

**STI OUTLOOK 2006 – POLICY QUESTIONNAIRE**

**THE SLOVAK REPUBLIC**

February 2006

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## REQUEST FOR INFORMATION

*Please provide a written response for Section A below, which addresses general science, technology and innovation policies, and for those topics identified in Sections B through G in which significant shifts in policy have been made or new initiatives launched in 2004 or 2005. Information on anticipated changes in 2006 (or beyond) should also be included, where possible.*

### **Section A: General framework and trends in science, technology, and innovation policy**

**A 1.** *Please provide a brief overview of the main directions, objectives and elements of national policies for science, technology, and innovation, highlighting the following topics:*

- *Main features of recent science, technology, and innovation policy developments (e.g., including new innovation strategies) and the rationale behind them:*

The Slovak Republic was concentrated on structural reforms in time of 1993 - 2005. Especially the period of 2002 - 2005 was characterized by several macroeconomic reforms to strengthen the Slovak economy and to ensure harmonisation of national legislation with the accession process to the European Union. In May 2004, Slovakia became a full member of the European Union, which crowned its efforts to be united in a community of European countries cooperating within a common internal market, free movement of goods and services and carrying out Shengen Agreement rules.

Science and technology policy did not belong to the top priorities of Slovak policy last years and thereby the S&T area was markedly undersized. A situation changed in the beginning of 2005 when the National Council of the Slovak Republic (the Slovak Parliament) adopted a new “Act on Organization of State Support for Research and Development in March 2005. (No. 172/2005 Coll., which came into force on 1 July 2005). The new act is aimed at achieving higher effectiveness of the utilization concerning the RTD state support aimed at the contribution to the economic, cultural and social progress of Slovakia.

The Slovak Government approved a basic strategic document „The Strategy of the Competitiveness of the Slovak Republic up to 2010“ (known as “The Lisbon Strategy for Slovakia”) in February 2005, where 4 main development priorities for Slovakia were set:

- Research, development and innovation.
- Information society.
- Human capital and education.
- Business environment.

Further on – in all of the 4 priority areas action plans were elaborated and approved by the government on 13 July 2006. These documents contain relevant steps to be done in a sphere of Slovak S&T development as well. As innovation is the main driving force of developed economy, an ultimate emphasis on support of S&T development became more intensive topic to achieve ability for SME’s

innovation considering the fact that the most basic input for innovation is a new knowledge arising from research and development results.

Slovakia has a relatively strong RTD potential but its quality is well behind the most developed world countries. Thereby the main aim of the “Action Plan for Science, Research and Innovation” is to contribute to the creation of basic conditions to help country in system development of research, progress and innovation comparable to the international quality. Suggested steps should create necessary system elements needed for effective financial support from the governmental sources. Implementing the “Action Plan” the Slovak government shall be able to increase the amount of finances aimed at the support of science, research and innovation. This should also minister to support an ability of Slovak subjects to profit financial means for science and research from the EU funds (European Social Fund and European Regional Development Fund) as well as from other international/multilateral financial resources as effectively as possible (EC Framework programmes for research, development and demonstrations, financial tools of EEC, European Science Foundation, etc.)

To conclude this part, an appropriate management of research and development is inevitable for better policy realisation. Therein competencies for science and technology are under the authority of the Ministry of Education of the SR (Division of Science and Technology), while innovation policy belongs to the main competencies within the Ministry of Economy of the SR, of which the main task is to create as effective as possible cooperation in order to increase the competitiveness of the country as a EU member state in the framework of “Lisbon strategy”.

- *Major changes in the legislative, administrative, organisational, institutional, or budgetary framework for the formulation and implementation of science, technology, and innovation policies (e.g., new Ministerial structures, better inter-Ministerial coordination, increased involvement of non-governmental stakeholders):*

The Slovak Science and Technology Policy is carried out by main central state administration bodies, as follows:

- 1) Ministry of Education of the SR (Division of Science and Technology) – a policy making body as well as funding institution of research and development.
- 2) Research and Development Agency – institution providing grants and financed by the Ministry of Education of the SR.
- 3) SARC (Slovak Advancement Research Centre) – institution handled by the Ministry of Education of the SR, which is responsible for management of European Research Area and EU Framework Programmes in Slovakia – providing information, organizing workshops, seminars, lectures, etc.

The aim to better dispose state’s financial means and to improve management structure, a new legislation framework was admitted in 2005. According to the Act of the Slovak National Council No. 172/2005 Coll. on Organization of State Support for Research and Development, the Government Council for Science and Technology (hereafter “Government Council for S&T”) was established. Government Council for S&T is one of four permanent advisory bodies of the Slovak Government. Its role is to discuss on all fundamental documentation on the subject of S&T state support, i. e. long-term concept of S&T policy, national programme of S&T development, reports on S&T status, proposals of S&T state programmes, proposals of state programmes concerning development of S&T infrastructure<sup>1</sup> etc. The Act will also identify and evaluate tendencies of research and development concerning the fulfilment of the

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<sup>1</sup> State programmes are financial instruments for supporting research and development on the principle “from up do down”, whereas the RD Agency financed projects are typical “bottom up” approach.

present and future needs of the society. The most essential changes relate to the regulations on the support of science and technology from the state budget. The act also discerns institutional support for public research institutions – finances for operation of infrastructure concerning research and development of Slovak Academy of Sciences and finances for specific research and development at universities. The new act contains regulations on the position and activities of the Research and Development Agency. The Agency, after the transformation process, which was finished till the end of the year 2005, is being a central funding agency of the Slovak Government for the support of basic research, applied research and development. Institutional support of research and development of public universities would be provided in accordance with the Act No. 131/2002 Coll. on Higher Education Institutions.

The main modification concerning the state budget is based on centralisation of financial resources for science and technology in the form of state-governed projects. While various ministries administrated projects' finances last years, a new legislation centralizes all financial support in the budgetary chapter of the Ministry of Education of the SR since 1 January 2006.

The principal financial instruments of specific support for research and development, which are to be allocated on the base of competition, are as follows:

- 1) Programmes of the Research and Development Agency including the resources set for international science and technology cooperation within European Science Foundation, COST, Eureka, etc. – bottom-up approach for all subjects and small projects;
- 2) State-governed programs of research and development – large projects with a real output towards industry application – projects suitable for research and development consortia;
- 3) State-governed programs for a development of infrastructure concerning research and development – projects reduced in size (in the area of human resources support) and large projects (national centers of excellence support; renewal of the research infrastructure...);
- 4) Eventual support schemes on the subject of other priorities – e.g. science and society.

State aid is a principal stage for financial resources providing to the applicants. It is presented according to the conditions defined by distinctive regulation and legal regulations of the European Community related to the state aid.

Effort to resolve an unfavorable situation relating science, research and technology, the Slovak Government approved „The Strategy of the Competitiveness of the Slovak Republic up to 2010“ (known as “The Lisbon Strategy for Slovakia”) in February 2005. The document identifies 4 key challenges:

- 1) Human Resources and Education.
- 2) Research, Development and Innovation.
- 3) Information Society.
- 4) Business Environment.

Within the priority “Research, Development and Innovation” the Slovak Reform Programme lists a range of planned actions targeting this key challenge focused on three priorities:

- Developing and supporting highly qualified scientists.
- Research of international quality adequately interlinked with the business sector.
- Effective public support of the business activities in the area of R&D and innovation.

Following the principal strategy, for each of the above-mentioned priorities action plans were elaborated and approved by the Slovak Government in July 2005. There are 14 priority tasks within the Action Plan for Research, Development and Innovation, which should be accomplished till August 2006.

According to the new act on the Organization of State Aid for Research and Development it will be elaborated a Long-term Concept of National Science and Technology Policy to the year 2015. The concept will predetermine basic aims and objectives in the field of research and development including the aims and objectives in the field of improvement of human resources in research and development, themes of state-governed programs of research and development and aims and objectives in the area of international cooperation in research and development. It will also contain the plan for financing the activities as it covers according to the Barcelona Tasks.

Within the National Program for Development of S&T (elaborated for upcoming 3 years at least) there would be financial instruments for Research and Development Agency, state-governed programs of research and development, state-governed programs for development of infrastructure concerning research and development, furthermore for covering tasks of the Ministry of Education in the field of science and technology and for other activities in the field of science and technology financed by the state budget.

Strengthening of research capacity at universities, assuring an increase in research quality at universities and elaboration of an effective system of their financing, all these aspects are included in Action plan of Slovak Republic for science, research and innovation, which would be implemented at national level and in line with the Lisbon Strategy. Objective of this task is to realize a process of complex accreditation of all universities and assign research universities gradually. This will create the premises to increase the research capacity of universities with focus on realization of university research and development at high European quality level.

Ministry of Education of the Slovak Republic will be, according to the new act, creating conditions for development of science and technology, it will be responsible for effective use of financial means from the state budget allocated on science and technology and it will coordinate activities of universities and of all other interested subjects in time of preparation and implementation of national science and technology policy.

As already above-mentioned, a detailed strategy relating to the Slovak science and technology, also with the respect of adaptation concerning internationalisation of R&D into the Slovak S&T policy, both of them are expressed in the new Act No.172/2005 Coll., On the Organization of the State Support for Research and Development and in Amending of the Act No.575/2001 Coll. on the Organization of the Activities of the Government and on the Organization of the Central State Administration, as Amended by Later Regulations”, which were approved by the Slovak Parliament.

The most important issues and objectives addressed in this legislative document are as follows:

- Centralizing the RD public support in the budgetary chapter of Ministry of Education.
- Building of the state science and technology policy with the long-term objectives, developed for upcoming 5 to 10; it contains a plan of financing as for included activities;
- Creating the National Science and Technology Development Program (within the state budget) designed to implement a long-term intention of the State Science and Technology Policy;
- Building relative national research and development infrastructure, State Research and Development Programs and State Research and Development Infrastructure;

- Development programs shall be special forms of research and development support in the areas specified by the state.

Implementation of S&T policy measures is carrying out, through the specific forms of research and development support, especially under the Act mentioned above.

Research and development shall be supported by providing funds from the state budget in the form of non-repayable subsidies. Funds shall be provided through the budgetary chapter of the Ministry of Education of the Slovak Republic, if not specified alternatively by the act above-mentioned.

- *New policy measures to foster increased innovation and productivity growth in the service sector (both services in general and specific service-sector, finance, etc.).*

Response:

According to the Lisbon Strategy for Slovakia up to 2010, a programme contains initiatives, which will lead to a re-evaluation of barriers for innovation and service sector. A new legislation for implementation of innovation is necessary to be approved by the Slovak Government and afterwards by the Slovak Parliament (proposal for the 1<sup>st</sup> quarter 2006). This new law should complete and join an actual law aimed at The State Support of Research and Development. The Strategy introduces other measures to be realised for fostering innovation in Slovakia, e.g. technology incubators support, which are oriented towards innovation firms. Currently, the State improves conditions and it leads to the creation of new incubators all over Slovakia, especially by means of State budget or the EU Funds. Societies functioning in incubators profit from privilege conditions as far as offices assigned as a residence of firm. The State actively cooperates with the service sector and it is expected that service sector should have more responsibility for incubator operating and services provided to firms performing in. The objective of Strategy is to support a creation and development of innovation firms in pre-seed and synchronise development of business mind, especially in science and technology community.

Innovation projects meet difficulties notably in the phase of initial development and its financing. Risk margin is high in this investment also for private funds of risk capital, if other factors complicate a market such as small and weakly developed market. In this case, a State contribution programme seems to be an appropriate instrument for start up of risk capital market. This programme will offer soft loans, grants or grant schemes, which eliminate an investment risk for a private investor.

The development of international research and development cooperation is significantly supported by the participation of research institutions and research centers of Slovak industrial sector in 6<sup>th</sup> Framework Programme, realized by the European Communities and aimed at research, development and demonstrations (currently 7<sup>th</sup> Framework Programme is under the preparation), and also especially through initiatives as EUREKA (applied and industrial research) and COST (European Cooperation in Science and Technology - mainly at level of the basic research).

Financial support concerning innovation is mentioned thereafter.

**2. Please describe major shifts or changes in the priority given to different areas of science, technology, and innovation policy listed below or the policy instruments used to achieve them: i) strengthening the science system; ii) supporting business innovation; iii) linking science to innovation; iv) developing human resources for S&T; and v) establishing framework conditions that are conducive to innovation (e.g., IPR regimes).**

Response:

As mentioned before, the Slovak Government concentrated its interest to resolve an unfavorable situation relating science, research and technology in 2005. This year was a significant milestone for a scientific community and service sector as well. „The Strategy of the Competitiveness of the Slovak Republic up to 2010“ (known as “The Lisbon Strategy for Slovakia”) was approved in February 2005. The document suggests indicators and measures to be carried out in the next years. Summarising, the Strategy identifies 4 key challenges as follows:

- Human Resources and Education.
- Research, Development and Innovation.
- Information Society.
- Business Enterprise Environment.

Within “Research, Development and Innovation” the Slovak Government approved the following three priorities:

- Developing and supporting highly qualified scientists.
- Research of international quality adequately interlinked with the business sector.
- Effective public support of the business activities in the area of R&D and innovation.

Following the principal strategy, for each of the above-mentioned priorities action plans were elaborated and approved by the Slovak Government in July 2005. There are 14 priority tasks within the Action Plan for Research, Development and Innovation, which should be accomplished till August 2006.

Strengthening of financial instruments is important to provide for a smooth implementation of research and development projects. In this respect, National Program for Development of S&T provides a programme framework for financing of Research and Development Agency, further it refers to state-governed programs of research and development, state-governed programs for development of infrastructure concerning research and development, covering tasks of the Ministry of Education in the field of science and technology and it mentions other activities in the field of science and technology financed by the state budget.

Strengthening of research capacity at universities, assuring an increase in research quality at universities and elaboration of an effective system of their financing, all these aspects are included in Action plan of Slovak Republic for science, research and innovation, which would be implemented at national level and in line with the Lisbon Strategy. Objective of this task is to realize a process of complex accreditation of all universities and assign research universities gradually. This will create the premises to increase the research capacity of universities with focus on realization of university research and development at high European quality level.

At the same time, The Slovak Government supports the idea of Science Popularization to approach the research and development significance to public and particularly to youth. This programme is proposed for 5 years realization with its start in 2006. Other objectives included in are to stimulate an establishment of strategic partnerships led to science education and support of science culture among institutions of research and development and elementary schools and secondary schools in Slovakia; to strengthen efficiency of instruments concerning mass communication (printed and electronic media) in the field of Science Popularization; to support an activation of talented youth by means of regional and national competitions and shows.

Human resources development for S&T will be influenced by the Programme of Research and Development Agency to support manpower in the field of research and development and Science Popularisation, which is to be approved by the Slovak Government in the 1st quarter 2006. The main objectives are to build up conditions for a continual growth of skills and knowledge of researchers and developers after doctorate studies graduation and thereby to increase an added value utilizable for society from investment to the third grade of university education; to stimulate close interconnection of workers in research and development who work in foreign institutions with those working in Slovakia; to stimulate the most productive workers of research and development in Slovakia and to create opportunities for a mobility between academic institutions and economy sphere; to increase know-how in a research and development community as for ethics and science issues.

**3. Please describe the primary challenges that are expected to be addressed in future science technology and innovation policy initiatives and/or that have been identified in forward-looking exercises, such as foresight and technology road mapping (i.e., in the 2007-08 timeframe).**

Response:

Science, technology and innovation can be developing in that time when an appropriate interest of a whole society is notable. Therefore science and research perception requires to be increased. For that purpose a programme for support of information flow between scientific community and other society should be elaborated. Encouraging youth interest respecting science and research at the level of primary and secondary schools should be an inseparable component of this programme as well since young people will be a future of science fields or science career. Programme of Science Popularisation should strengthen activities aimed at popularisation and presentation of science and research results and at out-reach activities in this field. In line with the Action Plan, this programme should be launched in August 2006.

Slovakia does not envisage just a weak interest of public in science. Actually, the state programmes represent a problem for various priorities that complicate projects approval and decrease a chance for a huge number of projects to be supported financially from the State budget. A new system of state research and development programmes would ensure resolving of key problems concerning development and needs of society. In compliance with the Lisbon Strategy for Slovakia, three priorities will be identified where Slovakia keeps a potential for research and development realisation and its output in practice at European level. Priorities should rise from existing science and technology potential but they should take into account needs of business sphere as well. It is proposed that priorities should be identified in August 2006. In the same time, new rules for functioning of state programmes system should be elaborated and approved by the Slovak Government.

## **Section B: Public sector research and public research organisations**

**1. Please describe major policy changes related to the financing of public R&D, to include the following:**

- *Changes in overall levels of R&D funding for public research organisations during last few years.*

Response:

In accordance with “The Act on the Organization of the State Support for Research and Development”, the research and development shall be supported by providing funds from the State budget in form of non-repayable assistance. Funds shall be provided via the budget chapter of the Ministry of Education of the SR, if not specified otherwise.

Forms of the research and development support shall be:

- a) Specific forms of research and development provided on a tender basis.
- b) Institutional forms of research and development support.

Within the ad hoc form the provider shall provide specific financing on the basis of a tender for

- a) Research and development projects.
- b) Development projects.

The specific form shall be applied to provide funds for

- c) Research and development projects by means of Research and Development Agency (special independent institution created by legislation, financed and managed by the Ministry of Education of the SR)
- d) Research and development projects within the scope of state research and development programmes, as well as the research and development infrastructure

The specific forms shall be applied to provide funds for

- a) Development projects by means of Research and Development Agency.
- b) Research and development projects within the scope of the State Research and Development Infrastructure development Programmes.

The institutional form shall be applied to ensure.

- c) Providing funds for the operation of the research and development infrastructure of the Slovak Academy of Sciences budgeted in the budget chapter of the Slovak Academy of Sciences.
- d) Providing funds to public universities and state universities for the performance of specific research and development as a requisite assumption of university education.

Provision of funds to support research and development of legal entities and natural persons-entrepreneurs, subject to a special regulation, is a state aid and shall be implemented under conditions stipulated by the special regulation and the legal regulations of the European Commission applicable to the state aid.

Provisions of support for research and development to ensure defence and security of the state; the financial resources for this purpose shall be provided through the relevant budget chapter.

Repayable funds supporting the application of research and development results in practice shall be ensured through a non-investment fund for research and development set up by the Ministry of Economy, subject also to a special regulation.

If funding data is available, please provide it below:

Year	2003	2004	2005	2006(forecast)	2007(forecast)
R&D funding (Unit: in thousands)	7 016 275	6 965 430	N/A <sup>2</sup>	N/A	N/A

<sup>2</sup> Data available by October 2006

- *Shifts in the allocation of funding across the following areas (please provide quantitative information if available):*

1) different types of public research organisations (e.g. universities vs. government research institutions)

Response:

Since the Slovak legislation specifies a different support position of institutions realizing education and /or research, a comparison with private sphere is included in a chart below:

Type of sector	Data (in thousands SKK)	
	2003	2004
Business enterprise sector	3 873 326	3 425 738
Government (state) sector	2 217 621	2 123 724
Private non-profit sector	1 814	14 573
Higher education sector	923 514	1 401 395
<b>Total</b>	<b>7 016 275</b>	<b>6 965 430</b>

2) different socio-economic objectives (e.g. general advancement of knowledge, health, national security, environment, energy)

Response:

Socio-economic objective	Data (in thousands SKK)	
	2003	2004
Development of agriculture, forestry and fishing	1 018 508	947 770
Promotion of industrial development technology	1 909 903	1 646 287
Production and rational use of energy	201 107	217 407
Transport and telecommunications	468 775	269 245
Urban and rural planning	2 945	3 943
Control and care of the environment	101 934	313 325
Health	719 244	519 215

Social development and services	86 898	84 135
Exploration and exploitation of Earth	255 475	277 605
General advancement of knowledge	2 157 965	2 630 057
Civil space	0	0
Defence	93 521	56 441
<b>Total</b>	<b>7 016 275</b>	<b>6 965 430</b>

3) different fields of science and technology (e.g. information and communications technology, biotechnology, and nanotechnology.)

Response:

Field	Data (in thousands SKK)	
	2003	2004
Natural science	2 120 312	2 035 425
Technological science	2 827 271	2 622 508
Medical and pharmaceutical sciences	747 413	754 503
Agricultural sciences	782 125	852 542
Social science	492 952	587 866
Humanities	46 202	112 586
<b>Total</b>	<b>7 016 275</b>	<b>6 965 430</b>

- Changes in the use of different types of funding instruments for financing R&D or the balance among them, e.g. institutional funding (block grants) and project funding (contracts and grants), or public funding vs. private funding. To what extent have funding mechanisms become more competitive?

Response:

#### A. Institutional funding vs project funding

Type of funding	Data (in thousands SKK)	
	2003	2004
I. Institutional funding	1 744 648	1 855 159
II. Project funding	5 271 627	5 110 271
<b>Total</b>	<b>7 016 275</b>	<b>6 965 430</b>
<i>of which financed by government</i>	<i>2 879 178</i>	<i>3 402 017</i>

- State R&D programmes	807 763	1 150 001
- State R&D orders	517 039	391 550
- Tasks of the Agency for Support S&T	142 528	193 771
- R&D tasks of innovation fund	9 500	5 162
- State support in R&D	45 296	33 985
- Other	1 357 052	1 627 548
<b>Total (government support)</b>	<b>5 758 356</b>	<b>6 804 034</b>

## B. Public funding vs private funding

Nature of funding	Data (in thousands SKK)	
	2003	2004
<b>I. Public funding</b>	<b>3 566 858</b>	<b>3 978 389</b>
<b>II. Private funding</b>	<b>3 449 417</b>	<b>2 987 041</b>
<b>Total</b>	<b>7 016 275</b>	<b>6 965 430</b>

### 2. Please describe major initiatives to reform the organisation and governance of universities and other public research organisations to improve the quality of their R&D or their ability to contribute to economic growth and other social objectives. Please consider reforms such as:

- Initiatives to increase the flexibility and/or accountability of universities and other public research organisations (e.g. granting more autonomy, performance measurement systems or stronger evaluation, new funding structures).

Response:

Research and development is considerably crushed in Slovakia. Larger-scale or more important projects are marked by deficient capacity. In this respect, a restructuralisation is needed at universities. According to the Action plan, a creation of university research centres system could help to enhance conditions for research. These centres would be financed following a regular external evaluation and would be comprised of university employees, which could have pedagogic duties as well to minimize staff costs. Trends of Centres should be compatible with the third grade of university studies (PhD) to acquire an added value. Another important event is to elaborate an appropriate legislation framework for establishment and assessment of university research centres. Action plan proposes to increase a percent rate of research and development financing partially and gradually within a total expenditure for university education (it should reach 20% in a horizon of Action plan existence).

- New organisational structures for performing R&D, such as larger-scale research teams, centres of excellence, multi-disciplinary research centres, research networks, etc.:

Response:

Since competitiveness can be developed after an added value exists in research and development, other activities have to be realized to reach a rise of added value. It means an elaboration of a scheme for

national centres of excellence funding in a special financial regime privileged for. These centres would have its institutional component and personal component (salaries privileged, possibility to obtain financial means for creation of new employees posts) and a satisfactory solving capacity (i.e. 20 – 30 employees with the third grade of university education). A clear definition of programme and objectives of research could exist. Its selection should be carried out by an independent international assessment exclusively. Junction of research teams from several institutions could create centres as well. The most important is a direct interconnection at the second and third grade of education (MA, MSc or PhD). Schema is to be proposed for an approval to the Slovak Government in April 2006.

- Revised procedures for setting research priorities at the institutional level in universities and public research organisations (*e.g.* involvement of outside stakeholders):

Response:

The Slovak Republic is not capable to finance the research in all fields of science and technology on an adequate level; therefore it should be concentrated especially at existing satisfactory capacity and where maximum potential is available for application in a form of innovation procedure in practise. On that account, it is necessary to elaborate a system of state priorities for a routing of science and technics. Priorities should come out from mapping of science-technics potential and economy potential of the SR. Following these priorities a need to establish centres (2-3) is evident. Centres would be oriented at priorities solving (virtual networks, common large-scale infrastructure...) and get a European significance (such as personal staff, financing and infrastructure equipment). Centres should be capable to attract experts from other EU countries.

- Reformed rules governing ownership and licensing of publicly-funded research results, support for technology licensing, etc., whether or not these measures are focused on a specific type of IPR (patents, copyright, *etc.*) or certain technological fields:

Response:

A stronger emphasis on research and development with an improved patented regime would be needed to strengthen an interconnection from science and technology towards innovation. At the moment, no new legislation was approved.

- Other

Response: -

**3. Please identify major shifts or changes in priority among the approaches for strengthening public sector research, including efforts to: *i*) increase levels of funding; *ii*) alter the structure of funding (*e.g.*, institutional vs. project-based funding; public vs. private-sector funding); *iii*) reform the governance of public research organisations; *iv*) implement new structures for performing research (*e.g.*, centres of excellence, multi-disciplinary centres); *v*) changing guidelines for ownership and management of IPR; and *vi*) implementing new evaluation procedures).**

Response:

- i.* As aforesaid, Action plan for Slovakia, approved by the Slovak Government in July 2005, proposes to increase a percent rate of research and development financing partially and gradually within a total expenditure for university education (it should reach 20% in a horizon of Action

plan existence till 2010). In line with Action plan, the State budget will provide 70 – 80% of total costs and private resources can achieve 20 – 30% of funding.

- ii. Funding is still a subject of projects ideas dynamics in any country. According to the statistics data, institutional funding was exploited more in comparison with project funding that recorded a decreased trend. A reason for this situation was an effort of research institutions and universities to profit from an infrastructure support especially. Since institutions and universities are funded by the public financing, the same trend was manifested along this line.
- iii. Reform of the governance concerning public research organisations meets organisational appurtenances and system of funding in line with the Act No. 172/2005 on “the Organization of the State Support for Research and Development”. The Act specifies responsibilities of relevant institutions and central bodies.
- iv. Elaboration of a scheme for national centres of excellence funding in a special financial regime privileged for. These centres would have its institutional component and personal component (salaries privileged, possibility to obtain financial means for creation of new employees posts) and a satisfactory solving capacity (i.e. 20 – 30 employees with the third grade of university education). The most important is a direct interconnection at the second and third grade of education (MA, MSc. or PhD). Schema is to be proposed for an approval to the Slovak Government in April 2006.
- v. not applicable
- vi. not applicable

**4. Please describe any new or recent changes in policies adopted by government, public research funding bodies or public research institutions to improve access to data resulting from publicly funded research.<sup>3</sup>**

Response:

No changes in above-mentioned policies realized.

**1. Looking to the future, what are the main challenges that the science system is expected to face and the main issues that policy makers will need to address? What future actions are anticipated?**

To encourage an interesting joining science, research and development, programme of Science Popularisation should be created. The Slovak side needs to strengthen activities aimed at popularisation and presentation of science and research results and at out-reach activities in this field. In line with the Action Plan, this programme should be launched in August 2006. Activities will be financed by means of calls carried out by Research and Development Agency at least one time per year. Total budget allocated is an issue of the State budget opportunities. Research and Development Agency has own right to launch specific calls within the programme, although financing will exceed financial means allocated from the State budget in case of particular out-budget grants (i.e. private resources, foreign investment).

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<sup>3</sup> Delegates may wish to consult with experts participating in the electronic discussion group to develop OECD guidelines for access to research data.

## Section C: Government support for private-sector R&D and innovation

### 1. Please describe major policy changes in the instruments used to support private sector R&D and innovation, including:

- Tax treatment of business R&D (*e.g.* tax credits for R&D expenditure, changes in corporate tax regimes that could affect business R&D activities):

Response:

Slovak Republic has implemented substantial tax reform – introduced flat tax rates for income tax and VAT. The current system is based on the principle “no exemptions” in the taxations and therefore tax treatment of business RD in not currently applicable in Slovakia.

- Direct public funding of business R&D and innovation (*e.g.* grants, contracts, loans, etc.):

Response:

Innovation Fund represents an important part of infrastructure support for business sector. It provides recoverable financial means with the aim at creation of appropriate conditions for using results coming from research and development of patents, industrial design and utility models in close connection to scientific, research and technical institutions. Innovation products and services with an added value are an output to enforce them at national market and European market or more precisely world market.

Financial recoverable assistance can be provided up to 50% of project budget costs (max. 5 mil. SKK) and can be realized max. 2 years. Term of expiration is max. 4 years.

Other form of direct public funding is projects cofinancing offered to the business sector if projects are carried out from the EU funds in the period of 2004 - 2006. Sectoral Operational Programme “*Industry and Services*” constitutes a part of structural assistance to Slovakia. The main objective of a measure “Support for business, innovation and applied research” is to increase the competitiveness of industry by supporting R&D undertaken by Slovak companies, by supporting new innovative technologies, processes, products by development of stronger ties between universities and research institutes. The support and development of this innovative environment has been primarily in the area of industrial R&D, transfer of technologies and know-how, innovative products and procedures. It is mainly aimed to transform SMEs into innovating enterprises at a regional level by encouraging the existing innovation centres to introduce research into practice. A Schema of State aid in this case is as follows:

- 1) Aid is provided for a period max. 2 years whereas tax-expenses are overpaid progressively.
- 2) Aid limit represents a sum of particular value of payed repayable financial grant.
- 3) Min. aid limit is 50 000 EUR and projects can be supported by max. 5 mil. EUR, whereas total costs of project cannot exceed 25 mil. EUR.

- Public procurement policies, new contractual guidelines, more competitive selection processes, etc:

Response:

In 2004, new contractual guidelines were elaborated by reason of the EU Structural Funds making use. In the time of 2005, some guidelines were redrafted to specify conditions for a beneficiary more precisely. No other changes were done.

- Changes in IPR regimes to create additional incentives for business investments in innovation, such as via new or revised guidelines for specific types of inventions (*e.g.* genetic, software, business methods), or new or strengthened mechanisms for enforcement of IPR (*e.g.* specialised courts):

Response:

No changes in this respect.

- Other forms of public support for innovation (*e.g.* consulting services and extension programmes):

Response:

Pre-accession fund Phare and ERDF fund strengthened a base for consulting services in a question to support innovation in the business sector. As a consequence of these projects, new incubators and contact points were created to assist people interested in elaboration of projects concerning business activities interconnected to R&D.

**2. Please describe policy changes in programmes to support R&D and innovation in SMEs and new technology-based firms, *e.g.*, via efforts to:**

- Establish and develop venture capital funds and/or second-stage financing for the support of new technology-based firms or spin-offs from public research organisations:

Response:

Slovak Reform Programme proposed creating of a significant public instrument that would improve access to venture capital for innovative firms in the early stage of their operation. Simultaneously, the idea to improve educational activities on the possibilities of venture capital for businesses was underlined as well. In 2005, an innovation support system based on international experience was developing and venture capital system designed. As a result, one venture capital fund was operating. This fund is based on public financial resources. However, some problems arose such as specific legislation lacking for venture capital funding or Government risk sharing in the private venture capital industry by participating in a privately managed venture capital fund.

- Provide additional R&D funding targeted to SMEs and new technology-based firms

Response:

Policy tools for private R&D funding are oriented at direct government support for R&D investment by firms and at intervention in the market for financing of innovative/technology-oriented firms that are engaging in commercialisation of R&D through direct government funding or incentives for private venture capital funding. No other additional funding was entered into practise.

- Encourage entrepreneurship through training, information services, or other means:

Response:

Sectoral Operational Programme “*Industry and Services*” 2004 – 2006 supported the main objective as to increase the competitiveness of industry by supporting R&D undertaken by Slovak companies, by supporting new innovative technologies, processes, products by development of stronger ties between universities and research institutes. The main growth factors of economies in the international scale includes also the quality of HR – utilizing the potential of the labour force and forging links between

companies with the institutions of science, R&D, which is necessary to promote innovative business. In the Slovak economy there is a lack of links between companies and universities and institutions of science, R&D, as well as effective strategy for management of companies in utilizing the creative potential of their workers. Purpose-designed training for employees has been carried out through Sectoral Operational Programme Human Resources within Structural Funds.

**3. Please identify major shifts or changes in the mix of instruments used to provide public support for private sector R&D and innovation, to include: i) direct financing of R&D, ii) R&D tax incentives, iii) support to entrepreneurship and SMEs and iv) IPR protection and other framework conditions. What shifts in the policy mix are anticipated in coming years?**

Response:

- i. Government funding of R&D and innovation is based on direct financial support by the State Aid and came be applicable in a more open way in 2005. In this respect any changes or shifts can be mentioned.
- ii. R&D incentives do not exist for Slovak SMEs. This appurtenance should be taken into account in the next years.
- iii. Strengthening of SMEs was insured via workshops or seminars in Slovak regions where a basic task was to encourage population in developing innovative firms. Currently, the situation is still underdeveloped in view of links lack between companies and universities and institutions of science, R&D, as well as effective strategy for management of companies in utilizing the creative potential of their workers.
- iv. Not relevant.

In future years, the Slovak State Aid is needed to be more transparent. The State Aid is a tool by which the Government distributes financial means of tax-payers and in the same time, it affects functioning of the open-market significantly. Since a transparent and conception system of the State Aid does not exist in Slovakia today, it will be useful to set up it with dispatch. It will be necessary to redirect the State Aid from sectoral priorities to horizontal priorities such as support of R&D, SMEs innovation facilitation etc. Obligatory publication of all beneficiaries of the State Aid and regional financial assistance will be carried out on the public administration web page.

**4. Looking to the future, what are the main issues that policy makers will need to address regarding support to the business innovation system? Please describe any efforts that have been taken to identify or address them.**

Improvement of information infrastructure will be one of important elements. It means to provide more consultation and further education/trainings services to business sector. After the support of these activities, Slovakia will be profitable more from increased knowledge potential of businessmen, qualification of workers will be improved, new business subjects with a view of innovation firms will be supported, etc.

The second element is the State Aid and its transparent and conception system which is to be developed. The system should be in line with priorities of Slovakia and European Lisbon Strategy in this sector.

## **Section D: Enhancing collaboration and networking among innovating and research organisations**

**1. Please describe major initiatives to promote collaboration and networking among innovating firms, e.g. via joint R&D programmes, regional innovative clusters, international co-operation (attracting research labs of foreign firms or supporting access of domestic firms to foreign programmes).**

Response:

As far as any country desires to realise R&D programmes at international level, a “critical mass” of technical and information infrastructure, such as human resources are required. In this respect, existence of national centres of excellence should help to create the centres with above-standard support as to institutional or financial aspect. A subsidy should be transferred to a strong improvement of technical equipment of these teams and institutions realizing research with an output to industrial sphere and for those who are active in international research projects. Simultaneously the State will encourage creation of networks between institutions from academic environment and business sector in the field of R&D. In addition to clearly specified criteria a screening control will be carried out in the centres of excellence whether R&D is implemented at high level and positive result from control will be a condition for the next State support. This activity is an appropriate tool to join research institutions to international projects via bilateral cooperation or cross-border activities.

**2. Please describe major policy initiatives to promote stronger industry-science relationships, such as efforts to:**

- Enhance collaborative research (e.g., through changes in regulations governing the types of agreements negotiated between public research organisations and businesses and their implications for access to and exploitation of research results);

Response:

As mentioned in the first article of D section, the most important factor for the upcoming period is to build up centres of excellence that will enhance a closer cooperation with the industrial sector as well. In 2005, the Slovak Government approved several documents with the aim to improve disfavoured situation in cooperation between the academic community and the economic practise. To assist and assure closer cooperation, technological platforms such as financial scheme for initialisation of interconnection between the business sector, researchers and state administrators (legislation) in particular fields will be set up (f. ex. woodworking, alternative energy sources, environmental technologies etc.)

- Increase the mobility of human resources between public and private sectors (e.g. by revising employment and financial rules governing public-sector researchers to allow them to more easily collaborate with industry, move between the public and private sectors, participate in the creation of spin-offs, take equity positions in technology-based firms emerging out of public research, etc.);

Response:

It is inevitable to create a tool for a support of R&D workers mobility between universities and the Slovak Academy of Science on one side and the business sector on the other side. This tool should support an international mobility of Slovak scientists and their participation in research projects abroad as well as foreign scientists in Slovakia. This instrument was prepared via a grant scheme. The Call for proposals is to be launched in the first quarter 2006. In connection with the idea mentioned a potential of Slovak

researchers should be raised and moreover, a mobility of top researchers from academic sector to the business sphere will be guaranteed as well.

Another instrument of mobility was proposed in the Strategy of Competitiveness up to 2010. Transfer of knowledge acquired in R&D into practise is one of the most important aspects of research influence on the State economy. Thereat a formation of a fund that will support a mobility schema between academic sphere and economic sphere should be launched. A stay financing of several months to several years (max. 3 years) will be assured and will give support to researchers from research institution in industrial organisations and vice versa in order to the knowledge transfer.

- Set up new modes of public/private partnerships for research and innovation:

Response:

In this respect, Slovakia decided to create a system of consultancy in the field of intellectual property and a system of education and preparation in this field. Namely this problem led to a fear public/private partnership as well. It will be significant to assure that a researcher, who realized its research, will be also a proprietor, although the research was carried out by public financial means (f. ex. Research financed by the EU).

- Others:

Response:

Knowledge transfer is accomplished naturally in an university environment where students are concerned in a research into practise. This process is long-lasting that is why it is accelerated by a direct cooperation of universities with work experience, which is today expressed as knowledge, technology or know-how transfer. The transfer takes affect as a stimulator of innovation processed realized in Slovakia. It is a process complicated and it will last some time to fully profit from innovation in regions since innovation is just developing.

**3. How has policy shifted in recent years in its support for different channels of industry-science linkages (e.g., collaboration, licensing, spin-outs, public/private partnerships). Please describe any anticipated shifts or changes in policy for strengthening industry-science linkages.**

All activities carried out in Slovakia in time of recent years are mentioned in previous articles.

## **Section E: Globalisation<sup>4</sup>**

**1. Please describe the most important policy issues and objectives with respect to the process of internationalisation of R&D:**

Response:

Slovakia has a relatively strong R&D potential but its quality is well behind the most developed world countries. Thereby the main aim of the “Action Plan for Science, Research and Innovation” is to contribute

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<sup>4</sup> Many of these questions on globalisation were asked in a questionnaire circulated in November 2004 in the context of the CSTP/TIP project on globalisation of R&D. 13 countries (Australia, Canada, Denmark, Finland, France, Germany, Italy, Japan, Korea, Netherlands, New Zealand, Norway, and Poland) replied. These countries are invited report only significant changes since November 2004.

to the creation of basic conditions to help country in system development of research, progress and innovation comparable to the international quality. Suggested steps should create necessary system elements needed for effective financial support from the governmental sources. Implementing the "Action Plan" the Slovak government shall be able to increase the amount of finances aimed at the support of science, research and innovation. This should also minister to support an ability of Slovak subjects to profit financial means for science and research from the EU funds (European Social Fund and European Regional Development Fund) as well as from other international/multilateral financial resources as effectively as possible (EC Framework programmes for research, development and demonstrations, financial tools of EEC, European Science Foundation, etc.)

2. Please identify and describe changes in policies to attract R&D through foreign direct investment. This may concern:

- Direct financial support
- Fiscal incentives (tax breaks, R&D tax credits ...)
- Administrative support
- Provision of infrastructure
- Public procurement
- Active recruitment of foreign firms
- Advertising
- Other measures: Establishment of new technology parks and centres financed by direct foreign capital

Please check the boxes above to indicate the types of policies used and provide more detail information here:

Direct foreign investment is incorporated in a construction of industrial parks or industrial zones that are building-up in less developed regions of Slovakia. The investment is supported and regulated by the Ministry of the Economy and the Ministry of Finances, in accordance with the inner regulations, as well as the regulation of the Ministry of Finances of the SR of July 7, 2003 No.: 5761/2003-2004, providing for the details for the state budget funds management in supporting science and technology. The Government also intended to attract a new wave of investment, particularly in disadvantaged regions, through significant fiscal incentives. While investment incentives are widely used by other countries in the region, they should be designed to ensure that they are cost-effective and promote investment that would not have otherwise taken place. While reducing distortions, encouraging investment, and improving tax administration, the recent tax reform also shifted the tax burden away from capital and toward labour, boosting incentives for more capital-intensive activities rather than employment growth. Public procurements are open for a wide sphere of companies interested and it can be said especially in large-scale projects are foreign investors successful.

**3. Please describe any changes in the principles concerning the treatment of foreign firms (both non-domiciled firms and foreign-owned subsidiaries) or foreign research institutions in national R&D programmes (e.g, access to national R&D funding programmes, rules for co-operation with domestic public research institutions, rules for co-operation in public private partnerships, public procurement, etc.)**

Response:

No changes in treatment of foreign firms or foreign research institutions recorded in 2005. Generally, Slovakia signed intergovernmental agreements on R&D cooperation where propositions of costs were approved. According to agreements, the Slovak side is responsible for costs linked to accommodation, daily diets and travel costs occurred.

**4. Please describe specific measures to support the internationalisation of domestic public research institutions (e.g., such as additional funding for projects with international partners, co-funding for project partners not located in-country, support for setting-up affiliates abroad).**

Response:

The internationalisation of R&D is a key dimension of globalisation of economic activities. It is driven by cross-border R&D investment strategies of multinational enterprises, the growing R&D potential of large developing economies, the progress of ICT technologies that allow the rapid development of global private and public research networks, and the increased circulation of human resources in science and technology. In time of calls for proposals launched, more projects realized with a foreign partner are stronger and even they are supported immediately.

Ministry of Education of the Slovak Republic is supporting the institutions of Slovak S&T Community in finding partners for international cooperation, especially under the projects and programmes of European union ( 6 Framework programme of EC for Research, development and demonstrations and in preparation of 7FP of ES also in the initiatives as COST, EUREKA, and in other programmes of international S&T Cooperation (NATO Scientific Programme, CEI, ICGEB, INTAS, special scientific programmes of UNO, CERN, JINR Dubna, etc. The big problem of the present situation is that we do not dispose with the updates database of research and development institutions and organizations as well as there is not enough information on R&D infrastructure, due to the massive changes of the process of restructuralization, privatization, etc.

- Ministry of the Economy is cooperating for several years with the Office “AiF”, Bratislava (Arbeitsgemeinschaft Industrieller Forschungsvereinigungen” – it means the Working Company of the Industrial R&D Associations) on the project PROINNO (program Innovationskompetenz) from the German Federal Ministry of the Economy and Technologies (BMWi).
- The international cooperation among enterprises is supported, as well as among enterprises and the research organizations are supported very much in the implementation of tasks of research and technology and development with the big technical risk. Each year there are organized at the SR Ministry of the Economy many contact professional seminars for the different branches for the Slovak industry.

**5. Please describe measures to link domestic firms, in particular SMEs, to foreign sources of research and innovation, including international co-operation in R&D (e.g., additional/preferential funding for projects with international partners; co-funding for project partners not located in the country; and support to find international partners, etc.).**

Response:

No measures realized in this respect.

## Section F: Human resources<sup>5</sup>

1. Please identify and describe recent efforts to improve supplies of university graduates with science and engineering degrees (both quantity and quality), in particular as relate to the following areas:

- Raising interest in and awareness of science among youth;
- Revising academic curricula to make science and technology more attractive to students, such as by expanding interdisciplinary training in S&E education;
- Improving teaching in mathematics and science, including through the use of ICT in teaching content and delivery;
- Reducing gender and ethnic minority gaps in science and technology education
- Enhancing financing opportunities for PhD study and post-doctorate training (such as through fellowships, funded research opportunities, *etc.*)
- Improving the quality of secondary university research laboratories/infrastructure
- Demand-side policies to increase the attractiveness of employment in public research organisations, make public sector employment more flexible, or improve provision of information to students regarding job opportunities in the public and private sectors.
- Others:

Please check the boxes above to indicate the types of policies used and provide more detail information here:

Science, technology and innovation can be developing in that time when an appropriate interest of a whole society is notable. Therefore science and research perception requires to be increased. For that purpose a programme for support of information flow between scientific community and other society should be elaborated. Encouraging youth interest respecting science and research at the level of primary and secondary schools should be an inseparable component of this programme as well since young people will be a future of science fields or science career. Programme of Science Popularisation should strengthen activities aimed at popularisation and presentation of science and research results and at out-reach activities in this field. In line with the Action Plan, this programme should be launched in August 2006.

Financial support of PhD students and post-doctoral students was absenting last years. Therefore a grant scheme for a support of the most quality human resources was proposed as a measure to finance doctoral/post-doctoral studies. The grant scheme should serve as a motivation of business subjects in supporting their top workers practising an external doctoral study and in a form of financial participation.

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<sup>5</sup> These questions are broader than those included in the OECD Questionnaire on the Working Conditions and Attractiveness of Research Careers in the Higher Education and Public Research Sectors (April 2005). Delegates may wish to consult their SFRI delegates in responding to these questions.

**2. Please describe recent policy changes to enhance the international mobility of scientific and high-skilled personnel, including programmes to attract foreign (and expatriate) talent and encourage students/workers to gain international experience. Consider such policies as:**

- Changes in immigration legislation;
- Funding of scholarships, grants for international mobility of students/scholars;
- Creation of special positions at universities or public research centres;
- Fiscal incentives (*e.g.*, income tax breaks) for foreign workers
- Programmes to promote return migration of expatriate students, scientists and engineers
- Other measures:

Please check the boxes above to indicate the types of policies used and provide more detail information here:

The Government of the Slovak Republic is creating favourable conditions for the young scientists to be able to participate as much as possible at projects and programmes of international S&T cooperation, especially within the 6th EU Framework programmes and other programmes and projects of multilateral organization as well as within the programme of bilateral cooperation, in the framework of intergovernmental agreements on science and technology. Mostly the mobility of young scientists is supported. But still a great “brain drain” exists mostly from economic reasons and because of better conditions obtained abroad. Immigration of foreign scientists and engineers into the country is very low and there are not special measures to attract them to come to Slovakia as professional experts. There are some centres of excellences where doctorands or post-doctorands and also PhD students from abroad are working. The perfect example is the “Institute of Experimental Endocrinology” of the Slovak Academy of Sciences in Bratislava, which is also the “Centre of Excellence of EU” As one of other positive examples could serve “The Astronomical Institute of the Slovak Academy of Sciences” in the High Tatra Mountains (Tatranská Lomnica).

**3. Please describe recent policy efforts to foster development of specific skills other than S&T skills needed to foster innovation in a knowledge-based economy (*e.g.*, management, communication, legal), notably as relates to the service sector.**

Response:

Legislation of the SR did not provided an innovation process in line with the EU requirements. Innovation is not currently treated by legislation. In this respect, the Slovak Government decided in Strategy of Competitiveness up to 2010 to elaborate a legislation base for innovation implementation. This will lead into national innovation strategy elaboration. A new legislation required should complete actual Act on Innovation.

**4. Please describe any major shifts or changes in the priorities and mix of instruments used for developing human resources for innovation, *e.g.*, between development of domestic talent versus attraction of foreign talent; between development of S&T skills and non-S&T skills; between stimulation of demand and development of supplies; between support for teaching and support for research; etc.**

Response:

No changes in the priorities and mix of instruments used for developing human resources for innovation occurred.

**5. Looking to the future, what are the main changes anticipated in the supply and demand for human resources, and what are the main policy challenges that policy makers will need to address? Please describe any efforts being made to identify future challenges or develop future policy directions.**

The key factors for the next years are as follows:

- 1) Mobility support of top human resources in the field of R&D who are participating in a research in the academic sector and the business sphere and vice versa.
- 2) Support of an international mobility of top human resources in R&D
- 3) Support of mobility within universities by means of more flexible functional posts of lecturers (amendment to Act on Higher Education will permit PhD holders to apply for a post of an associate lecturer)

### **Section G: Policy evaluation**

**1. Please describe recent changes in policies regarding ex-ante or ex-post evaluation of innovation policies and programmes, including new legislation or regulations, methodologies employed, criteria considered and the organisations/institutions that perform the evaluations.**

Response:

Not relevant.

**2. Please describe recent changes in policies regarding the evaluation of public research organisations, including legislation or regulations requiring evaluation, methodologies employed, criteria considered and the organisations/institutions that perform the evaluations.**

Response:

Not relevant.

**3. Please outline any significant changes in the priority given to evaluation in innovation policy, including the motivations for such changes and anticipated effects. Please include information about additional resources being invested in evaluation and approaches used to ensure that results of evaluation feed-back into policy making.**

Response:

Not relevant.

**4. Please provide information or web-links, if available, about the outcomes of recent major evaluations of R&D or innovation policies.**

Response:

Not relevant.

## **LIST OF ABBREVIATIONS**

R&D	Research and Development
SR	Slovak Republic
S&T	Science and Technology