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***Siberian Academic Complex:
Structure, Institutes and
Possibilities for Expanding
International Cooperation***

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The Aim of the Presentation

The **key purpose** of the presentation is to articulate historical specifics and formulate prospective vision of the Siberian Branch of RAS in general, and Novosibirsk Research Centre (Akademgorodok) in particular as hubs of R&D activities with good capacity for expanding international cooperation.

The following tasks are supposed to be addressed:

- highlighting in a comparative perspective against Soviet traditions and Western science a historical background of Akademgorodok formation as a centre of R&D growth;
- specifying Akademgorodok's role in the academic enterprise of Russia;
- identifying Akademgorodok's peculiarities as a science town integrated into the structure of Novosibirsk megalopolis;
- identifying key factors impacting Akademgorodok's future perspectives as an innovation centre;
- implementing SWOT-analysis of Akademgorodok as a core structure of the regional innovation cluster.

Historical Outlook: Akademgorodok Early Success Story

Combination of Solid Reasons for Setting Up (1957):

- ***Military and strategic factors.*** Organisation of a huge research center in a remote area of Russia as an alternative to research capacities located in the center of the country
- ***Economic factors.*** Desire to accelerate economic growth in the eastern part of Russia
- ***Science policy factors.*** Establishment of a regional research centre to give a momentum to Big Science in the country in large
- ***Political factors.*** One of the measures focused on changing system of distribution of power

Concept, Set up and Specifics:

- Radical break with a “center-oriented” approach in the organisation of Russian science
- Interdisciplinary science centre
- Centre of fundamental research of a civilian character open for international scientists
- New institutes as relatively small and flexible structures, merging institutional matrix and informal science schools yet at the inception phase
- Positioning of Akademgorodok as a driver of new technologies for real sector of economy
- Good living and working conditions for scientists and engineers

People:

- ***“Founding Fathers”.*** 3 leading scientists are considered “the Founding Fathers” of Akademgorodok – Professors Mikhail Lavrentiev, Sergey Khristianovich and Sergey Sobolev. Personal connections between Lavrentiev and Soviet leader Nikita Khrushchev created a political umbrella over Akademgorodok.
- ***The New Director Corp.*** New institutes were to be created with strong intellectual leaders selected throughout the country and placed in the centre of research teams.
- Younger scientists were guaranteed good possibilities for interesting job and career growth.

In the Middle of Nowhere

Setting up the Siberian Branch of the USSR Academy of Sciences (now Russian Academy of Sciences, RAS) and building of Akademgorodok became last but one giant Soviet mega-project implemented in the country. Akademgorodok appeared from the scratch.



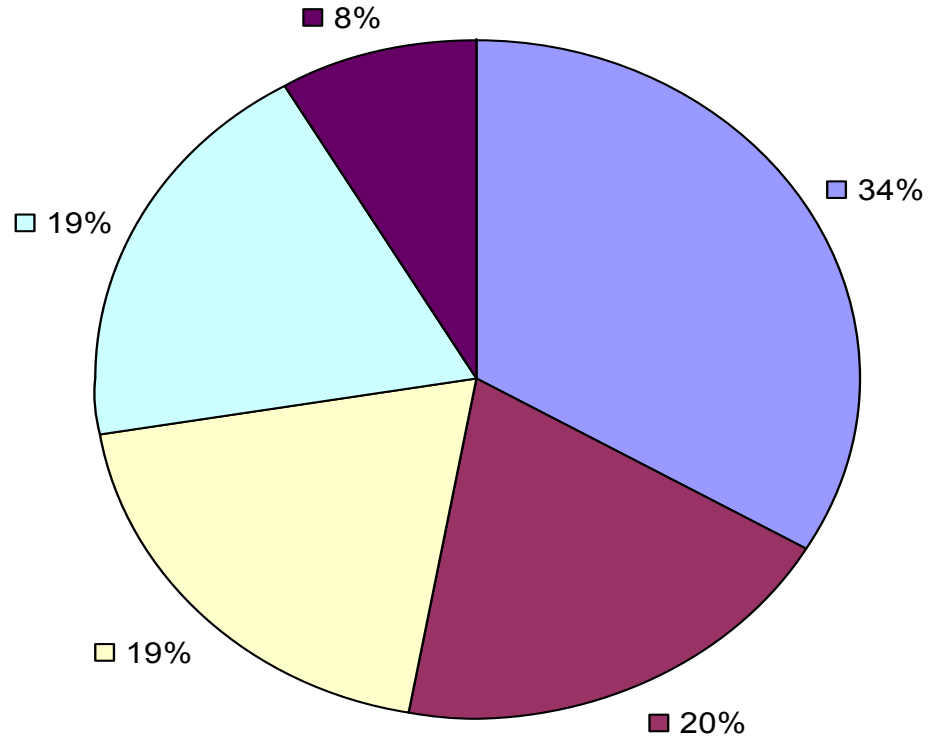
Immediate Results: By the Middle of 1960s Nice Looking Akademgorodok Appeared From the Scratch

Фотоархив СО РАН



The Research Centre Profile

Profile of the SB RAS Institutes, as in the Middle of 1960s



- Mathematics, Physics and Technical Sciences
- Chemistry
- The Earth Science
- Life Sciences
- Social Sciences and Humanities

Two Dimensions of Akademgorodok

Akademgorodok as a core structure of SB RAS

SB RAS is the biggest regional centre of RAS that is historically unique from the management, structural, budgetary and contextual points of view.

SB RAS consists of:

- 75 institutes and 100 plus auxiliary facilities integrated into 9 affiliates located throughout Siberia from Tumen to Yakutsk;
- 16 institutionalized international research centres;
- 32 000 people engaged including 9 100 researchers (some 4 800 Ph.D. and 1 900 Full Professors);
- Publishing House and 22 science magazines;
- 80 Ph.D and Dr.Sc. Councils

In total this is some 20–25% of Russian academic enterprise. All these data refer to the situation as before the start of the RAS reform in 2012

Akademgorodok as a part of megalopolis of Novosibirsk

- Novosibirsk is the 3rd biggest city of Russia. Population is some 1.5 mln. Located close to the geographical centre of the country, about 3 000 km from Moscow.
- Informal capital of Siberia and the core of the Siberia's Federal District
- Huge centre for high-tech industry, mostly military oriented.
- The largest R&D, educational and cultural centre on the East of Russia.
- Since the region lacks natural resources, its development strategy is based on R&D, education, high-tech industry, transportation and logistics, as well as on capitalizing advantages of geographical location as a gate to **Asia Pacific, Central Asia and South Asia.**

Akademgorodok as a Core Structure of SB RAS

- **Akademgorodok is a place where decision-making of SB RAS is performed and the regional S&T strategy is formulated.**
- **About 50% of the SB RAS research institutes are united into Novosibirsk research centre (that is Akademgorodok). This is the largest and the only regional centre of RAS where most of the disciplines and directions of modern science are presented from physics and mathematics to economics and humanities.**
- **56% of the SB RAS researchers including 60% of Full Professors and Ph. Ds. are employed in Akademgorodok's institutes.**
- **The majority of international research centres are also located in Akademgorodok.**
- **Akademgorodok is a place for most of the SB RAS innovation infrastructure and some research equipment which is unique for the RAS.**
- **Structural concept and management practices of Akademgorodok were disseminated to other regional complexes of RAS and beyond.**

The Presidium Building



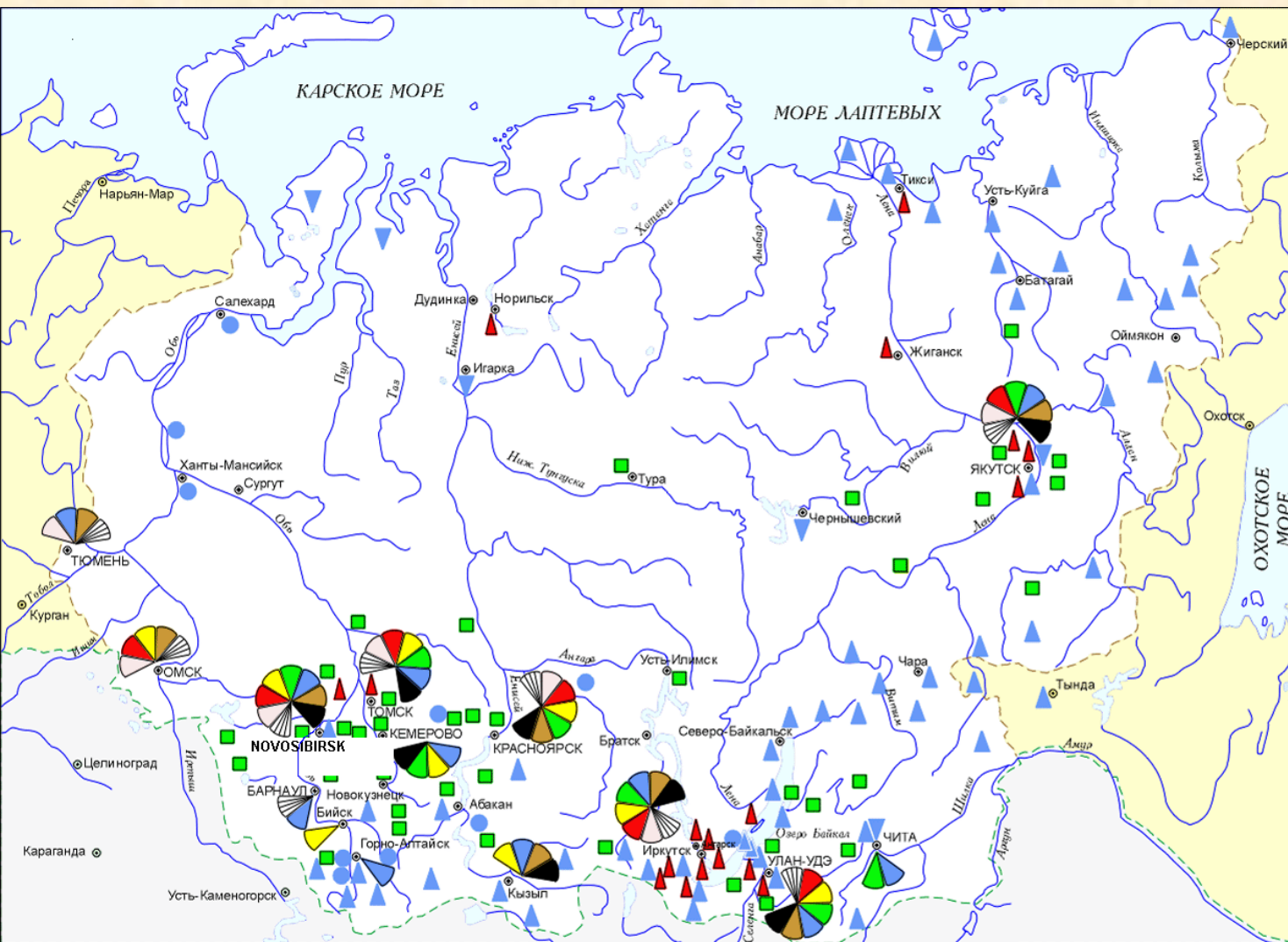
Allocation of Research Facilities of SB RAS





Research Potential Of the Siberian Branch of the Russian Academy of Sciences



Network of Research Stations and Observatories of the Siberian Branch of the Russian Academy of Sciences

-  Cosmophysics
-  Seismology
-  Cryology
-  Geography
-  Biospheric



Territorial Research Centres and Institutes of the Siberian Branch of the Russian Academy of Sciences

-  Mathematics and Mechanics
-  Physics and Technical Sciences

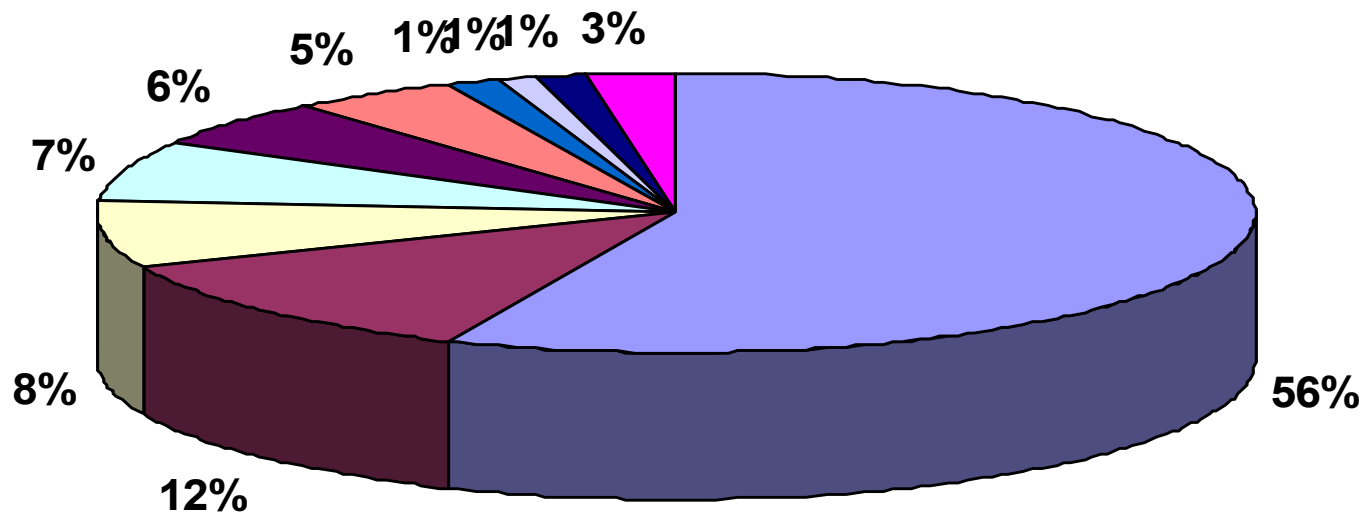
-  Chemical Sciences
-  Life Sciences

-  The Earth Sciences
-  Social Sciences and Humanities

 International Research Centres

 Classical Universities affiliated with the SB RAS

SB RAS Researchers in Regional Research Centers



56% - Novosibirsk; 12% - Irkutsk; 8% - Tomsk; 7% - Krasnoyarsk; 6% - Yakutsk, 5% - Ulan-Ude; 1% - Omsk; 1% - Kemerovo; 3% - other territories of Siberia

Akademgorodok as a Science City

In addition to research facilities belonging to RAS, Akademgorodok as a science city provides a room for a research university, innovation enterprises and technopark

- **Novosibirsk State University (NSU) is one of the leading universities of Russia that was granted a status of National Research University. At the inception phase it was aimed at educating research personnel for SB RAS; at the moment its strategy is being reshaped for R&D, higher education and innovation business.**
- **Historically “innovation belt” consisted of a dozen of SB RAS design bureaus. Currently it is represented by small and medium size businesses producing innovation products.**
- **Technopark (Akadempark) is a new facility. It is focused on providing a space, management consultancy and advice, as well as logistical support to small business companies mostly but not exclusively set up as spin offs of the SB RAS and NSU institutions.**

Akademgorodok Architecture: A Failure of Expectations



Originally a comfort of natural environment was to be supplemented with architectural experimentations symbolizing a dichotomy of virgin Siberian nature and “cosmic” technocratic expectations from science. But it did not happen because of a direct interference from the top policy hierarchy.

Overview of Akademgorodok



Novosibirsk State University

- Established in 1957-1959. Now it is one of 29 universities granted a status of NRU, and also belongs to Shanghai CO network university, being responsible for IT.
- NSU is ranked among 301-350 top universities of the world by THE index for 2014-2015, and is 85th among first 100 universities in natural sciences.
- Consists of 13 departments and College for Information Science. Some 6 000 students in total.
- Deeply integrated with SB RAS in terms of education and research programmes. 80% of NSU professors work at 28 institutes of SB RAS. This approach has later been extended to high-tech industry and innovation business.
- 74 chairs of NSU operate on the basis of SB RAS and SB of Russian Academy of Medical Sciences (SB RAMS).
- In addition to RAS and RAMS, the strategic partners of NSU are such companies as Intel, Hewlett-Packard, Schlumberger, Baker Atlas, Carl Zeiss, Parallel; the NSU cooperates with Google, Samsung Electronics, Sun Microsystems, Ernst&Young, etc.
- The University publishes 11 series of its science magazine.
- Collaborative educational and research programmes are implemented on the regular basis with universities of China, Kazakhstan, Kyrgyzstan, South Korea, Thailand, Singapore, Japan, France, Germany, etc.
- NSU is well-known with its emphasis on fundamental knowledge and early engagement of students into research. These principles have been supplemented by the interdisciplinary training and research with a strong focus on innovation.
- Current practice-oriented priorities of NSU are: mathematics, information science and information technologies; 'life systems'; energy generating, energy and resource saving; new materials; regional development and area studies.

Novosibirsk State University. Main Building



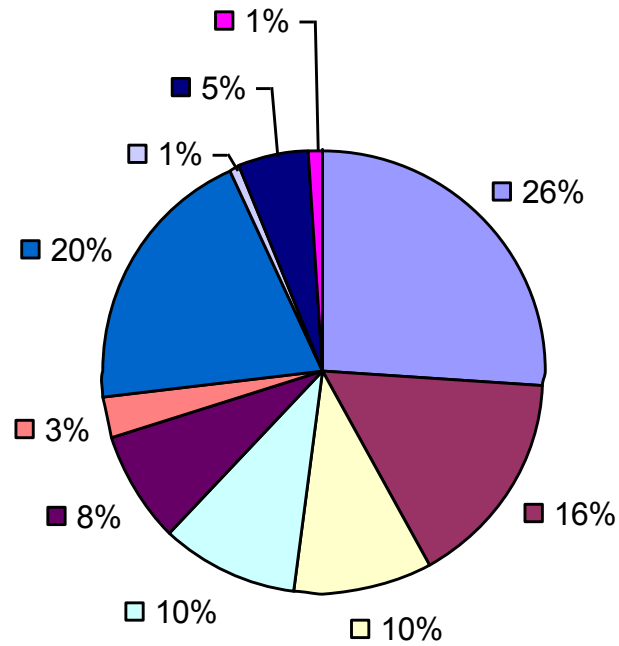
<http://timich.ru>

www.nsu.ru

Innovation Enterprises

- **100 plus innovation firms integrated into two associations – Sibakademsoft and Sibakademinnovation – operate in coordination with the SB RAS in Akademgorodok and commercialize R&D products of research institutes.**
- **70% of companies belong to small business sector as they employ not more than 30 employees. Total number of employed is above 7 000 people.**
- **The leading sectors are science and technology equipment construction, including laser systems and optical devices (26%), IT (20%), biotechnology (16%), engineering (10%), new materials (10%), machine building (8%).**
- **The most advanced are IT-companies and companies operating in the sectors of new equipment construction and biotechnology. It is explained by strong math and information sciences schools in NSU, profiles of SB RAS institutes in Akademgorodok, and connection with the National Research Centre ‘Vector’ (for biotechnology).**
- **The key markets for the IB firms are: federal agencies, research institutes and universities, energy generating, oil, gas and metallurgy companies, chemical industry, Russian railways, banks.**
- **Some products are exported to European Space Agency, Hewlett-Packard, Sun Microsystems, ESRI, Semicron, TNK-BP, RICOH, Océ, Toshiba, Fujitsu, Huawei, Alcatel, a number of US universities, and also to Indian enterprises on the contract with the Indian Ministry of Nuclear Energy.**

Profile of Akademgorodok High Tech Companies



- Analytical, measuring and controlling devices
- Biotechnology
- New materials
- Engineering
- Machine building
- Power electronics
- Information technology
- Geology and geophysics
- High tech service
- Consumer goods

Technopark 'Akademgorodok' – Akadempark

- **Akademgorodok's specifics had both positive and negative aspects for innovation technology products. Positive side refers to extensive SB RAS R&D facilities, the university, and operating innovation business; negative side – to insufficient production space and premises, and lack of modern technological infrastructure for production.**
- **Akadempark was created in the framework of the state programme aimed at supporting this kind of facilities in high-tech sphere. The initiative of TA creation belongs to Novosibirsk Region administration, the Mayor of Novosibirsk, and SB RAS. Basic TA infrastructure is funded from federal and regional budgets. After all, private investments are supposed to become the major source of financing.**
- **Akadempark is a complex technological park with unique infrastructure. Its key directions are information and telecom technologies; biotechnologies and medical technologies; production of high tech equipment; power electronics.**
- **A number of units have been established including a Technology Centre for production of equipment, machine building production and power electronics; Data Centre for IT companies; Biotechnology Production Centre.**

Akadempark Buildings



<http://www.academpark.com/>

Akademgorodok and its Environment

The external environment of Akademgorodok includes:

- a science town of Koltsovo built around a huge centre of biotechnology and microbiology – the NRC ‘Vector’;
- a science town of the Siberian Branch of the Academy of Agricultural Sciences;
- a research centre of the Siberian Branch of the Russian Academy of Medical Sciences;

These research complexes are situated within accessible distance of 15 - 20 km. from Akademgorodok.

- a number of other research facilities associated with industry, high-tech enterprises in the real sector of economics, and some 30 higher education establishments including huge technological university are located downtown Novosibirsk.

All these preconditions provide for intensive networking for Akademgorodok facilities also opening a room for their intellectual products.

Innovation Profile of the Novosibirsk Region

The Novosibirsk Region:

- is leading in Russia in terms of share of researchers with advanced academic degrees in total quantity of engaged in R&D sector;
- has the 4th rank in the country on a number of students per 10 000 of population;
- is the 6th in Russia on total number of those who are engaged in R&D;
- is the 3rd in Russia on total number of programmers;
- is the 3rd in Russia (after Moscow and St. Petersburg) and leading in Siberia on a number of operating IT businesses;
- is leading in the Siberian Federal District (SFD) on export of high-tech goods and services;
- is leading in the SFD on a number of patents received.

This is a science city of Akademgorodok which determines the innovation profile of the Novosibirsk Region (NR) as a whole. In fact, Akademgorodok (together with other SB RAS centers) is one of the poles of the bi-polar model of Russian system of basic research.

Akademgorodok is considered a huge source of innovations for Siberia and for Russia. The NR Strategy of Development determines regional perspectives to fix its position as the largest innovation centre on the east of Russia.

SWOT-analysis of Akademgorodok as a Centre for innovation growth (1)

Strengths

- Exceptional concentration of researchers belonging to strong academic schools;
- Very high concentration of R&D institutes of different profile;
- NSU as one of the best research universities in the country;
- Established connections with other segments of R&D system in the region and beyond;
- Innovation belt consisting of spin-off companies;
- Stimulating academic environment;
- Positive image of Akademgorodok in the country and in the world;
- Capacity of neighboring megalopolis of Novosibirsk;
- Support from SB RAS management and from federal, regional and local authorities.

Weaknesses

- Narrow market for R&D due to anti-innovative character of Russian industry;
- Deficit of venture capital;
- Deficit of operational premises for rent as they mostly belong to SB RAS as a state agency;
- High cost of land and its limited availability for new building;
- Outdated structure of Akademgorodok research facilities inherited from the Soviet past;
- Outdated infrastructure requiring huge investments for its updating;
- Lack of experience in new management practices;
- Legislative problems making difficult spinning off business companies;
- Economic instability in the country in large, and limited investment attractiveness of the region;
- Logistic difficulties due to remoteness of Akademgorodok from traditional connections in the USA and Western Europe.

SWOT-analysis of Akademgorodok as a Centre for innovation growth (2)

Opportunities

- **Getting new impetus of growth within the context of the knowledge economy;**
- **Taking a lead in innovation and filling a niche of becoming a core of the regional innovation system in Siberia and 'innovation capital' on the east of the country;**
- **Re-positioning the region by opening new perspectives in the sphere of innovation in such regions as Asia Pacific, Central and South Asia;**
- **Getting 'a snowfall effect' of the first positive changes that contribute to the regional development.**
- **Getting more chances to impact the S&T and innovation policy decision making process both at the regional and federal level;**
- **Attracting state and private investments for Akademgorodok update.**

Threats

- **The impact of US and EU sanctions which may lead to isolation from the global economy;**
- **Innovation orientation of the RF transformation policy remains just a theory;**
- **Venture capital will not come to Akademgorodok because of high risks;**
- **New development strategy is not supported and the structure of Akademgorodok research complex is not modified due to opposition from Soviet-type managers at the top and medium levels of the academic enterprise;**
- **Legislation is not modified and spin-off process is not accelerated;**
- **Academpark project is not successful.**

The balance of strength and opportunities against threats and weaknesses makes us remaining on the positive side when considering future of Akademgorodok as a Centre of R&D and S&T Growth. However, its future as an Innovation Center to a major extent depends on overall macroeconomic situation, geopolitical context, economic strategy and political will for a change.

Thank you very much for your attention!



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