves Russia in the Enterprise Europe Network. The Foundation is also involved with EUREKA, where it has provided funding for participating Russian SMEs. Links have also been set up with the EU’s TACIS programme. A joint funding activity has been implemented between FASIE and INTAS in 2006, when a joint call for innovation grants was made.

Results of international cooperation are satisfactory on the whole; especially the joint programmes with OSEO and IB which are examples of good practice. The Foundation is interested in further developing its international bilateral cooperation with possible partners, such as TEKES of Finland, Spain, Austria and Switzerland. Multilateral cooperation with FP7 and EUREKA is to be further enhanced.

**Strategic outlook**

Strategic objectives for FASIE include: increase of R&D support to SMEs at an early stage of the product innovation cycle, especially those based on high-tech results of basic research, and the development of cooperation with venture funds and structures providing financial support to innovative projects throughout the innovation cycle of a high-tech product.

FASIE is a key infrastructure for the development of Russia's innovative capacities. Its funding programmes support the diversification of the Russian economy towards promising high-tech sectors and innovative services. Designed for the support of Small and Medium Size Enterprises, it the Russian industry's change from huge enterprises to a more diversified and broadened business base. It has an important role in supporting the creation of high-tech start-ups.

FASIE is well linked with other R&D and innovation funding or regulating organisations. The ability to establish joint funding schemes with companies shows the organisation's flexibility in finding support solutions for useful innovation. Successful cooperation with European partners at bilateral level, as well as the European links of the Foundation make it a promising partner for joint funding programmes and for enhancing cooperation between EU/AC and Russia as a whole.

**3.3.2 Extrabudgetary Foundations**

An important stimulus for innovation is the innovative extra budgetary (EX-B) state and private funds. These funds have strictly limited aims and tasks – stimulating and funding scientific research, R&D, commercialisation, dissemination and application of innovations. The resources of EX-B innovation funds are:
- Special purpose taxes and levies, specifically set for the fund;
- Deductions from company profits, institutions, organisations;
- Budgetary funding;
- Profit from the commercial activity of the fund as a legal person;
- Loans obtained by the fund from the Central Bank of the RF or from commercial banks.

EX-B funds for financial support to sectoral, cross-sectoral and regional S&T programmes, as well as for commercialisation may be created by ministries, large cities and regions, large companies and financial-industrial groups.

Innovative funds appeared as a necessary supplement to budgetary funding, and for temporary institutions in order to meet the requirements related to new costs, not eligible for budgetary funding, and the corresponding budgetary reporting. In this case, completion of state activities and their budgetary funding (for which EX-B funds were created) would cause (and caused) liquidation of EX-B foundations. Therefore, the number of EX-B innovative foundations constantly fluctuated: some were set up, others were dissolved. The overall tendency was towards an increase in the number of foundations, due to intensified S&T policy and the activities of the state & business sector, especially innovative business. Furthermore, some innovation funds acted as semi-closed organisations due to the necessity of preserving state secret and commercial confidentiality with regard to military and civil R&D, which limited access to S&T achievements and caused discontent in the business sector.

- **Russian Foundation for Technological Development (RFTD)**

The **Russian Foundation for Technological Development** was established on 27 April 1992. It operates on behalf of the Russian Ministry of Education and Science and is based in Moscow.

The Foundation has initiated several major programmes aimed at the preservation and development of the scientific and technological potential of Russia. It provides competition-based support for applied R&D and subsequent commercialisation of research results. Applied research is funded in S&T priority areas and according to the federal list of critical technologies of the Russian Federation. Funding is also allocated to innovative projects and infrastructure for S&T and innovation.

RFTD has about 600 partners which are well known not only in Russia but all over the world. These include the Russian scientific centre “Kurchatov Institute” (Moscow), Krylov Shipbuilding Research Institute (St. Petersburg), Scientific-research institute of nuclear reactors, (Dimitrovgrad) and others.

**Budget**

RFTD’s budget is composed of contributions from federal executive authorities and extrabudgetary R&D funds. Another financial source of RFTD is made of voluntary contributions from companies, which in exchange benefit from tax advantages on their income. The RFTD budget fluctuates within 1.5%-4% of state expenditure for civil science as a result of these different financial sources.

**Project selection/Evaluation**

RFTD supports innovation projects. It distributes extra-budgetary funds among domestic enterprises oriented at the creation and implementation of high-tech products with
the active participation of the scientific community. The selection of projects is based on the results of state S&T expertise and on the expertise of the RFTD S&T Council. Applicants are required to justify the novelty and relevance of the proposed activities and outline a plan for the commercialisation of results. The funding is provided by RFTD in the form of 0% interest rate purpose-oriented loans. Thus, RFTD prioritizes research which may provide economic benefit in the short and medium term.

Results of funding activities:
During its 10 years of its existence, RFTD supported 840 cross-sectoral S&T projects, and 39% of RFTD applicants considerably increased their market share upon completion of projects. Within 16 years, RFTD supported nearly 1000 R&D projects with an overall sum of about €200 million. Between a few dozen and 150 projects were funded each year.

From 2001 to 2003, most of the projects included funding of up to RUB 5 million (€144 000). Currently the majority of projects is funded with around RUB 10 million (€288 000). When fundamental problems faced by an industry or group of industries are addressed, the funding of projects may reach hundreds of millions of Roubles.

Major areas of R&D funding are the following:
- creation of new products;
- development of new and improved applied technologies;
- increasing the technical level of production;
- standardization and certification of products;
- health and safety.

In 2006 the allocation of funds according to thematic priority areas was the following:
- life science – 7%;
- energy – 7%;
- nanosystem industry and new materials – 35%;
- transport and space systems - 27%;
- IT systems – 11%;
- environmental management – 5%;
- safety – 8%.

Statistics show that most of RFTD’s funds are allocated to the nanosystem industry and new materials, as well as the transport and space systems.

International cooperation
RFTD's principle is to provide funding for Russian researchers and institutions only. Nevertheless the Foundation has experience in financing applied R&D projects, carried out by Russian organisations in cooperation with European partners. These include:
- a joint project of the Conseil Europeen pour la Recherche Nucleare (CERN) with the Budker Institution of Nuclear Physics in Novosibirsk as part of the international programme dedicated to the development of the Large Hadron Collider
- Russian-German cooperation between St.Petersburg State University and Berlin Free University: creation of a station of Synchrotron Radiation.
- Russian-Finnish project between Krylov Shipbuilding Research Institute and Kverner MASA-yarde: project on ice conditions modelling of northern seas navigation.161

161 Source: http://www.eranet-rus.eu/_media/ROSTEK.pdf
Strategic outlook

Stable growth of loan repayments confirms RFTD’s expansion and continuous improvement of the quality of project selection. It is an indirect proof of the successful promotion of the results achieved by applicants in the course of their work under contracts with the Fund.

However, since its creation, RFTD and the system of extrabudgetary funds have not been very efficient; and RFTD has not developed much funding activity. But as there is demand in Russia for organisations, which specialize in the professional selection and funding of S&T and innovative projects, and given that the required organisational and regulatory basis will be adopted, extrabudgetary funds are expected to play an increasing role 162.

- Venture Foundations

At present the development of venture funding in the innovation sphere in Russia is becoming one of the priorities of the country's economic policy. Although the total volume of direct and venture investment funds operating in Russia, already exceeded USD 4 billion, the issue of attracting a greater number of private capital innovation companies at an early stage has not been resolved yet. One of the factors contributing to magnify the inflow of venture capital to innovation companies, is the improvement of possible organisational and legal registration forms and of the foundations' performance.

According to research data, by the end of 2007, over 80 managing companies operated on the Russian market (which is 18% more than in 2006), and accumulated volume of capital exceeded USD10 billion.

The volume of capital outflow from the direct and venture investments’ market increased twofold in 2007, which is, mostly due to successful completion of activity by the three oldest foundations, which were founded over 10 years ago. The total amount of investment made in Russian companies in 2007, exceeded USD 1 billion. From the total number of companies funded in 2007, those in the consumption sector are still leaders in attracting investments, while the expansion stage, like before, remains the most attractive for investors. The disproportion between investments at “venture stages” and later stages - the share of venture investments in the total volume of invested funds - remained almost unchanged in 2007 compared to the year 2006. At the same time, the volume of investments in monetary terms grew by more than one third.

In 2007 the funds managed by three companies that won a competition organized by the Ministry for Economic Development (in 2006), finalized several agreements for a total amount of slightly over USD 20 million. Revitalization of investments in this area had been expected in 2008/2009.

The infrastructure for seed funding in Russia is only beginning to take shape. The growing number of venture funds (see Figures 12 and 13), allowing for advancement of seed projects to start-up stage, activate the business community: the Joint Stock Company (JSC) “Russian Venture Company” plans to form seed fund, the Moscow “Agency for the Development of Innovation Entrepreneurship” proposes a system of measures, including financial, for the support of projects at “seed stage”. However, some weaknesses remain: slow development of communicative platforms, excessive bureaucratic regulations within the funding system, the early stages of creation of business incubators, etc.

---

162 Gutnikov O. Legislative Reform in S&T and Innovation // Foresight #3, 2007 (in Russian)
JSC “Russian Venture Company” (JSC “RVC”)\textsuperscript{163} was created by a Decree of the Government of the Russian Federation from 7 June 2006 # 838-p with a view to stimulating the creation of own venture investment industry in Russia, developing innovation sectors of the economy and promoting high-tech Russian products at international markers. The role of JSC “RVC” in the innovation system of Russia is that of a state fund of venture funds, through which state support to venture investment in Russia, as well as support to the high-tech sector in general will be channeled. The statutory capital of JSC “RVC” in 2008 amounted RUB 28 225 879 400 (€775 million). The priority areas of investment, formed with the participation of JSC “RVC” venture funds are set in line with the list of technologies of critical importance approved by the President of the Russian Federation. In 2010 RVC plans to start a number of specialized venture funds for biotechnology and microelectronics.

The JSC “RVC” took part in the creation of the High-tech Center of the Eurasian Economic Community (\textit{EurAsEC}). On 4 February 2009 the Intergovernmental Council of the Eurasian Economic Community (between heads of state) approved the creation of the \textit{EurAsEC High-tech Center} with the participation of the JSC “RVC” and of JSC “National Innovation Foundation” of the Republic of Kazakhstan.

Besides the already existing 2 venture funds “VTB-Venture Fund” (RUB 3,061 billion) and “BioProces Capital Ventures” (RUB 3 billion), 3 new ones appeared at the end of 2008: “Maxwell Biotech” (RUB 3,061 billion), foundation “Leader-Innovations” (RUB 3 billion), “Tamir Fishman CIG” (RUB 2 billion) and “C-Group Ventures” (RUB 1,8 billion). The total volume of venture funds, formed with the support of RVC funding since its foundation, reached RUB 15,9 billion (€436.5 million) in Spring 2008. RVC’s success is due to the proposed flexible mechanism of interaction, which even allows investors to buy out a fund. The condition for buy-out is a guaranteed 5% annual return of a fund.

As a result of the competition of RVC, the Managing Company, “Maxwell Asset Management” obtained the largest possible volume of state investments — RUB 1,5 billion, (€41 million) out of RUB 6,4 billion (€176 million). By the fall of 2008, the company created a special venture fund in the form of a closed mutual investment fund, which amounted to RUB 3 billion,(€82 million) of which 49% are the fund of JSC “RVC” and 51% are private investments. The investment focus of the fund, formed in line with Public Private Partnership principles, will be innovation projects in the sphere of biotechnology and medicine, biopharmaceuticals, industrial biotechnologies, production of food. The managing company “Maxwell Asset Management” defined four principal markets, where the fund’s interests are represented:

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure12.png}
\caption{The number of venture funds in Russia, 1994-2004 (data of the Russian Association of Direct and Venture Investment)}
\end{figure}

\textsuperscript{163} \url{http://www.rusventure.ru/}
1. Pharmaceutical market (about one half of planned projects). Investment in creation of a series of original home-made drugs.
2. Industrial biotechnologies. Investment in water purification and water treating technologies, in development of reagents for the cellulose-paper industry, oil extraction and oil and gas transportation, etc.

3. Agricultural market. Investments in the research of new growth stimulators and crop-protecting agents, new home-made veterinary drugs, etc.

4. Food industry. Investment in new bio-ingredients, elements of clinical nutrition, technologies for food waste disposal, etc.

In the first stage, the foundation gives priority to projects, products that are already sold or whose sales may start within the first year. Such approach allows the fund to start with less risky projects, accumulate experience and reinvest revenues in projects with higher risks and higher profits, as well as set long-term strategic relations with companies, whose project proved to be successful on the market. The main direction of fund’s investments at the initial stage is products' market development. The fund does not regard production as a priority, which allows saving time and resources (as production is a lengthy and costly process). Thus, the fund starts investing in companies, which have three key elements of investment attractiveness: market share of the product being sold; rights for new drugs; ability of a company to create new products (R&D).

A list of regional venture foundations and management companies, operating in the Russian Federation in 2007 may be found in Table 24. In addition to the listed ones, venture foundations in the following regions of the Russian Federation were created: St.Petersburg, Nizny Novgorod oblast, Saratov oblast (all managed by CJSC “VTB Asset Management”), Volgograd Oblast, Republic of Chuvashiya, Republic of Bashkortostan (all managed by CJSC “FinansTrust”), Voronezh oblast, Kaluga oblast, Samara oblast.

3.3.3 Private non profit-making S&T funding organisations from Russia

Charitable Foundations and non profit-making funding still have very limited relevance for S&T funding in Russia. One of the most important private organisations is the Dynasty foundation, which was founded by Dmitry Zimin, himself a former scientist and former boss of one of Russia’s mobile phone operators. Foundations have also been set up by famous Russian scientists such as the Nobel laureate Zhores Alferov, or by some of the so-called Russian oligarchs; this is the case for example for the Vladimir Potanin foundation. Usually funds are distributed in the form of excellence award grants to individual scientists.

Table 24: Regional venture foundations and management companies, operating in the Russian Federation as of 17.12.2007

http://www.dynastyfdn.com/english/
<table>
<thead>
<tr>
<th>Managing company</th>
<th>Russian region</th>
<th>Name of the foundation</th>
<th>City, web-site, email</th>
</tr>
</thead>
<tbody>
<tr>
<td>CJSC &quot;Managing company &quot;Troika Dialogue&quot;</td>
<td>Republic of Tatarstan</td>
<td>Foundation for the support of venture investments in small enterprises in S&amp;T sphere in the Republic of Tatarstan</td>
<td>Moscow info <a href="mailto:vc@troika.ru">vc@troika.ru</a></td>
</tr>
<tr>
<td></td>
<td>Krasnoyarsk krai</td>
<td>Foundation for the support of venture investments in small enterprises in S&amp;T sphere in Krasnoyarsk krai</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Moscow oblast</td>
<td>Foundation for the support of venture investments in small enterprises in S&amp;T sphere in Moscow oblast</td>
<td></td>
</tr>
<tr>
<td>JSC “Alliance ROSNO Asset Management”</td>
<td>Moscow city</td>
<td>Moscow venture fund</td>
<td>Moscow <a href="mailto:venture@allianzrosno.ru">venture@allianzrosno.ru</a> <a href="http://www.allianzrosno.ru/services/venture">www.allianzrosno.ru/services/venture</a></td>
</tr>
<tr>
<td></td>
<td>Perm Krai</td>
<td>Perm venture fund</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mordovia Republic</td>
<td>Mordovia venture fund</td>
<td></td>
</tr>
<tr>
<td>LLC “Managing Company “AK Bars Capital”</td>
<td>Republic of Tatarstan</td>
<td>Foundation for support to small venture investments in small S&amp;T enterprises of the Republic of Tatarstan</td>
<td>Moscow <a href="mailto:capital@uk.akbars.ru">capital@uk.akbars.ru</a></td>
</tr>
<tr>
<td>LLC “Managing company “Monomakh”</td>
<td>Tomsk oblast</td>
<td>Closed mutual investment fund of high risk (venture) investments “Regional venture fund of investments to small enterprises in S&amp;T sphere of Tomsk oblast</td>
<td>Novosibirsk <a href="mailto:mail@nsk.monomah.ru">mail@nsk.monomah.ru</a></td>
</tr>
<tr>
<td>CJSC &quot;Pioglobal Asset Management&quot;</td>
<td>Tumen oblast</td>
<td>Foundation for the support to venture investments in small enterprises in S&amp;T sphere in Tumen oblast</td>
<td>Moscow <a href="mailto:Welcome@pioglobal.ru">Welcome@pioglobal.ru</a> <a href="http://www.pioglobal.ru">www.pioglobal.ru</a></td>
</tr>
<tr>
<td>CJSC “Managing Company “Ermak”</td>
<td>Sverdlovsk oblast</td>
<td>Foundation for the support of venture investments in small enterprises in S&amp;T sphere in Sverdlovsk oblast</td>
<td>Perm <a href="mailto:mmolchanov@ermak.ru">mmolchanov@ermak.ru</a></td>
</tr>
</tbody>
</table>
3.4 State corporations

The Russian Government has in recent years created a number of state corporations formed as non-member, non-profit-making entities, founded by the Russian Federation, which put in assets. State corporations were created for the implementation of social, governance and other functions of societal importance. Each state corporation was created on the basis of a special federal law. Assets provided by the state to a corporation is the property of the corporation. State corporations may engage in entrepreneurial activity as far as it serves its statutory principles\(^{165}\). As of December 2009 there were seven state corporations – Bank for Development and Foreign Economic Affairs (Vnesheconombank), “Russian Technologies”, “RUSNANO”, Agency for Bank Deposits’ Insurance, Foundation for support to housing and utilities infrastructure reform, “Rosatom” and “Olympstroy”. Furthermore, in July 2009 the President of the RF signed the law establishing the state company “Russian highways (“Avtodor”), which will be in charge of developing a network of highways and adjacent infrastructure.

Each corporation corresponds to a particular thematic focus. A number of state corporations play an important role in supporting research. For instance, the Russian Corporation of Nanotechnologies “RUSNANO”, established in 2007, is designed as a state investment fund to support nanoinfrastructure, innovative projects in nanotechnology and other initiatives. Other state corporations are huge industrial enterprises, which have been established to consolidate certain research-intensive sectors of the Russian economy. This concerns Rosatom for the nuclear sector, the United Aircraft Corporation for the aviation sector and Russian Technologies for automobile and military technologies. All these corporations dispose of a number of research institutes.

Some of the state corporations are struggling with debts; a problem which has aggravated as a result of the current international economic crisis. Substantial financial means had therefore to be injected for example into the Russian Technologies and United Aircraft Corporations out of the federal budget\(^{166}\).

In August 2009 the President of the RF initiated an audit of state corporations’ activities with subsequent recommendations on expediency of this legal form of organisation. Special attention was paid to issues of financial prudence and effectiveness of the use of state property and financial resources allocated to them, as well as adherence to declared goals. This presidential initiative led to an expert discussion about the transformation of state corporations into other legal forms, which would not be awarded special status or privileges\(^{167}\). Rosnano would be transformed into Joint Stock Company by the end of 2010, Russian Technologies by 2014, while a decision on Rosatom will be made after 2011\(^{168}\).

3.4.1 United Aircraft Corporation

United Aircraft Corporation / Obedinyonnaya Aviasroitel’naya Korporatsiya (UAC / OAK)\(^{169}\) is a Russian government-owned corporation that incorporates aircraft construction

\(^{165}\) http://www.rian.ru/economy/20090807/180096090.html

\(^{166}\) The automobile producer Avtovaz (being part of Russian Technologies) has received RUB 37 billion and Sukhoi (belonging to UAC) received RUB 3.2 billion directly out of the federal budget. See Kommersant No. 242 (4297), 25.12.2009. GTK “Rossija” posadili na bjudzhetnye dengi” at www.kommersant.ru

\(^{167}\) http://www.rian.ru/economy/20090810/180402511.html

\(^{168}\) Quarterly Report of the EU Delegation to Russia, Moscow, January- March 2010

\(^{169}\) http://www.uacrussia.ru/en/
companies and state assets engaged in the design, manufacture, sale, maintenance, and upgrading of military, civil, transport, and unmanned aircraft.

The goal of the Joint Stock Company United Aircraft Corporation (JSC UAC) is to maintain and enhance the scientific and production potential of the Russian aircraft industry, to ensure the security and defence capabilities of the country, to pool intellectual, industrial and financial resources for the implementation of new aircraft development programmes.

UAC was established according to a Decree “On Joint Stock Company United Aircraft Corporation” signed by Russian President V. Putin on February 20, 2006 and was registered in November 2006. The government contributed assets of the largest state-owned Russian aircraft building companies to the UAC’s charter capital, which amounted to RUB 96.72 billion (€ 2.83 billion) at the time of its establishment. Meanwhile the charter capital has been increased to RUB 110.28 billion (€3.2 billion), of which the Russian Federation holds a share of 91.34%.

**UAC Strategy**

The “Main provisions of the Development Strategy of UAC for the period up to 2025” set forth the basic lines for the development of the Corporation. UAC aims to achieve the status of one of the world's largest aircraft industry centres with a diversified product portfolio of military, civil and transport aircraft. The implementation of this strategy should enable UAC to fulfil its priority tasks, including:

- satisfying the requirements of Russian state customers (Ministry of Defence, Ministry of Internal Affairs, Ministry of Emergencies and others) for advanced aircraft;
- competing successfully with American and European vendors in third countries' military aircraft markets;
- increasing sales of its civil aircraft in the domestic market by manufacturing competitive products with regard to foreign companies;
- gaining positions in niches of the foreign civil aircraft markets by 2025.

UAC includes the following companies: Aviation Holding Company Sukhoi, the Sukhoi Design Bureau, the Sukhoi Civil Aircraft, the Komsomolsk-on Amur Aircraft Production Association named after Yu.Gagarin, the Novosibirsk Aircraft Production Association named after V.P. Chkalov, the UAC - Transport Aircraft, the Ilyushin Aviation Complex, the Voronezh Aircraft Manufacturing Company, the Ilyushin Finance Cie, Tupolev, the Aviastar-SP, the Scientific and Production Corporation IRKUT, the Yakovlev Design Bureau, the Beriev Aircraft Company, the Finance Leasing Company, the Nizhny Novgorod Aircraft Building Plant SOKOL and the Taganrogskaya Aviatsiya.

A special “Federal Targeted Programme for the Aviation Sector 2006-2010” is available to provide funding for companies and R&D institutions under the roof of UAC. The UAC company Sukhoi currently develops the new Russian regional aircraft “Superjet”, which is a prestigious project and will revive civil aircraft production in Russia.

**3.4.2 Russian Technologies**

The State Corporation ”Russian Technologies” (Rosttechnologii)\(^ {170}\) was created at the end of 2007. It promotes the development, production and export of Russian high-tech industrial products. It supports its subordinated companies, which are developers and manufacturers of more or less high-tech products, to improve sales on the domestic and

\(^ {170}\) [http://www.rosttechnologii.ru](http://www.rosttechnologii.ru)
foreign markets. It also takes care of attracting investments in the various industries that it covers. Like other state corporations, Rostechnologii will facilitate the implementation of applied research and advanced technologies to enhance the domestic high-tech industrial output.

Rostechnologii is an important player in the military-industrial sector. It has a role in the implementation of state policy in the sphere of military-technical cooperation between the Russian Federation and foreign states and in the implementation of the state weapons programme. Rostechnologii is involved in selling military products on foreign markets. The Corporation is based in Moscow and headed by a General Director and supervisory body.

Main S&T related activities:
- Science and industrial technologies development:
  The corporation’s activity in the field of science and technology is devoted to R&D projects in natural science and in various fields of engineering science: industrial technologies, electronic component-based technologies, development of radio systems, information system technologies.

- Maintaining and developing the scientific and industrial potential in the various industries covered by Rostechnologii.
  Planned activities for the development of productive capacities focus on the reconstruction, technical equipment and creation of new industries based on advanced technologies. The implementation of innovative projects will lead to competitive products of civil purposes.

- Promotion and marketing of high-tech industrial products, as well as management of intellectual property rights (IPR)
  In 2008, the Corporation's efforts were aimed at creating a legal framework to protect the Corporation’s interests in terms of intellectual property rights on the domestic and export markets of high-tech industrial products. An intellectual property management concept for the Corporation has been drafted to define the basic principles, goals, objectives and mechanisms of action in the Corporation's acquisition of rights to intellectual activity and means of personalization, as well as their disposition. The concept will allow to create a uniform system of intellectual property management, increase the value of the Corporation's assets and entities, their competitiveness in the investment and innovation market, it will improve the scientific and technical capacity of the Corporation's organisations and ensure their access to advanced technologies

Funding programmes
  The Corporation implements a competitive selection of projects based on advanced technological solutions and their implementation through credit schemes, extra-budgetary and other funding. Financing of innovative projects is carried out on the basis of business plans for establishing high-tech products. In order to achieve the goals and perform the tasks specified for the Corporation, Rostechnologii participates as co-investor in a variety of Federal Targeted Programmes. In 2008, the volume of public contracts awarded by these institutions amounted to **RUB 38.5 billion**, or about €1 million (for R&D – 23% of this amount). It involved in R&D projects more than 180 organisations in 38 regions of the Russian Federation.

International Cooperation

---

171 See the federal target programs in the report of the Ministry of Industry and Trade RF
Rostechnologii has its own missions in 49 foreign countries. One of the tasks and functions of the Corporation’s representatives in foreign countries is to represent its interests in the sphere of scientific-technical and other cooperation. Within the frame of international cooperation working groups are formed to develop proposals for specific projects, and for technological and investment cooperation.

International cooperation covers the following technological areas:
- electronics, automotive, chemical industry;
- technological equipment and automation;
- integrated security systems;
- information technology and solutions, including IT-infrastructure, outsourcing and consulting;
- medical equipment and technology;
- energy-saving technologies.

**Strategic outlook**

Russian Technologies is a huge conglomerate of companies in various technological sectors, embracing more than 400 different organisations. It is quite questionable, whether such a state structure is efficient. Several of Rostechnologii’s companies are in serious economic trouble.172

### 3.4.3 Rusnano

#### Objectives of Rusnano

The Russian State Corporation of Nanotechnologies (Rusnano)173 was established in 2007 on the basis of Federal Law № 139. The Corporation is a public financial instrument established exclusively to develop nanotechnology and the nanoindustry throughout the Russian Federation. Rusnano is a sort of state-owned investment fund, which co-invests in nanotechnology industry projects that have high commercial potential or social benefit. Early-stage investment by Rusnano lowers risks for its investment partners from the private sector. Rusnano develops partnerships with leading nanotechnology centres in the world and organizes the annual International Nanotechnology Forum in Russia with the aim of assisting the Russian nanotechnology industry to progress on the global market and to strengthen its international links. The Corporation is based in Moscow and headed by a General Director and supervisory body.

#### Budget and targeted groups of funding:

Rusnano has received from the Russian federal budget a **founding capital of RUB 130 billion** (~ € 3.7 billion) in 2007. This capital as well as the interest resulting from its activity in the years 2008 to 2015 have been invested in the commercialisation of nanotechnologies. Target groups of Rusnano funding are therefore public or private companies, research organisations or individuals dealing with the implementation and production of nanotechnology inventions.

In 2008, total funding of investment projects (including R&D), infrastructure and educational projects amounted to RUB 20.5 billion (€563 million). In 2009 the budget was increased to RUB 24 billion (€544 million174).

---

172 For example the biggest Russian automobile producer AvtoVaz or the airline “Rossiya”.
173 www.rusnano.com
174 The decrease in Euro is explained by the change in the currency rate between 2008 and 2009, respectively 36.4207 and 44.1376.
**Funding Activities:**

- **Investment:**
  The main activity of Rusnano is to fund close-to-market investment projects in nanotechnologies. The Corporation supports the implementation of innovative nanotechnologies by bridging the gap between product development and the market place through investment at an early stage. Acting as a co-investor, the Corporation is not involved in the pursuit of profit and competition with business. Its main task is to assist business by sharing the risk linked with the development of nanotechnologies that have high commercial or social potential. Funding is provided in the form of long-term loans for periods of 5-10 years, which are given at favourable interest rates.
  Funded projects may include scientific research and development. A reasonable plan for the commercialisation of project results and for the registration of related intellectual property rights is an essential condition to the funding of projects.
  One of the most important areas of the corporation’s activities is the commercialisation of existing scientific and technological products and intellectual capital, which are government property or which have been developed with federal budget funding.

- **Measures accompanying Rusnano’s investment activities**
  Scientific foresight and roadmaps: In order to efficiently invest assets in critically important technologies, the Corporation uses scientific foresights and roadmaps to help determine the potential global demand in new, high-tech nanoindustry products. Roadmaps on possible directions of science and technology development in a given area are developed at the Corporation’s request and are readily available to other players in the innovation pipeline.

**Infrastructure:**

The Corporation supports scientific and technical infrastructure, such as centres of collective use of equipment, nanotechnology centres of excellence, scientific and engineering centres on the one hand. On the other hand, it supports the development of innovation infrastructure, including technology parks, business incubators and early-stage investment funds. The combination of these elements will help to overcome many barriers in the innovation pipeline such as: market, technology, interdisciplinarity, geographical and managerial barriers and thereby ensure an effective commercialisation of nanotechnologies.

The main users of the innovation infrastructure are teams involved in the research, development and production of nanotechnology-based products. Access to supported infrastructure is in principle open to all players of the innovation pipeline, but is granted on a competitive basis to those who make the most efficient use of equipment and services.

**Education:**

Rusnano finances the training and retraining of specialists in science, applied fields, entrepreneurship, finance, jurisprudence, and management. The Corporation develops educational programmes that support the projects in which it co-invests. These programmes are designed to bridge personnel gaps in the most rapidly developing market areas. Rusnano together with the Ministry of Education and Science of the Russian Federation and the concerned organisations evaluate the demand for specialists within the nanoindustry.

Rusnano follows an interdisciplinary approach here, to enable specialists to work throughout each stage of the innovation pipeline: fundamental research - technological developments - commercialisation of technology - introduction of nanoproducts onto the markets.

Certification is encouraged by Rusnano for the protection, standardization, certification and metrological provision of the nanoindustry. Health, safety and environmental issues will be made necessary as part of the certification process. Voluntary certification will create a
positive perception of nanoindustry products and their manufacturers on both foreign and domestic markets. Certification will cover:

- certification of compliance with Russian and international standards for nanoproducts and nanotechnologies;
- certification to support experts in decision-making on the investment projects;
- certification of quality management systems of enterprises working in nanoindustry (ISO 9000);
- certification of ecological management systems of enterprises working in nanoindustry (ISO 14000).

Rusnano also provides support for the popularisation of nanoscience and nanotechnologies with a view to enhancing its public acceptance.

**Results of funding activity**

In 2008, the first year of Rusnano’s effective existence, 91 projects with a total budget of RUB 142 billion (€3.9 million including RUB 91 billion or €2.5 million requested from the corporation or 64% of the total budgets for the projects) were evaluated (Figures as of December 31, 2008). Seven projects (six investment projects and one educational project) for a total amount of RUB 10.3 billion (€283 million), including corporation resources of RUB 5.5 billion (€151 million) were approved. In addition, in 2008 the corporation created a reserve of projects at various stages of assessment and preparedness. This Corporation has succeeded in setting up a processing system ranging from funding applications to project evaluation and approval by the Executive Board and Supervisory Council of Rusnano.

Until mid-October 2009 Rusnano received over **1250 applications** including more than 100 applications submitted either by foreign organisations or with foreign participation. The scientific and technical expertise of projects submitted to Rusnano is carried out by external experts. Objects of expertise include plans for nanotechnology production, applications for funding through the Corporation, R&D and training project’s plans in the nanofield, etc. Overall Rusnano has been given approval for the financing of 38 projects including one with international participation, and 25 foreign applications are going through final approval stages. The total volume of investment into **38 approved projects is ~ €2.2 billion including Rusnano’s share of ~ €1.2 billion.**

In March 2010 four projects, submitted under a call for proposals by centres in Kazan, Dubna, Zelenograd and Tomsk/Novosibirsk, were awarded the right to enter into an agreement with Rusnano for the creation of nanotechnology centers. Overall 19 billion Roubles (€500 million) will be invested by Rusnano for the development of its nanotechnology centers.175

**International Cooperation**

Rusnano will become an important global and regional player in nanotechnology and will develop cooperation with international organisations and large foreign companies. It will attract foreign investment in Russian nanotechnologies and facilitate cooperation between Russian and foreign companies. It will also assist Russian nanotechnology companies in entering the global market with their products. Finally a harmonisation of Russian and international regulations and safety standards for nanotechnologies will be enacted.

Meanwhile, Rusnano has concluded a range of international agreements, covering cooperation with Ministries (e.g. China), nanotechnology and innovation support bodies (e.g.

---

175 Quarterly Report of the EU Delegation to Russia, Moscow, January- March 2010
from Finland, South Korea) and international bodies (e.g. EBRD). Foreign entities may apply to Rusnano and receive funding, as long as they set up production in Russia.

**Strategic outlook**

Rusnano’s business strategy has been developed until the year 2020, which corresponds to the duration of the national “Programme of nanoindustry development in the Russian Federation”.

In the short term, an effective system for the commercialisation of nanotechnology intellectual property objects will be set up from 2008-10. In the medium term, large-scale output of nanoindustry products will be guaranteed until the year 2015 and Russian key nanotechnology producers will be introduced in the world's high-tech market. In the long term, up until the year 2025, nanotechnology will become a new pillar of the Russian economy.

### 3.4.4 Biotechnology Corporation

The open Joint Stock Company “Biotechnology Corporation” was established in March 2008 at the initiative and with the participation of the State Corporation “Rostechnologii” and the non-profit organisation “Fuel and Energy Union”. Biotechnology Corporation aims at developing a number of high-tech innovative biotechnology projects in the Russian Federation, including the establishment of a new industry branch for the manufacturing of biofuels. State of the art biotechnology centres for the production of advanced biotechnology products will be created on the basis of existing industrial sites of former hydrolysis and alcohol plants.

50.01% of the company shares is property of JSC United industrial corporation “Oboronprom” (which is 67% state-owned), 30% belongs to LLC “Innovative Technologies” and 19.99% to JSC “Finconsalt” (the last two were established by individuals). The corporation is an independent entity, which defines its own R&D and innovative policy.

The project to establish the Biotechnology Corporation is implemented in accordance with the “Programme of alternative energy development in Russia” signed by the Russian premier Vladimir Putin in January 16, 2009. The project's main target is to create a group of bio refineries for the processing of cellulosic waste and for the production of biofuel. Besides, the corporation will provide products for the agricultural, pharmaceutical and food markets, and for the chemical industry in the Russian Federation.

A multitude of economic, social and environmental objectives will be achieved through the corporation:

- development of small-scale power generation for steady power supplies of small towns of Siberia and the Far East;
- improvement of the cost efficiency of industries in the wood, petrochemical, pharmaceutical, agricultural and energy sectors;
- reduction in pollutant emissions through the use of environmentally-friendly motor fuel additives;
- creation of an alternative raw material base for the development of the pharmaceutical industry and of a feed protein base for cattle breeding (thus reducing dependence on imports);
- recycling of logging and lumber waste, as well as processing the hydrolysis industry’s waste;
- higher employment and development of the social infrastructure in depressed regions;

---

176 See: [www.corphitech.ru](http://www.corphitech.ru)
creating new conditions for labour migration from Central-European Russia to Siberian and Far East regions.

**Strategic outlook**

By 2020 the corporation will reach the following targets:
- creation of up to 30 high-tech biotechnology plants in the Russian Federation;
- reaching an annual sales volume of at least € 3 billion;
- creation of at least 15000 new jobs;
- reduction of the oil and gas sector’s production volumes through the manufacturing of at least 2 million tons of motor fuel additives per year from renewable raw materials without using oil and gas reserves;
- securing a reliable basis for Russia's food and pharmaceutical safety.

Bold investments into the Biotechnology Corporation had been planned before the current economic crisis. These plans are at a standstill, but may resume as soon as financial resources allow and higher oil prices make investment into fields such as bio-fuels more attractive. The corporation remains a small entity, which has strong links with leading biotechnology research institutions in Russia.

### 3.4.5 Rosatom

**Objectives**

Rosatom was established on December 18, 2007, following the adoption of the Federal Law On the State Atomic Energy Corporation «Rosatom», which took effect from December 5, 2007. It was intended to replace the Federal Nuclear Power Agency. It is the first time a state corporation has been created from an agency of the executive branch of the government.

The State Atomic Energy Corporation «Rosatom» runs all nuclear assets of the Russian Federation, both civil and military. Along with commercial activities to promote nuclear power and nuclear fuel cycle facilities, it acts as a governmental agent, primarily in the field of national security, nuclear and radiation safety, basic and applied science. Besides, it has the authority to fulfill, on behalf of the Russian Federation, the international commitments undertaken by the nation with regard to the peaceful use of atomic energy and non-proliferation.

The Russian Government has set three major goals for Rosatom:
- ensure sustainable development of the Nuclear Weapons Complex;
- increase nuclear contribution in electricity generation (to 25%-30% by 2030) with continued safety improvement;
- strengthen the country’s position on the global market of nuclear technology, by expanding traditional markets and gaining new ones.

**Main activities**

Rosatom gathers all the structures of the atomic industry under one roof, starting with uranium mining and its enrichment to decommissioning nuclear installations and disposal of radioactive waste.

---

177 Marquis, Adeline, Note N°6 / 2009, CNRS Bureau in Moscow, 21-04-2009
The Corporation’s structure is composed of three branches – the nuclear energy complex (Atomenergoprom), the nuclear weapons complex (NWC) and the branch that oversees nuclear and radiation safety and fundamental science.

Some state firms working in the nuclear field are under the supervision of Rosatom: Atomredmetzoloto (uranium production), TVEL (uranium production), RosEnergoAtom (running 10 Russian nuclear plants, with 31 nuclear reactors), Tekhsnabexport (export of fuel and services), Atomstroyexport (building of nuclear plants abroad), nuclear weapons enterprises, the federal state-owned unitary enterprise Atomflot running the nuclear ice-breaker fleet, and INTER RAO UES which manages energy assets in 14 countries and controls export/import of electricity.

Rosatom also coordinates research activities and research for the development and industrialization of the nuclear field. It is in charge of research institutes like the Russian Research Institute of Inorganic Materials (VNIINM) in Moscow, the Russian Scientific Research and Design Institute of Energy Technology (VNIPIET) in Saint Petersburg. It also has a role in the building and maintenance of nuclear plants in Russia and abroad (Finland, Iran). The, Russian Federation Institute of High-Energy Physics and Institute of Theoretical and Experimental Physics state scientific centers were both set up as the national experimental base for carrying out research in high-energy physics and nuclear physics, and still remain the principal Russian centers for basic studies in nuclear physics and for the training of young scientists. Many basic and applied studies are performed in federal nuclear centers, in particular, the Russian Research Institute of Experimental Physics in Sarov, and the Russian Research Institute of Applied Physics in Snezhinsk.

Basic research lays down the foundations of new applied nuclear technologies. Rosatom is at the forefront of the work on innovative economy. The greatest effort has gone into three innovative areas:
- water treatment (Water Technologies company),
- new isotopes for medical applications,
- superconductivity.

Special attention is given to nanotechnologies. Rosatom closely collaborates with the State Corporation, Rusnano. Currently, Rosatom scientists are developing demonstration nanotechnologies for the production of functional substances and products for the needs of nuclear, fusion, hydrogen and conventional power, as well as drugs, materials and products for the national economy in general.

Another important partner of Rosatom in basic research is the Russian Research Center Kurchatov Institute. In this cooperation Rosatom conducts plasma studies, develops new techniques for the use of synchrotron emission in material studies, prepares safety cases for commercial VVER and RBMK reactors. The results of these studies do not only help to improve existing technologies but also to find new promising technical applications.

**Budget and volume of financing**

Rosatom is directly subordinated to the government but is financially independent. The corporation is responsible for atomic energy and contributions to national defence and scientific research. Weaponry, research and some safety measures are financed by the federal budget.

The law establishes that financial programme support for the activities of the Corporation in the long term will be achieved by:
- the Corporation’s income;
- Federal budget subsidies;
• budget funds earmarked for national defence;
• property investments of the Russian Federation from the Russian state budget;
• supplements from the Corporation’s special reserve funds;
• other means of the Corporation and its subsidiary bodies.

**Funding programmes**

On the 20th September of 2008, the Russian government has adopted and published the *new Activity Programme of the Corporation Rosatom for 2009-2015*. The Activity Programme was elaborated by the Surveillance Council of Rosatom, before being submitted to the Russian government, approved by the government and then ratified by the President, in accordance with the socio-economic development project of the Russian Federation until 2020 and the General scheme for the distribution of electrical installations until 2020. This Activity Programme includes and strengthens federal sector-based programmes and development programmes concerning the activities of the State Corporation. It is a new budgetary device based on the State Corporation while former programmes were financed by the Federal Nuclear Power Agency.

Planned financing programme in the period until 2015 (7 years):

<table>
<thead>
<tr>
<th>Total:</th>
<th>RUB 2 084 billion (€57 billion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>From Rosatom:</td>
<td>RUB 1 264 billion (€34.7 billion)</td>
</tr>
<tr>
<td>From federal budget:</td>
<td>RUB 820 billion (€22.5 billion)</td>
</tr>
</tbody>
</table>

The Activity Programme is concentrated on four strategic objectives incumbent upon the Russian nuclear sector:

1/ Military and defence: protect the geopolitical interest of the Russian Federation, maintain its nuclear shield, and its rank in the nuclear power
2/ Energy: protect the energy independence of the RF and ensure its energy needs, respecting nuclear safety norms and radioprotection
3/ Industry and economy: create a leading company on the global market, grouping together all the organisations working in this sphere
4/ R&D: ensure the development of an innovative sector, including studies about the new generation of nuclear reactors, and the fuel closed cycle.

The recent *federal target programme on the new generation of nuclear technologies* aims at the creation of a new technological platform for nuclear power based on fast neutron reactors and closed fuel cycle. The programme is planned for 2010-2020 and should deliver new nuclear technologies of the next generation. Russia is a recognized leader in fast reactor technologies with sodium coolant; it is the only country in the world that has successfully operated a large-power commercial fast neutron reactor (BN-600 at Beloyarsk NPP). Scientific leadership in this area belongs to the Institute of Physics and Power Engineering named after A. Leipunsky (state scientific center of the Russian Federation). The programme also covers provisions from the foundation for commercial fusion power. The Troitsk Institute of Innovative and Thermonuclear Studies (state scientific center of the Russian Federation) takes the lead on plasma studies and laser physics.

**International Cooperation**

Further progress in nuclear power depends on the enhancement of nuclear and environmental safety, non-proliferation, safety and security of nuclear materials, and risk reduction. This can only be achieved through robust international cooperation aimed at large-scale and safe worldwide development of global nuclear power within the framework of the existing non-proliferation regime.
In international and intergovernmental agreements on peaceful nuclear cooperation, Rosatom acts as an executive or competent authority of the Russian Federation. Within the framework of international treaties and agreements, Rosatom and its subordinate entities participate in long-term and short-term projects and programmes initiated by individual countries and international organisations with a view to addressing the global or local challenges associated with further utilization of atomic energy or nuclear legacy. Particular attention is given to the cooperation seeking insurance and strengthening of the non-proliferation regime.

Rosatom has constructively interacted with international organisations, such as the International Atomic Energy Agency (IAEA), World Nuclear Association (WNA), World Association of Nuclear Operators (WANO), etc.

The government-to-government agreement signed in 1993 with the United States is being implemented. It covers the supply to the USA of low enriched uranium produced from high enriched uranium extracted from dismantled nuclear warheads (HEU Agreement). The supplied quantity is sufficient to meet more than a third of reactor fuel demand in the USA, Western Europe, Asian and Pacific Regions. The Russian contracting agent is TENEX (part of Atomenergoprom).

Following the Russian President’s Initiative of January 2006 on the creation of a global nuclear power infrastructure, an International Uranium Enrichment Center was established in Angarsk (Russia). The legal framework for the Center is the intergovernmental agreement signed between Russia and Kazakhstan. The Center was set up in compliance with Russian law as an open joint stock company, which opens market perspectives. The Center is a joint venture between Russian and Kazakhstan companies, and several Armenian and Ukrainian companies are about to join it. The Center is open for cooperation and investments from foreign companies, without any political conditions.

Other good examples of international cooperation include rapidly-growing collaboration between ARMZ Uranium Holding (also known as Atomredmetzoloto) and foreign partners on developing new uranium deposits in Kazakhstan and other countries. Atomstroyexport is building new nuclear power plants in Bulgaria, India and Iran, and TVEL is supplying nuclear fuel and its components for these projects. Atomenergomash has established a joint venture with the French group, Alstom. A Memorandum of Understanding was signed with Siemens (Germany) to establish a joint nuclear venture. There is a framework partnership agreement between Atomenergoprom and Toshiba Corp. (Japan). The international cooperation with WANO helps to enhance the safe operation of Russian nuclear power plants.

A new Rosatom’s company, INTER RAO UES, which deals with the export/import of electricity proves to be very efficient. The company controls a number of energy generation and distribution assets in Russia and abroad, with a total installed capacity of about 20,000 MW. The company deals with trans-border electricity supplies, hence ensuring sustainable energy supply to Russian and foreign consumers. By purchasing foreign assets, INTER RAO UES consolidates its position in commercially-attractive electricity markets in Europe, Transcaucasia, the Far East and Central Asia. Today, it has established cooperation agreements with 14 countries. Its partners, both in Russia and abroad, have achieved sustainable growth each year.
Rosatom takes an active part in international research programmes, e.g., in the ITER project. The project seeks to develop and build a thermonuclear experimental reactor based on Russian Tokamak installations. For example, the Chepetsk Mechanical Plant (a TVEL enterprise) has started production of superconductive materials specifically for this project.

Within the framework of its cooperation with the IAEA, Rosatom participates in three innovative research programmes:

- INPRO and Generation IV aimed at developing next-generation nuclear reactors
- and the Global Nuclear Energy Initiative aimed at developing nuclear reactors with closed fuel cycle and minimum waste generation.

The State Atomic Energy Corporation «Rosatom» welcomes open and mutually beneficial international cooperation which facilitates the safe and publicly acceptable development of nuclear power and the reinforcement of the non-proliferation regime.

### 3.5 Research performers

The Russian S&T system is dominated de facto by research organisations under public ownership. R&D statistics do not really reflect this fact, because a substantial range of public institutions are organised as companies and therefore included in statistics of the Business and Enterprise sector. Some major Public Research Organisations (PROs) absorb a large part of the Russian R&D budget.

The Russian Academy of Sciences (RAS) is historically and still today the most important Russian research organisation. It absorbs around a third of the Russian civilian R&D budget or more than RUB 50 billion (€1.4 billion) per year.

The second major PRO is the Russian Federal Space Agency (Roscosmos), which is responsible for the whole Russian space sector. Federal programmes finance R & D projects in the frame of the federal budget – RUB 305 billion (€6.9 million) Extra-budgetary funding constitutes about RUB 181.81 billion (€4 million). Russia’s Federal Space Programme for the period of 2006-2015 envisages further work in the section «Space means of technological purpose», along the following lines:

- Exoatmospheric astrophysics – accessing scientific data on the origin and evolution of the Universe;
- Planetology – the study of planets and small bodies of the Solar system;
- Study of the Sun, cosmic plasma and solar-terrestrial connections;
- Research in space biology, physiology and materials science.

Roscosmos holds open tenders for the conclusion of public contracts. Criteria for the creation of scientific & technical products are the price of the contract, the quality and the duration of the work performed (services) and the participant's qualifications. Through open tenders different R&D projects are selected, the funding of which ranges from RUB 55 000 to RUB 500 million (from €1 200 to €11 million). The main activities of Roscosmos have been described in chapter 3.1.

A third important PRO is the new National Research Center (NRC) «Kurchatovsky institute» which is in charge of the development of science and technologies in the Russian Federation in the areas of «Industry of nanosystems and materials» and «Power

---

178 For more details about ITER see section 4.2.3
engineering and power savings». The main component of the NRC is the Russian Research Center “Kurchatov institute” (RRC KI) in Moscow, which has been one of the leading Russian centres in the field of nuclear physics. Several other research institutes in related scientific fields will be linked with or integrated into the Center. The national nuclear research university MIFI\textsuperscript{180} is seen as one of the higher-educational partners of the NRC.

The joint infrastructure of institutes constituting the NRC will make it possible to carry out research on nano- bio- and information technologies with a view to achieving serious progress in the fields of artificial intelligence, the creation of supercomputers and hybrid nanosystems. The amount of funding allocated by the Government to support the activity and development of the research infrastructure at the NRC is estimated at RUB 10 billion (around € 270 million) for the period 2010-2012.

In recent years, some important public research performers have been transformed and integrated into state corporations. This concerns state corporations such as Rosatom, Russian Technologies and United Aircraft Corporation, which have been described in chapter 3.4 “State corporations”.

Branch institutes subordinated to ministries, state agencies or regional authorities, are another important group of PROs. These institutes have the status of fully or partly state-owned research institutes or companies. For example the former Federal Agency for Science and Innovation (FASI) had more than 30 institutes and companies under its guidance.

Universities have traditionally focused on education, but have played an increasingly important role in research over recent years; this evolution is encouraged and pursued by the government’s research policy.

The private sector, including foreign companies, has a relevant role as research performer, but its importance is difficult to grasp. This is due to the fact that a broad range of Russian research performers are publicly-owned companies.

3.5.1 Academic sector

About 143 000 people are employed at RAS and the other five Academies, including 80 000 researchers, 48 200 of whom have a scientific degree (see Table 25). The total number of employees has fallen down (by about 3,5 %). from 2000 to 2007, however, while this decline was significant for the RAS (9 %), the number of employees in the other academies (Agriculture, Education and Medicine) grew by up to 10 %.

Table 25: Personnel of the Academic sector\textsuperscript{181}.

<table>
<thead>
<tr>
<th>Academic Sector</th>
<th>Total</th>
<th>Researchers</th>
<th>Researchers with a scientific degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAS</td>
<td>96 969</td>
<td>56 764</td>
<td>34 600</td>
</tr>
<tr>
<td>RA of Agricultural Sciences</td>
<td>29 854</td>
<td>13 914</td>
<td>6 700</td>
</tr>
<tr>
<td>RA of Medical Sciences</td>
<td>13 272</td>
<td>8 007</td>
<td>5 700</td>
</tr>
<tr>
<td>RA of Education</td>
<td>1 562</td>
<td>1 176</td>
<td>780</td>
</tr>
</tbody>
</table>

\textsuperscript{180} See section 2.5.3 for National Research Universities.

\textsuperscript{181} Tendency in the development of human potential in Russian science (2008), Institute of the development of science in RAS, Moscow, p. 26.
• **Russian Academy of Sciences and its Institutes**

The Russian Academy of Sciences (RAS) plays a key-role in the Russian scientific sphere by participating in the elaboration of a scientific policy in collaboration with the Ministry of Education and Science, and by implementing such policy through a network of Institutes across the Russian Federation. It is a civil self-governed non-commercial institution, including scientific, science support and social organisations. The Academy comprises full members (academicians) and corresponding members elected by the RAS General Assembly and scientists of the Academy's institutes. The RAS structure is complies with disciplinary rules and territorial principles.

The management bodies of the RAS are the General Assembly, the Presidium and the President of the RAS. Its structure comprises discipline and branch specific divisions, regional RAS divisions and regional RAS scientific research centers (Figure 14). The principal objective of the regional branches consists in organizing and implementing scientific research, as well as promoting the most appropriate development for the region and the Russian Federation as a whole. They include scientific centres, institutes, other scientific organisations, science support and social organisations.

![Figure 14: Structure of the Russian Academy of Sciences](image)

**Objectives**

The principal aim of the Russian Academy of Science consists in organizing and performing fundamental research to promote technological, economic, social and cultural development in Russia. Its primary objectives include:

- **Development of scientific research**
  - fundamental and applied scientific research on the most important issues of natural, technical, social sciences and humanities;

- **Scientific and financial support to scientists**
  - training and support of highly-qualified scientists;
  - support to young scientists;
  - participation in the training of higher-education specialists;
  - development of science;
  - promotion of scientific knowledge and scientific research achievements.

- **Coordination and implementation of State Policy**
  - coordination of fundamental scientific research funded by the Federal Budget;
  - development and implementation of: the State's Scientific Research Policy; expert assessment and major scientific research programmes and projects.
• **Interactions with the industry**
  - development of forecasts on technological development and on Russia's position and role in the high-tech market;
  - enhancement of scientific cooperation and interaction with industry-specific scientific academies; implementation of scientific and technical achievements, assistance in the development of the high-tech branches of the Russian economy.

**Main activities**
The RAS is entitled to manage its activities, establish, reorganize and liquidate its constituents. The Academy annually presents the President of the Russian Federation and the Government with reports on scientific research, scientific and engineering results, as well as proposals on the main priorities of fundamental and applied science development.

• **Determining scientific directions**
  - determining the principal and most promising fundamental research directions.

• **Providing technical instruments and economic services**
  - providing instruments for research, in particular via collective access centers, the establishment of research infrastructures, higher education institutions, etc.;
  - undertaking the construction of RAS science facilities, as well as research and social facilities;
  - providing technical and economic services for its activities and real-estate;

• **Intermediary between RAS employees and State Policy**
  - participating in the expert assessment of the S&T research programmes and projects funded by the Federal Budget and the Russian Federation;
  - safeguarding copyrights for RAS scientists and organisations, participating in the implementation of State Policy;
  - ensuring compliance with the obligations related to State protection, proprietary and commercial secret provided for by the legislation of the Russian Federation;
  - securing social protection of RAS employees, and representing employers for the development, execution and performance of industry (tariffs) agreements.

• **Administrating science in Russia**
  - establishing its representative offices and branches;
  - establishing science councils, committees and commissions on the most important science and technology fronts;

• **Ensuring information and communication**
  - acting as a publisher: establishing printing houses; establishing and publishing academic, scientific and popular science magazines;
  - organizing and ensuring information support for scientific research (libraries, museums, scientific congresses, conferences); developing scientific information networks, databases and banks within the Russian territory.

**Budget and volume of funding**
The principal source of funding of the RAS is the Federal Budget. The regional branches (the Far East, Siberia and Urals Divisions) are direct recipients and principal administrators of Federal Budget allocations. Additional sources (including foreign currency) of the RAS and organisations funding are as follows:
• Federal Budget resources provided under the Target Federal Programmes, those provided by the ministries, agencies and committees, as well as by the state scientific research foundations;
• public and private foundations funds, including international foundations;
• revenues from arrangements, agreements, contracts with legal entities and individuals in Russia and other countries;
• revenues derived from the use of assets and other property rights;
• voluntary donations by various organisations, including foreign organisations;
• revenues from other budget and off-budget sources received by the RAS and other organisations.

Funding programmes
RAS Presidium programmes were initiated in 2001, in order to channel the material and intellectual resources of RAS institutions along the priority lines of fundamental research conducted in humanities, natural and social sciences.

Project funding is awarded on the basis of competition. The main criteria for evaluation are the feasibility of project results, the disclosure of relevant information and a regular public accounting system. The funding covers interdisciplinary fundamental scientific research conducted by several organisations which answer to the same Academy, but which specialize in different fields of research.

In order to fund new RAS Presidium programmes, academics analyze the results of previously-conducted research as well as the global trends of fundamental science. Then, they formulate programme proposals which they submit for review by a commission of the RAS Presidium. The commission issues conclusions on these programmes and submits them to the Presidium, which in turn approves the programmes’ final list, their coordinates and the budget foreseen. Thereafter, each of these programmes establishes a scientific council composed of leading scientists from the corresponding discipline. On a competitive basis, these councils select projects for the implementation of the work assigned. The commission convenes every year and adopts decisions concerning the allocation of funding for the subsequent period of the programmes’ performance.

The objectives of the Fundamental Research Programme of the RAS (2008-2012) are:
- to expand and deepen knowledge on social sciences, as it applies to the interests of social and economic development and the strengthening of the Russian Federation’s security;
- to increase the international prestige of Russia’s fundamental science, and develop its human resource potential.

Its tasks include:
- ensuring the competitive selection of projects
- consolidating scientific ties between the various Academies, ensuring the coordination of fundamental research conducted both by the RAS and by academies which do not conduct fundamental research;
- stimulating the integration of academic science;
- training and retaining scientific staff in academic science, lowering the average age of personnel involved in fundamental scientific research; developing leading scientific schools;

182 Facts and figures on funding activities by scientific disciplines and on fundamental research programs conducted by RAS departments may be found in Annex 8
- integrating Russian fundamental sciences into the global scientific area (implementation of international programmes and projects, international scientific events…)
- modernizing the experimental capabilities of scientific organisations;
- elevating the prestige of science in society and popularizing the scientific achievements of fundamental research.

International Cooperation

The RAS international cooperation policies target the study and analysis of international scientific achievements in order to use them in Russia and the development of international scientific cooperation.

Collaboration with foreign partners is carried out through agreements for scientific cooperation with the academies of sciences and other research organisations, the establishment of national committees and international research centers within the Academy, and broad collaboration with international and foreign scientific organisations.183

Other activities include the representation of Russian scientists at international scientific unions, participation in international organisations, international scientific congresses, conferences, symposia and seminars, international exhibitions, etc.

- Others academies

Others academies have been created to conduct fundamental and applied research in various fields. The main tasks of the different Academies are similar to those of the Russian Academy of Sciences, in their own sphere.

The Russian Academy of Agricultural Sciences is devoted to research relating to the agro-industrial sector. It organizes the study of economics and the social aspects of rural development, agro-ecology, soil management, plant protection, forestry, veterinary medicine, genetics, biotechnology, mechanization and engineering, electrification and automation, and the storage and processing of agricultural products.

The Russian Academy of Education conducts scientific research and takes part in the coordination of research related to paramount problems concerning educational, pedagogic and psychology sciences, Its main objectives consist in gaining new understanding of modern human development and of how education develops in children and adults. It also seeks to ensure a constant rejuvenation of knowledge in pedagogical, psychological and related sciences.

The Russian Academy of Medical Sciences aims to organize and pursue scientific research activities aimed at gathering new knowledge in medical and biological sciences, as well as their related life sciences. This includes the development and creation of advanced technologies aimed at maintaining people’s health and improving their living standards and life expectancy, as well as strengthening the country’s labor and defence potential.

Federal budget funds provide the main source of financing for fundamental and high-priority applied scientific research conducted by the Academies (See Table 26). The Academies are the recipients and controllers of federal budget funding, including funds designed to finance the activities of organisations under their jurisdiction (such as scientific and social service organisations) and state investment for the support and development of the scientific and social infrastructure.

183 The list of RAS agreements on international S&T cooperation may be found in Annex 9
### Table 26: Federal budget funding assigned to the Academic fundamental scientific research Programme for 2008 – 2012

<table>
<thead>
<tr>
<th>Academy</th>
<th>Federal budget funding amount (million RUB)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2008</td>
</tr>
<tr>
<td>The RAS and its regional branches</td>
<td>38 628.49</td>
</tr>
<tr>
<td>Russian Academy of Medical Sciences</td>
<td>3 710.8</td>
</tr>
<tr>
<td>Russian Academy of Agricultural Sciences</td>
<td>3 819.9</td>
</tr>
<tr>
<td>Russian Academy of Education</td>
<td>347.03</td>
</tr>
<tr>
<td>Russian Academy of Arts</td>
<td>89.46</td>
</tr>
<tr>
<td>Total</td>
<td>46 693.34</td>
</tr>
</tbody>
</table>

### 3.5.2 Higher Education Sector: R&D Performing Universities

In Russia, the Higher Education sector has traditionally been limited to education with little involvement in R&D activities. Research and development were concentrated in the Academy of Sciences and branch institutes sector. This division had been established in the Soviet Union and was inherited by Russia, although several leading universities have always performed R&D at the highest level. This is the case of Moscow State University, Moscow Physical Technical Institute, St. Petersburg State University, Novosibirsk State University, etc. In the year 2007 there were 616 HEI performing R&D, accounting for 15.6% of all R&D performing institutions in Russia. In terms of R&D personnel, 6.1% of the Russian R&D personnel was employed in the Higher Education sector in 2007. Interestingly, while the overall Russian R&D personnel has been constantly declining since the 1990ies, in the Higher Education sector, an increasing trend has been observed over the past ten years. This confirms efforts to strengthen research in universities.

In Russia, the higher education institution (HEI) is defined as an institution providing higher professional education in accordance with the state accreditation. There are three types of HEIs: universities (multidisciplinary HEIs performing educational programmes in many fields of knowledge), academies (preparing a wide range of specialists for a particular sphere of activity, e.g. agriculture, health, arts etc) and institutes (HEI performing R&D and education in a particular area of activity; they are often part of a university or academy).

Recently, the Russian Government has decided to establish National Research Universities in order to increase synergies between research and higher education, and to create centers of excellence across the Russian territory. This is an important step considering the traditional separation of research institutions from the higher education system. The

---

184 HSE, Science Indicators: 2009, Moscow.
national research universities should generate knowledge, create a wide spectrum of fundamental and applied research programmes and play an important role in the transfer of technologies towards the economy. Two pilot universities have been selected to be pilot test cases: the Moscow Institute of Steel and Alloys State Technology University and the Moscow Engineering and Physical Institute. After a competitive examination, 12 National Research Universities have been selected for a period of 10 years, and 14 National Research Universities have thus been approved. They will each receive an amount of RUB 1.8 billion each year between 2009 and 2018\textsuperscript{185}.

One should also mention a promising programme for the development of R&D and innovation human resources (HR) in HEIs. This Federal Programme called “Scientific and Scientific-Pedagogical Human Resources for an Innovative Russia” was prepared for the period 2009-2013 (President Commissions, 04.08.2006). The aim of the Programme is to provide institutional support for efficient HR development of the S&T and innovation sphere. This could be achieved by attracting and involving young talented and highly-skilled professionals in S&T and innovation projects and by consolidating highly-performing HR in these areas. The Programme includes a number of actions and mechanisms to achieve this goal: special centers of excellence for science and education, a system of grants for young promising scientists and teachers, particular mechanisms to attract young promising scientists and teachers from abroad, a system of grants for the development of innovative infrastructures etc.

All the actions mentioned above, together with other mechanisms and initiatives, should significantly boost R&D and innovation in the Russian HEIs sector and are expected to have considerable impact on Russia’s NIS and economic growth. It is important to bear in mind that all actions concerning the NIS should be closely coordinated.

\subsection*{3.5.3 National Research Center “Kurchatov Institute”}

The National Research Center (NRC) «Kurchatovsky institute» was created as a pilot project on April, 28th, 2008 according to the Decree issued by the President of the Russian Federation V.V. Vladimir Putin\textsuperscript{186}. It concentrates on:

- boosting the commercialisation of research results, and carrying out complete and innovative research and development activities, including the creation of industrial samples, in priority areas for the development of science, technologies and technics in the Russian Federation, such as: «Industry of nanosystems and materials» and «Power engineering and power savings»,
- coordinating scientific activities for the implementation of the Presidential initiative «Strategy for the development of nanoindustry»,
- developing principles for the construction and functioning of national research centres.

In addition to its primary activities, the NRC "Kurchatov institute” will participate, on behalf of the President of the Russian Federation and of the Government, in the implementation of large-scale international projects in the area of creation and implementation of research infrastructure.

In order to ensure favorable conditions for the successful implementation of the project, the Russian Research Center "Kurchatov institute" comes under the direct responsibility of the Government of the Russian Federation by the Order of the Government of the Russian Federation from December, 14th, 2009\textsuperscript{187}.

\textsuperscript{185} For more details, see section 2.5 Distribution between education and research
\textsuperscript{186} [http://www.kiae.ru/index34.html](http://www.kiae.ru/index34.html)
\textsuperscript{187} [http://www.kiae.ru/index37.html](http://www.kiae.ru/index37.html)
In the pilot project for the creation of the NRC, besides the Russian Research Center “Kurchatov institute”, RRC KI (Moscow), a few other leading Russian research institutions are taking part, such as the Konstantinov Institute of Nuclear Science, PNPI (Gatchina near St.Petersburg), High-energy physics institute, IHEP (Protvino, Moscow region) and Institute of theoretical and experimental physics, ITEP (Moscow). Those centres are the leading Russian centres in the field of nuclear physics and they have various large and unique research facilities.

Figure 15:

Composition of research and educational institutions in NRC “Kurchatov Institute”

The research and development programme of the NRC will be focused on the following horizontal activities using unique Mega-Sciences complexes:
- Modernisation and decommissioning of Mega-Facilities
- Research and development of new national state-of-the-art Mega-Facilities
- Education programme and infrastructure support of Mega-Science
- International cooperation in Mega-projects (ITER, XFEL, CERN, FAIR, BOREXINO,….

The NRC framework is a new strategic element of Russian innovative infrastructure aiming at introducing modern management methods, organisational structure and activities in the scientific sphere, setting up a complete chain from fundamental discoveries to the implementation of technologies focused on Russian traditional areas of expertise, but also developing new areas which will define key vectors of global technological competition.

The process is essentially aimed at establishing a system approach to the management of large-scale, unique installations at national level and using them to develop research programmes. To a certain degree this approach can be compared to the activity of the German company, Helmgoltz and to leading American laboratories.

In the long run, the experience of the pilot project is planned to facilitate the creation of approximately five-seven similar centres in Russia.
3.5.4 Business sector

- **Multinational companies and financial Industrial Groups**
  
  An important part of research is carried out in large Russian companies and Financial Industrial Groups (Holdings). Research departments and research organisations are included in the holdings.

  Gazprom, which is the world’s largest gas producer and which is mostly state-owned, boasts several mainly gas-related research and technology development institutes (e.g. VNIIGAZ).

  The Joint Stock Financial Corporation SISTEMA\(^\text{188}\), active in several high-tech fields, began establishing R&D centres in each of its main businesses in 2006. A new high-tech R&D centre, the first public-private R&D center “Sitronics” was created jointly with the Institute for Information Transmission Problems of the RAS in Moscow. Sistema has recently launched also its own Corporate University.

  Russia's state-owned oil company Rosneft and the Moscow State Institute of International Relations (MGIMO) and its International Institute of Energy Policy and Diplomacy (MIEP) have signed a Strategic Partnership Agreement that includes the organisation of necessary studies on issues relevant to Russia's petroleum industry and the training of professionals for the oil and gas industry at different levels (professional training, bachelor and master degree programmes, other)\(^\text{189}\).

  Another large oil industry holding, Lukoil, has helped acquire scientific equipment for research labs besides performing research. For example, in 2007, considerable funds were allocated to the development of the material and technical infrastructure of the Gubkin Russian State University for Oil and Gas, Moscow Physical Technical Institute, Perm State Technical University, Ukhta State Technical University.

- **Foreign companies**

  Private sector R&D is conducted in some foreign multinational companies. Universities and scientific institutes have formed partnerships with large international companies such as Intel, IBM, and Cisco Systems. Other foreign companies active in R&D in Russia include Siemens, Microsoft and Samsung.

  In 2006, IBM opened its first Russian Systems and Technology Laboratory in Moscow, which focuses on mainframe technology development. In 2007 the lab submitted two patent applications, three in 2008, and six in 2009 (only one was granted). In 2008, IBM also opened the Russian Center for Advanced Studies. Similarly, in 2005 General Motors opened an R&D office in Moscow to involve Russian science institutes and universities in the research of fuel cells, hybrid and electronic controls, and battery research.

  Annex 10 provides a list of activities supported by Russian business groups and multinational companies.

---

\(^{188}\) [www.sistema.com](http://www.sistema.com)

4. International cooperation

Favourable regulations for international S&T co-operation are stated in Russian Federal law\textsuperscript{190}. The “Strategy for the Development of Science and Innovation in the RF for the Period till 2015”\textsuperscript{191} includes a short chapter on positioning the Russian research sector in a global context. Cooperation with the EU is stressed here. A number of new programmes and commitments taken at Russian governmental level relevant for international cooperation have been discussed in the first chapter on S&T strategy and governance. One of the programme initiatives worth pointing out once more is the Federal Targeted Programme "Research and Development in Priority Fields of S&T Complex of Russia for 2007-2012" that allows for participation of foreign entities.

4.1 S&T cooperation agreements

4.1.1 Cooperation agreements with the EU Member and Associated States

When looking at the forty-nine cooperation agreements Russia has concluded with foreign partners\textsuperscript{192}, a strong focus on cooperation with countries of the European Union and countries associated to the EU R&D Framework Programme is obvious. The Russian Federation has active agreements with fifteen out of the twenty-seven EU members\textsuperscript{193} and with five associated countries to FP7 (Israel, Norway, Macedonia, Serbia and Turkey).

- The EU-Russia S&T Agreements

The Agreement on cooperation in science and technology between the European Community and the Government of the Russian Federation\textsuperscript{194} was signed on 16 November 2000 and entered into force on 10 May 2001. The Agreement was renewed for another five years\textsuperscript{195} following the Council Decision on 30 March 2009. The agreement is a formal basis of cooperation in scientific and technological research between the EU and Russia in the following fields: environment and climate research, including earth observation; biomedical and health research; agriculture, forestry and fisheries research; industrial and production technologies; materials research and metrology; non-nuclear energy transportation; information society technologies; social sciences research; science and technology policy; and training and mobility of scientists.

For steering the EU - Russia S&T cooperation and for implementing the Agreement, a number of coordination mechanisms have been established. This includes the Joint EU-Russia S&T Cooperation Committee (S&T Agreement Steering body) and Joint Thematic EU-Russia Working Groups on most topics of FP7: Nanotechnologies, Health,

\textsuperscript{190} According to Article 16 "International Scientific and S&T Co-operation of the Russian Federation” of the Federal Law No. 127-FZ of 23 August 1996 "On Science and State S&T Policy" "Public authorities of the Russian Federation create the necessary conditions for international scientific and S&T co-operation. The actors in scientific and/or S&T activities may join international scientific and S&T organisations or associations, participate in international scientific and S&T programmes or projects, scientific and S&T programmes or projects of foreign countries, conclude agreements (contracts) and other agreements with foreign legal entities to perform work in or outside of Russia in accordance with the legislation of the Russian Federation”.


\textsuperscript{193} The countries listed at the Russian Ministry’s website are: Austria, Bulgaria, Czech Republic, Finland, France, Germany, Hungary, Italy, Netherlands, Poland, Romania, Slovakia, Slovenia, Spain, and United Kingdom.


Food/Agriculture/Biotechnologies, Energy, Environment, Aeronautics, Space, Nuclear Energy Fission Research, ICT and Mobility. The Working Groups involve representatives of the European Commission (of Directorate General Research, except for Space which involves Directorate General Enterprises), Federal Agencies, Russian ministries and scientists, Russian NCPs; on the EU side, these Working Groups are headed by Directors in charge of the corresponding themes.

- The EU – Russia Partnership and Cooperation Agreement (PCA). Four Common Spaces

The EC – Russia PCA was concluded on 24 June 1994; as the PCA expired in 2008, negotiations on a new agreement were launched at the June 2008 Summit between EU and the Russian Federation. Following the Russia/Georgia conflict the EU postponed the second round, pending withdrawal of Russian troops to positions held prior to August 7, 2008.

In 2003 four strategic cooperation directions named “Common Spaces” were launched within the PCA. They cover Economic Issues & the Environment; Freedom, Security & Justice; External Security; and Research & Education, including Cultural Aspects.

The Common Space on Research, Education, and Culture includes strengthening Russia’s participation in the EU Framework Programme, implementation of the Bologna process in higher education in Russia and harmonisation of rules and regulations. A Permanent Partnership Council (PPC) has been established, which held its first meeting in May 2008. An important project in the framework of this common space is the European Studies Institute (ESI) in Moscow, which is co-financed by Russia and the EU.

4.1.2 Euratom Programme international agreements

EU – Russia cooperation in the area of research in fusion, fission and radiation protection takes place within the Euratom nuclear research Programme. Euratom energy research activities are carried out under the Euratom Treaty, which established the European Atomic Energy Community (Euratom) in 1957. Euratom is legally separated from the European Community (EC) and has its own Framework Research Programme, however managed by the common Community institutions. According to the Council Decision concerning the Seventh Euratom Framework Programme (Euratom FP7) for nuclear research and training activities, € 2 751 million will be spent over five years (2007-2011).

In FP7 Euratom, there are two associated specific programmes: one covering indirect actions in the fields of fusion energy research (these indirect actions are managed by the Commission's Directorate-General for Research - DG RTD) and nuclear fission and radiation protection, the other covering direct actions in the nuclear field undertaken by the Commission's Joint Research Centre (JRC). FP7 Euratom aims at addressing major issues and challenges in nuclear research and contributing to further consolidation of the European Research Area in the nuclear energy sector. High-level agreements between Euratom and third countries facilitate the cooperation in this field. Moreover, participation of third countries in projects is possible on an ad hoc basis (See Table 27 for the agreements with Russia). An important example of international collaboration is the ITER Project which provides a major step towards the creation of prototype reactors for fusion power stations. This project is implemented by a multinational consortium, including the EC and the Russian Federation (see section 4.2.3).

196 http://www.eurocollege.ru/
198 The legal basis of international agreements is Art. 101 of the Euratom Treaty
### Table 27. Euratom bilateral agreements with Russia

<table>
<thead>
<tr>
<th>Euratom bilateral agreements with Russia</th>
<th>Signatures by both parties</th>
<th>Entry in force</th>
<th>Last renewal</th>
<th>Next renewal</th>
</tr>
</thead>
</table>

### 4.2 International programmes and initiatives

#### 4.2.1 EU/European programmes

- **INTAS**

INTAS, the International Association for the promotion of cooperation with scientists of the New Independent States of the Former Soviet Union, was created in 1993 as a specific instrument for the support of scientific cooperation between EU Member states, Associated Countries and the states of the Former Soviet Union. INTAS is currently being closed and did not launch any new research funding activities after 2006.

Russia, together with Ukraine, received over 75% of INTAS funding for the research projects of Open and Thematic Calls and Young Scientist Fellowships. It was due to the size of the country and its important scientific potential. Over the FP6 period, from 2002 to 2006, INTAS had funded 420 research projects involving more than 800 teams from Russia. INTAS was very successful as it provided a strong networking effect, reaching out to broad groups of scientists, not only in the major cities of Moscow and St. Petersburg, but also to top scientific centres in regions such as Novosibirsk, Kazan, and Tomsk. Regarding the number of projects and research teams involved, INTAS supported significantly more projects than the FP or ISTC, and was a source of major support to young scientists. Projects output measured in terms of joint publications and patents did confirm the true collaborative efforts undertaken by the European scientists and their colleagues from the Former Soviet Union. Excellence was proven by publications in top scientific journals.

Within INTAS Open and Thematic Calls for research projects, Russia received 22.4 million € in the period 2002-2007. Moreover, young scientists from Russia received 6.7 million € through Young Scientist Fellowships during the same period.

Nanosciences, nanotechnologies, materials and new production technologies had the largest share in INTAS research projects. Russia’s closest partner country was Germany (49 joint projects), closely followed by France (48) and the UK (35). Russia had the highest number of joint research projects with Germany in all scientific fields but social sciences and humanities.

Owing to INTAS calls, Russia received € 50 million of R&D support from the EU during FP6, in addition to direct support via the FP. INTAS is well known in Russia for its broad outreach to scientific disciplines and for having provided support to science during difficult times.

The key institutions in Russia with the highest participation in INTAS funded projects include the following organisations:

- **M. V. Lomonosov Moscow State University** had the highest participation in INTAS

---

199 There is an initial period of 5 to 10 years, then an agreement is renewed automatically for 5 year periods

200 INTAS, A bridge to partnership in research, Activities over the FP6 Period 2002-06, Brussels, 2007, 4 and 30.
projects during the years 2002-2006, with 61 teams participating in projects of Open Calls,
Collaborative Calls with GSI, CNES, CERN, South Caucasus and in different Thematic Calls. A. N. Belozersky Institute of Physico-Chemical Biology, Faculty of Physics, Faculty of
Chemistry, Faculty of Mechanics and Mathematics and Center for Sociological Studies
were the most active project partners from the Moscow State University, thus covering the
majority of scientific fields.

- **Joint Institute for Nuclear Research (JINR)** in Dubna, Moscow region, came second
with 39 teams participating in INTAS projects. JINR had well established collaboration
with CERN and GSI in a number of projects of Collaborative Calls.

- **Institute for Theoretical and Experimental Physics (ITEP)** in Moscow also had a
very important share in INTAS projects – altogether 28 teams participated. ITEP was
especially active in the Collaborative Calls with GSI, but also in the Collaborative Calls
with CERN with 5 projects.

- **St. Petersburg State University** had 24 participations in INTAS projects covering a
range of scientific fields, being most frequently represented by its Faculty of Mathematics
and Mechanics.

- **Petersburg Institute of Nuclear Physics** had 21 teams participating in INTAS projects.
The important majority of projects were funded under INTAS Collaborative Calls with
CERN, also 6 with GSI.

- **Institute of Applied Physics** from Nizhny Novgorod was the first participating research
organisations outside Moscow and St Petersburg with 18 teams represented in INTAS
projects. Most of the projects were funded under INTAS Open Calls.

- **A.F. Ioffe Physico-Technical Institute** of RAS from St. Petersburg had 17
participations in INTAS projects, in addition to Framework Programme projects.

- **Institute for High Energy Physics** in Protvino participated in 15 INTAS projects
mainly funded within Collaborative Calls with CERN. Four of these projects were
supported in the frame of Collaborative Calls with GSI.

- **Institute for Nuclear Research** of RAS, Moscow had 14 research teams in INTAS
projects, nearly half of them being projects within Collaborative Calls with GSI.

- **P.N. Lebedev Physical Institute** from Moscow participated in 14 research projects
which were almost equally funded under Open Calls and Collaborative Calls with CERN
and GSI.

- **Russian Research Centre 'Kurchatov Institute',** Moscow, had 13 teams participating
in INTAS projects in the field of nuclear research.

- **Steklov Institute of Mathematics** of RAS from Moscow and its branch in St.
Petersburg were active in 12 INTAS research projects, mainly funded under Open Calls.

- **Space Research Institute** of RAS from Moscow participated in 10 projects, 3 of them
being research projects within INTAS Thematic Call with ESA 2006.

- **St. Petersburg State Polytechnic University,** mainly represented by its Faculty of Physics
and Mechanics, also participated in 10 INTAS projects.

- **EU Framework Programme for Research and Technological Development**

  The EU Framework Programmes (FP) are the main tool at the EU level for funding
Research and Technological Development in a broad range of scientific disciplines. The FPs
are targeted at the EU member states and countries associated to the FP. Over time, the FPs
have become more open to participation of so-called “Third Countries”, a term referring to countries, which are not members of the EU or which are not associated to the FP. Considering the cooperation patterns in the EU Framework Programme, Russia has consistently the highest participation of all Third Countries in past FP’s and the current FP7 (2007-2013). Entities from the Russian Federation participate in all thematic and sub-programmes of FP7 with a Community contribution of € 29 million\(^{201}\). Russia has signalled its interest in an associate status to the FP7.

During the FP6 period (2002-2006), Russian teams were involved in 310 projects funded in the different programmes of FP6 (including Euratom). 455 Russian teams participated in these projects and received an EC contribution of around 50 million euros\(^{202}\). Most projects with Russian participation were funded in FP6 fields of Sustainable development, global change and ecosystems, Nanotechnologies and nanosciences and Information society technologies (IST)\(^{203}\).

Within FP6 Russia had partners from 89 countries, the most intensive collaboration being with Germany: the German partners of Russian organisations constituted 14 % of all partners in FP6 projects, the British - 11.2%, the French - 10.5% and the Italian - 7.6% (see Figure 16).

**Figure 16: Share, %, of the number of partners from EU Member and Associated States in FP6 projects with Russian participation, 2002 – 2006.**

In the following are some details on the participation of 455 Russian teams in 310 projects of FP6. The distribution of Russian teams in these successful FP6 projects by Research Areas and Research Activities are summarized in Figure 17.

Out of the 7 Priority Thematic Areas of FP6, “Sustainable development, global change and ecosystems” had the highest share of Russian participants. 89 Russian teams were collaborating in 58 projects. P. P. Shirshov Institute of Oceanology of RAS was


\(^{202}\) European Commission, FP6 Data, 2008, [www.cordis.lu](http://www.cordis.lu)

\(^{203}\) European Commission, FP6 Data, 2008, [www.cordis.lu](http://www.cordis.lu)
particularly active in the field with 7 different projects. The Russian Research Centre « Kurchatov Institute » and St Petersburg State University follow both with 4 projects in this thematic area. Apart from Moscow and St Petersburg research institutions, the Boreskov Institute of Catalysis of the Siberian Branch of RAS is worth pointing out with 3 projects.

In the thematic area "Nanotechnologies and nano-sciences, knowledge-based functional materials, new production processes and devices”, 48 Russian teams were represented in 36 projects. Both the A. F. Ioffe Physical-Technical Institute of RAS in St Petersburg and the Institute Microelectronics Technology, RAS in Chernogolovka had 3 projects in the field.

![Figure 17: Distribution of Russian teams in the successful FP6 projects by Research Areas and Research Activities](image)

With 2 participations A. F. Ioffe Physical-Technical Institute of RAS in St Petersburg was also active in the FP6 area “Information society technologies (IST)”. Overall, 36 Russian research organisations participated in 32 projects within this thematic area. The St Petersburg Institute for Informatics and Automation had the highest participation with 4 projects. The Institute of Operating Systems, Moscow participated in 3 IST projects.

The participation in the thematic area “Aeronautics and Space” was similar to that of IST: 36 Russian research teams participated in 26 projects. The fact that several Russian teams took part in the same projects is a specific feature of this thematic field, which is characterised in general by a dense knowledge network. The Zhukovsky Central Aerohydrodynamic Institute had a clear advantage here with 10 projects; the Institute of Theoretical and Applied Mechanics from Novosibirsk followed with 2 projects.

In the field of “Life sciences, genomics and biotechnology for health”, 27 Russian institutions participated in 25 projects. The Belozersky Institute of Physico-Chemical Biology
of the M.V. Lomonosov Moscow State University was involved in 3 projects, both the
Institute of Biomedical Chemistry of RAS and the Institute of Internal Medicine of Siberian
Branch of Russian Academy of Medical Sciences were involved each in 2 projects.

The thematic areas “Citizens and governance in a knowledge-based society” and
“Food quality and safety” had fewer participants from Russia:13 and 10 teams respectively.
The A.N. Bakh Institute of Biochemistry, RAS, is the main beneficiary with 3 projects in the
field of Food quality and safety.

An important part of Russia’s participation in FP6 was covered by the dimension of
“International co-operation (INCO) Activities”. 90 research organisations participated in
36 specific measures in support of international S&T cooperation.

Russian teams were also integrated in efforts to improve research infrastructures. 11
projects supported under FP6 Activities for ”Research Infrastructures” provided funding
for 33 Russian research teams.

The ten most active Russian research organisations in FP6 were the following:

- **M.V. Lomonosov Moscow State University** had 21 projects. The Skobeltsyn Institute of
  Nuclear Physics and the Faculty of Physics participated in the majority of them. 4 Marie
  Curie Actions fellowships and 3 sustainable development projects were also supported.
- **St Petersburg State University** participated in 12 projects, 4 of them being in sustainable
development and 4 Marie Curie Actions.
- **P. P. Shirshov Institute of Oceanology of RAS** in Moscow (with several regional
  branches) was active in 10 projects, 7 of them in the field of sustainable development.
- **Central Aerohydrodynamic Institute in Zhukovsky**, Moscow Region was involved in 10
  projects in aeronautics.
- **Russian Research Centre “Kurchatov Institute”** in Moscow collaborated in 9 projects, 4
  of them in sustainable development. 2 projects were funded under the European Atomic
  Energy Community's Sixth Framework Programme for research and training activities
  (Euratom FP6, 2002-2006).
- **Nansen International Environmental and Remote Sensing Centre** in St Petersburg took
  part in 6 projects, and coordinated two of them. 3 projects in the field of specific measures in
  support of international cooperation and 2 in the field of sustainable development were also
  supported.
- **F. Ioffe Physical-Technical Institute of RAS** in St Petersburg had 6 projects, whereby 3 of
  these projects were in the field of nanotechnologies and new materials and 2 in information
  technologies.
- **A.N. Bakh Institute of Biochemistry of RAS** in Moscow participated in 5 projects, 3 of
  them were in the thematic area of Food quality, and 1 in life sciences.
- **Boreskov Institute of Catalysis of Siberian Branch of RAS**, Novosibirsk, was involved in
  5 projects in the fields of nanotechnologies and sustainable development.
- **St Petersburg Nuclear Physics Institute, RAS**, in Gatchina had 5 FP6 projects mainly for
developing research infrastructures.

The majority of institutes and universities, which participate in 4 or more FP6 projects
are situated in Moscow or St Petersburg; however, research organisations from other regions
are also strongly represented in FP6. This concerns the above mentioned Boreskov Institute in
Novosibirsk, the Komi Scientific Center of the Ural branch of RAS in Syktyvkar, as well as
the Siberian Center for Environmental Research and Training, a joint center of SB-RAS, and
Tomsk State University, both located in Tomsk.
7 Russian SMEs were partners in Co-operative Research Projects (CRAFT), an FP6 funding instrument promoting the participation of SMEs. In general, most Russian participants (80-90%) in FP6 were public or semi-public research organisations, while the representation of industry and SMEs remained low.

The current 7th Framework Programme for Research and Technological Development (FP7) runs from 2007-2013 with a budget of more than € 50 billion. Third Country participation is possible in the following forms:

- Participation of research teams from Third Countries, in FP7 project consortia; Russian teams may receive funding on equal footing with EU MS&AC organisations;
- SICA – Specific Cooperation Actions dedicated to International Cooperation–, including actions relevant for Russia;
- Coordinated calls, which are jointly defined and funded by the EC and Russia.

Cooperation with the EU is strengthened within FP7, especially through coordinated calls between the EC and Russia in thematic priorities of the Specific Programme “Cooperation”. In these calls, the EC and Russia jointly define specific topics in the frame of a standard call of the cooperation programme. The Russian participants in selected projects will then be funded by the Russian Federal budget. Such coordinated calls and topics have been agreed upon in the following areas: Food, Agriculture and Biotechnology, Energy, Health, Nanotechnology and New Materials. Discussions on coordinated calls are ongoing for aeronautics, nuclear fission and space research. The specific topics of the call are agreed among Russian and EU experts in joint Working Groups, involving representatives of the Commission and Russian ministries. Working Groups are currently running for the FP specific programmes Nanotechnologies, Health, Food/Agriculture/Biotechnologies, Sustainable Energy, Aeronautics, Space, Nuclear Energy Fission Research, Environment, and Mobility.

<table>
<thead>
<tr>
<th>NMP-2009-1.2-3 Nanotechnologies – coordinated call with Russia204</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research in nanotechnologies being a top priority for the Russian government and an objective of mutual interest with the EU, the coordinated FP7 call is well placed to address the field.</td>
</tr>
</tbody>
</table>

The Call was published on 19 November 2008 with the closure date on 31 March 2009. One project was expected to be funded in each of the following three research areas: Optical chemical sensing with nano-particles, nano-waveguides and photonic- Structures, Wireless Surface Acoustic Wave Physical Sensors for operation in a wide temperature range and Sensing of toxic and explosive agents in air based on metal oxide semiconductor nano-structured materials. Moreover, one Support Action was called for in order to make one survey of main Russian infrastructures active in nanotechnology. The proposals also had to take into account the exchange of researchers.

The indicative budget from the EC was EUR 4,650 million in 2009 and a similar budget for the call was expected from the Ministry of Education and Science of Russia, in particular, its Federal Agency for Science and Innovation (FASI).

The minimum conditions were at least two participants, one of which established in Member States or associated countries and the other one in Russia.

The project had to be presented for funding also to the Russian Federal Agency for Science and Innovation (FASI).

---

There are several examples for such EC-Russia coordinated calls: two coordinated calls, one in the field of Energy and one in the field of Food, Agriculture and Biotechnology were published at the end of 2007 with the deadline of 26 February 2008. Both calls had an EC contribution of € 4 million and the same amount was added to the budget of the calls by Russia. A more recent coordinated call was launched in the field of nanotechnologies with an EC contribution of € 4.65 million (see above). The application procedure of the call was somewhat simplified as compared to previous coordinated calls. While previously the call evaluation procedure was implemented (e.g. Call FP7-ENERGY-2008-RUSSIA) in parallel by the Commission and the former Federal Agency for Science and Innovation (FASI), in this call the evaluation followed a single-stage evaluation procedure. The proposals were evaluated by a panel consisting of both European and Russian experts.

In addition to these examples, other coordinated calls and calls specifically devoted to the participation of Russian research organisations in joint projects (SICA) were launched.

We have screened the data available on 129 Russian teams, who had participated in 75 FP7 projects as on 8 October 2008. According to the available data, the projects with Russian participation fall into 8 main research themes:
- Environment (including Climate Change),
- Food, Agriculture, and Biotechnology,
- Health,
- Information and Communication Technologies,
- Nanosciences, Nanotechnologies, Materials and new Production Technologies,
- Socio-economic sciences and Humanities,
- Space,
- Transport (including Aeronautics).

The field with the highest participation of Russian teams is “Transport”, including Aeronautics. 33 Russian research teams participate in 18 projects. A number of projects include several Russian partners as dense networks are usual in this field. The Central Aerohydrodynamic Institute "TsAGI" clearly dominates with participation in 7 research projects. The 7 projects are coordinated either by large industrial companies, such as UK Rolls-Royce plc, or national research centres of aeronautics, e.g., German Aerospace Center (DLR). Besides state research institutions, a few Russian commercial entities also participate, e.g., New Technologies and Services LLC, Research Design Lab. "NAVIS ».

The field of “Environment including Climate Change” follows with participation of 26 Russian research teams in 11 projects. Again we can see a number of large networks in which several Russian teams participate. The P. P. Shirshov Institute of Oceanology of RAS, which was also active in FP6, is present with 3 projects. The coordinators of these 3 projects come from different countries - Natural Environment Research Council of UK, University of Tromsø, Norway, and Mariene Informatie Service 'MARIS' BV, the Netherlands. The St. Petersburg State University and Voronezh State University are both involved in 2 projects in the field.

In the field « Food, Agriculture, and Biotechnology » 23 Russian teams participate in 11 projects. The A.N. Bakh Institute of Biochemistry of RAS is represented by 4 teams collaborating in three cases with coordinators from Italy.

In the field of « Nanosciences, Nanotechnologies, Materials and new Production Technologies » 15 Russian teams are active in 9 projects. The A.V. Shubnikov Institute of Crystallography of RAS and the St Petersburg Electrotechnical University "LETI" participate
both in two projects. Like in the area of transport there is quite important participation of Russian enterprises in this field as well.

In the field «Health» 13 Russian teams are consortia members of 10 research projects. Different RAS institutes as well as universities participate, besides the Ministry of Health and Social Development of the Karelian Republic of the Russian Federation.

Under «Information and Communication Technologies» there are 9 projects in which 11 Russian teams take part. Teams of the A.F. Ioffe Physical Technical Institute of RAS participate in two projects. Out of 11 teams, 5 are commercial entities including the Russian Technology Transfer Network.

In the fields «Space» and «Socio-economic sciences and Humanities» 5 and 3 Russian teams participate, respectively.

Figure 18 gives a summary of the representation of Russian teams by research fields. However, the results of coordinated calls such as in «Energy» and “Food, Agriculture and Biotechnology” are not yet included into the analysis. This is to be kept in mind in order to have a better global picture of the current state of research field representation.

**Figure 18: Distribution of Russian teams in the successful FP7 projects by Research Themes**

As FP7 is not even half way yet and the data on Russian participation are still scarce, we cannot definitely establish the research themes where Russian teams are most present neither draw far-reaching conclusions about the most active institutions in FP7. However, we can notice the recurrence of institutions that also actively participated in FP6 projects. Besides, compared to FP6, there is an outstanding increase in the participation of the business sector, as well as increased interest of European big industry and multinationals in the collaboration with Russian research organisations.

The ten most active Russian research organisations in FP7 are the following:
- **Central Aerohydrodynamic Institute "TsAGI"**, one of the largest scientific research centers in aerodynamics in the world, participates in 7 research projects with world-known companies and European research centers as partners.
- **A.N. Bakh Institute of Biochemistry**, the first biochemistry institute of the Russian
Academy of Sciences, founded in 1934, today active in a number of industry oriented projects, is represented in FP7 projects by 4 research teams. 3 of the projects are coordinated by Italian research centres and universities.

- **M. V. Lomonosov Moscow State University** also participates in 4 research projects. Two teams from the University’s Center for Sociological Studies are partners in two of them. The latter two projects are coordinated by the Institute for Advanced Studies, Austria, the remaining two by the University of Leeds, UK and the Marine Information Service 'MARIS' BV, the Netherlands.

- **P. P. Shirshov Institute of Oceanology of RAS**, the oldest and the largest Russian research center in the field of oceanology, participates in 3 projects.

- **St. Petersburg State University** is active in 3 research projects, 2 of them being in the field of environment and one in information and communication technologies. The coordinators of the three projects are different organisations: the Consorzio Nazionale Interuniversitario per la Fisica della Materia, Italy, Helmholtz - Centre for Environmental Research LLC (UFZ), Germany and the University of Geneva, Switzerland.

- **A.F. Ioffe Physical Technical Institute, RAS**, one of the largest research institutes in physics and technology in Russia, founded in 1918, is involved in 2 research projects in information and communication technologies; one is coordinated by VTT Technical Research Centre of Finland and the other by the Technical University Berlin, Germany.

- **A.V. Shubnikov Institute of Crystallography of RAS** participates in 2 research projects in the field of Nanosciences, Nanotechnologies, Materials and new Production Technologies. One project is coordinated by the European Membrane House, Belgium and the other by the Foundation for Research and Technology, Greece.

- **M.M.Shemyakin and U.A. Ovchinnikov Institute of Bioorganic Chemistry of Siberian Branch of RAS** is involved in a project in the field of health coordinated by the Vrije Universiteit Amsterdam, and in another project in Food, Agriculture, and Biotechnology coordinated by the Università degli Studi di Trieste, Italy.

- **St Petersburg Electrotechnical University "LETI"** is involved in 2 projects in the field «Nanosciences, Nanotechnologies, Materials and new Production Technologies», one of them coordinated by Philips Electronics Nederland B.V. and the other by the Institute of Nanotechnology of the UK.

- **Voronezh State University** has 2 projects in the field of environment, one coordinated by the Centre for Economic and Financial Research, Russia and the other by the Università Ca' Foscari di Venezia, Italy.

The other Russian research organisations participating in FP7 are involved only in one research project.

- **EU-Russia Dialogue on Space Cooperation, including Galileo**

Since 1997, the EU – Russia cooperation activities in the space field have been carried out under the Partnership and Co-operation Agreement between the EU and the Russian Federation, which includes the "Space Partnership". The cooperation was further strengthened in 2006 with the establishment of the “EU-Russia Dialogue on Space Cooperation” under the EU – Russian Common Economic Space (CES), one of the EU – Russia strategic cooperation programmes. The parties of the dialogue are the Russian space agency (Roscosmos), the European Commission and the European Space Agency (ESA). The Space Dialogue encompasses space applications (satellite navigation, Earth observation and satellite communications), access to space (launchers and future space transportation systems), space science and space technology development. Russia has know-how and technology for earth observation, satellite navigation, launcher technologies and basic and applied space research, which are of significant interest to the European partners.
The Space Dialogue is managed by a Steering Committee that meets regularly in order to coordinate ongoing joint projects and prepare new initiatives, including a range of research projects. Cooperation within the Space Dialogue is organised through the following seven working groups established in 2007:

- Earth Observation
- Satellite Navigation
- Satellite Communication
- Fundamental Space Science
- Applied Space Science and Technology
- Launch Systems
- Crew Space Transportation System (Spaceship)

Galileo/GLONASS cooperation

The Galileo – GLONASS cooperation is conducted under the EU – Russia Space Dialogue on Satellite Navigation and Communication programmes. Galileo is Europe’s initiative for a state-of-the-art global navigation satellite system, providing a highly accurate, guaranteed global positioning service under civilian control. 30 satellites are foreseen in the GALILEO constellation; GALILEO is to become fully operational in 2013. The Galileo project was launched by the European Union to provide a civil alternative to the U.S. military-controlled Navstar GPS system.

Russia’s global navigations satellite system is GLONASS. The GLONASS state programme foresaw 18 satellites in constellation in 2007–2008; full operation capability (24 satellites) should be reached by 2009\textsuperscript{205}. GLONASS is strategically a very important project for the Russian Federation; it is planned that only over the years 2008-2010 € 1 billion will be made available by the Russian Government for the development of the space programme and GLONASS.

While Galileo and Russia's GLONASS are intended to provide the EU and Russian alternatives to GPS, the three systems are interoperable. The EU – Russia cooperation is aimed at promoting the compatibility and interoperability of the two global navigations satellite systems – Galileo and GLONASS.

Implementation of the cooperation activities under the Space Dialogue is organised mainly through the established instruments of the 3 collaborating partners: the ESA programmes, the Space programme of the Russian Federation and the Space programme of FP7. All the cooperative research projects in the space field within FP6 and FP7 are conducted in close cooperation with the ESA.

Russian space research organisations took an active part in FP6 projects – 36 Russian teams participated in 26 projects under the thematic area “Aeronautics and Space”. The Zhukovsky Central Aerohydrodynamic Institute was by far the most active Russian partner and collaborated in 10 projects.

As a result of the first FP7 call in the space field, the GAGARIN: Galileo-GLONASS Advanced Receiver Integration project\textsuperscript{206} was supported. The GAGARIN project deals with the development of a Global Navigation Satellite Systems (GNSS) receiver for aeronautical applications in the Russian Federation. It is an industry cooperation between major receiver and antenna suppliers in Europe (respectively THALES and ERA) and in Russia (NAVIS),


\textsuperscript{206} See European GNSS Supervisory Authority: \url{http://www.gsa.europa.eu/go/randd/fp7/information-on-winning-proposals-in-fp7-1st-call/galileo-glonass-advanced-receiver-integration}
supported by key aeronautical Research Laboratory in Europe (DLR) and in Russia (FGUP GosNII Aeronavigatsia). The project will contribute to the development of standardized worldwide GNSS solutions including GALILEO in the pre-existing GPS and GLONASS solutions, and is paving the way to closer industrial and economical cooperation between Russia and Europe.

- **EUREKA**

EUREKA\(^2\) is a pan-European intergovernmental organisation established in 1985. Its aim is to enhance European competitiveness through support to businesses, research centres and universities that carry out pan-European projects to develop innovative products, processes and services. EUREKA is a membership organisation with 39 members, including EU member and associated states, as well as Russia (since 1993).

**Scientific domains**

The EUREKA domains are Electronics, IT and Communication Technologies; Industrial Manufacturing, Materials and Transport; Other Industrial Technologies; Energy Technology; Chemistry, Physical and Exact Sciences; Biological Sciences; Agriculture and Marine Resources; Agrofood Technology; Measurements and Standards; Technology for Protection of Humankind of Environment.

**Types of activities**

EUREKA’s main role is to coordinate the research and innovation activities between the member countries and to facilitate sharing of knowledge, skills and expertise across Europe. EUREKA supports mainly market-oriented joint research projects as well as technology transfer and training activities. Financial support is provided through national governmental and private sources of the EUREKA member countries.

**Cooperation patterns**

In 2002 - 2007, 34 EUREKA joint research projects were implemented with the participation of research organisations and businesses from Russia. The main partners of Russia in EUREKA are the Czech Republic, Slovenia, the Slovak Republic, Poland, France, and Germany.

The participation of Russian organisations is rather low in comparison to the duration of Russia’s involvement in EUREKA. This confirms the limited innovative capacities available in the country and a lack of appropriate innovative companies. Russia is not yet member of EUROSTARS, a recently established EUREKA funding tool for SMEs.

- **TACIS & ENPI**

The Technical Assistance to the Community of Independent States (TACIS) programme began in 1991, when the EC allocated ECU 54 million to improve nuclear safety in the former Soviet Union. In 1998, the TACIS Programme was revised and main emphasis was given to promote democracy and stimulate investment in Russia and other New Independent States. In the period 1991-2006, € 2.7 billion was granted to Russia and invested in 1500 projects in 58 regions. In addition to the national TACIS programme, Russia received support through TACIS multi-country programmes, including the Regional Programme and the Cross-Border Cooperation Programme. This funding covered projects in the fields of telecommunications, environment, Information Society networks, crime, and migration.

\(^2\) [www.eureka.be](http://www.eureka.be)
The TACIS programme, being a technical assistance programme, did not fund directly EU – Russia research cooperation; it included projects on commercialisation of science and technology in Russia as well as the development of partnerships, studies, training, and networking throughout the EU and partner countries. For example the Russian Technology Transfer Network (RTTN) was set up with support of TACIS.208

The funded projects included the following:
- Science & Technology Development in the Russian Market Economy (EDRUS9512)
- Science Cities and Innovation Centres (FINRUS 9804)
- Science & Technology Commercialisation (AP 2002)
- Innovations & strategy in the use of intellectual property (AP 2002).

The TACIS regulation expired at the end of 2006. From 1 January 2007, it has been replaced by a new regulation for the European Neighbourhood and Partnership Instrument (ENPI). The areas of cooperation have been narrowed to cover only areas mentioned in the EU – Russia Common Spaces roadmaps209 and the Northern Dimension Initiative210.

- COST – European Cooperation in Science and Technology

COST was founded in 1971. It is an intergovernmental framework for European cooperation in the field of scientific and technical research, allowing the co-ordination of nationally funded research at the European level211. Today institutions from 58 countries are involved in COST activities; this includes 34 COST member states, one “Cooperating State” (Israel) and 27 participating countries, including Russia.

The funds provided by COST support coordination costs of innovative interdisciplinary research networks (named Actions). This includes support to networking activities such as meetings, conferences, short-term scientific exchanges and dissemination of research results, for instance, publications. COST does not support research itself, which is the responsibility of countries involved in the COST cooperation.

Usually, COST does not reimburse participants from non-COST country institutions. However, in 2004, COST adopted a decision to provide financial support of travel costs for experts from neighbouring countries participating in COST Actions, including Russia.

Russia has the largest participation in COST Actions among institutions of non-COST countries. Russian S&T institutions participated in
- Materials, Physical and Nanosciences domain - 25 projects
- Information and communication technologies - 5
- Food and agriculture - 4
- Earth systems science and environmental management - 3
- Biomedicine and molecular biosciences - 3
- Chemistry and molecular sciences and technologies - 1
- Forests, their products and services – 1

- European Space Agency (ESA)

---

208 For more details about RTTN see section 2.2.2.
211 http://www.cost.esf.org/
The European Space Agency (ESA) Space Science programme is aimed at exploring the Solar System and is focused on understanding the Earth’s relations with the other planets. The ESA cooperation with Russia includes the following directions: human spaceflight, space science and exploration, launchers, Earth Observation, telecommunications, applied space science and technology, and navigation.

The cooperation between the ESA and the Russian Federation began in 1991 with the signature of the ESA-Russia Framework Agreement on Cooperation. Today, the cooperation is based on an Agreement between the ESA and the Government of the Russian Federation on Cooperation and Partnership in the Exploration and Use of Outer Space for Peaceful Purposes, signed by the Russian Minister of Foreign Affairs and ESA’s Director General in Paris on 11 February 2003. In the frame of the Partnership Agreement, other more specific agreements have emerged: for example, agreements on the implementation of Soyuz launches from the Guiyana Space Centre (2005) and on cooperation in research and technology development for future launchers (2005).

The ESA’s counterpart in Russia is Roscosmos - the Federal Space Agency. There is an ESA office in Moscow, officially named “ESA Permanent Mission in the Russian Federation”, which represents the Agency in Russia. ESA - Russia cooperation is supported through applied research projects funded under the EU RTD framework programmes, and by INTAS until 1st January 2007. In the ESA – INTAS 2006 Collaborative Call for Research Project Proposals, 7 research projects with a wide participation of Russian RTD organisations were supported.²¹²

### 4.2.2 The US Civilian Research and Development Foundation (CRDF)

The U.S. Civilian Research and Development Foundation for the Independent States of the Former Soviet Union (CRDF) is a nonprofit organisation authorized by the U.S. Congress and established in 1995 by the National Science Foundation.²¹³ This unique organisation promotes international scientific and technical collaboration through grants, technical resources, and training. CRDF is based in Arlington, Virginia with offices in Moscow, Russia; Kiev, Ukraine; Almaty, Kazakhstan; Baku, Azerbaijan (opening 2010); and Amman, Jordan (opening 2010).

The CRDF implements the following programmes:
- the Basic Research and Higher Education (BRHE) joint US-Russia programme is aimed at developing S&T and educational infrastructure in Russia.
- the Technological Entrepreneurship Development Programme (TEDP) is aimed at support to the creation and development of high-tech enterprises, innovation infrastructure and human capital.
- a partnership between CRDF and the Investment-venture Foundation of the Republic of Tatarstan is aimed at supporting high-tech SMEs in Tatarstan.

The CRDF supported updating of Russian research infrastructures and launched collaborative calls for research projects. The CRDF’s first initiative was the Cooperative Grants Programme launched in September 1995. In September 1996, the CRDF announced


the results of the first competition, awarding funding to 191 Russian teams. The Cooperative Grants Programme awarded an average of $41000 and typically supported two-year projects.\(^{214}\) The Cooperative Grants Programme is closed today, but there are a number of other CRDF funded initiatives ongoing.

The Basic Research and Higher Education (BRHE) programme is an example of an effective solution jointly managed by the CRDF and the Russian Ministry of Education and Science to foster integration of scientific research and education in the Russian Federation. This programme has significantly influenced higher education policies in Russia. By 2006, the BRHE had successfully established 20 Research and Education Centres (RECs) across Russia, giving students and faculty access to state-of-the-art research equipment and providing training for a better integration of young Russian scientists into world science. The programme is half co-funded by American sources; these financial resources are made available by the MacArthur Foundation and Carnegie Corporation of New York and provided via the CRDF to the Russian grantees. The other 50% of the BRHE funding is coming from the Russian Ministry of Education and Science. At the beginning of the programme in 2001, the John D. and Catherine T. MacArthur Foundation was contributing $18 million to the BRHE programme over seven years. The Carnegie Corporation of New York was contributing $2 million over four years to support the programme.

The CRDF also gives opportunities for business-science partnerships through its Partner Development Programme Science & Technology Entrepreneur Programme (STEP).

The CRDF and the Russian Foundation for Basic Research (RFBR) launched a joint call in 2009 for the 2009 CGP-RFBR Climate Change and Energy Competition. This programme provides awards approximately $93000 to joint research teams of U.S. and Russian scientists for a period of up to two years. This competition was open to proposals that address the impacts of solutions to climate change, including energy efficiency and production.

### 4.2.3 Multinational programmes/organisations

- **ISTC**

ISTC\(^{215}\) – the International Scientific and Technological Center – is an intergovernmental organisation specially designed to prevent Soviet military scientists from leaving the country and conducting military research abroad. It is dedicated to the non-proliferation of weapons and technologies of mass destruction. ISTC was established at the beginning of the 1990s by an agreement between the European Union, Japan, the Russian Federation, and United States of America. Armenia, Belarus, Georgia, Kazakhstan and the Kyrgyz Republic also have joined the ISTC. Norway acceded to the ISTC in 1997, the Republic of Korea in May 1998 and Tajikistan in March 2003. Canada became a full member of the ISTC in March 2004. The ISTC Secretariat Headquarters is located in Moscow. ISTC coordinates the efforts of numerous governments, international organisations and private sector organisations, providing weapons scientists from Russia and other EECA countries market based opportunities to redirect their talents towards peaceful scientific research and innovation.

---


\(^{215}\) [www.istc.ru](http://www.istc.ru)
The ISTC's activities are divided into 6 fields of expertise: Counter Terrorism and Global Security; Biotechnology, Public Health and Agriculture; Advanced Nuclear Energy Technology, Nuclear Fuel Cycle and Nuclear Safety; Environmental Remediation and Climate Change Mitigation; Renewable and Environmental Friendly Energy Technologies (Non nuclear energy technologies); High Energy Physics based on Advanced Accelerator Technology (also called Particle Physics).

The activities of the ISTC fall in two broad categories. Firstly ISTC provides financing of research projects that promote knowledge development in civilian areas. Secondly, the Centre carries out a number of complementary activities to ensure commercialisation of research results but also to foster integration of scientists in the international scientific community. The Centre not only contributes to the non-proliferation of weapons of mass destruction but also to further economic development of the countries involved through the promotion of innovation, job creation and diversification of economic activities. The ISTC supports the following types of activities:

- **Science Projects.** The Science Project Programme is the most comprehensive non-proliferation activity conducted by ISTC. Through this programme, the ISTC collects scientific project proposals from institutes throughout EECA countries and provides funding and logistic support to project teams.

- **Partnership.** The Partner Programme provides opportunities for private industry, scientific institutions, and other governmental or non-governmental organisations to fund research in EECA institutions via the ISTC.

- **Programmes.** The ISTC manages numerous supporting programmes which strengthen hundreds of ISTC projects and support the integration of weapons scientists into the international community.

The most active Russian research organisations by scientific fields are:

**Agriculture**
- All-Russian Research Veterinarian Institute

**Biotechnology**
- Institute of Immunological Engineering
- Ivanovsky Institute of Virology
- State Research Center of Virology and Biotechnology VECTOR
- State Research Center for Applied Microbiology and Biotechnology
- State Scientific Center of Genetics and Selection of Industrial Microorganisms

**Chemistry, Environment, Non-nuclear energy and ICT**
- Federal Nuclear Center - The All-Russian Research Institute of Experimental Physics (RFNC - VNIIEF)

**Fission reaction**
- Research Institute of Technology
- Federal Nuclear Center - The All-Russian Research Institute of Experimental Physics (RFNC - VNIIEF)

**Fusion**
- Kurchatov Research Center / Institute of General and Nuclear Physics

**Instrumentation**
- Joint Institute of Nuclear Research
- Physical Technical Institute of the Russian Academy of Sciences

**Materials**
- Moscow Institute of Steel and Alloys

**Physics**
Khlopin Radium Institute
Federal Nuclear Center - The All-Russian Research Institute of Experimental Physics (RFNC - VNIIEF)
The Russian Federal Nuclear Center – VNIITF, Chelyabinsk Region
Space, aircraft, transport
Research Institute of Aviation Systems
MAI - Moscow Aircraft Institute
Central Aerodynamic Institute

CERN

CERN\textsuperscript{216} – European Organisation for Nuclear Research (the European Laboratory for Particle Physics) – is an intergovernmental organisation headquartered in Geneva, Switzerland. Russia signed a cooperation agreement with CERN in 1993.

The main achievement of CERN has been the Large Hadron Collider (LHC) project. The project was conceived as a large international venture, and Russia was invited to join it. The cooperation was formalised in a Protocol signed by CERN and the Russian Ministry of Science on behalf of the Russian Government on June 14, 1996. According to the agreement, Russian institutes and production plants had to produce in ten years high-tech equipment for an amount of € 132 million. Russia's contribution, including subsequent participation of Russian physicists in experiments to be run at the collider, amounted to € 88 million. Russia participates both in the construction of the accelerator and the development of the CMS (Compact Muon Solenoid) detector; it is also involved in research activities that will be carried out using these facilities. The Joint Nuclear Research Institute in Dubna acts as Project Coordinator on behalf of Russia and its member states\textsuperscript{217}.

CERN and Russian nuclear scientists cooperation was also supported by INTAS and ISTC. A Cooperation Agreement between CERN and INTAS was signed with particular focus on the development of detectors for LHC experiments. CERN and INTAS issued a co-financed Joint Call in 2005. 11 projects related to the LHC programme were funded in this call.

Support to the CERN's LHC collaborations was also provided by ISTC through a series of development projects launched with Russian weapon institutions and academic research institutes. Since the first project, NA48, approved in 1994, CERN has been involved in 15 further projects in collaboration with ISTC; mostly concerned R&D for LHC detectors. In July 2000, two major partnership projects for ATLAS (a particle physics experiment at the Large Hadron Collider) and CMS were signed by ISTC and CERN.

ITER

The ITER – International Thermonuclear Experimental Reactor – project is a large-scale scientific experiment intended to prove the viability of fusion as an energy source, and to collect the data necessary for the design and subsequent operation of the first electricity-

\textsuperscript{216}www.cern.ch, CERN Member States are Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Netherlands, Norway, Poland, Portugal, the Slovak Republic, Spain, Sweden, Switzerland and the United Kingdom. Israel, the Russian Federation, Turkey, Yugoslavia (status suspended after UN embargo, June 1992), the European Commission and UNESCO have observer status.

\textsuperscript{217}JINR, http://www.jinr.ru/, Member States are Armenia, Azerbaijan, Belarus, Bulgaria, Cuba, Czech Republic, Georgia, Kazakhstan, Democratic People’s Republic of Korea, Moldova, Mongolia, Poland, Romania, Russia, Slovak Republic, Ukraine, Uzbekistan and Vietnam.
producing fusion power plant. The ITER project was launched in 1986. The initial signatories of the ITER cooperation were the former Soviet Union, the USA, the European Union (via EURATOM) and Japan. Meanwhile, the People's Republic of China and the Republic of Korea in 2003, and India in 2005, joined the project.

The ITER installation is being built at Cadarache, near Aix-en-Provence in Southern France. The construction is expected to be achieved by 2017. The construction will cost about €5 billion; the expenses are shared by the EU (40%), and the other participants, including Russia (approximately 10% each).

ITER facilities will benefit from Russian nuclear scientists’ high potential and at the same time will provide Russian scientists with unique research data. The EU – Russian cooperation in fusion research is supported through the Euratom Seventh Research Framework Programme lasting from 2007 to 2011 with total €1.9 billion over this period. About €1 billion is dedicated to ITER construction and €900 million to fusion research in general.

4.2.4 Private international foundations

International foundations from Europe and the USA played an important role in keeping up Russian science right after the perestroika and following the dissolution of the former Soviet Union. More than 95% of funding for Russian S&T came from the federal budget at the beginning of the 1990s; with the dissolution of the Soviet Union, most of that funding was cut down drastically; one of the result was a brain drain – both internal (from science to other economy sectors) and external (migration of scientists abroad). The support of international foundations was especially important for Russian social sciences and humanities.

The beginning of active support for Russian S&T by foreign foundations is usually connected with the name of George Soros, whose International Science Foundation (ISF) provided about $130 million over four years (1993–1996) to support basic research in the natural sciences in the former Soviet Union. Although Soros was actually not the first person or organisation from abroad to fund scholarships in the former Soviet Union, his efforts were both early and large.

Soros made possible the creation of a new foundation for natural science and engineering in the former Soviet Union by donating $5 million to the U.S. National Science Foundation (NSF). Based on the NSF funding and $5 million contribution from the U.S. Department of Defence’s Nunn-Lugar programme aimed at promoting demilitarization in the former Soviet Union, the U.S. Civilian Research and Development Foundation (CRDF) was established. The CRDF is one of few international foundations which continue to fund Russian science today.

At the beginning of 1990s, offices of several foreign foundations were established in Moscow, including the John D. and Catherine T. MacArthur Foundation, International Research and Exchanges Board (IREX) and the Fulbright Programme. In 1992 and 1993, these and other foundations announced their first competitions. The first peak of activity of foreign foundations occurred in 1994 and 1995 when ISF alone provided 12.6 and 13.6 percent, respectively, of total domestic expenditures on basic research in Russia. In 1996, the Ford Foundation opened its office in Moscow.

http://www.iter.org
The disciplinary orientation of international foundations active in Russia is approximately the same as international foundations in the rest of the world. Most nongovernmental foundations support social sciences, humanities, and socially important activities such as ecology, gender studies, and the construction of a civil society. A number of foundations support basic research in natural science; this includes ISF, CRDF, Howard Hughes Medical Institute, International Soros Science Education Programme (ISSEP), German Academic Exchange (DAAD), and such foundations as the MacArthur Foundation and the Carnegie Corporation of New York (which provide funds for Russian natural science through the CRDF).219

Due to the improved economic situation in Russia, several US foundations reduced or ended their support for Russian S&T during the last years. For example in 2005, as programme priorities shifted, the Ford foundation ended its higher education and scholarship programme in Russia. The Foundation decided to close its operations in Moscow by the end of September 2009. However, the support for the International Fellowships Programme (IFP) in Russia will continue until 2014.

As regards European foundations, there are several German foundations that support policy oriented research and academic exchanges with Germany. German public foundations such as the German Research Foundation or the Humboldt Foundation promote and support cooperation between German and Russian scientists. A number of private foundations also operate in Germany; several of these foundations such as the Haniel Foundation or the Gerda Henkel Foundation have developed specific support schemes for science in Russia. UK organisations have traditionally been present in Russia: the British Council has been fostering cooperation with the UK in education and science and the Wellcome Trust runs an international fellowship programme, which is open for Russian scholars too. Other European countries have active foundations: the American-Austrian Foundation based in Austria and the USA has long been offering scientific training for Russian medical doctors and researchers.

- **Instruments of support used**

The forms and types of support provided by foreign foundations to Russian scholarship have changed over time. At the beginning of the 1990s, the most common form of support was individual or group grants for researchers to continue their work in Russia, or for scholarships or fellowships to do research outside Russia; this included travel grants to take part in international conferences and events in the West. To encourage the development of the scientific potential in Russia and prevent the brain drain of scientists, the George Soros CEU Foundation introduced reintegration grants for research in Russia: scientists, who received fellowships for a one-two year research in the West, were offered one year grants up to $25000 for research to be conducted in Russia.

At the beginning of the 1990s, infrastructure support grants were among the most popular and effective instruments of support. This included telecommunication grants (for instance, establishing email and internet access at libraries and research organisations, provided by IREX, McArthur Foundation and other US foundations and organisations) and library grants that allowed purchasing scientific literature to opening Russian science to the world.

---

Another type of support that grew over time was cooperative research projects grants in which Russian research teams worked together with foreign partners. The support of cooperative projects is more selective by nature than individual and group grants. Cooperation may occur only if Russian researchers have already established contacts with foreign partners and demonstrated good research results. Financially, such cooperation has often not been equal (in 1990s foreign scientists were usually in charge of such collaborative grants and there were critics from Russian scientists that they were sometimes used to collect raw data for Western scientists), but the situation has changed and most of such collaborative programmes are run today by Russian and foreign scientists on equal footing.

Nowadays, Russian financial and infrastructural basis for research has developed, and consequently a number of support instruments such as individual funding of Russian scientists to conduct research in Russia or telecommunication grants have been discarded. Travel grants to visit conferences, to conduct research in foreign research institutions for a limited period of time remain to be popular instruments to support Russian scientists. This includes the well-known Fulbright Scholar Programme, the Carnegie Research Fellowship Programme and a few more fellowship programmes. The duration of grants can vary from a conference visit or a month research visit grant to two-year scholarships.

Support of international foundations to the establishment of new research centres has been prevalent. There are successful examples like the European University at St. Petersburg and the New Economic School in Moscow which were supported by a number of American private foundations. The Ford foundations also initiated the Independent Institute for Social Policy in Moscow. Moreover, the John D. and Catherine T. MacArthur Foundation and Carnegie Corporation supported the initiative of the Centres for Advanced Study and Education (CASEs) in Russia. These institutions helped to cover the lack of competent teaching and high-level research in social sciences that prevailed in Russia and in other countries of the former Soviet Union in 1990s. However, the initiative of establishing new research centres is not only limited to social sciences. Other important supports to Russian science from international foundations include local philanthropy and institutional grants to facilitate international cooperation of universities and research organisations. One example of such local foundations in Russia is the Arkhangelsk Center of Social Technologies “Garant”, which was established with the support of the Eurasia Foundation.

As the economic conditions in Russia have improved and its co-funding capacities in international R&D programmes have increased, there is a growing tendency to establish cooperative state-level funding programmes with foreign public bodies. One of the most important examples in this respect are the coordinated calls between the EU and Russia within FP7. Foreign private foundations are consequently reducing their activities in Russia.

- **Impact of the international foundations support on Russian S&T potential**

The support from international foundations has played an important role in adapting science to the economic and political changes in Russia and in opening Russian science to the international community. According to Dezhnina and Graham\(^{221}\), the main impacts of the international foundations on Russian science have been the following:

---


• New funding mechanisms for research, particularly open competitions and peer-review-based selection procedures;
• New research administration skills, such as writing proposals, negotiating project agreements, budget planning and managing international projects;
• Increased participation to international research projects, increased number of co-authored publications in international scientific journals and improved opportunities to participate in international scientific conferences;
• Improved state of research infrastructures, equipment and better material situation of researchers;
• Improved telecommunication facilities and access to international scientific journals;
• Reduced gap between research and teaching and increased attention to young scientists;
• Increased role of technology transfer and commercialisation of research results, improved knowledge of intellectual property rights.

Therefore, the international foundations have not only supported Russian science and Russian scientists but also supported institutional changes in Russian RTD, making them more competitive and open to the wider world; they have helped to develop multiple international links with scientists in the West after the breakup of the “Iron Curtain”.

4.2.5 Bilateral programmes

A broad range of bilateral S&T cooperation programmes links Russia with EU member states and associated countries to FP7. On the Russian side, RFBR and FASIE are the main funding organisations implementing these bilateral programmes. These links are analyzed in detail in the ERA.Net RUS Analytical report 3, “State of the art and perspectives of bilateral S&T programmes between EU MS/AC and Russia and of activities of S&T programme owners in EU MS/AC towards Russia and in Russia towards EU MS/AC accompanying / complementing bilateral S&T agreements”.

4.3 Indicators

• Brain circulation

Tables 28-32 and figures below provide the latest official federal non-recurrent statistical survey “Information about employees working abroad in 2002” (the survey was approved and carried out by Rosstat)222. The survey covered 2922 researchers which carried out R&D in the reporting year in all fields of science (with the exception of small enterprises). Researchers are employees, professionally occupied in scientific research and development (R&D) and directly involved in creation of new knowledge, products, processes, methods or systems, as well as management of these activities; they usually have completed higher professional education.

According to the survey, in 2002 only 2922 researchers worked abroad, that is less than 1% of the total number of researchers that year.

Among researchers, working abroad in 2002, 72% were under 50, and about 56% of them were under 40. Over 75% of the total were men. The largest group was men aged 40-49 (nearly one fourth of those sampled belonged to that category).

---

About 74% of researchers who worked abroad are doctor of science and candidates of science, and the ratio of these groups is 1:3.

Table 28: Researchers that worked abroad, by length of stay and types of contract: 2002 (no. of persons)

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>3 months to one year</th>
<th>1 to 2 years</th>
<th>2 to 3 years</th>
<th>More than 3 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Researchers that worked abroad – total</td>
<td>2922</td>
<td>1591</td>
<td>484</td>
<td>240</td>
<td>607</td>
</tr>
<tr>
<td>Including – by types of contract:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Invitation of a foreign partner</td>
<td>1340</td>
<td>770</td>
<td>231</td>
<td>109</td>
<td>230</td>
</tr>
<tr>
<td>Assignment from a scientific</td>
<td>762</td>
<td>463</td>
<td>98</td>
<td>68</td>
<td>133</td>
</tr>
<tr>
<td>organisation, official business trip</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contract, concluded through official</td>
<td>171</td>
<td>139</td>
<td>15</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>Russian organisations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contract concluded individually</td>
<td>460</td>
<td>109</td>
<td>104</td>
<td>40</td>
<td>207</td>
</tr>
<tr>
<td>exchange</td>
<td>75</td>
<td>64</td>
<td>11</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>other</td>
<td>114</td>
<td>46</td>
<td>25</td>
<td>16</td>
<td>27</td>
</tr>
</tbody>
</table>

Table 29: Researchers with degrees that worked abroad, by length of stay: 2002 (no. of persons)

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>3 months to one year</th>
<th>1 to 2 years</th>
<th>2 to 3 years</th>
<th>More than 3 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Researchers with scientific degrees</td>
<td>2158</td>
<td>1089</td>
<td>372</td>
<td>197</td>
<td>500</td>
</tr>
<tr>
<td>that worked abroad – total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Including</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doctors of science</td>
<td>527</td>
<td>317</td>
<td>55</td>
<td>34</td>
<td>121</td>
</tr>
<tr>
<td>Candidates of science</td>
<td>1631</td>
<td>772</td>
<td>317</td>
<td>163</td>
<td>379</td>
</tr>
</tbody>
</table>

Table 30: Researchers that worked abroad, by gender and age: 2002 (no. of persons)

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>age, years</th>
<th>Up to 29 (inclusive)</th>
<th>30–39</th>
<th>40–49</th>
<th>50–59</th>
<th>60–69</th>
<th>70 and older</th>
</tr>
</thead>
<tbody>
<tr>
<td>Researchers that worked abroad – total</td>
<td>2922</td>
<td></td>
<td>384</td>
<td>797</td>
<td>922</td>
<td>605</td>
<td>188</td>
<td>26</td>
</tr>
<tr>
<td>Including</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>2203</td>
<td></td>
<td>271</td>
<td>562</td>
<td>690</td>
<td>489</td>
<td>167</td>
<td>24</td>
</tr>
<tr>
<td>Women</td>
<td>719</td>
<td></td>
<td>113</td>
<td>235</td>
<td>232</td>
<td>116</td>
<td>21</td>
<td>2</td>
</tr>
</tbody>
</table>
Table 31: Researchers that worked abroad, by country of destination and purposes of trips: 2002 (no. of persons)

<table>
<thead>
<tr>
<th>Researchers, working abroad – total</th>
<th>Total</th>
<th>Lecturing, consultancy</th>
<th>Joint research, projects</th>
<th>Scientific work in foreign organisations</th>
<th>Contact</th>
<th>Studies, internship</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2922</td>
<td>188</td>
<td>1170</td>
<td>944</td>
<td>349</td>
<td>185</td>
<td>86</td>
</tr>
</tbody>
</table>

Including by country of destination:

<table>
<thead>
<tr>
<th>Country</th>
<th>Total</th>
<th>Lecturing, consultancy</th>
<th>Joint research, projects</th>
<th>Scientific work in foreign organisations</th>
<th>Contact</th>
<th>Studies, internship</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>18</td>
<td>2</td>
<td>8</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>–</td>
</tr>
<tr>
<td>Austria</td>
<td>26</td>
<td>1</td>
<td>11</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Algeria</td>
<td>17</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>1</td>
<td>–</td>
<td>16</td>
</tr>
<tr>
<td>Antigua and Barbuda</td>
<td>7</td>
<td>4</td>
<td>–</td>
<td>1</td>
<td>–</td>
<td>2</td>
<td>–</td>
</tr>
<tr>
<td>Bahrain</td>
<td>8</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>–</td>
<td>2</td>
</tr>
<tr>
<td>Belarus</td>
<td>22</td>
<td>6</td>
<td>10</td>
<td>4</td>
<td>–</td>
<td>–</td>
<td>2</td>
</tr>
<tr>
<td>Belgium</td>
<td>36</td>
<td>1</td>
<td>11</td>
<td>12</td>
<td>2</td>
<td>10</td>
<td>–</td>
</tr>
<tr>
<td>Dahomey (Benin)</td>
<td>8</td>
<td>–</td>
<td>8</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Brazil</td>
<td>20</td>
<td>10</td>
<td>6</td>
<td>3</td>
<td>1</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Great Britain</td>
<td>135</td>
<td>10</td>
<td>43</td>
<td>55</td>
<td>15</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>Virgin Islands (GB)</td>
<td>14</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Germany</td>
<td>556</td>
<td>23</td>
<td>253</td>
<td>171</td>
<td>54</td>
<td>47</td>
<td>8</td>
</tr>
<tr>
<td>Denmark</td>
<td>19</td>
<td>–</td>
<td>7</td>
<td>9</td>
<td>2</td>
<td>1</td>
<td>–</td>
</tr>
<tr>
<td>Israel</td>
<td>26</td>
<td>3</td>
<td>4</td>
<td>12</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>India</td>
<td>69</td>
<td>–</td>
<td>26</td>
<td>2</td>
<td>36</td>
<td>–</td>
<td>5</td>
</tr>
<tr>
<td>Iran</td>
<td>25</td>
<td>–</td>
<td>22</td>
<td>–</td>
<td>3</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Ireland</td>
<td>13</td>
<td>–</td>
<td>2</td>
<td>9</td>
<td>2</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Spain</td>
<td>22</td>
<td>–</td>
<td>14</td>
<td>7</td>
<td>–</td>
<td>1</td>
<td>–</td>
</tr>
<tr>
<td>Italy</td>
<td>60</td>
<td>6</td>
<td>28</td>
<td>12</td>
<td>8</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>23</td>
<td>–</td>
<td>16</td>
<td>6</td>
<td>–</td>
<td>–</td>
<td>1</td>
</tr>
<tr>
<td>Canada</td>
<td>48</td>
<td>3</td>
<td>15</td>
<td>18</td>
<td>9</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>China</td>
<td>59</td>
<td>18</td>
<td>20</td>
<td>3</td>
<td>11</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Korea</td>
<td>55</td>
<td>9</td>
<td>20</td>
<td>16</td>
<td>7</td>
<td>3</td>
<td>–</td>
</tr>
<tr>
<td>Mexico</td>
<td>25</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>3</td>
<td>–</td>
<td>1</td>
</tr>
<tr>
<td>Netherlands</td>
<td>58</td>
<td>2</td>
<td>31</td>
<td>14</td>
<td>4</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Norway</td>
<td>11</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Poland</td>
<td>11</td>
<td>2</td>
<td>5</td>
<td>1</td>
<td>–</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Portugal</td>
<td>20</td>
<td>2</td>
<td>3</td>
<td>9</td>
<td>5</td>
<td>–</td>
<td>1</td>
</tr>
<tr>
<td>USA</td>
<td>840</td>
<td>36</td>
<td>300</td>
<td>346</td>
<td>102</td>
<td>46</td>
<td>10</td>
</tr>
<tr>
<td>Taiwan (Rep. of China)</td>
<td>9</td>
<td>–</td>
<td>2</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>–</td>
</tr>
<tr>
<td>Tunisia</td>
<td>9</td>
<td>–</td>
<td>–</td>
<td>2</td>
<td>–</td>
<td>7</td>
<td>–</td>
</tr>
<tr>
<td>Ukraine</td>
<td>13</td>
<td>2</td>
<td>10</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>1</td>
</tr>
<tr>
<td>Finland</td>
<td>45</td>
<td>4</td>
<td>22</td>
<td>12</td>
<td>3</td>
<td>4</td>
<td>–</td>
</tr>
<tr>
<td>France</td>
<td>190</td>
<td>15</td>
<td>80</td>
<td>66</td>
<td>15</td>
<td>14</td>
<td>–</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>10</td>
<td>–</td>
<td>6</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>–</td>
</tr>
<tr>
<td>Switzerland</td>
<td>95</td>
<td>1</td>
<td>70</td>
<td>14</td>
<td>7</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Sweden</td>
<td>94</td>
<td>1</td>
<td>40</td>
<td>43</td>
<td>6</td>
<td>4</td>
<td>–</td>
</tr>
<tr>
<td>South Africa</td>
<td>9</td>
<td>–</td>
<td>1</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>–</td>
</tr>
<tr>
<td>Japan</td>
<td>125</td>
<td>5</td>
<td>32</td>
<td>51</td>
<td>20</td>
<td>14</td>
<td>3</td>
</tr>
<tr>
<td>Other countries</td>
<td>72</td>
<td>10</td>
<td>29</td>
<td>12</td>
<td>14</td>
<td>2</td>
<td>5</td>
</tr>
</tbody>
</table>
Table 32: Researchers that worked abroad, by country of destination and field of science: 2002 (no. of persons)

<table>
<thead>
<tr>
<th>Researchers that worked abroad - total</th>
<th>Total</th>
<th>Natural sciences</th>
<th>Of which</th>
<th>Technical sciences</th>
<th>Medical sciences</th>
<th>Agricultu</th>
<th>Social</th>
<th>Humanita</th>
<th>rian sciences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2922</td>
<td>2251</td>
<td>272</td>
<td>984</td>
<td>178</td>
<td>666</td>
<td>151</td>
<td>372</td>
<td>104</td>
</tr>
<tr>
<td>Including by country of destination:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Australia</td>
<td>18</td>
<td>15</td>
<td>6</td>
<td>1</td>
<td>–</td>
<td>7</td>
<td>1</td>
<td>–</td>
<td>2</td>
</tr>
<tr>
<td>Austria</td>
<td>26</td>
<td>14</td>
<td>2</td>
<td>5</td>
<td>–</td>
<td>4</td>
<td>3</td>
<td>9</td>
<td>–</td>
</tr>
<tr>
<td>Belarus</td>
<td>22</td>
<td>16</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>16</td>
<td>6</td>
<td>–</td>
</tr>
<tr>
<td>Belgium</td>
<td>36</td>
<td>31</td>
<td>3</td>
<td>14</td>
<td>3</td>
<td>9</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Brazil</td>
<td>20</td>
<td>20</td>
<td>13</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Great Britain</td>
<td>135</td>
<td>114</td>
<td>21</td>
<td>51</td>
<td>3</td>
<td>39</td>
<td>–</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>Germany</td>
<td>556</td>
<td>475</td>
<td>38</td>
<td>288</td>
<td>47</td>
<td>80</td>
<td>22</td>
<td>37</td>
<td>15</td>
</tr>
<tr>
<td>Denmark</td>
<td>19</td>
<td>16</td>
<td>5</td>
<td>8</td>
<td>3</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Israel</td>
<td>26</td>
<td>25</td>
<td>3</td>
<td>14</td>
<td>5</td>
<td>3</td>
<td>–</td>
<td>1</td>
<td>–</td>
</tr>
<tr>
<td>India</td>
<td>69</td>
<td>3</td>
<td>2</td>
<td>–</td>
<td>1</td>
<td>66</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Iran</td>
<td>25</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>25</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Spain</td>
<td>22</td>
<td>21</td>
<td>2</td>
<td>11</td>
<td>3</td>
<td>5</td>
<td>–</td>
<td>1</td>
<td>–</td>
</tr>
<tr>
<td>Italy</td>
<td>60</td>
<td>49</td>
<td>11</td>
<td>30</td>
<td>–</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>23</td>
<td>1</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>1</td>
<td>22</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Canada</td>
<td>48</td>
<td>43</td>
<td>4</td>
<td>16</td>
<td>2</td>
<td>16</td>
<td>5</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Rep. of China</td>
<td>59</td>
<td>12</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>22</td>
<td>3</td>
</tr>
<tr>
<td>Korea</td>
<td>55</td>
<td>37</td>
<td>2</td>
<td>20</td>
<td>9</td>
<td>3</td>
<td>3</td>
<td>9</td>
<td>–</td>
</tr>
<tr>
<td>Mexico</td>
<td>25</td>
<td>19</td>
<td>5</td>
<td>7</td>
<td>–</td>
<td>7</td>
<td>–</td>
<td>6</td>
<td>–</td>
</tr>
<tr>
<td>Netherlands</td>
<td>58</td>
<td>42</td>
<td>2</td>
<td>20</td>
<td>2</td>
<td>14</td>
<td>4</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>Portugal</td>
<td>20</td>
<td>19</td>
<td>6</td>
<td>8</td>
<td>4</td>
<td>1</td>
<td>–</td>
<td>1</td>
<td>–</td>
</tr>
<tr>
<td>USA</td>
<td>840</td>
<td>709</td>
<td>75</td>
<td>240</td>
<td>50</td>
<td>310</td>
<td>34</td>
<td>33</td>
<td>50</td>
</tr>
<tr>
<td>Finland</td>
<td>45</td>
<td>37</td>
<td>2</td>
<td>11</td>
<td>1</td>
<td>19</td>
<td>4</td>
<td>4</td>
<td>–</td>
</tr>
<tr>
<td>France</td>
<td>190</td>
<td>162</td>
<td>35</td>
<td>56</td>
<td>19</td>
<td>46</td>
<td>6</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>Switzerland</td>
<td>95</td>
<td>84</td>
<td>3</td>
<td>70</td>
<td>3</td>
<td>8</td>
<td>–</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Sweden</td>
<td>94</td>
<td>80</td>
<td>4</td>
<td>25</td>
<td>8</td>
<td>38</td>
<td>5</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Japan</td>
<td>125</td>
<td>92</td>
<td>6</td>
<td>54</td>
<td>6</td>
<td>15</td>
<td>11</td>
<td>17</td>
<td>3</td>
</tr>
<tr>
<td>Other countries</td>
<td>211</td>
<td>115</td>
<td>23</td>
<td>26</td>
<td>8</td>
<td>29</td>
<td>29</td>
<td>65</td>
<td>6</td>
</tr>
</tbody>
</table>

Researchers, who worked abroad       Researchers – total
Co-publications

Table 33 provides some data about co-publications with foreign scientists. Only 6% of the Russian researchers co-authored international scientific articles with foreign scientists (2007). Over the 2004-2008 period, the Russian’s leading international partners were the USA and Germany (more than 10% of total copublications each). Then came France (6.6%), the UK (5.4%), Italy (4.3%) and Japan (3.7%). Although not in the top ten the shares of China and South Korea are rising rapidly.²²³

Table 33 Data of inventory survey of S&T organisations in the Russian Federation for 2007 (publications made in co-authorship)²²⁴

| Number of publications made in joint authorship with foreign scientists (units) | 14256 |
| Number of employees, who have publications made in joint authorship with foreign scientists (people) | 23932 |
| Number of organisations, which have publications made in joint authorship with foreign scientists (units) | 779 |

5. Conclusions

From the above study it can be stated that the Russian S&T system is rather complex. Its main features may be summarized as follows:

1. **Scientific excellence**

Cross-country comparison shows that absolute figures of S&T human potential bring Russia to the fourth place in the World, right after China, Japan and the USA. Russia also ranks among the leaders by certain indicators like scientific publications, although regarding the latter its ranking is steadily falling (14th in 2007 instead of 7th in 1995). But for important comparative indicators such as citations or patents, Russia is obviously not at the forefront. Despite the considerable scope of human potential, its dynamics shows an overall decrease in R&D personnel, although such decrease has slowed in the past years.

Russia benefits from scientific excellence in basic research fields such as physics, chemistry, etc. and in certain applied research areas such as nuclear or space research.

2. **Governance system and policy framework**

The Russian S&T system is still policy-driven at national level. The Ministry of Education and Science (MES Russia) elaborates a federal strategy for scientific and technological development. The most recent strategy-making document is the “Strategy for the development of science and innovation in the RF for the period until 2015.”

At the implementation level, two main agencies used to be in charge of supporting R&D through Federal Targeted Programmes, the new tools designed for funding R&D in a competitive way:
- the Federal Agency for Science and Innovation, which implemented the main competitive funding programme for S&T, the “Federal Targeted Programme R&D in Priority Fields of the S&T Complex of Russia 2007-2012”.
- the Federal Agency for Education,

Since March 2010 these two agencies have been closed, and MES Russia has taken over their functions.

3. **Higher Education and Research**

Russia has a particular division between organisations that conduct research and education. Research was historically performed at research institutes of the Russian Academy of Sciences (RAS), and higher education at universities. The new “Federal law on integration of science and education” (2007) aims at boosting S&T and innovation activities in Higher Education Institutions and establishing close links between HEIs and research institutions. One of the recent achievements is the new statute of National Research Universities assigned to leading Universities on a competitive basis.

4. **Research expenditure**

Domination of the government-owned budget-funded institutions in the Russian S&T sector is the main difference from the science systems of EU Member States and other industrialised countries. It is also one of the major challenges in terms of future restructuring of the Russian science system to make it more competitive at international level. While 34% of the Gross Domestic Expenditure on Research and Development (GERD) in the EU was financed by governments in 2006; for Russia the proportion is opposite: 62% of the GERD
was financed by the government. Over the last twenty years the Russian GERD declined from 2% of the Gross Domestic Product in 1990 to 1.12% in 2007.

The two main recipients of the civilian State R&D budget are the Russian Academy of Sciences, which is still the major actor, and the Federal Space Agency (Roskosmos).

5. **Innovation policy**

The number of federal and regional bodies and public corporations involved in the formulation and implementation of innovation policy has increased over the last years.

At the same time, the National Innovation System (NIS) suffers from the heritage of the Soviet Union and the social, political and economic transition of the nineties. According to the MES itself\(^{225}\), the main NIS weaknesses are:

− Insufficient coordination between the public and private sectors in the development of priorities and measures for the financial support for R&D.
− Low level of implementation of adopted measures aimed at promoting innovation activity in the enterprise sector to solve the problems linked with the industry's technological lag.
− Fragmented nature of policy aimed at improving inter-agency transfer of knowledge and technology, low level of inter-ministerial coordination of innovation activity.
− Low level of support for small innovative enterprises at all stages of development, lack of large innovative companies in the country and as a consequence, lack of promotion of real life experience for innovative entrepreneurship.

Therefore Russia has to overcome a wide range of problems and barriers to introduce and develop an efficient and competitive NIS.

The effect of the practical measures provided by the Government on the reorganisation of national S&T during the last 15 years are visible, but still too limited. Changes to the situation will strongly depend on the success of measures aimed at improving the overall business environment, economic stability, and respect of the law.

6. **International cooperation.**

According to its national strategy for the development of science and innovation, Russia is willing to create favourable conditions for international S&T co-operation. Importantly, the Federal Targeted Programme "Research and Development in Priority Fields of S&T Complex of Russia for 2007-2012" allows for participation of foreign entities.

The agreement on cooperation in science and technology between the EU and the Government of the RF, renewed on 30 March 2009, is a formal basis of the cooperation in S&T between the EU and Russia. Russia had the highest participation in the FP6 (2002-2007) of all Third Countries. Entities from the Russian Federation participate in all thematic and sub-programmes of FP7, including coordinated calls in several thematic priorities. Russia has signalled its interest in an associate status to the FP7.

Data for co-publications between Russian and foreign scientists exhibit a significant trend of bottom-up bi- and multi-lateral cooperation, especially in fundamental research. The Russian Foundation for Basic Research is the major player which provides support for international cooperation on a joint and competitive basis.

Overall the Russian S&T sector shows an ambiguous picture: Despite the high rate of economic growth achieved before the global crisis beginning in 2008, the stagnation of the

S&T sector is evident. Indicators such as R&D expenditure calculated as share of GDP, scientists' publication activity, innovation activities of enterprises, etc. remained comparatively low. Large parts of the S&T sector still operate in an old Soviet mode, where funding is spread with no or only limited competition and accountability, and private business does not show much interest in innovation.

On the other hand, the Russian R&D personnel has stabilised and financial input into S&T has significantly improved over the last years. Important reforms have been achieved in that operational independent funds for R&D support have been established and competitive funding programmes have been introduced. Priority has been given to innovation support and several support measures have been devised.

Although some obstacles regarding internal regulations remain to be tackled, it can be concluded that Russia has the research potential, the resources, the instruments, and finally the willingness to make a new step to strengthen S&T cooperation with EU member states for a mutual benefit.
Bibliography

Publications


CREST OMC-Working Group on Internationalisation of S&T (2008), Comparative Summary Report and Summary of Recommendations on the cooperation with Brazil, India and Russia, Brussels.


Dezhina, Irina (1996), Funding of Russia’s science: new forms and mechanisms// Voprosy Economiki, #10.


Dezhina, Irina/Peltrova, K.-K., International learning in Innovation Area: Finnish Experience for Russia.


Gokhberg, Leonid (2003), The Statistics of Science – Moscow: TEIS.

Graham, Loren (1998), What have we Learned About Science and Technology from the Russian Experience?, Stanford.

Gutnikov O. (2007), Legislative Reform in S&T and Innovation // Foresight #3.

HTSPE (2008), Mid-Term Evaluation of Tempus in Russia – Assessing the contribution of Tempus to the Bologna process in Russia.


Marquis Adeline (2009), Note N°6 from the Moscow Office of CNRS.


OECD (2005), Fostering Public-Private Partnership for Innovation in Russia, Paris.


OECD (2008), Science, Technology and Industry Outlook: Country Response to Policy Questionnaire. (not published yet)


Tendency in the development of human potential in Russian science (2008), Institute of the development of science in RAS, Moscow.

Walz, Rainer/Katrin Ostertag/Wolfgang Eichhammer/Nele Glienke/Arlette Jappe-Heinze/Wilhelm Mannsbart/Jan Peukert (2008), Research and Technology Competence for a Sustainable Development in the BRICS Countries, Karlsruhe.

Wissenschaft – Forschung – Bildung in der Russischen Föderation (2008), compiled by Deutsche Forschungsgemeinschaft (DFG), Helmholtz-Gemeinschaft, Botschaft der Bundesrepublik Deutschland in Moskau, Moscow.


**EU - INTAS**
INTAS, A bridge to partnership in research, Activities over the FP6 Period 2002-06, Brussels, 2007
Activity reports, evaluation reports and projects - [http://www.intas.be/content/intas/reports.html](http://www.intas.be/content/intas/reports.html)

**EU - FP**


Scope-East, Bibliometric report on Russian and Ukrainian research potential, 2007, [http://scope-east.net](http://scope-east.net)

Scope-East, Concluding report on areas for enhanced cooperation with Russia and Ukraine, 2007.

**Bilat RUS**

Rusera

RUSERA-EXE. Expanding the ERA over Russia. Spotlight on EU-Russia RTD cooperation. A snapshot of experiences on researchers’ level. Vienna, 2009.

ERA.Net RUS - ten EU/AC countries participating in ERA.Net RUS: Austria, Estonia, Finland, France, Germany, Greece, Hungary, Norway, Russia, and Turkey.


**EU – TACIS**
Russian Technology Transfer Network (RTTN), www.rttn.ru
Science and Technology Commercialisation, http://ras-stc.ru


EU - ISTC
ISTC annual reports

Other EU (multilateral & bilateral)
COST
EUREKA
ITER
ESA
CERN
GSI
Joint labs RU-DE, RU-FR
Joint mobility schemes and funding programmes RU-AT, DE, FR, FI, PL …
Bilateral agreements RU-AT, DE, FR, FI, PL, …

Russian websites with S&T relevant information, which are at least partly in English:
http://www.brin-net.ru
http://www.dynastyfdn.com/english/
http://www.gate2rubin.ru
http://www.government.ru
http://www.mon.gov.ru
http://www.ras.ru
http://www.rfbr.ru
http://www.rostechnologii.ru
http://www.rusnano.com
http://www.rvca.ru/eng/
http://www.poisknews.ru/category/english
http://www.rfir-net.org
http://www.rtttn.ru/
http://en.rusnano.com/
http://www.sciencepark.ru
http://rus.unite.ru/
http://www.sistema.com

EC documents


Council of the European Union, 11214/08, Joint Statement of the EU-Russia summit on the launch of negotiations for a new EU-Russia agreement, Khanty-Mansyisk, 27.06.2008

European Commission, Eastern Europe and Central Asia Meeting doc. 137/08, Joint Statement of EU-Russia Permanent Partnership Council on Research, Ljubljana, 27.05.2008


**Data**


Eurostat - Russia included in main S&T statistics publications

Eurostat (2008), The European Union and the Commonwealth of Independent States, Statistical comparison.


OECD - Russia included in main S&T statistics publications (e.g. MSTI, STI outlook, etc.)

OECD. Main Science and Technology Indicators (MSTI), 2008-2


Science Indicators (2009) Data Book. – Moscow: State University – Higher School of Economics (in Russian);


State University - Higher School of Economics (HSE) (2007), S&T Indicators in the Russian Federation, Moscow.

State University - Higher School of Economics (HSE) (2009), S&T Indicators in the Russian Federation, Moscow. (in Russian)

**Non-EU**
CRDF – Civilian Research and Development Fund: annual reports
ANNEX 1 : LIST OF TECHNOLOGIES CRITICAL FOR THE RUSSIAN FEDERATION

Approved by President Putin on 21.5.2006

Basic and military critical, specialized and industrial technologies

Bioinformatics technologies

Technologies of biocatalysis, biokinetics and biosensors

Biomedical and veterinary technologies for life protection of humans and animals

Genomic and post genomic technologies for conception of medical drugs

Cell technologies

Nano technologies and nano materials

Technologies of atomic energetics, nuclear fuel cycle, safe treatment of radioactive waste and burn out nuclear fuel

Technologies of bioengineering

Technologies of hydrogen energy

Technologies of mecanotronics and conception of micro system techniques

Technologies of monitoring and forecasting conditions of atmosphere and hydrosphere

Technologies of new and renewable energy sources

Technologies of protecting population and important objects against threats of terrorist activities

Technologies of treatment, storage, transmission and protection of information

Technologies of resource evaluation and forecasting of biospheric and litospheric conditions

Technologies of processing and utilization of technological waste

Technologies producing programming support

Technologies producing fuels and energy from organic raw materias

Technologies of parallel computing systems

Technologies reducing risks and consequences of natural and technological catastrophes

Technologies of conceive biocompatible materials
Technologies of conceiving intelligent navigation and control systems
Technologies of conceiving and treatment of nanocomposite materials
Technologies of conceiving and treatment of crystalline materials
Technologies of conceiving and treatment of polymers and elastomers
Technologies of conceiving and controlling new types of transporting systems
Technologies of conceiving membranes and catalytic systems
Technologies of conceiving new generation of cosmic, airplane and seaship techniques
Technologies of conceiving electronic component base
Technologies of conceiving energy saving systems of transport, delivery and use of heat and electricity
Technologies of conceiving energy-effective motors and propulsors for transporting systems
Technologies of ecologically safe and resource saving production of agricultural products and foodstuffs
Technologies of ecologically safe exploiting of fossil raw materials
ANNEX 2 : List of the 12 Major Innovation Projects of National Importance, contracted in 2003

- Development of technologies and introduction in serial production of a new generation of sealing and fireproof materials of common industrial application (the amount of government support: RUB 400 million, funds from other sources: RUB 410.2 million);
- Development and start of production of instruments and equipment for nanotechnology (government support: RUB 400 million, funds from other sources: RUB 410.5 million);
- Development of biotechnologies and industrial introduction of high-reproduction seed materials of genetically modified agricultural plants (government support: RUB 150 million, funds from other sources: RUB 170 million);
- Development and start of production of perspective matrix photo-electronic modules for the development of competitive home-made infrared equipment (government support: RUB 300 million, funds from other sources: RUB 150 million);
- Development and start of production of catalysts and catalytic technologies of a new generation for manufacture of motor fuels (government support: RUB 350 million, funds from other sources: RUB 653 million);
- Development and industrial introduction of a technology of manufacturing new types of high-quality cardboard, using recycled fibre (government support: RUB 150 million, funds from other sources: RUB 318.7 million);
- Development and start of production of a class of highly efficient steam-gas power installations with the unitary power over 200 megawatt (government support: RUB 450 million, funds from other sources: RUB 550 million);
- Development of technologies and start of industrial production of constructive metallic materials with twofold increase in the most important operation properties (government support: RUB 200 million, funds from other sources: RUB 200 million);
- Development of the synthetic dielectric crystals industry and products (government support: RUB 460 million, funds from other sources: RUB 501 million);
- Development and start of serial production of a class of competitive diesel engines for motor transportation (government support: RUB 500.0 million, funds from other sources: RUB 2041.2 million)
- Development and practical improvement of technical, technological, organisational and financial solutions (including complex ones) for increasing the efficiency of heat supply
# ANNEX 3: Objectives of MES in Russia

<table>
<thead>
<tr>
<th>Objectives of MES Russia</th>
<th>MES goals</th>
<th>State Budget owners involved in realization of Objectives</th>
</tr>
</thead>
</table>
| 1. To guarantee the availability of quality education for all stratus of Russian society as a basis for social mobility and essential means to decrease of social economic differentiation of society. | 1.1. Support of Educational system on the Federal, regional and municipal level.  
1.2. Raising the status of pedagogical personnel.  
1.3. Creation of national system of education quality assessment in order to ensure proper standards of educational programmes.  
1.4. Development of financial and economic mechanisms in educational sphere. | MES Russia,  
The Federal Service for Supervision of Education and Science (Rosobrnadzor), |
| 2. To secure training and availability of professional personnel with required qualifications for current and forthcoming social and economic needs of the society, and to ensure the development of continuous education. | 2.1. To ensure appropriateness of the infrastructure for professional qualification training to the need of labor market and new horizons of economic development, and fulfillment of state interest in educational sphere.  
2.2. Development and realisation of educational standards and variations of programmes.  
2.3. Development of continuous education, including vocational training as a means for covering current and forthcoming needs of national economy and society.  
2.4. To ensure Russia’s integration in world education, and to raise competitiveness of Russian education in world education market.  
2.5. Modernisation of system of measures of social and stipend support in professional education establishments. | MES Russia,  
The Federal Service for Supervision of Education and Science (Rosobrnadzor),  
Russian Academy of beaux-arts,  
Russian Academy of Science,  
Russian Academy of Education,  
Moscow State University named after M.V.Lomonosov |
| 3. To ensure necessary requirements for active participation of children of all education establishments in economic, social, political and cultural spheres of society. | 3.1 Modernisation of mechanisms of education and individual development of children and all other categories of people receiving education.  
3.2. To ensure rights and interests of most vulnerable children in society, social orphanages, children homelessness and neglected.  
3.3. To improve access to education for handicapped.  
3.4. To improve the conditions for healthy life among children and all other categories of people receiving education.  
3.5. To create conditions and ensure students’ access for worldwide community. | MES Russia,  
Russian Academy of beaux-arts,  
Russian Academy of Science,  
Russian Academy of Science (Siberian branch),  
Russian Academy of Science (Ural branch),  
Russian Academy of Science (Far East branch)  
Russian Union of Youth (RUY) |
<table>
<thead>
<tr>
<th>Objectives of MES Russia</th>
<th>MES goals</th>
<th>State Budget owners involved in realization of Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. To provide all necessary measures for the development and effective use of S&amp;T potential.</td>
<td>4.1. To raise effectiveness of the S&amp;T sphere through optimization of the network of State research organisations, focusing of resources on priority areas of S&amp;T and engineering, and development of quality regulation in the area.</td>
<td>MES Russia, Federal Service for Supervision of Education and Science (Rosobrnadzor), Russian Academy of Science, Russian Academy of Science (Siberian branch), Russian Academy of Science (Ural branch), Russian Academy of Agricultural Sciences, Russian Academy of Beaux-arts, Russian Academy of Architectural sciences, Russian Academy of Education, Moscow State University named after M.V. Lomonosov, Russian Foundation for Basic Research, Russian Foundation for Humanitarian Sciences</td>
</tr>
<tr>
<td></td>
<td>4.2. To ensure priority for the development of basic and applied science, and support of leading S&amp;T schools, support of the quality of professional personnel, including highly qualified personnel.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.3. Integration of educational and scientific activity, improving of science in Universities and formation of scientific educational centers.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.4. Development of material and technical base of fundamental and applied science, including modern equipment, devices and materials, modernisation of infrastructure and functioning of scientific organisations.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.5. Integration of national science in global development of S&amp;T process.</td>
<td></td>
</tr>
<tr>
<td>5. To secure all necessary measures for innovation development</td>
<td>5.1. To ensure proper conditions for innovation activity and sensibility of organisations to innovations and progressive technologies as means for products competitiveness.</td>
<td>MES Russia, Federal Service for Intellectual Property, Patents and Trademarks, Russian Foundation for Humanitarian Sciences, FASIE</td>
</tr>
<tr>
<td></td>
<td>5.2 To ensure the development of state mechanism for support of innovation, development of public private partnership and realization of priority innovation projects of national value.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5.3 Development of infrastructure of national innovation system.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5.4 To ensure all measures for national appropriate use of the results of S&amp;T activities, and support for the market development of IPR</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5.5 To support the development of innovative SMEs.</td>
<td></td>
</tr>
</tbody>
</table>
ANNEX 4 : Overview of research infrastructures in Russia

1. Overview of important Russian research infrastructures

**Synchrotron Centers**

<table>
<thead>
<tr>
<th>Institute Name</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Budker Institute of Nuclear Physics</td>
<td>Novosibirsk</td>
</tr>
<tr>
<td>- VEP-3, E = 2.0 GeV</td>
<td></td>
</tr>
<tr>
<td>Kurchatov Institute</td>
<td>Moscow</td>
</tr>
<tr>
<td>- SR – center, E = 2.5 GeV</td>
<td></td>
</tr>
<tr>
<td>Scientific Research Institute of physical problems</td>
<td>Zelenograd, Moscow region</td>
</tr>
<tr>
<td>- under construction, E = 1.5 GeV</td>
<td></td>
</tr>
</tbody>
</table>

**Neutron Reactors**

<table>
<thead>
<tr>
<th>Institute Name</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joint Institute for Nuclear Research</td>
<td>Dubna, Moscow region</td>
</tr>
<tr>
<td>- Impulse reactor IBR-2</td>
<td></td>
</tr>
<tr>
<td>Kurchatov Institute</td>
<td>Moscow</td>
</tr>
<tr>
<td>- Research reactor IR-8</td>
<td></td>
</tr>
<tr>
<td>Physics Energy Institute</td>
<td>Obninsk, Moscow region</td>
</tr>
<tr>
<td>- Fast reactor BR-10</td>
<td></td>
</tr>
<tr>
<td>Reactor Materials Institute</td>
<td>Zarechniy, Sverdlovsk region</td>
</tr>
<tr>
<td>- Basin-type reactor IBB-2M</td>
<td></td>
</tr>
<tr>
<td>Moscow Engineering Physics Institute</td>
<td>Moscow</td>
</tr>
<tr>
<td>- Research reactor</td>
<td></td>
</tr>
<tr>
<td>Petersburg Institute of Nuclear Physics</td>
<td>Gatchina, Leningrad region</td>
</tr>
<tr>
<td>- High flux beam reactor PIK</td>
<td></td>
</tr>
</tbody>
</table>

**Beam Technology**

<table>
<thead>
<tr>
<th>Institute Name</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kurchatov Institute</td>
<td>Moscow</td>
</tr>
<tr>
<td>Budker Institute of Nuclear Physics</td>
<td>Novosibirsk</td>
</tr>
<tr>
<td>Russian federal Nuclear Center</td>
<td>Sarov,</td>
</tr>
<tr>
<td>All-Russia Scientific Research Institute of Experimental Physics</td>
<td>Nizhniy Novgorod region</td>
</tr>
<tr>
<td>Alikhanov Institute of Theoretical and Experimental Physics</td>
<td>Moscow</td>
</tr>
<tr>
<td>Joint Institute for Nuclear Research</td>
<td>Dubna, Moscow region</td>
</tr>
</tbody>
</table>

**Clean Rooms**

---

227 Overview of relevant Russian research infrastructures according to a presentation given by Dr. Sergey Ivanets, Russian Ministry of Education and Science, at a meeting of EU S&T Councillors in Moscow, July 2008.
### Company, Cleanroom Class, Region

<table>
<thead>
<tr>
<th>Company</th>
<th>Cleanroom Class</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>JSC EcoProject</td>
<td>Up to Class I – submicroelectronics (World largest cleanroom for rocket fueling in Baikonur)</td>
<td>Moscow</td>
</tr>
<tr>
<td>PharmStroy</td>
<td>Class 100 – pharmaceutical, optical manufacturing</td>
<td>Moscow</td>
</tr>
<tr>
<td>Miass Factory of Medical Equipment</td>
<td>Class 100 - pharmaceutical and electronics manufacturing</td>
<td>Miass, Chelyabinsk region</td>
</tr>
<tr>
<td>Rost Construction Company</td>
<td>Class 100 - pharmaceutical and electronics manufacturing</td>
<td>Ekaterinburg</td>
</tr>
</tbody>
</table>

### 2. Overview of 135 unique installations supported within activity line 1.8 of the Federal Targeted programme «Research and development in priority fields of S&T complex of Russia for 2007-2012»

<table>
<thead>
<tr>
<th>Object of Research Infrastructure</th>
<th>Holder name</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Complex of unique stands for modelling of acoustic and hydroacoustic fields</td>
<td>Andreev Acoustic Institute</td>
<td>Moscow</td>
</tr>
<tr>
<td>2. Unique complex of the scientific equipment of the raster ionic-electronic microscopy, scanning probe microscopy, high resolution scanning electronic microscopy, mercury porosometry, tribology and adhesive tests</td>
<td>Belgorod State University</td>
<td>Belgorod</td>
</tr>
<tr>
<td>3. Light detection and ranging measuring complex of the Federalno-regional centre of space and land monitoring of objects and natural resources</td>
<td>Belgorod State University</td>
<td>Belgorod</td>
</tr>
<tr>
<td>4. Collection fund of the Komarov Botanic Garden RAS</td>
<td>Komarov Botanic Garden RAS</td>
<td>St.-Petersburg</td>
</tr>
<tr>
<td>5. Unique system of facilitie «Research complex of synthesis and diagnostics of nanostructures and nanodefects»</td>
<td>Vladimir State University</td>
<td>Vladimir</td>
</tr>
<tr>
<td>6. Gravimetric observatory with the complete set seismic gravimetric equipment («Gravimetric observatory»)</td>
<td>Vladimir State University</td>
<td>Vladimir</td>
</tr>
<tr>
<td>7. Kozo-Poljansky Botanic Garden of the Voronezh State University</td>
<td>Voronezh State University</td>
<td>Voronezh</td>
</tr>
</tbody>
</table>

---

228 Compiled by Evgeniy Ugrinovitch, Kurchatov Institute, April 2010
<table>
<thead>
<tr>
<th>Object of Research Infrastructure</th>
<th>Holder name</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>8. Unique installation for precision measurements of photometric, and spectrum radiometric characteristics of radiation sources and receivers in wide spectral range from UV to IR areas of spectrum and temperature above 2000 K</td>
<td>All-Russia Scientific and Research Institute of Optico-Physical Measurements</td>
<td>Moscow</td>
</tr>
<tr>
<td>9. Unique superhigh-voltage test facility of the Complex High-voltage Stand</td>
<td>All-Russia Lenin Electrotechnical Institute</td>
<td>Moscow</td>
</tr>
<tr>
<td>10. Unique stands and installations for research of physical processes of electrodynamic firmness of power transformers and electric durability designs</td>
<td>All-Russia Lenin Electrotechnical Institute</td>
<td>Moscow</td>
</tr>
<tr>
<td>11. Unique installation «Superbroadband geoscanner» for an investigation of superbroadband geolocation methods</td>
<td>All-Russia Lenin Electrotechnical Institute</td>
<td>Moscow</td>
</tr>
<tr>
<td>12. Unique stand for electromagnetic investigations of firm objects</td>
<td>All-Russia Lenin Electrotechnical Institute</td>
<td>Moscow</td>
</tr>
<tr>
<td>13. Complete set of installations for operational tests of overvoltage terminators</td>
<td>All-Russia Lenin Electrotechnical Institute</td>
<td>Moscow</td>
</tr>
<tr>
<td>14. Installation «Stock Orangery of the Tsitsin Main Botanic Garden RAS»</td>
<td>Tsitsin Main Botanic Garden RAS</td>
<td>Moscow</td>
</tr>
<tr>
<td>15. Unique scientific-expedition vessel «Academician Feodorov» for researches in polar regions of the world ocean</td>
<td>Arctic and Antarctic Research Institute</td>
<td>St.-Petersburg</td>
</tr>
<tr>
<td>16. Aerosol statiko-dynamic experimental stand for technologies of the express control of patogene aerosols</td>
<td>State Research Institute of Biology Instrument Engineering</td>
<td>Moscow</td>
</tr>
<tr>
<td>17. Unique stand installation «All-Russia collection of industrial microorganisms»</td>
<td>State Research Institute for Genetics and Selection of Industrial Microorganisms</td>
<td>Moscow</td>
</tr>
<tr>
<td>19. Laboratory complex of installations with P-4 level (highest) of biological protection (LSK-4) for a complete study of particularly dangerous viral and bacterial infections with an aerosol way contamination in and air disinfecting devices</td>
<td>State Research Center of Virology and Biotechnology VECTOR</td>
<td>Koltsovo, Novosibirsk region</td>
</tr>
<tr>
<td>Object of Research Infrastructure</td>
<td>Holder name</td>
<td>Location</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>20. Complex of unique installations of viral aerosols; efficiency of means and ways of treatment of the infections with an aerosol way contamination and air disinfecting devices, individual protection means and other aerosol equipment</td>
<td>State Research Center of Virology and Biotechnology VECTOR</td>
<td>Koltsovo, Novosibirsk region</td>
</tr>
<tr>
<td>21. Unique installation « Stand for handling of AIDS-virus contaminated biological material</td>
<td>Institute of Immunology</td>
<td>Moscow</td>
</tr>
<tr>
<td>22. Advanced unique stands of a complex «Deep-water diving research installation GVK-250»</td>
<td>Institute of medical-biological research RAS</td>
<td>Moscow</td>
</tr>
<tr>
<td>25. Power breadboard model of laser system pumped dy the pulse reactor &quot;BARS-6&quot; (Stand &quot;B&quot;)</td>
<td>Leipunsky Institute for Physics and Power Engineering</td>
<td>Obninsk, Kaluga reg.</td>
</tr>
<tr>
<td>28. Experimental complex of tokamak installation with a strong field and adiabatic plasma compression (Complex of TSP installation)</td>
<td>Troitsk Institute for Innovation &amp; Fusion Research</td>
<td>Troitsk, Moscow reg.</td>
</tr>
<tr>
<td>29. Pulse thermonuclear installation &quot;Angara-5-1&quot; and the electromagnetic energy concentrator on the Angara-5-1 installation</td>
<td>Troitsk Institute for Innovation &amp; Fusion Research</td>
<td>Troitsk, Moscow reg.</td>
</tr>
<tr>
<td>30. Installation for localisation of microarc oxidation process and plazma-electrolytic contact for nanostructure microarc coating structures and properties investigations</td>
<td>State Technology University « Moscow Institute of Steel and Alloys »</td>
<td>Moscow</td>
</tr>
<tr>
<td>31. Unique bench installation of scientific devices &quot;Biospectrum tomography&quot; for the human and animal pathologies research</td>
<td>State Scientific-Educational Interfaculty and Interdisciplinary Center of magnetic tomography and spectroscopy of the Moscow State University</td>
<td>Moscow</td>
</tr>
<tr>
<td>Object of Research Infrastructure</td>
<td>Holder name</td>
<td>Location</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td>32. Installation «Stock collections of Zoological institute, including of Peter the Great Kunstkamera»</td>
<td>Zoological Institute ps RAS</td>
<td>St.-Petersburg</td>
</tr>
<tr>
<td>33. Unique installation «Laser methods of research of the condensed media, biological objects and environment monitoring»</td>
<td>Institute of Automatics and Control Processes of Far-Eastern Branch of RAS</td>
<td>Vladivostok</td>
</tr>
<tr>
<td>34. Unique installation «Laser methods of research of the condensed media, biological objects and environment monitoring» for a development of methods and equipment of on-line monitoring of atmosphere, hydrosphere and sea ecosystems conditions</td>
<td>Institute of Automatics and Control Processes of Far-Eastern Branch of RAS</td>
<td>Vladivostok</td>
</tr>
<tr>
<td>35. Unique stands and installations of laser methods of research &quot;LaMI&quot; for studying of influence of a climate changes on phytoplankton cells photosynthetic performance and a potential impact of phytoplankton communities on a development of global warming</td>
<td>Institute of Automatics and Control Processes of Far-Eastern Branch of RAS</td>
<td>Vladivostok</td>
</tr>
<tr>
<td>36. Russian collection of genetic material «TRANSGENBANK»</td>
<td>Institute of Gene Biology RAS</td>
<td>Moscow</td>
</tr>
<tr>
<td>37. Unique installation &quot;Biocenter&quot; for biotechnological research on plants and laboratory animals</td>
<td>Shemyakin &amp; Ovchinnikov Institute of Bioorganic Chemistry RAS</td>
<td>Moscow</td>
</tr>
<tr>
<td>38. Unique installation « Complex of the equipment for research of nucleinic acids – KODINK»</td>
<td>Institute of Biochemistry and Genetics, Ufa Scientific Center RAS</td>
<td>Ufa, Republic of Baskortostan</td>
</tr>
<tr>
<td>39. All-Russia collection of microorganisms</td>
<td>G.K.Skrjabin Institute of Biochemistry and Physiology of Microorganisms</td>
<td>Puschino, Moscow reg.</td>
</tr>
<tr>
<td>40. Spectroscopy station EXAFS of the «Siberian Synchrotron and Terahertz Radiation Center» for research of structure low-percentage and high dispersion catalysts</td>
<td>Boreskov Institute Catalysis of the Siberian Branch of RAS</td>
<td>Novosibirsk</td>
</tr>
<tr>
<td>41. Yakut complex installation of wide atmospheric rains for research of space beams from 1016 to 1020 eV</td>
<td>Shafer Institute of Cosmophysical Research and Aeronomy of the Siberian Branch of RAS</td>
<td>Jakutsk, Jakutia</td>
</tr>
<tr>
<td>Object of Research Infrastructure</td>
<td>Holder name</td>
<td>Location</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>42. <strong>Unique installation “Lengmur research and technological complex for inorganic, organic and</strong></td>
<td><strong>Shubnikov Institute of Crystallography RAS</strong></td>
<td><strong>Moscow</strong></td>
</tr>
<tr>
<td><strong>bioorganic nanosystems substance, structure and properties investigation”</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>43. <strong>Femtosecond LiF:F2 laser complex with a retuning frequency and multi Terawatt peak power in</strong></td>
<td><strong>Prokhorov General Physics Institute RAS</strong></td>
<td><strong>Moscow</strong></td>
</tr>
<tr>
<td><strong>a wavelength of 1,1-1,25mcm for energy, solid state physics, plasma, technology and medicine</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>researchers</strong></td>
<td></td>
<td><strong>Moscow</strong></td>
</tr>
<tr>
<td>44. <strong>Research vessel &quot;Academician Mstislav Keldysh&quot; with application of deep-water manned devices</strong></td>
<td><strong>Shirshov Institute of Oceanology RAS</strong></td>
<td><strong>Moscow</strong></td>
</tr>
<tr>
<td><strong>&quot;Mir-1&quot; and &quot;Mir-2&quot;</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45. <strong>Aircraft-laboratories An-30 &quot;Optik-E&quot; for research of gas and aerosol spatial distribution and</strong></td>
<td><strong>Zuev Institute of Atmospheric Optics of the Siberian Branch of RAS</strong></td>
<td><strong>Tomsk</strong></td>
</tr>
<tr>
<td><strong>of tendencies of air structure change</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>46. <strong>Siberian lidar station for complex remote optical research of thermal structure and aerosol-gas</strong></td>
<td><strong>Zuev Institute of Atmospheric Optics of the Siberian Branch of RAS</strong></td>
<td><strong>Tomsk</strong></td>
</tr>
<tr>
<td><strong>structure of atmosphere in a altitude range of 0-80 km</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>47. <strong>Unique stands and installations in the area of power generation and power savings: super</strong></td>
<td><strong>Zelinsky Institute of Organic Chemistry RAS</strong></td>
<td><strong>Moscow</strong></td>
</tr>
<tr>
<td><strong>high frequency activation of nanosized materials and catalysts</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>48. <strong>“Radio interferometric complex&quot;QUASAR&quot; for astrometric, geodynamic and astrophysical research</strong></td>
<td><strong>Institute of Applied Astronomy RAS</strong></td>
<td><strong>St.-Petersburg</strong></td>
</tr>
<tr>
<td>49. <strong>Unique installation «Super-power femtosecond laser on the basis of a parametrical light</strong></td>
<td><strong>Institute of Applied Physics RAS</strong></td>
<td><strong>Nizhni Novgorod</strong></td>
</tr>
<tr>
<td><strong>amplifier»</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50. <strong>Unique installation &quot;Hydrophysical complex for modelling of hydrodynamic processes in</strong></td>
<td><strong>Ishlinsky Institute for Problems in Mechanics RAS</strong></td>
<td><strong>Moscow</strong></td>
</tr>
<tr>
<td><strong>environment and their impact on underwater technical objects, as well as distributions of</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>impurity at the ocean and atmosphere&quot;</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>51. <strong>Unique installation «Experimental explosion stand»</strong></td>
<td><strong>Institute of Problems of Chemical Physics RAS</strong></td>
<td><strong>Chernogolovka,</strong></td>
</tr>
<tr>
<td>Object of Research Infrastructure</td>
<td>Holder name</td>
<td>Location</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>52. Unique installation &quot;Solo&quot;, equipped with an electronic source with net stabilisation of a plasma emission border for research of the mechanisms of nanostructure modification and strengthening of intermetallic and ceramic-metal alloys surfaces</td>
<td>Institute of High Current Electronics of the Siberian Branch of RAS</td>
<td>Tomsk</td>
</tr>
<tr>
<td>53. Observatory for radio physical atmosphere diagnostics (ORDA) on a basis of the Irkutsk Non-Coherent Dispersion Radar</td>
<td>Institute of Solar-Terrestrial Physics of the Siberian Branch of RAS</td>
<td>Irkutsk</td>
</tr>
<tr>
<td>54. Unique installation &quot;Siberian solar radio telescope&quot; (SSRT)</td>
<td>Institute of Solar-Terrestrial Physics of the Siberian Branch of RAS</td>
<td>Irkutsk</td>
</tr>
<tr>
<td>55. Unique installation &quot;Large solar vacuum telescope&quot; (BSVT)</td>
<td>Institute of Solar-Terrestrial Physics of the Siberian Branch of RAS</td>
<td>Irkutsk</td>
</tr>
<tr>
<td>56. Large-scale thermohydrodynamic stand for investigation of thermal and gasodynamic characteristics of power installations and &quot;Vacuum gasodynamic complex of Institute of thermophysics of the Siberian Branch of the Russian Academy of Sciences&quot;</td>
<td>Kutateladze Institute of Thermo-Physics of the Siberian Branch of RAS</td>
<td>Novosibirsk</td>
</tr>
<tr>
<td>57. Unique stand of tunable powerful (to 2ГВт) pulse femto - and nanosecond lasers and parametrical light generators of light (&quot;Femtospektr&quot;)</td>
<td>Institute of Microstructure Physics RAS</td>
<td>Nizhni Novgorod</td>
</tr>
<tr>
<td>58. Installation for super high speed acceleration of objects, modified (USRTM)</td>
<td>Institute for Electrophysics and Electro-energetics RAS</td>
<td>St.-Petersburg</td>
</tr>
<tr>
<td>59. Complex of electron-positron colliders VEPP-4 – VEPP -2000 for high energy physics and nuclear physics experiments</td>
<td>Bunker Institute of Nuclear Physics of the Siberian Branch of RAS</td>
<td>Novosibirsk</td>
</tr>
<tr>
<td>60. Modern open magnetic traps (Complex DOL)</td>
<td>Budker Institute of Nuclear Physics of the Siberian Branch of RAS</td>
<td>Novosibirsk</td>
</tr>
<tr>
<td>61. Unique installation «Tandem-BNZT proton accelerator» for a preclinical research of Boron Neutron Capture therapy for malignant tumours in vitro</td>
<td>Budker Institute of Nuclear Physics of the Siberian Branch of RAS</td>
<td>Novosibirsk</td>
</tr>
<tr>
<td>62. Complex of electron-positron colliders VEPP-4 – VEPP-2000 for high energy physics and nuclear physics experiments and experiments with use of synchrotron radiations</td>
<td>Budker Institute of Nuclear Physics of the Siberian Branch of RAS</td>
<td>Novosibirsk</td>
</tr>
<tr>
<td>Object of Research Infrastructure</td>
<td>Holder name</td>
<td>Location</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td>63. Unique installation «Linear accelerator of hydrogen ions and a pulse neutron source of the INR RAS»</td>
<td>Institute of Nuclear Research RAS</td>
<td>Moscow</td>
</tr>
<tr>
<td>64. Baikal deep-water neutrino telescope (BGNT)</td>
<td>Institute of Nuclear Research RAS</td>
<td>Moscow</td>
</tr>
<tr>
<td>65. Linear proton accelerator of INR RAS</td>
<td>Institute of Nuclear Research RAS</td>
<td>Moscow</td>
</tr>
<tr>
<td>66. Complex of installations of the Baksansky underground scintillation telescope (BPST)</td>
<td>Institute of Nuclear Research RAS</td>
<td>Moscow</td>
</tr>
<tr>
<td>67. Unique installation «Complex geophysical information-measuring system of the Berbekova Kabardino-Balkarian state university for research of the geodynamic processes at North Caucasus potential earthquake areas</td>
<td>Berbekov Kabardino-Balkarian state university</td>
<td>Nalchik, Kabardino-Balkarian Republic</td>
</tr>
<tr>
<td>68. Botanical garden of the Berbekov Kabardino-Balkarian state university</td>
<td>Berbekov Kabardino-Balkarian state university</td>
<td>Nalchik, Kabardino-Balkarian Republic</td>
</tr>
<tr>
<td>69. Unique gasdynamic testing facility</td>
<td>Tupolev Kazan State Technical University</td>
<td>Kazan</td>
</tr>
<tr>
<td>70. PP-2 unique stand for investigation of persistence of perspective composite materials and coatings to multifactorial influence of heterogeneous environments and vacuum</td>
<td>Moscow Aviation Institute (state technical university)</td>
<td>Moscow</td>
</tr>
<tr>
<td>71. Experimental complex stand for research of superconducting systems and electromechanical energy converters on the basis of low-temperature and high-temperature superconductors</td>
<td>Moscow Aviation Institute (state technical university)</td>
<td>Moscow</td>
</tr>
<tr>
<td>72. Multifunctional complex for imaging and diagnostics of mineral substance in special thermobar conditions «MULTISCAN» for research of the formation processes of new technological properties of natural and technogenic mineral substance under the influence of physical and material fields</td>
<td>Moscow State Mining University</td>
<td>Moscow</td>
</tr>
<tr>
<td>73. Experimental research and diagnostic stand based on high-current magnetic plasmodynamic accelerator of extreme power density (BEAM CO1)</td>
<td>Bauman Moscow State Technical University</td>
<td>Moscow</td>
</tr>
<tr>
<td>Object of Research Infrastructure</td>
<td>Holder name</td>
<td>Location</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>74. Unique thermophysical stand («Mercury MGD-STAND») for the research of hydrodynamics and heat exchange liquid metal heat-carrier in strong magnetic fields in perspective nuclear power applications</td>
<td>Bauman Moscow State Technical University</td>
<td>Moscow</td>
</tr>
<tr>
<td>75. Experimental complex of unique stands and installations – «Hydroshock stand Erosion M» for research of the constructional materials surface destruction processes, composition and and structure of perspective nanocomposites coatings</td>
<td>Bauman Moscow State Technical University</td>
<td>Moscow</td>
</tr>
<tr>
<td>76. Experimental research complex “Murmansk oceanarium” (Oceanarium)</td>
<td>Murmansk Marine Biological Institute RAS</td>
<td>Murmansk</td>
</tr>
<tr>
<td>77. Astrophysical complex for research of ultrahigh energy space beams (Tunka and SHAL-MGU installations)</td>
<td>Scobeltsyn Institute of Nuclear Physics, Lomonosov Moscow State University</td>
<td>Moscow</td>
</tr>
<tr>
<td>78. Multi-purpose chemical technology experimental complex on the basis of research nuclear reactor VVR-c (Uikum VVR-c)</td>
<td>Karpov Institute of Physical Chemistry</td>
<td>Moscow</td>
</tr>
<tr>
<td>79. Stand for mechanism research of low-energy nuclear reactions, initiated by methods of low-energy physics and physical chemistry</td>
<td>Karpov Institute of Physical Chemistry</td>
<td>Moscow</td>
</tr>
<tr>
<td>80. Measuring complex for research of aerosol, gas components of atmosphere and meteorological parameters as well as performing atmosphere monitoring in the Baikal region</td>
<td>Karpov Institute of Physical Chemistry</td>
<td>Moscow</td>
</tr>
<tr>
<td>81. Unique installation &quot;Simulation facility complex geophysical processes research» for the development and investigation of a methods of active influence powder hygroscopic reagents on clouds for a precipitation increase</td>
<td>Science and Production Association &quot;Typhoon&quot;</td>
<td>Obninsk, Kaluga region</td>
</tr>
<tr>
<td>82. Unique installation &quot; NEVOD experimental complex &quot; for research of the heliospheric processes impact on a condition of the Earth atmosphere</td>
<td>National Research Nuclear University MEPhI</td>
<td>Moscow</td>
</tr>
<tr>
<td>83. Unique stands and installations «Nuclear centre of MEPhI» (MIFI)</td>
<td>National Research Nuclear University MEPhI</td>
<td>Moscow</td>
</tr>
<tr>
<td>84. Unique installation «Non-dislocation silicon production and test facility » («Superpurified silicon»)</td>
<td>JSC State Research and Disign Institute of Rare-Metal Industry &quot;Giredmet&quot;</td>
<td>Moscow</td>
</tr>
<tr>
<td>Object of Research Infrastructure</td>
<td>Holder name</td>
<td>Location</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>85. Complex of cryogenic stands for electromagnetic, electromechanical and thermophysical processes investigation in energy saving high-temperature superconductivity electrotechnical installations</td>
<td>JSC Scientific Research Institute of Electric Machines, NIPTIEM</td>
<td>St.-Petersburg</td>
</tr>
<tr>
<td>86. Unique installation “Climatic complex for tests of vehicle and their components in artificial climate cells” (&quot;Climate&quot;)</td>
<td>JSC Federal Research Test Center of Machine Building</td>
<td>Novy Byt, Moscow reg.</td>
</tr>
<tr>
<td>87. High-power femtosecond lasers complex</td>
<td>Joint Institute of High Temperature RAS</td>
<td>Moscow</td>
</tr>
<tr>
<td>89. Unique installation “Research water-water nuclear reactor IVV-2M”</td>
<td>Institute of Metal Physics, Ural Branch of RAS</td>
<td>Ekaterinburg</td>
</tr>
<tr>
<td>90. Neutron material research complex</td>
<td>Institute of Metal Physics, Ural Branch of RAS</td>
<td>Ekaterinburg</td>
</tr>
<tr>
<td>91. Unique installation for a development creation of novel perspective composite self-greased materials by a chemical design method</td>
<td>Special Design and Technological Bureau ORION</td>
<td>Novocherkassk, Rostov reg.</td>
</tr>
<tr>
<td>92. Experimental mechanics centre for basic research of processes of non-elastic deformation and destruction of constructional and functional materials at complex thermomechanical influences</td>
<td>Perm State Technical University</td>
<td>Perm</td>
</tr>
<tr>
<td>93. Krasnoyarsk neutrino complex</td>
<td>Konstantinov Petersburg Nuclear Physics Institute RAS</td>
<td>St.-Petersburg</td>
</tr>
<tr>
<td>94. VVR-M reactor small angle neutron dispersion facility</td>
<td>Konstantinov Petersburg Nuclear Physics Institute RAS</td>
<td>St.-Petersburg</td>
</tr>
<tr>
<td>95. EVIO experimental installation for research of processes of isotope exchange in water-hydrogen system</td>
<td>Konstantinov Petersburg Nuclear Physics Institute RAS</td>
<td>St.-Petersburg</td>
</tr>
<tr>
<td>96. Unique radio tomography installation</td>
<td>Polar Geophysical Institute Kola Science Center RAS</td>
<td>Apatity, Murmansk region</td>
</tr>
<tr>
<td>Object of Research Infrastructure</td>
<td>Holder name</td>
<td>Location</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>97. Unique installation «Multifunctional installation on the basis of use of the ring twirled streams (the artificial tornado effect) for hydrotransportation of highly saturated mixes on a long distance, and intensification of mass-exchange processes at valuable components extraction during hydrometallurgical repartition»</td>
<td>Sergo Ordzhonikidze Moscow State Geological Prospecting University</td>
<td>Moscow</td>
</tr>
<tr>
<td>98. Installation on test of a gas hydrate method for selective separation of gas mixes for purification and separation of components of natural and associated gases</td>
<td>Gubkin Russian State University of Oil and Gas</td>
<td>Moscow</td>
</tr>
<tr>
<td>99. Unique installation Tokamak-10 (T-10))</td>
<td>Russian Research Center “Kurchatov institute”</td>
<td>Moscow</td>
</tr>
<tr>
<td>100. Unique installation «Research complex of protective chambers fo material science (IKMZK)»</td>
<td>Russian Research Center “Kurchatov institute”</td>
<td>Moscow</td>
</tr>
<tr>
<td>101. Unique installation « Kurchatov synchrotron radiation source» (KISI)</td>
<td>Russian Research Center “Kurchatov institute”</td>
<td>Moscow</td>
</tr>
<tr>
<td>102. Unique installation – research nuclear reactor IR-8</td>
<td>Russian Research Center “Kurchatov institute”</td>
<td>Moscow</td>
</tr>
<tr>
<td>103. Cyclotron of the RRC&quot;Kurchatovsky institute&quot;</td>
<td>Russian Research Center “Kurchatov institute”</td>
<td>Moscow</td>
</tr>
<tr>
<td>104. Complex installation on analytical research of a solid, liquidand gas phase and on studying of various purpos materials (&quot;Unikun-PH&quot;)</td>
<td>Russian Research Center “Applied Chemistry”</td>
<td>St.-Peterburg</td>
</tr>
<tr>
<td>105. Unique installations for research and development of techniques for increase of oil reservoir productivity and the development of hard-to-recover hydrocarbon reserves</td>
<td>Samara State Technical University</td>
<td>Samara</td>
</tr>
<tr>
<td>106. Unique installations for research of structure and properties of perspective nanostructured materials and coatings formed by active physical influence of a targeted explosion</td>
<td>Samara State Technical University</td>
<td>Samara</td>
</tr>
<tr>
<td>107. Optical-laser optical system for analysis of functioning three-dimensional nanosystems as a part of unique complex installation for dynamics nanobiovehicle research (« Laser tweezers »)</td>
<td>St.-PetersburgState Politechnical University</td>
<td>St.-Petersburg</td>
</tr>
<tr>
<td>Object of Research Infrastructure</td>
<td>Holder name</td>
<td>Location</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td>108. Stand for tests of electricity transmissions of ultrahigh voltage (SNI SVN) for reliability increase of electric power transportation and distribution</td>
<td>St.-Petersburg State Politechnical University</td>
<td>St.-Petersburg</td>
</tr>
<tr>
<td>109. Unique installations of synchrotron radiation and certification facilities for preparation of experiments</td>
<td>St.-Petersburg State University</td>
<td>St.-Petersburg</td>
</tr>
<tr>
<td>110. Unique stands on research of power saving electropower devices made of nanostructured materials</td>
<td>St.-Petersburg State University of Aerospace Instrumentation</td>
<td>St.-Petersburg</td>
</tr>
<tr>
<td>111. Complex Pezon unique installation for ferroelectric monocrystals electrooptical and optical-acoustic properties research</td>
<td>Saratov State Technical University</td>
<td>Saratov</td>
</tr>
<tr>
<td>112. Unique installation «Radio telescope RATAN-600» for the development of evaluation methods for a condition of the Earth atmosphere and methods of forecasting the influence of solar activity on the Earth atmosphere</td>
<td>Special Astrophysical Observatory RAS</td>
<td>Nizhnij Arkhyz, Karachaev-Cherkesia</td>
</tr>
<tr>
<td>113. Unique scientific facility - the Large telescope azimuthal with a prime mirror diameter of 6 m</td>
<td>Special Astrophysical Observatory RAS</td>
<td>Nizhnij Arkhyz, Karachaev-Cherkesia</td>
</tr>
<tr>
<td>114. Research of a space radio emission by multifrequency observations with the RATAN-600 radio telescope: solar-terrestrial communications and background radiations of the Universe</td>
<td>Special Astrophysical Observatory RAS</td>
<td>Nizhnij Arkhyz, Karachaev-Cherkesia</td>
</tr>
<tr>
<td>116. Collection of sea microorganisms of the Pacific institute of bioorganic chemistry of Far East Branch of RAS</td>
<td>Pacific Institute of Bioorganic Chemistry, Far-Eastern Branch of RAS</td>
<td>Vladivostok</td>
</tr>
<tr>
<td>117. Unique installation &quot;Marine experimental station of the Pacific institute of bioorganic chemistry of Far East Branch of RAS</td>
<td>Pacific Institute of Bioorganic Chemistry, Far-Eastern Branch of RAS</td>
<td>Vladivostok</td>
</tr>
<tr>
<td>118. High-altitude polarising lidar for atmospheric sensing (LIDAR)</td>
<td>Tomsk State University</td>
<td>Tomsk</td>
</tr>
<tr>
<td>119. Tomsk ionospheric station (Ionozond)</td>
<td>Tomsk State University</td>
<td>Tomsk</td>
</tr>
<tr>
<td>120. Tomsk state university complex of material structure and properties research</td>
<td>Tomsk State University</td>
<td>Tomsk</td>
</tr>
<tr>
<td>Object of Research Infrastructure</td>
<td>Holder name</td>
<td>Location</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td>121. Unique installation «Complex of installations for metal melts structure and physical properties research», &quot;Rasplav&quot;</td>
<td>President Eltsin Ural Federal University</td>
<td>Ekaterinburg</td>
</tr>
<tr>
<td>122. Unique installation for circumterrestrial and space research (SURA stand)</td>
<td>Radiophysical Research Institute</td>
<td>Nizhny Novgorod</td>
</tr>
<tr>
<td>123. Spherical GLOBUS-M tokamak with additional megawatt heating</td>
<td>Ioffe Physical-Technical Institute RAS</td>
<td>St.-Petersburg</td>
</tr>
<tr>
<td>124. The unique experimental stand TUMAN-3M tokamak for a development of methods of heating and optimisation of scenarios for a high-temperature plasma maintaining</td>
<td>Ioffe Physical-Technical Institute RAS</td>
<td>St.-Petersburg</td>
</tr>
<tr>
<td>125. Unique high-current installation &quot;Tulip&quot; for a development of novel plasma diagnostics methods and plasma technologies</td>
<td>Lebedev Physical Institute RAS</td>
<td>Moscow</td>
</tr>
<tr>
<td>126. Installation “X-ray emulsion chamber of the Pamir-Chakaltaja experiment for studying nuclear active getting components of space beams at mountain altitudes</td>
<td>Lebedev Physical Institute RAS</td>
<td>Moscow</td>
</tr>
<tr>
<td>127. Unique installations of the Pushchinsky radio-astronomical observatory: PhIAS BSA radio telescopes, PhIAS DKR-1000, PhIAS RT-22 and the Reference complex of pulsar time</td>
<td>Lebedev Physical Institute RAS</td>
<td>Moscow</td>
</tr>
<tr>
<td>128. Installation “X-ray emulsion chamber of the Pamir-Chakaltaja experiment for studying of a power spectrum and structure of primary space radiation within energy range 0.1-1000 PeV</td>
<td>Lebedev Physical Institute RAS</td>
<td>Moscow</td>
</tr>
<tr>
<td>129. Unique stand for carrying out of researches of materials in extreme conditions of ultralow temperatures, high pressures, strong electric and magnetic fields</td>
<td>Lebedev Physical Institute RAS</td>
<td>Moscow</td>
</tr>
<tr>
<td>130. Experimental installation of artificial climate for the development of heterologous genes expression technologies for an improvement of the major commercial crops</td>
<td>Center &quot;Bioengineering&quot;</td>
<td>Moscow</td>
</tr>
<tr>
<td>131. Unique bench installation «Test facility for research of complex space objects in zero-gravity imitation conditions of weightlessness imitation»</td>
<td>Central R&amp;D Institute for Robotics and Technical Cybernetics</td>
<td>St.-Petersburg</td>
</tr>
<tr>
<td>Object of Research Infrastructure</td>
<td>Holder name</td>
<td>Location</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Unique research installations of a mechanical activation technological complex for research of the composition, structure and properties of composite nanoreinforced and nano-lacquer powder materials of various classes and applications</td>
<td>Central Research Institute of Construction Materials &quot;Prometey&quot;, St.-Petersburg</td>
<td>St.-Petersburg</td>
</tr>
<tr>
<td>Complex of installations for mechanical activation for obtaining, processing and investigation of properties of nanocrystal and ultradisperse catalitic, magnetic, wearproof, suppressing vibrations powder materials and solders with controlled fractional structure and operational properties</td>
<td>Central Research Institute of Construction Materials &quot;Prometey&quot;, St.-Petersburg</td>
<td>St.-Petersburg</td>
</tr>
<tr>
<td>Installation for physical and chemical research of materials and high-temperature processes by means of molecular beams for creation of novel generation of high-quality steels, alloys, bimetals, others perspective, including, amorphous, quasicrystal nanostructured materials and technologies of their production</td>
<td>Bardin Central Research Institute for Ferrous Metallurgy</td>
<td>Moscow</td>
</tr>
<tr>
<td>Installation on studying of physical and chemical properties and forecasting of a metastable condition in metal alloys and inorganic systems by means of molecular beams generating and analysis</td>
<td>Bardin Central Research Institute for Ferrous Metallurgy</td>
<td>Moscow</td>
</tr>
</tbody>
</table>
**ANNEX 5 : Unique installations created at institutions of different branches of RAS**

1. **Special Astrophysical Observatory RAS:**
   - Big Telescope Alt-azimuthal (BTA)

2. **Institute of Solar-Terrestrial Physics, Siberian branch of RAS:**
   - Siberian Solar Radio Telescope (SSRT)

3. **The Institute of Laser Physics, Siberian branch of RAS:**
   - Laser frequency standards and optical clocks

4. **Far-Eastern branch of RAS:**
   - Research vessel «Academician Oparin»

5. **G.K.Skrjabin Institute of Biochemistry and Physiology of Microorganisms:**
   - All-Russian collection of microorganisms

6. **Institute of Mathematics and Mechanics, Ural branch of RAS:**
   - Unique systems for high-performing computations and network control

7. **Institute of Continuous Media Mechanics, Ural branch of RAS:**
   - Natrium magnetic - hydrodynamic installation

8. **Keldysh Institute of Applied Mathematics RAS:**
   - The equipment for twist pressing of cylindrical objects in VTMO BTMO with possibility of change of the intense-deformed condition at the thermodeformed influence, allowing to obtain various structural conditions

9. **Blagonravov Institute of Machines Science RAS:**
   - Installation for studying of stress influence (stretching-compression, torsions or combined stress) on magnetic characteristics of constructional materials
   - Mobile hardware-software complexes for investigation of current mechanical properties of constructional materials on the basis of use of magnetic methods and kinetic identification.

10. **Institute of Metal Physics, Ural Branch of RAS:**
    - Installation for producing metal-carbon nanocomposites
    - Installation for producing thin continuous tapes from materials in amorphous and nanocrystalic conditions
    - New generation of equipment for non-destructive magnetic and acoustic quality control for steel objects and surface-reinforced layers.

11. **Institute of Electrophysics, Ural Branch of RAS:**
    - Nanosecon pulse generators of Megawatt level with GWatt power pulse

---

229 Annex 1 to the interim report of the state contract № 02.521.11.1085 within the Federal Targeted Programme "Research and development in priority areas of S&T complex of Russia for 2007-2012".

---
- Compact nanosecond high current electron accelerators and relativistic SHF generators with a few GWatt peak power
- Sources of wide electron and ion beams, plasma generators for material modification technologies
- Compact pulse nanosecond X-ray devices with digital and film imaging screens
- Installations for developing nanopowders by means of electric explosion
- PulsePulse-periodic CO₂ lasers for target evaporation and nanopowder synthesis
- Pulse cathode luminescent spectral analyzer for non-destructive analysis of solid state objects

12. **Physical-Technical Institute of Udmurtskogo Scientific Center, Ural Branch of RAS:**
   - High-temperature viscometer for viscosity research of metallic melts by the twisting fluctuations method
   - Installation for contactless measurement of elastic and magnetoresistive properties of magnetics in wide range of temperatures (from liquid Helium to Curie temperatures)
   - Software and hardware complex of management and registration of electronic spectra for high resolution electronic spectrometers

13. **Landau Institute for Theoretical Physics of RAS:**
   - Installation of laser contactless quality assurance of coatings and thermo physical properties of layered and non-heterogeneous materials

14. **Severtsov Institute of Ecology and Evolution of RAS:**
   - Mobile dosimetric radiometric spectrometer complex consisting of a mobile spectrometer of gamma radiation, a portable radio dosimeter, a navigator and a control, storage and information processing unit

15. **Baykov Institute of Metallurgy and Material Studies of RAS:**
   - Installation for registration of melts electronic spectra by a method of reflection-absorption electronic spectroscopy in range 50000-4000 cm⁻¹ at temperature to 1200K in adjustable gas atmosphere
   - Installation for research of gas permeability of inorganic materials
   - Installation for studying low-frequency acoustic fluctuations impact on melts

16. **Baykov Institute of Metallurgy and Material Studies of RAS and Institute of Solid State Chemistry and Mechanochemistry, Siberian Branch of RAS:**
   - Research complexes on a basis of electronic spectrometers ESCALAB MK II (UK) и Multiprob (Germany) equipped by vacuum cameras with scanning probe microscopes and systems for thin film condensing.

17. **Institute of Solid State Chemistry and Mechanochemistry, Siberian Branch of RAS:**
   - Automated installations for measurement of Faraday efficiency, chemical diffusion of oxygen, q-metric titration, measurements of high-temperature conductivity and Seebeck effect (Thermojeds) depending on oxygen partial pressure
<table>
<thead>
<tr>
<th>No.</th>
<th>Institute</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>18.</td>
<td>Institute of High-temperature Electrochemistry, Ural Branch of RAS:</td>
<td>- Installations and techniques for research of electro physical and electrochemical characteristics (electro conductivity, polarization of electrodes, numbers of carrying over of ions and so forth)</td>
</tr>
</tbody>
</table>
| 19. | Institute of Mining Engineering, Ural Branch of RAS: | - The device for the express analysis of magnetite gland in analytical tests of ferriferous materials  
- The device for manual approbation of iron ores in transport vessels  
- Devices for diagnostics of engines diesel-electrical supersize autodump-body trucks for open-cast mines |
| 20. | Institute of Geophysics, Ural Branch of RAS: | - MChZ-3 equipment for carrying out of multifrequency electromagnetic researches by inductive methods of electroinvestigation  
- Three-component surface magnetometer MNT-3  
- Duster magnetometer-inklinometer MI-3803M  
- Seismoprospecting station “Sinus-24MS”  
- Hardware-methodical complex BN-4008 for measurement of geoacoustic signals in wells |
| 21. | Institute of Geology, Komi Scientific Center, Ural Branch of RAS: | - X-ray luminescent complex  
- Complex of means for manufacture of technical analyses of coal, combustible slates and bitumen, laboratory installations of high-temperature pyrolysis  
- The equipment for technological assessment of mineral raw materials (screw separators, swilling installations, dividers of tests) |
| 22. | Institute of Mineralogy, Ural Branch of RAS: | - Monochromator based high-temperature raman spectrometer DFS-24  
- Installation for synthesis of especially pure and alloyed quartz glass on the basis of the high-temperature furnace Granat – 2M |
| 23. | Institute of Biology, Komi Scientific Center, Ural Branch of RAS: | - Technology, equipment and software for three-dimensional reconstruction of long scenes at carrying out of field researches |
| 24. | Institute of Physiology, Komi Scientific Center, Ural Branch of RAS: | - SOFID installation, computer software for a regime calculation |
| 25. | Laboratory of comparative cardiology, Komi Scientific Center, Ural Branch of RAS: | - Multichannel (128-channel) system for synchronous registration cardio-electrical potentials  
- Multichannel automated system for cardio-electrical research |
### ANNEX 6: New research technologies in Russian regions

<table>
<thead>
<tr>
<th>Federal subject</th>
<th>Area</th>
<th>Population</th>
<th>Density of population</th>
<th>Number of projects</th>
<th>Total federal funding (Mln of Rbls)</th>
<th>Funding per project (Mln. of Rbls)</th>
<th>Funding per reg. person (Rbls./p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North-West FD</td>
<td>1 854,6</td>
<td>14 304,0</td>
<td>7,71</td>
<td>519</td>
<td>2 218,29</td>
<td>4.27</td>
<td>155</td>
</tr>
<tr>
<td>Kaliningrad region</td>
<td>15,1</td>
<td>943,2</td>
<td>62,46</td>
<td></td>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Leningrad region</td>
<td>85,9</td>
<td>1 649,6</td>
<td>19,20</td>
<td>31</td>
<td>53,50</td>
<td>1.73</td>
<td>32</td>
</tr>
<tr>
<td>Novgorod region</td>
<td>55,3</td>
<td>710,9</td>
<td>12,86</td>
<td>1</td>
<td>2,00</td>
<td>2.00</td>
<td>3</td>
</tr>
<tr>
<td>Pskov region</td>
<td>55,3</td>
<td>778,0</td>
<td>14,07</td>
<td>1</td>
<td>0.26</td>
<td>0.26</td>
<td>0</td>
</tr>
<tr>
<td>Murmansk region</td>
<td>144,9</td>
<td>977,6</td>
<td>6,75</td>
<td>30</td>
<td>164,27</td>
<td>5.48</td>
<td>168</td>
</tr>
<tr>
<td>Karelia</td>
<td>172,4</td>
<td>756,4</td>
<td>4,39</td>
<td>15</td>
<td>70,08</td>
<td>4.67</td>
<td>93</td>
</tr>
<tr>
<td>Vologda region</td>
<td>145,7</td>
<td>1 301,1</td>
<td>8,93</td>
<td>2</td>
<td>0.30</td>
<td>0.15</td>
<td>0</td>
</tr>
<tr>
<td>Nenets Autonomous Area/Okrug</td>
<td>176,7</td>
<td>44,9</td>
<td>0,25</td>
<td></td>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Arkhangelsk region</td>
<td>587,4</td>
<td>1 428,9</td>
<td>2,43</td>
<td>1</td>
<td>2.20</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Komi Republic</td>
<td>415,9</td>
<td>1 117,2</td>
<td>2,69</td>
<td>16</td>
<td>168,78</td>
<td>10.55</td>
<td>151</td>
</tr>
<tr>
<td>St. Petersburg</td>
<td>4 596,2</td>
<td>422</td>
<td></td>
<td>1</td>
<td>1 756,90</td>
<td>4.16</td>
<td>382</td>
</tr>
<tr>
<td>Central FD</td>
<td>650,7</td>
<td>36 481,8</td>
<td>56,07</td>
<td>2250</td>
<td>34 583,95</td>
<td>15.37</td>
<td>948</td>
</tr>
<tr>
<td>Belgorod region</td>
<td>27,1</td>
<td>1 498,0</td>
<td>55,28</td>
<td>26</td>
<td>495,52</td>
<td>19.06</td>
<td>331</td>
</tr>
<tr>
<td>Bryansk region</td>
<td>34,9</td>
<td>1 410,3</td>
<td>40,41</td>
<td>7</td>
<td>5.50</td>
<td>0.79</td>
<td>4</td>
</tr>
<tr>
<td>Vladimir region</td>
<td>29,0</td>
<td>1 573,9</td>
<td>54,27</td>
<td>25</td>
<td>47,72</td>
<td>1.91</td>
<td>30</td>
</tr>
<tr>
<td>Voronezh region</td>
<td>52,4</td>
<td>2 414,7</td>
<td>46,08</td>
<td>74</td>
<td>213,00</td>
<td>2.88</td>
<td>88</td>
</tr>
<tr>
<td>Region</td>
<td>Value</td>
<td>Number</td>
<td>Percentage</td>
<td>Value</td>
<td>Number</td>
<td>Percentage</td>
<td>Value</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-------</td>
<td>--------</td>
<td>------------</td>
<td>-------</td>
<td>--------</td>
<td>------------</td>
<td>-------</td>
</tr>
<tr>
<td>Ivanovo region</td>
<td>21.8</td>
<td>1 191,2</td>
<td>54.64</td>
<td>20</td>
<td>20.31</td>
<td>1.02</td>
<td>17</td>
</tr>
<tr>
<td>Kaluga region</td>
<td>29.9</td>
<td>1 058,9</td>
<td>35.41</td>
<td>69</td>
<td>1 948.16</td>
<td>28.23</td>
<td>1 840</td>
</tr>
<tr>
<td>Kostroma region</td>
<td>60.1</td>
<td>766,4</td>
<td>12.75</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kursk region</td>
<td>29.8</td>
<td>1 284,5</td>
<td>43.10</td>
<td>4</td>
<td>8.30</td>
<td>2.08</td>
<td>6</td>
</tr>
<tr>
<td>Lipetsk region</td>
<td>24.1</td>
<td>1 228,9</td>
<td>50.99</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moscow region</td>
<td>47.0</td>
<td>6 409,7</td>
<td>136.38</td>
<td>262</td>
<td>3 242.21</td>
<td>12.37</td>
<td>506</td>
</tr>
<tr>
<td>Orel region</td>
<td>24.7</td>
<td>883,5</td>
<td>35.77</td>
<td>3</td>
<td>1.00</td>
<td>0.33</td>
<td>1</td>
</tr>
<tr>
<td>Ryazan region</td>
<td>39.6</td>
<td>1 255,0</td>
<td>31.69</td>
<td>8</td>
<td>6.08</td>
<td>0.76</td>
<td>5</td>
</tr>
<tr>
<td>Smolensk region</td>
<td>49.8</td>
<td>1 098,3</td>
<td>22.05</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tambov region</td>
<td>34.3</td>
<td>1 240,7</td>
<td>36.17</td>
<td>19</td>
<td>125.57</td>
<td>6.61</td>
<td>101</td>
</tr>
<tr>
<td>Tver region</td>
<td>84.1</td>
<td>1 552,3</td>
<td>18.46</td>
<td>26</td>
<td>110.97</td>
<td>4.27</td>
<td>71</td>
</tr>
<tr>
<td>Tula region</td>
<td>25.7</td>
<td>1 690,0</td>
<td>65.76</td>
<td>15</td>
<td>11.25</td>
<td>0.75</td>
<td>7</td>
</tr>
<tr>
<td>Yaroslavl region</td>
<td>36.4</td>
<td>1 386,3</td>
<td>38.09</td>
<td>23</td>
<td>124.86</td>
<td>5.43</td>
<td>90</td>
</tr>
<tr>
<td>Moscow</td>
<td></td>
<td>8 539,2</td>
<td>1 669</td>
<td>28 223.50</td>
<td>16.91</td>
<td>195</td>
<td></td>
</tr>
<tr>
<td>South FD</td>
<td>569.9</td>
<td>21 471,3</td>
<td>37.68</td>
<td>190</td>
<td>834.34</td>
<td>4.39</td>
<td>39</td>
</tr>
<tr>
<td>Adygeya</td>
<td>7.6</td>
<td>444,9</td>
<td>58.54</td>
<td>1</td>
<td>0.15</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Dagestan</td>
<td>50.3</td>
<td>2 179,5</td>
<td>43.33</td>
<td>13</td>
<td>54.20</td>
<td>4.17</td>
<td>25</td>
</tr>
<tr>
<td>Ingushetia</td>
<td>0.0</td>
<td>466,3</td>
<td></td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chechnya</td>
<td>0.0</td>
<td>624,6</td>
<td></td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kabardino-Balkaria</td>
<td>12.5</td>
<td>782,0</td>
<td>62.56</td>
<td>18</td>
<td>30.40</td>
<td>1.69</td>
<td>39</td>
</tr>
<tr>
<td>Kalmykia</td>
<td>76.1</td>
<td>305,6</td>
<td>4.02</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Karachaev-Cherkessia</td>
<td>14.1</td>
<td>428,6</td>
<td>30.40</td>
<td>5</td>
<td>13.00</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>North Ossetia-Alania</td>
<td>8.0</td>
<td>678,2</td>
<td>84.78</td>
<td>10</td>
<td>18.50</td>
<td>1.85</td>
<td>27</td>
</tr>
<tr>
<td>Krasnodar Territory</td>
<td>76.0</td>
<td>4 987,6</td>
<td>65.63</td>
<td>25</td>
<td>41.17</td>
<td>1.65</td>
<td>8</td>
</tr>
<tr>
<td>Region</td>
<td>Agricultural Area</td>
<td>Population</td>
<td>GNI</td>
<td>Population (thousand)</td>
<td>Agricultural Area (thousand)</td>
<td>GNI ($ billions)</td>
<td>Population (thousand)</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-------------------</td>
<td>-----------</td>
<td>-----</td>
<td>-----------------------</td>
<td>-------------------------------</td>
<td>------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>Stavropol region</td>
<td>66,5</td>
<td>2 642,6</td>
<td>39,74</td>
<td>36</td>
<td>177.00</td>
<td>4.92</td>
<td>67</td>
</tr>
<tr>
<td>Astrakhan Region</td>
<td>44,1</td>
<td>1 008,7</td>
<td>22,87</td>
<td>12</td>
<td>25.13</td>
<td>2.09</td>
<td>25</td>
</tr>
<tr>
<td>Volgograd Region</td>
<td>113,9</td>
<td>2 636,5</td>
<td>23,15</td>
<td>22</td>
<td>47.79</td>
<td>2.17</td>
<td>18</td>
</tr>
<tr>
<td>Rostov Region</td>
<td>100,8</td>
<td>4 286,2</td>
<td>42,52</td>
<td>48</td>
<td>427.00</td>
<td>8.90</td>
<td>100</td>
</tr>
<tr>
<td><strong>Volga region</strong></td>
<td><strong>1 070,9</strong></td>
<td><strong>31 789,6</strong></td>
<td><strong>29,68</strong></td>
<td><strong>348</strong></td>
<td><strong>4 607.85</strong></td>
<td><strong>13.24</strong></td>
<td><strong>145</strong></td>
</tr>
<tr>
<td>Bashkir Republic</td>
<td>143,6</td>
<td>4 090,6</td>
<td>28,49</td>
<td>42</td>
<td>259.38</td>
<td>6.18</td>
<td>63</td>
</tr>
<tr>
<td>Mari(y) El Republic</td>
<td>23,2</td>
<td>750,3</td>
<td>32,34</td>
<td>10</td>
<td>22.00</td>
<td>2.20</td>
<td>29</td>
</tr>
<tr>
<td>Republic of Mordovia</td>
<td>26,2</td>
<td>910,0</td>
<td>34,73</td>
<td>9</td>
<td>15.00</td>
<td>1.67</td>
<td>16</td>
</tr>
<tr>
<td>Republic of Tatarstan</td>
<td>68,0</td>
<td>3 768,2</td>
<td>55,41</td>
<td>49</td>
<td>245.00</td>
<td>5.00</td>
<td>65</td>
</tr>
<tr>
<td>Udmurt Republic</td>
<td>42,1</td>
<td>1 616,2</td>
<td>38,39</td>
<td>19</td>
<td>23.57</td>
<td>1.24</td>
<td>15</td>
</tr>
<tr>
<td>Chuvashia Republic</td>
<td>18,3</td>
<td>1 346,3</td>
<td>73,57</td>
<td>5</td>
<td>5.00</td>
<td>1.00</td>
<td>4</td>
</tr>
<tr>
<td>Kirov region</td>
<td>120,8</td>
<td>1 560,0</td>
<td>12,91</td>
<td>1</td>
<td>0.33</td>
<td>0.33</td>
<td>0</td>
</tr>
<tr>
<td>Nizhni Novgorod region</td>
<td>76,9</td>
<td>3 598,3</td>
<td>46,79</td>
<td>84</td>
<td>2 700.68</td>
<td>32.15</td>
<td>751</td>
</tr>
<tr>
<td>Orenburg region</td>
<td>124,0</td>
<td>2 199,4</td>
<td>17,74</td>
<td>6</td>
<td>26.50</td>
<td>4.42</td>
<td>12</td>
</tr>
<tr>
<td>Penza region</td>
<td>43,2</td>
<td>1 504,1</td>
<td>34,82</td>
<td>9</td>
<td>19.00</td>
<td>2.11</td>
<td>13</td>
</tr>
<tr>
<td>Perm region</td>
<td>160,6</td>
<td>2 923,7</td>
<td>18,20</td>
<td>27</td>
<td>33.90</td>
<td>1.26</td>
<td>12</td>
</tr>
<tr>
<td>Komi-Permyak Okrug</td>
<td>32,9</td>
<td>147,8</td>
<td>4,49</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Samara region</td>
<td>53,6</td>
<td>3 258,7</td>
<td>60,80</td>
<td>27</td>
<td>27.87</td>
<td>1.03</td>
<td>9</td>
</tr>
<tr>
<td>Saratov region</td>
<td>100,2</td>
<td>2 676,4</td>
<td>26,71</td>
<td>45</td>
<td>126.00</td>
<td>2.80</td>
<td>47</td>
</tr>
<tr>
<td>Ulianovsk region</td>
<td>37,3</td>
<td>1 439,6</td>
<td>38,60</td>
<td>15</td>
<td>1 103.62</td>
<td>73.57</td>
<td>767</td>
</tr>
<tr>
<td>Region</td>
<td>Ural FD</td>
<td>Siberian FD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------</td>
<td>---------</td>
<td>-------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kurgan region</td>
<td>3 062,3</td>
<td>6 785,9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sverdlovsk region</td>
<td>194,8</td>
<td>20 826,7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tyumen region</td>
<td>1 435,2</td>
<td>3 07</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Khanty-Mansi Autonomous Area/Okrug</td>
<td>523,1</td>
<td>406</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yamal-Nenets Autonomous Area/Okrug</td>
<td>750,3</td>
<td>8 848,56</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chelyabinsk region</td>
<td>87,9</td>
<td>21.79</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Khakassia Republic</td>
<td>61,9</td>
<td>64.78</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Altai</td>
<td>169,1</td>
<td>666</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Krasnoyarsk Territory</td>
<td>2 339,7</td>
<td>3 015,3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taimyr AO</td>
<td>862,1</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evenkiski AO</td>
<td>767,6</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Irkutsk region</td>
<td>767,9</td>
<td>5 610.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ust-Ordynskaya AO</td>
<td>22,4</td>
<td>124.67</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kemerovo region</td>
<td>95,5</td>
<td>5.26</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Novosibirsk region</td>
<td>178,2</td>
<td>3.79</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Omsk region</td>
<td>139,7</td>
<td>9.50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tomsk region</td>
<td>316,9</td>
<td>3.02</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chita region</td>
<td>431,5</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Region</th>
<th>Siberian FD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ural FD</td>
<td>4 72</td>
</tr>
<tr>
<td>Siberian FD</td>
<td>1 829,94</td>
</tr>
<tr>
<td>Kurgan region</td>
<td>15,13</td>
</tr>
<tr>
<td>Sverdlovsk region</td>
<td>23,33</td>
</tr>
<tr>
<td>Tyumen region</td>
<td>2,28</td>
</tr>
<tr>
<td>Khanty-Mansi Autonomous Area/Okrug</td>
<td>12.21</td>
</tr>
<tr>
<td>Yamal-Nenets Autonomous Area/Okrug</td>
<td>0</td>
</tr>
<tr>
<td>Chelyabinsk region</td>
<td>41,28</td>
</tr>
<tr>
<td>Siberian FD</td>
<td>1 472,48</td>
</tr>
<tr>
<td>Buryat Republic</td>
<td>2,90</td>
</tr>
<tr>
<td>Tuva Republic</td>
<td>1,82</td>
</tr>
<tr>
<td>Khakassia Republic</td>
<td>9,30</td>
</tr>
<tr>
<td>Altai</td>
<td>15,50</td>
</tr>
<tr>
<td>Krasnoyarsk Territory</td>
<td>1,29</td>
</tr>
<tr>
<td>Taimyr AO</td>
<td>0,05</td>
</tr>
<tr>
<td>Evenkiski AO</td>
<td>0.02</td>
</tr>
<tr>
<td>Irkutsk region</td>
<td>3,53</td>
</tr>
<tr>
<td>Ust-Ordynskaya AO</td>
<td>6,36</td>
</tr>
<tr>
<td>Kemerovo region</td>
<td>30,79</td>
</tr>
<tr>
<td>Novosibirsk region</td>
<td>15,25</td>
</tr>
<tr>
<td>Omsk region</td>
<td>15,23</td>
</tr>
<tr>
<td>Tomsk region</td>
<td>3,35</td>
</tr>
<tr>
<td>Chita region</td>
<td>2,87</td>
</tr>
<tr>
<td>----------------------</td>
<td>-------</td>
</tr>
<tr>
<td>Buryat region</td>
<td>19,0</td>
</tr>
<tr>
<td>Far East FD</td>
<td>6 517,4</td>
</tr>
<tr>
<td>Yakutia Republic</td>
<td>3 103,2</td>
</tr>
<tr>
<td>Primorye</td>
<td>165,9</td>
</tr>
<tr>
<td>Khabarovsky Territory</td>
<td>788,6</td>
</tr>
<tr>
<td>Amur region</td>
<td>363,7</td>
</tr>
<tr>
<td>Kamchatka</td>
<td>472,3</td>
</tr>
<tr>
<td>Koryakski region</td>
<td>301,5</td>
</tr>
<tr>
<td>Magadan region</td>
<td>461,4</td>
</tr>
<tr>
<td>Sakhalin region.</td>
<td>87,1</td>
</tr>
<tr>
<td>Chukchi</td>
<td>737,7</td>
</tr>
<tr>
<td>Evreiski AO</td>
<td>36,0</td>
</tr>
<tr>
<td>Total</td>
<td>20 511,7</td>
</tr>
</tbody>
</table>
ANNEX 7: Leading industrial sectors and R&D investment in Russian regions

Central Federal District (diagram 1).

Central Federal District (R&D potential)

<table>
<thead>
<tr>
<th>Year</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of organisations</td>
<td>1631</td>
<td>1597</td>
<td>1539</td>
<td>1490</td>
<td>1437</td>
<td>1393</td>
<td>1426</td>
<td>1536</td>
</tr>
<tr>
<td>R&amp;D personnel (total)</td>
<td>455985</td>
<td>349312</td>
<td>440577</td>
<td>431718</td>
<td>420375</td>
<td>408330</td>
<td>411958</td>
<td>415522</td>
</tr>
</tbody>
</table>

Central Federal District (diagram 3)
Central Federal District (thousands of rubles)

North-West Federal District (diagram 1)

North-West Federal District (R&D potential)

<table>
<thead>
<tr>
<th>Year</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of organisations</td>
<td>627</td>
<td>606</td>
<td>590</td>
<td>578</td>
<td>552</td>
<td>536</td>
<td>531</td>
<td>606</td>
</tr>
<tr>
<td>R&amp;D personnel (total)</td>
<td>116812</td>
<td>168114</td>
<td>124478</td>
<td>110738</td>
<td>107928</td>
<td>104752</td>
<td>103635</td>
<td>103864</td>
</tr>
</tbody>
</table>
North-West Federal District (diagram 2)

North-West Federal District (thousands of rubles)

South Federal District (diagram 1)
South Federal District (R&D potential)

<table>
<thead>
<tr>
<th>Year</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of organisations</td>
<td>342</td>
<td>345</td>
<td>325</td>
<td>316</td>
<td>313</td>
<td>310</td>
<td>312</td>
<td>355</td>
</tr>
<tr>
<td>R&amp;D personnel (total)</td>
<td>37422</td>
<td>37617</td>
<td>36683</td>
<td>35750</td>
<td>35502</td>
<td>34530</td>
<td>35210</td>
<td>36714</td>
</tr>
</tbody>
</table>

South Federal District (diagram 2)

Volga Federal District (diagram 1)
Volga Federal District (R&D potential)

<table>
<thead>
<tr>
<th>Year</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of organisations</td>
<td>623</td>
<td>623</td>
<td>597</td>
<td>570</td>
<td>559</td>
<td>540</td>
<td>547</td>
<td>585</td>
</tr>
<tr>
<td>R&amp;D personnel (total)</td>
<td>150046</td>
<td>267845</td>
<td>149336</td>
<td>147680</td>
<td>146150</td>
<td>140592</td>
<td>134188</td>
<td>126903</td>
</tr>
</tbody>
</table>

Volga Federal District (diagram 2)

Volga Federal District (thousands of rubles)

Urals Federal District (diagram 1)

49% Minerals

6% Energy

45% All manufacture
Urals Federal District (R&D potential)

<table>
<thead>
<tr>
<th>Year</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of organisations</td>
<td>255</td>
<td>255</td>
<td>260</td>
<td>253</td>
<td>234</td>
<td>226</td>
<td>225</td>
<td>233</td>
</tr>
<tr>
<td>R&amp;D personnel (total)</td>
<td>50803</td>
<td>53116</td>
<td>53936</td>
<td>54259</td>
<td>52216</td>
<td>49670</td>
<td>49377</td>
<td>47562</td>
</tr>
</tbody>
</table>

Urals Federal District (diagram 2)

Siberian Federal District (diagram 1)
Siberian Federal District (R&D potential)

<table>
<thead>
<tr>
<th>Year</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of organisations</td>
<td>464</td>
<td>457</td>
<td>444</td>
<td>437</td>
<td>415</td>
<td>419</td>
<td>425</td>
<td>464</td>
</tr>
<tr>
<td>R&amp;D personnel (total)</td>
<td>62477</td>
<td>135116</td>
<td>63052</td>
<td>63376</td>
<td>62494</td>
<td>60986</td>
<td>58647</td>
<td>56427</td>
</tr>
</tbody>
</table>

Siberian Federal District (diagram 2)

Far East Federal District (diagram 1)
Far East Federal District (R&D potential)

<table>
<thead>
<tr>
<th>Year</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of organisations</td>
<td>157</td>
<td>154</td>
<td>151</td>
<td>153</td>
<td>146</td>
<td>142</td>
<td>156</td>
<td>178</td>
</tr>
<tr>
<td>R&amp;D personnel (total)</td>
<td>14184</td>
<td>857743</td>
<td>14816</td>
<td>14949</td>
<td>14673</td>
<td>14347</td>
<td>14051</td>
<td>14143</td>
</tr>
</tbody>
</table>

Far East Federal District (diagram 2)
ANNEX 8 : RAS facts & figures on funding activities by scientific disciplines

1. Allocation of funds for fundamental research programmes conducted by RAS departments in 2009

<table>
<thead>
<tr>
<th>No.</th>
<th>Department of the RAS</th>
<th>Funding, 2009 (million RUB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Department of Mathematical Sciences</td>
<td>64.0</td>
</tr>
<tr>
<td>2</td>
<td>Department of Physical Sciences</td>
<td>180.0</td>
</tr>
<tr>
<td>3</td>
<td>Department of Power Industry, Machine Industry, Mechanics and Control Processes</td>
<td>75.0</td>
</tr>
<tr>
<td>4</td>
<td>Department of Information Technologies and Computing Systems</td>
<td>64.0</td>
</tr>
<tr>
<td>5</td>
<td>Department of Chemistry and Material Sciences</td>
<td>116.0</td>
</tr>
<tr>
<td>6</td>
<td>Department of Biological Sciences</td>
<td>65.0</td>
</tr>
<tr>
<td>7</td>
<td>Department of Earth Sciences</td>
<td>75.0</td>
</tr>
<tr>
<td>8</td>
<td>Department of Social Sciences</td>
<td>25.5</td>
</tr>
<tr>
<td>9</td>
<td>Department of Historical and Philological Sciences</td>
<td>25.5</td>
</tr>
<tr>
<td></td>
<td>TOTAL:</td>
<td>690.0</td>
</tr>
</tbody>
</table>

2. List of fundamental research programmes within the RAS Presidium for 2009

<table>
<thead>
<tr>
<th>No.</th>
<th>Programme name</th>
<th>Funding, 2009 (million RUB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Problems of creating a broad national scientific information-computer environment on the basis of GRID technologies and modern telecommunication networks</td>
<td>45.0</td>
</tr>
<tr>
<td>2</td>
<td>Intellectual information technologies, mathematical modeling, system analysis and automation</td>
<td>30.0</td>
</tr>
<tr>
<td>3</td>
<td>Fundamental problems of system programming</td>
<td>30.0</td>
</tr>
<tr>
<td>4</td>
<td>Fundamental problems of nonlinear dynamics</td>
<td>30.0</td>
</tr>
<tr>
<td>5</td>
<td>Quantum physics of condensed medium</td>
<td>70.0</td>
</tr>
<tr>
<td>6</td>
<td>Problems of physical electronics, charged particle beams and the generation of electromagnetic radiation in high-power systems</td>
<td>70.0</td>
</tr>
<tr>
<td>7</td>
<td>Origin, makeup and evolution of celestial objects</td>
<td>40.0</td>
</tr>
<tr>
<td>8</td>
<td>Neutrino physics and neutrino astrophysics</td>
<td>50.0</td>
</tr>
<tr>
<td>9</td>
<td>Experimental light fields and their origins</td>
<td>70.0</td>
</tr>
<tr>
<td>10</td>
<td>Experimental and theoretical research of fundamental interactions associated with work conducted at the CERN accelerator complex</td>
<td>60.0</td>
</tr>
<tr>
<td>11</td>
<td>Fundamental problems of interaction mechanics in technical and natural systems</td>
<td>30.0</td>
</tr>
<tr>
<td>12</td>
<td>Thermophysics and mechanics of extreme energy</td>
<td>70.0</td>
</tr>
<tr>
<td></td>
<td>depositions and highly compressed matter physics</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>-------------------------------------------------</td>
<td>---</td>
</tr>
<tr>
<td>13.</td>
<td>Fundamental bases of energy system and technology development</td>
<td>40.0</td>
</tr>
<tr>
<td>14.</td>
<td>Scientific bases of efficient natural resource management, mineral and raw materials resource development, development of new sources of natural and industrial raw materials</td>
<td>60.0</td>
</tr>
<tr>
<td>15.</td>
<td>Origin of biospheres and evolution of geo-biological systems</td>
<td>50.0</td>
</tr>
<tr>
<td>16.</td>
<td>Climate change and the environment: extreme acts of nature and disasters</td>
<td>90.0</td>
</tr>
<tr>
<td>17.</td>
<td>Fundamental problems of oceanography: physics, geology, biology, ecology</td>
<td>50.0</td>
</tr>
<tr>
<td>18.</td>
<td>Development of methods for obtaining chemical substances and creating new materials</td>
<td>80.0</td>
</tr>
<tr>
<td>19.</td>
<td>Chemical aspects of energy physics</td>
<td>50.0</td>
</tr>
<tr>
<td>20.</td>
<td>Creation and enhancement of methods for conducting chemical analysis and researching the structure of matter and materials</td>
<td>30.0</td>
</tr>
<tr>
<td>21.</td>
<td>Fundamental sciences – medicine</td>
<td>100.0</td>
</tr>
<tr>
<td>22.</td>
<td>Molecular and cellular biology</td>
<td>260.0</td>
</tr>
<tr>
<td>23.</td>
<td>Biodiversity</td>
<td>90.0</td>
</tr>
<tr>
<td>24.</td>
<td>Fundamental problems of spatial development in the Russian Federation: interdisciplinary synthesis</td>
<td>45.0</td>
</tr>
<tr>
<td>25.</td>
<td>Historical and cultural heritage and Russia’s spiritual values</td>
<td>35.0</td>
</tr>
<tr>
<td>26.</td>
<td>Scientific and technological forecasting of Russia’s economic development</td>
<td>30.0</td>
</tr>
<tr>
<td>27.</td>
<td>Bases of fundamental research in nanotechnologies and nanomaterials</td>
<td>250.0</td>
</tr>
<tr>
<td>28.</td>
<td>Economics and the sociology of knowledge</td>
<td>35.0</td>
</tr>
<tr>
<td>29.</td>
<td>Mathematical theory of management</td>
<td>30.0</td>
</tr>
<tr>
<td>30.</td>
<td>Fundamental problems of the physics of high-temperature plasma with magnetic thermal insulation</td>
<td>40.0</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>1 960.0</strong></td>
<td></td>
</tr>
</tbody>
</table>
ANNEX 9 : RAS Agreements on international S&T cooperation

The Russian Academy of Sciences has signed agreements on S&T cooperation with academies of sciences and research organisations of the following countries:

Armenia – National Academy of Sciences of the Republic of Armenia;
Austria - Austrian Academy of Sciences (ÖAW);
Azerbaijan – National Academy of Sciences of Azerbaijan;
Belarus – National Academy of Sciences of the Republic of Belorussia;
Bulgaria – Bulgarian Academy of Sciences;
Chile – University of Santiago;
Croatia - Croatian Academy of Science and Arts (HAZU);
Czech Republic – Academy of Sciences of Czech Republic (ASCR);
Ecuador – National Secretariat for Science and Technology (SENACYT);
Egypt – Egypt Academy of Research and Technology;
Estonia – Estonia Academy of Sciences (ETA);
Finland – Academy of Sciences of Finland;
France – French Academy of Sciences, L'École des hautes études en sciences sociales (EHESS), Maison des science de l'homme, Centre National de la Recherche Scientifique (CNRS), University Bordeaux I, Pierre and Mari Curie University;
Georgia – National Academy of Sciences;
Germany – Max Planck Society, Deutsche Forschung Gemeinschaft, Berlin-Brandenburg Academy of Sciences;
Greece – General Secretariat for Research and Technologies;
Hungary – Hungarian Academy of Sciences;
India – Indian Academy of Sciences;
Israel – Israel Academy of Sciences and Humanities;
Italy - Accademia Nazionale dei Lincei, "Alessandro Volta" Centre for Scientific Culture, National Institute of Nuclear Physics, Consiglio Nazionale delle Ricerche;
Kazakhstan – National Academy of Sciences of the Republic of Kazakhstan;
Kyrgyzstan - National Academy of Sciences of the Republic of Kyrgyzstan;
Latvia – Latvian Academy of Sciences;
Lithuania – Lithuanian Academy of Sciences (LMA);
Macedonia – Macedonia Academy of Science and Art (MANU);
Malaysia – Academy of Sciences of Malaysia;
Mexico – Mexican Academy of Science;
Moldova – Academy of Sciences of Moldova;
Mongolia – Academy of Sciences of Mongolia;
Montenegro – Montenegro Academy of Science and Arts (CANU);
Norway – University of Oslo, Bergen University;  
Peoples Republic of China – Chinese Academy of Social Sciences, Chinese Academy of Sciences, Ministry of Education of PRC, National Science Foundation of China, Shanghai Academy of Social Sciences;  
Republic of South Africa – Academy of Science of South Africa (ASSAf), Human Sciences Research Council (HSRC);  
Romania – Academy of Romania;  
Serbia – Serbian Academy of Science and Arts (SANU);  
Slovakia – Slovak Academy of Sciences (SAV);  
Socialist Republic of Vietnam – Academy of Natural Sciences and Technologies and Academy of Social Sciences;  
South Korea - Korea Science and Engineering Foundation (KOSEF), Korean Academy of Science and Technology (KAST);  
Spain – Spanish High Council for Scientific Research, Madrid Polytechnic University;  
Sweden – Royal Academy of Sciences (KVA), Royal Swedish Academy of Letters, History and Antiquities;  
Switzerland – World Agency for Planetary Monitoring and Earthquake Risk Reduction (WAPMERR);  
Syria – Damask University;  
Tajikistan – Academy of Sciences of the Republic of Tajikistan;  
Turkey – Istanbul University;  
UK – The British Academy, the Royal Society;  
Ukraine – National Academy of Sciences;  
USA – Geological Survey, Department of Energy, National Institute of Standards and Technology, National science Foundation, International Research & Exchanges Board (IREX);  
Uzbekistan – Academy of Sciences of the Republic of Uzbekistan.
ANNEX 10 : Russian business groups and multinational companies (cases)

<table>
<thead>
<tr>
<th>Company</th>
<th>Website</th>
<th>Scientific field</th>
<th>Type of actions</th>
<th>Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 International academic publishing company “Science/Interperiodica”</td>
<td><a href="http://www.maik.ru">www.maik.ru</a></td>
<td>Technical and natural sciences</td>
<td>Awards are given to: authors of the most genuine works in the course of one year or a series of works, published for the first time in journals; authors of the most genuine scientific and semi-popular publications, textbooks and manuals</td>
<td>Annual budget for awards - $124 000</td>
</tr>
<tr>
<td>3 “Renova” group of companies</td>
<td><a href="http://www.renova.ru">www.renova.ru</a></td>
<td>Support to the creation of the Great Eurasian university. Support to basic sciences. Restitution into Russia from the USA and hand-over to the Moscow state university of the archive of philosopher I. Ilyin. Participation in the Board of founders “Center for the support of Russian philology”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 National Reserve Bank</td>
<td><a href="http://www.nrb.ru">www.nrb.ru</a></td>
<td>Natural sciences</td>
<td>Annual awards to scientists</td>
<td></td>
</tr>
<tr>
<td>5 Gazprom</td>
<td><a href="http://www.gazprom.ru">www.gazprom.ru</a></td>
<td>Natural sciences, energy</td>
<td>Founder of a number of scientific and non-governmental organisations and foundations. Cost-sharing of the “Global Energy” award</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>“MEDCI” group of companies</td>
<td><a href="http://medsi2.ru">http://medsi2.ru</a></td>
<td>Medicine</td>
<td>Competition of scientific works</td>
</tr>
<tr>
<td>7</td>
<td>Research, engineering and consulting company HALDOR TOPSOE A/O (Denmark)</td>
<td><a href="http://www.haldortopsoe.ru">www.haldortopsoe.ru</a></td>
<td>Natural sciences (Catalysis and surface science)</td>
<td>Since 1995 – programme of nominal grants for young scientists adjudged on a competitive basis</td>
</tr>
<tr>
<td>8</td>
<td>IBM</td>
<td><a href="http://www.ibm.ru">www.ibm.ru</a></td>
<td>Natural sciences</td>
<td>Support to scientific research. Annual international competition for PhD students. Cooperation programme for university scientists from different countries</td>
</tr>
<tr>
<td>9</td>
<td>TNK-BP</td>
<td><a href="http://www.tnk-bp.ru">www.tnk-bp.ru</a></td>
<td>Priority areas: engineering; economics; governance; law; mathematics; natural sciences</td>
<td>Fellowship programme</td>
</tr>
<tr>
<td>10</td>
<td>Microsoft</td>
<td><a href="http://www.microsoft.ru">www.microsoft.ru</a></td>
<td>Natural sciences</td>
<td>Series of scientific and applied conferences and seminars for PhD students and young scientists</td>
</tr>
<tr>
<td>11</td>
<td>Siemens</td>
<td><a href="http://www.siemens.ru">www.siemens.ru</a></td>
<td>Transport</td>
<td>Grants for scientific and research works in 3 universities. Organisation of conferences</td>
</tr>
</tbody>
</table>