Country Briefing Report - Restructuring of R&D systems in Russia
BRUIT project

A. Questions

1. Please, explain changes in the system of Academies of Sciences in your country since early 1990s. Explain changes in statutes of Academy and changes in statuses of individual Academy institutes. Was there program of restructuring of Academy institutes? If yes, please, explain criteria for restructuring of Academy institutes.

1991: AS USSR was transformed into RAS in 1991 (Decree of the President of the RFSSR No. 228 of 21.11.1991).

1993-94: The Russian Foundation for Basic Research (RFBR) was established (1993). Later the Russian Foundation for the Humanities (RFH) was detached from RFBR. For the first time, these two foundations introduced research grants into Russian S&T. RAS and university research groups are main applicants to RFBR and RFH.

2002: The reform of the executive system of RAS was introduced: RAS institutions were organised into 9 scientific branched. The number of Vice-Presidents of RAS was reduced to 6 persons.

2006: A pilot project of salary reform in RAS. It was accompanied by the restructuring of the system of Academy institutes: some institutes were merged; all institutes were demanded to reduce the R&D personnel by 20% within three-year period (2006-2008).

2007: The collision between Budget Code of the RF and the legal status of RAS has been eliminated. RAS now is the government institution; the President of the RAS should be now elected by the General Assembly of the RAS but commissioned by the President of the RF. The RAS Charter should be approved by the Russian government. On an annual basis the RAS should submit the report to the government in which the current state of science sphere is analyzed, the suggestions on priority directions of development are given, and the results of the RAS activity (both research, financial, and managerial areas) are presented. The assumption behind these organizational changes is that they should increase the transparency of the RAS as a government establishment.

2. Please, explain changes in the R&D in higher education system in your country? Has R&D at universities increased or decreased? Have there been activities in merging independent/government/academy institutes with universities?

Private HE is developing (mostly as regards specialties in social sciences and the humanities). R&D commercialization and innovation infrastructure in HE sector (HT parks, business incubators, etc.) Harmonization of Russian HE with Bologna process is going on. R&D in universities is slightly increasing if to judge by the amount of R&D executed in universities (see table). However the share of HE sector in total expenditures on R&D stays quite low – less then 6%. The discussions concerning merging universities and independent (academy or former “branch” institutes) did

take place but in practice these merges did not happen so far. The hampering factors to such merges are both legal and political. The legal obstacle is in the fact that the legal status of most former branch institutes differs from the legal status of universities and merging demands complicated procedures of transforming of organization from one status to another. Political obstacle – RAS was not willing to lose its institutes in favour of strengthening R&D base at universities.

3. Please, explain changes in the sector of ex-industrial institutes in your country? What is their current legal status? How S&T and innovation policy has been treating these organisations? For which programs these institutes are eligible and what are criteria applied in their public funding? Please, explain privatisation in this sector.

1993: Status of State Research Centre (SRC) was introduced in order to support the best industrial research institutes (SRC programme implementation).

1990s: Privatisation of industrial research institutes. Many of the privatised institutes are kept under the government control (Government is a major stockholder in most of the institutes). At the same time many of privatized organizations have changed their profile and stopped conducting R&D.

In 1999: The attempt was made to create larger industrial establishments, such as Federal centres of science and high technology. Three such centres were created but the initiative did not show the expected effects. Therefore it was terminated.
The most successful industrial institutes are those that managed to change their R&D management for more flexible forms of modern R&D management.
Nowadays: Effective R&D performance still remains a problem in most of industrial institutes in spite of the introduction of different mechanisms of competitive state financing for those institutes. The concept of creation of "national labs" is under discussion. The national labs should substitute State Research Centres.

Industry institutes are eligible to participate in variety of competitions for federal funds: tenders of the Ministry of education and science; tenders of other ministries; grants from the RFBR and RFH; support from Russian Foundation for technological development.

4. Please, explain changes in the sector of enterprise R&D (in house R&D) in your country? Who are major R&D performers in business R&D? How S&T and innovation policy has been treating these organisations? For which programs these institutes are eligible and what are criteria applied in their public funding?

1990s: The sector of enterprise R&D shrank dramatically.

There is a lack of information about the sector. According to regular statistics, only 231 enterprises performed R&D in 2005.

No special programmes exist for enterprise R&D. They are eligible for public funding within the common rules stated in the public procurement legislation.

5. Please, explain R&D funded from abroad? If possible, refer to collected data.

The role of funding from abroad is diminishing (statistical data).

What are the major sources of funding from abroad?

Major sources of funding from abroad: commercial contracts, charity foundations' grants, EU framework programme (very modest Russian participation).

Are there foreign direct investments in R&D in your country? Please, explain motives of foreign companies to set up R&D facilities?

Some transnational companies (TNC) invest in R&D directly (Boeing, Samsung, LG). Motives: higher qualification of applied R&D and engineering personnel. In some cases – unique qualification (development of software). Also, in average the workforce in Russia is less expensive then in developed countries.

6. Please, explain changes in modes of funding of R&D in your country? Modes of funding are: institutional (statutory, core or basic funding); programme funding (portfolio of projects which together make programme), project funding and individual grants. Please, use data whenever available.

In the Soviet R&D model, there was only institutional funding with a very little complementation of business contracts (about 5% of total funding).

Since 1992s: all forms are available in R&D funding (institutional, programme, project funding, individual grants). In the government sector of S&T, institutional funding still plays a major role.

Ministry of Education and Science distributes government financing mostly on a programme, competitive basis: more then 70% of its financing is competitive-based. In Academy of sciences the proportion is opposite. The overall trend is to the growing share of programme funding, decreasing block funding, and stable grant funding (RFBR and RFH have a fixed share in the Federal budget – total 7% of government allocations on civilian science).

In which of institutional sectors changes in modes of funding were the biggest? Why? Explain.

In the business enterprise sector R&D (together with the state unitary enterprises), the changes were essential since they were cut out of institutional funding.

Does the government strike a balance between institutional (statutory), programme funding and specific project-based funding? Please, explain.

No special measures are provided by the government.

Does the government organise competitive and transparent R&D funding schemes? If so, please provide details – scheme structure, funding, target audience, evaluation board/methods, means of submission, evidence of success, etc.

There are many state programmes which envisage R&D financing. Though transparent and fare competition is still a problem.

The major changes in the programme – based financing are in the attempt to comprise a Programme from smaller number of larger projects (by volume of financing and by the number of participants), to attract business to co-financing of the Programme's projects, and to stimulate commercial application of R&D financed through the Programmes. The appearance of a limited number of large projects in the conditions when government sector of science is dominating means that the number of organizations receiving significant government support is sharply decreasing. In conditions of inadequate funding from other non-government sources this situation leads to lobbying and the monopolization of state funding by a narrow group of organizations. Often in selection process the most important factors are not qualitative ones (such as, for example, number and quality of publications, success in getting contracts and grants from outside). Instead, the most important criteria seem to be the content of proposal and the status of the leaders of the project. Sometimes the winners are known before the beginning of the competition, and the list of victors demonstrates the existence of a permanent circle of successful organizations. According to some evaluations, made by outside consultants in 2005, in competition for Ministry of Education and Science contracts on R&D 10.3% of the organizations received 31.8% of all financing.

7. What evidence is there of university/academy/institutes-industry links in your country (e.g. science-industry platform/centres of excellence [1], technoparks, innovation/R&D programmes requiring R&D -industry consortia, etc)?

In Russia, they speak about public-private partnership rather than university/academy/institutes-industry links. There are such mechanisms of that as joint financing within federal programmes, consortia in project implementation. The only example of PPP of such type are so called "megaprojects". It was initiated in 2002. In this programme the government provides funds for R&D implemented in R&D organizations or universities and which results will be further commercialized at partner industrial enterprises. The only criterion for the selection of proposals was the requirement that after the project realization the commercial sales at least five times exceed budget allocations to the contractor under the government contractual agreement.

As of today 18 projects are under implementation in the following subject areas:

- Information technologies, communications and electronics;
- New materials and chemical technologies;
- New transportation technologies;
- Production technologies;
- Technology of live systems;

[1] Science-industry platforms/centres of excellence are public-private groupings of universities, research laboratories/centres, industries and institutional public actors sharing the common objective of structuring, enhancing and developing joint research activities. The main objective is the improvement of applied research and the exploitation of research results.

- Ecology and rational use of nature;
- Energy-saving technologies.

Six projects are completed at the present time; three of them experts consider as successful ones.

There is also a number of technology parks in Russia as well as innovation-technology centers (organizations, closed by their functions to the parks). Innovation-technology centers represent conglomerates of small innovating enterprises that are located "under one roof", i.e. in certain compact territory (in case of today's Russia - even in one building since the scale of most ITCs is modest). Today there are about 60 innovation-technology centers in different regions of Russia, and about half of them were formed around universities.

In recent years the state stopped providing support for ITCs and at the same time regional authorities did not increase financing. Among those ITCs which were created at the end of 90-s only few of them continue to implement their primary function. Others turned into organizations that lease office space to different companies, not necessarily related to high tech business.

Currently 7 technology parks in IT sphere are under creation. The government mainly invests in technical infrastructure. The new initiative does not build on elaboration of previous experience with technoparks.

But it should be outlined that the links among universities, research organizations, and business are underdeveloped and the business community considers the state's partnership only as a funding donor so far.

8. What evidence is there of technology transfer support infrastructure in your country (e.g. technology-transfer offices in universities, training schemes for scientists on IPR and technology commercialization issues, support to university spin-outs, incubators)? Please, cite successful examples of these activities? Explain factors behind their success.

Innovation infrastructure consists of technoparks, incubators, education programmes on innovation and technological management, and technology transfer offices that were established with the government support in universities and research organizations. There are also state budgetary foundations like Foundation for promotion of small innovation enterprises (Bortnik's Fund), Russian Foundation Technological Development, a number of industrial R&D and regional innovation funds.

As successful example may be seen the Bortnik's Fund programme called START.

The START programme supports SME at the seed stage. Start-up companies in Russia It was initiated in 2003. Approximately half of the Fund's budget was devoted to the START programme. The START programme reminds one by its structure of the American SBIR programme. The Programme consists of two steps. The duration of the first step is one year during which the group of researchers or newly created small firm receives "seed" financing (up to about 20 thousand euros per project). The small firm should conduct R&D, develop the prototype, patent their development and

work out a business plan. At the end of the first year the firm should demonstrate commercial potential of its product.

At the second step the firm should find co-investor who is interested in manufacturing of the firm's product or the firm should start own manufacturing of the new product. In this case it will receive next portion of financing from the Fund. After the two steps the manufacturing should be actually started, and Fund stops financing the project.

In 2005 the first stage of the programme was realized, and the second stage, which requires finding non-government financing for the continuation of the work of a small firm, has been entered by 20% of the start-ups [2], a fully satisfactory statistic considering the difficulty of finding additional sources of financing for small science-intensive firms.

Aside of that, the Programme raised interest among corporations, and some of them were willing to co-finance the programme. At the present time there are some projects implemented in interests of such companies as Intel, LOMO, and AFC "Systema". This shows that demand on high tech products in Russia does exist, and there is a potential to satisfy it.

At the same time, the country bares a lack of qualified IPR specialists and relative training programmes. Hence, commercialisation of R&D results (at the pre-innovation stage) is also underdeveloped. Also there is no clarity in IPR regulation of remuneration of inventory authors in both state institutions and industrial R&D organisations. IPR relations between a customer (also when a customer is the government) and an R&D organisation are recommended to be ruled by contract conditions. Since January 1, 2008 Part IV of the Civil Code comes in force. It is devoted exclusively to the IPR and it substitutes all major laws on intellectual property. Concerning the allocation of IP rights for the R&D results created under budgetary expense, it defines that source and volume of financing are key factors for assignment of IPR. It means that if budgetary financing was the primary source, then the government decides concerning the allocation of IPR.

[2] Data for 2006.

B. Changes in institutional structure of R&D as depicted in R&D statistics

Gross domestic expenditure on R&D (GERD), by sector of performance and source of funds

In million roubles		1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
executed by	financed by												
All sectors	All sectors	**12149.5**	**19393.9**	**24449.7**	**25082.1**	**48050.5**	**76697.1**	**105260.7**	**135004.5**	**169862.4**	**196039.9**	**230785.2**	**288356.1***
	Business enterprise sector	7899.1	12679.6	15021.6	15555.1	26999.5	46889.5	67058.1	86378.5	104345.2	123277.4	142562.2	178268.7:
	Government sector	3036.3	4703.9	6319.9	5705.2	10733.8	17131.4	23730.6	30650.2	40017.0	47172.1	57496.7	72424.5:
	Higher education sector	650.1	919.2	1285.7	1229.0	2162.6	3357.1	5203.1	6842.0	9881.3	10363.5	12803.0	16590.5:
	Private non-profit sector	2.1	9.2	14.0	19.6	48.2	146.8	196.7	273.3	350.7	373.4	395.3	493.5:
	Abroad	561.8	1081.9	1808.4	2573.2	8106.4	9172.4	9072.2	10860.5	15268.2	14853.5	17528.0	20578.9:
Business enterprise sector	All sectors	**4503.3**	**6934.2**	**8860.5**	**10671.1**	**21831.9**	**32580.3**	**42171.3**	**52631.7**	**63923.6**	**73600.5**	**83570.1**	**101124.6:**
	Business enterprise sector	3639.1	5488.1	6696.7	7908.0	13224.1	22199.4	30729.1	38602.8	44401.7	51502.6	58460.6	71221.6:
	Government sector	255.8	399.0	484.8	520.7	1392.3	2028.3	3166.8	4019.2	4925.9	6491.8	6845.5	7775.2:
	Higher education sector	181.0	221.6	300.3	320.3	545.9	951.9	1454.0	1989.2	2870.1	3488.3	3911.2	5246.4:
	Private non-profit sector	0.8	3.5	5.5	6.2	8.7	28.9	44.3	88.3	59.1	45.3	27.5	33.4:
	Abroad	426.6	822.0	1373.3	1915.9	6660.9	7371.9	6777.0	7932.2	11666.7	12072.5	14325.3	16848.0:
Government sector	All sectors	**7604.1**	**12282.3**	**15304.5**	**14022.2**	**25878.5**	**43680.3**	**62219.7**	**81279.3**	**104415.9**	**121299.2**	**145614.8**	**185157.6:**
	Business enterprise sector	4256.8	7093.7	8130.6	7437.9	13698.0	24674.9	36274.5	47710.2	59896.8	71716.2	84032.7	106955.2:
	Government sector	2779.2	4289.4	5818.9	5149.8	9317.1	15060.4	20398.0	26540.0	34808.4	40563.0	50589.8	64561.7:
	Higher education sector	440.4	652.9	943.0	836.6	1521.2	2220.6	3443.9	4458.5	6294.2	6269.1	7982.2	10172.6:
	Private non-profit sector	0.3	4.3	7.5	11.6	34.6	79.8	112.4	175.2	252.6	319.0	356.0	447.4:
	Abroad	127.3	242.0	404.6	586.3	1307.6	1644.6	1990.8	2395.4	3163.8	2431.9	2654.0	3020.7:
Higher education sector	All sectors	**37.8**	**68.9**	**79.5**	**154.7**	**308.5**	**345.2**	**644.4**	**907.2**	**1223.7**	**1025.1**	**1518.2**	**1972.8:**
	Business enterprise sector	2.3	2.0	1.7	4.0	73.8	11.3	46.3	16.1	23.9	47.8	46.9	64.7:
	Government sector	0.8	8.1	8.9	13.2	13.2	23.7	16.5	28.0	77.9	46.2	46.8	63.3:
	Higher education sector	27.4	42.1	39.9	69.3	91.7	178.0	297.1	382.1	704.2	597.9	889.1	1149.8:
	Private non-profit sector	-	-	-	-	-	-	-	-	1.3	0.4	0.5	0.6:
	Abroad	7.2	16.7	29.0	68.1	129.9	132.2	284.5	481.0	416.4	332.6	535.0	694.4:
Private non-profit sector	All sectors	**4.3**	**108.4**	**205.2**	**234.1**	**31.6**	**91.3**	**225.3**	**186.3**	**299.1**	**115.1**	**82.1**	**101.1:**
	Business enterprise sector	0.8	95.9	192.6	205.1	3.6	3.9	8.2	49.4	22.8	10.7	22.0	27.2:
	Government sector	0.5	7.4	7.4	21.5	11.3	19.0	149.3	63.0	204.7	71.1	14.6	24.3:
	Higher education sector	1.3	2.6	2.6	2.8	3.9	6.7	8.1	12.2	12.8	8.2	20.5	21.7:
	Private non-profit sector	1.1	1.3	1.0	1.9	4.9	38.1	39.9	9.8	37.7	8.7	11.4	12.1:
	Abroad	0.6	1.2	1.5	2.8	8.0	23.6	19.8	52.0	21.2	16.4	13.7	15.8:

* preliminary data

: estimation

Researchers by sector

Researchers (FTE)	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006*
All sectors	**610,357**	**562,070**	**532,469**	**492,494**	**497,030**	**506,420**	**505,778**	**491,944**	**487,477**	**477,647**	**464,577**	**466,253**
Business enterprise sector	368,299	331,424	304,590	273,623	279,418	289,868	283,716	275,333	267,850	257,621	237,959	226,599
Government sector	157,784	151,777	152,161	147,332	143,519	142,191	144,716	145,646	146,370	147,896	154,827	165,520
Higher education sector	84,030	78,245	75,237	70,672	72,721	72,264	74,930	69,441	71,174	70,844	70,493	72,735
Private non-profit sector	244	624	481	867	1,372	2,097	2,416	1,524	2,083	1,286	1,298	1,399

*** estimations based on preliminary data**

Country Briefing Report – Policy Monitoring in Russia
BRUIT project

1 What lessons can be drawn from Policy Implementation?

1.1 Lessons from the Evaluation of Innovation Policy Measures

The positive changes in Russian innovation policy formulation and implementation are as follows:

- Innovation policy has become a priority area for several government agencies;
- Attempts are being made to integrate into strategies all the elements of innovation system – science and technology, business and government, direct budget support and indirect promotion;
- Attempts are being made to adopt a systematic approach to setting main tasks, trends and measures of innovation policy realization;
- Use of mid-term indicators in research policy setting.

The negative aspects of the process of forming innovation policy are the following ones:

- A lot of innovation policy directions and priorities are not accompanied by concrete measures especially in industrial strategies and plans of development, i.e. these measures are not specific enough;
- Little attention is paid to indirect measures such as tax and depreciation policy, regulation, competitive and antitrust policies;
- Innovation policy does not yet have a system's character – it does not integrate science and technology policy, educational, industrial and regional policies;
- Innovation policy is often formulated based on a lot of basic and conceptual papers issued over a short period of time; and they often duplicate each other – this indicates poor quality of policy design;
- Lack of cross government coordination in the process of innovation policy development.

We can give two examples of combining positive and negative aspects of policy implementation: stimulating venture capital industry and creating special economic zones for innovation companies.

In the first case, on an encouraging note, the venture industry is currently developing in parallel two models of venture funds. Whilst the "Fund of Funds" is important for stimulating venture financing as a whole and also as a learning experience of work with venture money, the ICT fund as a specialized organization may become a success from a market point of view. The specialized funds are usually is more capable to ensure the necessary high level of expert evaluation of projects and thus to decrease the risks. On the negative side, there is a lack of projects suitable for venture financing. Government officials recognize this fact by pointing out that the main problem is to find sufficient innovation projects to make full use of the available funds.

Government initiatives aimed at creating new technoparks and special economic zones have been developed but without a serious evaluation of past successes and failures. There are no reliable statistics about the extent to which technoparks have facilitated successful work, and how they did this. Currently, the government plans to make big investments in the engineering and transportation infrastructure for technoparks and special economic zones, as well as introduce some tax concessions (in the zones).

Four special zones were selected through an open competition. The choice of specializations gives evidence about the attempt to support the strongest territories and most promising S&T directions, guaranteeing in this way "a history of success." However, so far, there are too few residents in the zones – only one to two companies in each one. The zones are due to become fully operational in 2007 and the first results can be evaluated in two or three years.

1.2 Review of Good Practice

Support of Small Innovative Enterprises at the Seed Stage: the START Program

The START program supports SME at the seed funding stage. Start-up companies in Russia have difficulties in obtaining bank loans because they usually are unable to guarantee the return of the loan (by presenting as a deposit real estate, equipment or commodity circulation). They cannot prove that their business will be profitable. In such conditions the START program has a special importance.

The program was initiated by the Fund for Assistance to Small Innovative Enterprises (FASIE) in 2003. Approximately half of the Fund's budget has been devoted to the START program (in 2006 - approximately 12 million Euros).

The program consists of two steps. The duration of the first step is one year during which the group of researchers or newly created small firm receives "seed" financing (up to about 20 thousand euros per project). The small firm should conduct R&D, develop the prototype, patent their development and work out a business plan. At the end of the first year the firm should demonstrate the commercial potential of its product.

At the second step, the firm should find a co-investor who is interested in manufacturing the firm's product, or the firm should start its own manufacturing of the new product. In such cases, it will receive the next portion of financing from the Fund. After the two steps the manufacturing should be actually started, and the Fund stops financing the project. In comparison with the US' Small Business Innovation Research (SBIR) Program, the step between R&D and a prototype must be taken very rapidly – with in a year – for the Russian program. The risks involved in such a short transition are high. But first results of the program implementation have proved to be encouraging.

The most active participants in this program are university researchers: 36% of the applications for the creation of small firms have originated from there, scientists from the Russian Academy of Sciences have presented 13% of the applications for small firms, applications from government science centres have presented 1.4%, and "others" have presented 18%. The remaining 33% of applications have come from already-existing small enterprises. Statistics on the program for the two years 2004 and 2005 are given in the table below.

Table: Characteristics of the START Program

	2004	**2005**
Number of applications	2764	1674
Number of contracts concluded by the Fund	538	421
Level of competition, applications per grant	5	4
Total financing, million Euros	10,0	9,6
Volume of financing per project at the first step, thousand Euros	19,2	22,8

Source: Fund for Assistance to Small Innovative Enterprises - Annual reports for 2004 and 2005.

In 2005, the first stage of the program was realized, and the second stage, which requires finding non-government financing for the continuation of the work of a small firm, has been entered by 20% of the start-ups [3], a fully satisfactory statistic considering the difficulty of finding additional sources of financing for small science-intensive firms.

Aside from that, the program has raised interest amongst corporations, and some of them are willing to co-finance the program. At the present time, there are some projects being implemented in the interests of companies such as Intel, LOMO, and AFC "Systema". This shows that demand for high-tech products in Russia does exist, and there is the potential to satisfy it.

Effective infrastructure for innovation: case of Zelenograd (Moscow region)

Zelenograd [4] represents a fine example of an effectively working innovation infrastructure that has been created around a university – the Moscow Institute of Electronic Engineering (MIEE). The creation of the innovation infrastructure started in 1991 when a technology park with an incubator was built on the campus. Then in 1998 an innovation-technology centre was established. The innovation-technology centre is a special Russian type of infrastructure aimed at serving the next stage of development of small firms after technoparks. The idea is that growing firms eventually graduate from the technopark and enrole at the innovation-technology centre. In the innovation-technology centre, small firms get access to scientific and technological equipment, and to the experimental facilities of MIEE (specifically the plant "Proton"). This access has helped companies to increase their productivity and grow further.

In 1999 the innovation-industrial complex was established around MIEE with the main goal of creating conditions for the development of full-scale industrial production for the most promising high tech products. Finally, in 2002 in order to create linkages with regional industry, the so-called "technological village" was opened. The technological village is, in other words, a high tech cluster that unites university, small firms and regional industry. This cluster has not only helped to increase manufacturing of high tech products but also to develop modern education that takes into account the current needs of industry. Thus, in 2004 MIEE created the technology transfer office and later - Centres of Competence that train Master's students to use modern equipment in interdisciplinary areas of interest to local

[3] Data for 2006.
[4] Moscow satellite city

industry. These Centres are based on the Bologna principles of education, i.e. they propose a modular approach to training. Aside of that, the Centres of Competence may be seen as a mechanism for strengthening linkages between university and industry because business men teach courses and conduct practical training courses there. In this way, Master's students obtain those skills necessary to work in modern business, and industry does not need to re-train them before allowing newly hired graduates to work on up-to-date equipment.

Finally, in 2006, the innovation complex MIEE has became part of a newly created special technical development zone, and the innovation-technology centre was registered as the first resident of that zone. The table below presents the overall results of high tech business development that was supported through technological infrastructure. As can be seen, from 1999 till 2006, the number of firms in the technological cluster has grown 16 fold, volume of sales – 33 fold, and attracted investments – 15 fold. This proves that there has been not only an increase in the number of firms but also in their size and production.

Table: Characteristics of high tech business development in Zelenograd cluster

Indicator	**1999**	**2002**	**2004**	**2006**	**Rate of growth, 2006 to 1999, times**
Number of small high tech firms	10	40	70	160	16
Volume of sales, mln Euro	2.2	14.6	35.7	72.1	33
Volume of investments attracted, mln Euro	1.5	9.1	14.3	23.1	15
Number of MIEE professors working at small firms, headcount	2	8	30	60	30
Number of students trained at small firms, headcount	35	150	260	440	13
Number of graduates hired by high tech companies located in the cluster, headcount	30	120	220	470	16

Source: MIEE, 2006.

The table also demonstrates the positive influence a technological cluster can have on education: a growing number of students are trained at small innovative companies. The rate of admission of graduates to regional companies also grows much faster. Among other positive effects, the technological cluster has helped to decrease brain drain which was previously the case amongst electronic engineers (and especially for those working in the area of nanotechnologies).

This "success story" demonstrates that government initiatives aimed at creating technological infrastructure may be successful, especially in the case of different types of infrastructure that co-exist on one territory. Aside from that, important factors for success have been: 1) Zelenograd's narrow specialization on electronics: much of the electronics industry is presented nearby - this has helped with establishing

linkages between the university, small companies and large firms and factories. 2) Zelenograd already initially possessed strong potential in education and research.

Exhibit: Summary of good practice cases in Russia

Year	Title of good practice case	Justification for selection
2002	MIEE technological village	Create linkages between education, R&D and innovation infrastructure with regional industry
2003	START Program	The first program to support SMEs at the seed funding stage
2004 - 2005	MIEE Technology transfer office and Centres of Competence	Train Master's students to use modern equipment in interdisciplinary areas of interest to local industry
2006	MIEE innovation-technology centre registered as the first resident of the special technical development zone	Formation of full scale regional cluster