



EUROPEAN COMMISSION

ERAWATCH Research Inventory Report For: SLOVAKIA

This document presents information published in the Research Inventory of the ERAWATCH website. ERAWATCH provides timely and comprehensive information on national and regional research policies, structures, support measures and organisations. ERAWATCH is being conducted on behalf of DG Research of the European Commission by DG Joint Research Centre - the Institute for Prospective Technological Studies. The information is mainly collected by the ERAWATCH Network.

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Overview

Basic characterisation of the research system

Evolution of research system

By 1989 Slovakia had an extensive and well-funded research system, with over 35 thousands researchers and gross expenditure on

By 1989 Slovakia had an extensive and well-funded research system, with over 35 thousands researchers (in headcounts) and gross expenditure on research and development (GERD) of 3.88 % GDP. The collapse of central planning was immediately reflected in the disintegration of the system amongst research agencies. The "shock therapy" model of economic and social transition encouraged short-term economisation in company planning. The demand for traditional company-level research has declined in favour of technology imports. Many research institutes have been closed or severely cut back. Falling public spending was also linked to a brain-drain and the exodus of scientists from the public sector. A dual economy was established in Slovakia in the late 1990s and early 2000s. Branches of multinational companies (MNCs) form one sector, typically with world-class technology imported from abroad and high productivity levels. Some 60 thousands of Slovak small and medium enterprises (SMEs) and few large companies owned by domestic investors form the second sector, typical with low productivity levels and low R&D intensity. In 2005 share of Slovak GERD in GDP fell to 0.49%, and numbers of researchers in head counts dropped to 18.8 thousand by 2006. Looking at the evolution of researchers over the last 10 years, they have been decreasing slightly only in the business sector. Slovakia's research agencies currently rank among the poorest within EU27.

Research policy was not considered a priority till 2005 when the Competitiveness Strategy was passed. Innovations, research and education also became major priorities in the National Reference Framework for the planning period 2007-2013. Operational Programme "Research and Development" should account for some 10% of total outlay from structural funds.

Research performers

The Slovak national research system consists of a number of governmental, private and non-profit organisations. Most of these organisations (including private ones) are controlled and/or supported by the government and its agencies. Major research performers are agencies managed by the Ministry of Education (Slovak Academy of Science and 33 Higher Education Facilities), some 40 industry research institutes (remnant of the pre-1989 system) and R&D departments of selected large enterprises (Matador, Biotika-Zentiva, US Steel).

Major players in policy making

The Ministry of Education is the central body for drafting, implementing and evaluating science and technology policies in the Slovak Republic. All S&T policies drafted by the Ministry are checked with other bodies of central government and most important policy stakeholders. The Slovak Government Board for Science and Technology advises the Slovak government on preparation and execution of the state-governed policy for science and technology, related to the economic, social and cultural development of the Slovak Republic. Technology Foresight exercise, Annual R&D Reports and regular evaluations of State R&D programmes are major tools for policy advice.

Principles of research policy

The 2005 "Law on Organisation of the State Support of R&D" laid down a system of public financial support for R&D spenders, and indicated rules for evaluating their performance.

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Multi-annual S&T Policy Concepts, laws on public support to science and technology, and annual budget cycles are major principles of Slovak research policies. In September 2007 the Slovak government passed the "Long-Term Objective of the State S&T Policy up to 2015". The Objective is the basic document on research policy and sets horizontal (cross-cutting) and vertical (thematic) levels of priorities.

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Name of correspondent: Vladimir Balaz

Main challenges for research policies

The main challenges for the Slovak research system are related to profound economic and social changes after 1989. The introduction of market reforms, changes in organisational structure of national economy and the removal of barriers to knowledge transfer have destroyed the former system of research performers. The dual structure of the Slovak economy in particular seems to be a major systemic challenge for the development of a modern research system. Both sectors – branches of MNCs and domestic SMEs – generate quite a low demand on research. The MNCs perform their research activities abroad, and Slovak SMEs compete with low costs of inputs. Research in the private sector has been diminishing, its place being taken over by (basic) research performed in public research facilities.

The 2006 Annual Report on R&D (p. 4, in Slovak only) summarises major challenges to the Slovak research and development system:

1. Very low financial resources for research activities – Slovakia ranks to countries with the lowest shares of GERD in GDP in the EU27. Share of GERD in GDP dropped from 3.88% in 1989 to 0.49% in 2006. "Alarmingly low" is interest, in and support to, research by the private sector. Linkages and cooperation between public R&D institutes and businesses are underdeveloped;
2. Research infrastructure is weak and ageing, and accounts for large regional disparities. About half of R&D capacities are concentrated in Bratislava;
3. Fragmentation of R&D activities among various research institutes and agencies;
4. Low numbers and poor quality of human resources in R&D sector. Numbers of employees in R&D sector dropped from 60000 in 1989 to 15000 in 2006;
5. Low numbers and poor quality of research outputs. Slovakia has one of the lowest numbers of scientific publications, and patents and licences in the EU27. Slovak researchers and businesses do not fare well in the field of international science and technology co-operation.

All these challenges are addressed in the "Long-Term Objective of the State S&T Policy up to 2015",

the basic government document on S&T policies. The Slovak government plans to supply structural funds and heavily invest in human resources, R&D infrastructure and to build linkages between the private and public sectors. Whether these plans are capable of addressing systemic challenges of a dual economy is yet to be seen.

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New research policy developments

1.3 New research policy developments

Two important policy documents were discussed in last six months:

- The Ministry of Education, Slovak Republic Government Board for Science and Technology and Slovak Government, prepared the "Long-term Objective of the State S&T Policy up to 2015". The "objective" is based on the 172/2005 "Law on Organisation of State Support for Research and Development". The Ministry of Education was helped by an Expert Committee comprising experts from central government ministries and regional governments, universities, the Slovak Academy of Sciences, professional associations and industry unions. The "objective" became the basic strategy for development of the Slovak R&D system up to 2015, and replaced the State Science and Technology Policy Concept for 2000-2005. The Objective is put into practice via two strategies. These contain list of detailed policy measures to be implemented by central government bodies in 2007-2010 and 2011-2015 periods. Slovak government passed the first Strategy, intended for period 2008-2010, via the Government resolution No 79/2008 of 6th February 2008.

- The Slovak government and the EU authorities discussed and approved the draft of the Operational Programme Research and Development (OPRD). The OPRD is a reference document to be used as a basis for the provision of assistance for R&D and infrastructure of universities, using national resources and the resource of the European Regional Development Fund. The OPRD defines the global goal, priority axes, measures and activities supporting R&D in period 2007-2013 in Slovakia. In period June-September 2008 several calls assisted by the OPRD were launched. They aimed at (1) developing University infrastructure; (2) R&D Centres of Excellence in the Bratislava Region, (2) R&D Centres of Excellence in the non-Bratislava Regions; (4) National Information System for support of R&D. Projects supported by these initiatives are expected to start by end of 2008.

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Research policy

Relevance of research policy

The Relative Importance of Research Policy

The government of Prime Minister Mr Robert Fico announced ambitious social initiatives aimed at improving the welfare state in Slovakia. The Government Programme Statement recognises also the importance of science and technology for increasing economic efficiency and standards of living. It therefore sets out to promote R&D financing from

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multiple sources to raise the share of gross R&D expenditure to 0.8% of GDP by 2010. Other priorities of R&D development included support to SMEs, IPR protection and support to the R&D infrastructure and centres of excellence. Special attention should be paid to support for young talented R&D workers to counter the "brain drain" from Slovakia.

The government enhanced research governance structures. The Slovak Republic Government Board for Science and Technology was re-structured, and meets more frequently. Government passed basic documents on innovation and R&D – the "Innovation Strategy and the Long-term Objective of the State S&T Policy up to 2015".

The Slovak 2008 National Budget increased level of financial support to the R&D system by 49 percent in nominal terms and by 47 percent in real terms. The share of public R&D expenditure in GDP rose from 0.18 percent in 2007 to 0.24 percent in 2008. The R&D-related expenditure generated about 0.9% of the 2007 overall government budget in 2007, but increased to 1.25 percent in 2008.

Table: State support of R&D in 2008 in Slovakia

	<i>SK million</i>	<i>€ million</i>
Programmes implemented by Ministry of Education – total	2930.315	88.80
of which		
State programmes by Ministry of Education	123.78	3.75
The RDA projects	968.297	29.34
Co-ordination of horizontal activities of the state S&T policies	1602.154	48.55
State programmes for support of R&D infrastructure	236.084	7.15
Slovak Academy of Science	1834.101	55.58

Source: The 2008 State Budget Law

Notes: exchange rate was estimated for €1 = SK33.0 in 2008

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Research policy

Recent political events relevant to research policy

The 2006 early elections brought a new government to power. The government of Prime Minister Mr Robert Fico announced ambitious social initiatives aimed at improving the welfare state in Slovakia.

The government also announced its wish to adopt the euro by 2009, and stated its strict adherence to Maastricht criteria. This would require significant reductions in the budgets of other policy areas, including R&D.

The 2007 Budget also confirmed some positive trends in the Slovak R&D system. Most of all, the shift towards programme-based expenditure continued, and the bulk of government expenditure was no longer allocated to particular Ministries, (then to be spent at their

discretion), but to specific programmes.

Public support for R&D activities increased in several key areas, for universities and RDA (the Research and Development Agency) in particular. In contrast, public funding for the Slovak Academy of Science remained unchanged and, in real terms, decreased.

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Research policy

Policy goals and priorities

Current research policy goals are set in the "Long-term Objective of the State S&T Policy up to 2015":

- (a) Higher involvement of the S&T in development of Slovakia, and more intensive participation by S&T in solving economic and social problems in Slovakia.
- (b) Better conditions for S&T development inside Slovakia, and also for Slovakia's activities within the European Research Area.
- (c) Setting targets for S&T development in the further mentioned areas (1) – (10)

Particular policy areas are specified in 10 chapters:

1. S&T Policy Coordination
2. R&D Infrastructure
3. Systemic Priorities of R&D
4. Thematic Priorities
5. Support for S&T
6. Framework Model of Organisation of Financing Slovak Science and Technology up to 2010.
7. International Cooperation in R&D
8. R&D Evaluation
9. Popularising R&D
10. Monitoring State S&T Policies

The chapter on Support to R&D establishes direct and indirect S&T policy measures. It sets a clear target of 1.8% share by GERD in GDP by 2015. Some 2/3 of total GERD should be provided by the business sector. European funds should be another important resource for the Slovak R&D system. Expenditure on S&T should be given a special chapter in the State Budget Law. The 172/2005 Law states that the Objective's targets are implemented via the National R&D Programmes, which in fact, are sections of the state budget and provide institutional and project finance for the Slovak R&D system. The "objective" envisages important changes in the structure of public support for R&D. Institutional finance accounted for about one half of the total support in 2007. By 2015 institutional support should decrease to one third, while the project finance should generate some two thirds of the total outlay on R&D by the state budget. Institutional support to universities and the Slovak Academy of Science, and project finance channelled via the State R&D programmes, RDA grants and horizontal programmes remain major forms for direct assistance to R&D in Slovakia till 2015. Indirect assistance should consist of tax incentives, but these must be consulted over with the Ministry of Finance first.

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Research policy

Policy goals and priorities

Research policy focus

Research priorities are identified in the Long-term Objective of the State S&T Policy up to 2015.

Most of the identified priorities will be implemented via specific programmes and/or policy measures developed and/or coordinated by the Ministry of Education and its agencies. Selected ministries will implement priorities related to environment, biotechnology, food and agriculture, and health care. The Slovak Government Council for Science and Technology has an important say about the formulation of research policy and priority-setting in each thematic area.

The Slovak government likes to highlight the importance of R&D for the Slovak economy and society, but assigns quite limited financial resources to the R&D sector. Instead, the government refers to the structural funds when identifying financial resources for research policy instruments. The Operational Programme "Research and Development" will definitely be the main source of financial means for the Slovak R&D sector in the planning period 2007-2013.

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Research policy

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Research policy

(Main aims of research policy)

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Main instruments of research policy

As for the financial support for R&D activities, Slovak research policy relies almost exclusively on grants. Other forms of financial stimuli have been considered from time to time (e.g. equity stakes in new technology-based firms, tax incentives or subsidised loans), but not introduced so far. Public financial support takes two forms:

- institutional funding for the Slovak Academy of Science, and higher education facilities via direct transfers and VEGA grants;
- project finance is provided via competitive grants, and is organised by government grant agencies (RDA, the Research and Development Agency and the VEGA agency).

Table: Institutional finance in Slovak R&D system, provided by the state budget in 2003-2006, thousands euros

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Institutional finance	2002	2003	2004	2005	2006
Universities	14,096.75	16,362.30	23,695.19	28,247.35	31,292.96
of which via VEGA	3,135.85	3,133.21	5,979.07	7,238.41	8,013.16
Slovak Academy of Science (SAS)	26,364.72	34,756.53	39,051.87	43,213.46	45,527.33
of which via VEGA	1,103.19	1,113.49	1,264.23	1,422.56	1,741.17
Institutional finance total	40,461.48	51,118.82	62,747.06	71,460.81	76,820.29

Source: The 2006 Annual Report on R&D Note: Exchange rate €1 = SK37.248

Table: Project finance supported by the Slovak state budget in 2006

	state budget	private funding
RDA - general calls	15,550.63	3,005.18
RDA - two specific calls	1,865.04	106.13
State R&D programmes	7,776.50	1,702.08
Bilateral international cooperation	197.35	0.00
ESF projects	643.52	0.00
ERDF projects	513.85	0.00

Source: The 2006 Annual Report on R&D. Note: Exchange rate €1 = SK37.248

See chapter 2.7.4 for more details on thematic/sectoral priorities.

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Main instruments of research policy

Public-private collaboration

There are several organisations supporting public-private cooperation in R&D in Slovakia.

- Federation of Employers' Associations
- Forum of Scientific and Research Workers
- Association of Industrial Research and Experimental Development Organisations
- Slovak Association of Scientific and Technical Societies
- The Houses of Technology

These organisations should contribute to better linkages between businesses and academic institutions. The Houses of Technology, for example, offer various professional workshops, courses, seminars, symposia and congresses often with participation of foreign experts.

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These activities should enhance exchange of professional information and acquisition of new knowledge, but frequently cope with low demand on R&D activities by Slovak SMEs.

Slovak R&D and innovation policy documents frequently refer to "improving cooperation between Industry and Academia", and/or "developing public-private partnerships in R&D sector". As a matter of fact, initiatives for doing innovative research and aimed at increasing science-industry links (such as clusters, technology- platforms and networks) have not developed well so far in Slovakia. This is confirmed by evidence from Community Innovation Surveys, where Slovakia regularly ranks as the poorest innovators in the EU-27.

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Related policies in other domains

Fiscal Policies

In 2004 Slovakia launched a tax reform. The reform simplified the Slovak fiscal system, as it abolished eight different rates for personal and corporate income, and VAT, and replaced these by a flat rate of 19%. The reform also included elimination of the double taxation of income, such as dividend tax, real estate transfer tax, inheritance tax and gift tax. The reform also considerably decreased the numbers of tax exemptions and fiscal incentives for particular industries and economic activities. There are no fiscal incentives promoting R&D activities. The current Slovak government considered an idea that Slovak enterprises could deduct research expenses from their tax bases. The Ministry of Finance, however, pointed to the importance of the adoption of the euro and the necessity of adhering to the Maastricht criteria.

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Research policy

Human Resource Policies

Human resource policies in Slovak research rely on system of doctoral studies carried out in most of the universities and in several institutes of the Slovak Academy of Sciences. This system is fully compatible with EU standards. Low funding of R&D facilities, however, makes careers in this sector unattractive for young and talented people. The stock of human capital has been shrinking since 1989. The numbers of researchers in headcounts, for example, halved from 34.7 thousands in 1989 to 18.8 thousands in 2006. Moreover, Slovak R&D personnel were ageing and becoming less mobile. The Slovak government launched three major initiatives to counteract these negative trends:

(1) The State Programme for "Development of personality and talent of young employees in research and development and doctoral students". The programme (2003 – 2005) was aimed

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at:

- exploiting the intellectual potential of young people via excellent projects;
- developing and supporting co-operation with the business sector;
- creating conditions for setting-up joint research workplaces;
- stabilising the intellectual potential of the young generation (doctoral students) in research and development;
- improving salaries and living conditions, and increasing the status of science workers in society;
- catching up with advanced nations in the number of doctoral students in Slovakia.

(2) The Research and Development Agency prepared the "Programme for Support of Human Resources in R&D and Popularisation of Science". The Programme was discussed with the Slovak Republic Government Board for Science and Technology and approved via the Government Resolution No. 216/2006 of 8th March 2006. The Programme makes the following priorities:

- creating a positive environment for post-doctoral R&D workers;
- supporting mobility between Industry and Academia sectors;
- improving cooperation between Slovak and international R&D facilities;
- improving education on the subject of R&D ethics.

Typical means of achieving these targets include the creation of 3-years job contracts for postdoctoral workers, re-integration grants for Slovak R&D workers employed at least two years abroad, and grants for excellent mentors in PhD education. The Programme also plans to create a database of Slovak scientists working abroad.

(3) Operational Programme "Research and Development" contains measures aimed at:

- encouraging Slovak scientists working abroad (including PhD students and post-docs) to return to Slovakia
- support for top-quality human resources in areas of strategic importance for the development of society and the economy

Initiatives (1) and (2) are supported from the state budget; initiative (3) relies on Community assistance in the planning period 2007-2013.

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Interaction between Innovation and Research Policies

By 2007, three policy schemes had integrated support for innovation and R&D activities:

- *Activities of the Research and Development Agency (RDA)*. The RDA supports domestic and international R&D projects developed by government research institutes, universities, private enterprises and non-profit organisations.
- *Support of Industry Research and Pre-Competitive Development (SIRPCD, SK 08)*. The Scheme aims to develop closer networks between the user and facilitators of the industry research and pre-competitive development, and to exploit the R&D base so as to support positive R&D activities directed towards environmental issues.
- *Business Incubators, Technology Parks and R&D Centres Scheme (BITPRDC, SK 10)*. The Scheme supports business incubators for start-ups and personal businesses; technology parks for various industries; R&D centres for applied research; feasibility studies, and consultancy projects.

The scheme SK 04 is funded from the state budget; schemes SK 08 and SK 10 considerably rely on the Community assistance.

More schemes supporting innovations and R&D will be implemented once the National Reference Framework and related Operational Programmes come into being. On 14 March 2007, the Slovak government, via the Government Resolution No 265/2007, passed the "Innovation Strategy". The strategy relies substantially on the structural funds, and sets three priorities, and a number of particular policy measures:

Priority 1 *High-quality infrastructure and an efficient system for the development of innovations* states two policy areas important for interplay of R&D and innovations:

- Measure 1.1 *Financial support for establishing innovation centres*. This measure intends to establish a financial assistance scheme for innovation centres. Universities, R&D centres and businesses should be the main beneficiaries of the scheme.
- Measure 1.2 *Establishing an information gate supporting business innovations*. This measure intends to establish an Internet gateway to R&D, providing information on potential sources of finance.

Priority 2 *High-quality human resources* states one policy area relevant for interplay of R&D and innovations:

- Measure 2.1 *Increasing the quality of human resources by education, mobility and knowledge transfer*. This measure supports education, and the mobility of R&D workers, students and entrepreneurs, with grants and fellowships,

Priority 3 *Efficient innovation policy tools* states one policy area relevant for interplay of R&D and innovations:

- Measure 3.1 *Support to innovations in the business sector*. The Ministry of Economy launches a grant scheme for the transfer of know-how, the protection of IPR, and the

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introduction of quality management systems, certifications and innovative technologies. Another target is to support spin-offs in the business and academic sectors.

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Research policy

Other Policies

The Ministry of Finance occupies a special position in Slovakia in relation to the R&D sector:

- The Ministry of Finance drafted the Competitiveness Strategy – the Lisbon Strategy for Slovakia. The strategy was approved by the Slovak government in February 2005, and was the first document to set building knowledge-based society as a development priority. The ministry also drafted lists of R&D policy targets and benchmarking indicators for evaluation of efficiency of public spending on R&D. Some of these indicators were included in the State Budget Law.

- The same ministry has the central role when setting the overall budget for the state S&T policies.

- The Ministry of Finance is the key agency responsible for the adoption of the euro 2009 in Slovakia. The Slovak government considers the introduction of the euro the most important economic and policy target. It strictly adheres to the Maastricht criteria and limits public expenditure in many policy areas. While health and social care policies were considered sensitive areas and accounted for funding increases, expenditure on research, technology and innovation policies was restricted.

Selected central government bodies (Ministries of Education and Economy in particular) also launch tenders for the State R&D Programmes and State Research Orders. Ministries of Defence, Agriculture and Environment receive some 85% of total funding outside projects and institutions supported by the Ministry of Education and the Slovak Academy of Science.

Table: Research supported by central government bodies, outside the Ministry of Education and SAS in 2006

<i>Ministry</i>	<i>No of projects</i>	<i>Support, thousands €</i>	<i>share, %</i>
Ministry of Health	46	1,403.20	6.54
Ministry of Agriculture	23	8,040.94	37.45
Ministry of Construction and Regional Development	19	368.74	1.72
Ministry of Environment	89	2,663.71	12.41

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Ministry of Transport and Telecommunications	3	598.56	2.79
Ministry of Labour, Social and Family Affairs	1	439.46	2.05
Ministry of Defence	n.a.	7,431.27	34.61
Statistical Office of the Slovak Republic	1	524.22	2.44
Total	173	21,470.10	100.00

Source: The 2006 Annual Report on R&D

Note: Exchange rate €1 = SK37.248. = not available: confidential data

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Name of correspondent: Vladimir Balaz

Research policy

Policy mixes to stimulate research

The "Long-Term Objective of the State S&T Policy up to 2015" the basic government document on S&T policies, contains a short chapter on "Coordination of science and technology up to 2015". Introductory part of this chapter states that 'every EU Member Country needs vertical and horizontal coordination of the R&D processes'.

- The 'vertical coordination level' refers to cooperation between the central and regional government bodies on one hand, and R&D bodies and R&D users on the other hand. Current level of cooperation is unsatisfactory and calls for improvement.
- The 'horizontal coordination level' refers to cooperation between the Ministry of Education on one hand, and other central government ministries and industry unions on the other hand. Each central government ministry and the Slovak Academy of Science have to elaborate plans for development of R&D activities.

Each central government ministry has to select professional staff for managing R&D activities. The regional governments should develop their own regional innovation strategies. These strategies should contain R&D development targets and science and technology policies plans for support to regional development.

The chapter on "Coordination of science and technology up to 2015" set no quantitative targets for policy mixes.

The European Commission Policy Mix Web Portal

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Name of correspondent: Vladimir Balaz

Research policy

Research policy trends

Major trends in Slovak research policies noticed in the 2000s include:

Growing awareness of the importance of R&D and innovations for economic and social development. Prior to 2004, R&D and innovations had not even been recognised as development priorities. In 2004-2005 Slovak government and Parliament authorised several important measures (the Strategy of Competitiveness and the Law on Organisation of State Support to Research and Development) and increased public financial support for R&D.

Shift in balance between institutional funding and project finance The Research and Development Agency (former Science and Technology Assistance Agency) was restructured, and became a major provider of research grants for private and public sector bodies.

Improvements in public accountability and evaluation culture Each programme and project subsidised by the public sector must conclude with an audit of the research results. These results also have to be made available to the public in a clear and understandable language. The Ministry of Education provides a comprehensive overview of the efficiency of public financial support for R&D in the Annual Report on R&D.

Closer integration of basic and applied research and innovation activities The Research and Development Agency, the major provider of public funding for R&D initiatives, favours projects in applied research, which integrate public and private sector participants.

There have also been some ***negative trends***. Declared support for R&D is mostly visible in the field of administrative reforms and drafting policy initiatives. Financial support for public and private research increased, but remains extremely low. The Slovak research system is heavily underfinanced, and not able to attract enough young and talented people. Moreover, the Slovak government seems to think the priorities in the fiscal area to be more important than those in the research system. The current Slovak government likes to promote the importance of R&D for the development of the country, but has already reduced real expenditure in R&D in the 2007 fiscal year. The government also had originally declared that a substantial proportion of the structural funds should go to higher education, R&D and innovations in the planning period 2007-2013, but later reduced this proposed financial support by several hundred million euros.

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SLOVAKIA - Important policy documents

Title of document	Date	Organisation responsible	Type of Document
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<u>Long-term Objective of the State S&T Policy up to 2015</u>	2007-09-12	Slovak Government and Ministry of Education / Slovak Government and Ministry of Education	Government Resolution No 766/2007 of 12th September 2007
<u>CONCEPT OF NATIONAL SCIENCE AND TECHNOLOGY POLICY BY 2005</u>	2000-12-20	Ministry of Education of the Slovak Republic / Ministry of Education of the Slovak Republic	Approved by the resolution of the Slovak Government No. 724/2000 and by the resolution of the National Council of the Slovak Republic No. 1228/2000)

Impact of EU developments

Overview

Slovakia's membership in the EU provided an important impetus for the development of R&D activities, in the public sector at least. Considerable progress was made in several areas:

- higher funding for good quality research centres, and higher education facilities provided by the structural funds, and projects developed under the ERA;
- better opportunities for international networking and cooperation in R&D, in FP programmes in particular;
- increasing recognition of R&D as major driving force of economic and social development in government documents (although more visible in declarations than in real policy actions);
- system changes in R&D governance, particularly increasing the importance of competitive funding for research projects, and the introduction of benchmarking indicators in science and technology.

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Impact of EU developments

Towards ERA and Lisbon

Towards European Research Area

The impact of ERA and international co-operative research is growing, and this is very much due to the participation of Slovak academics in the Framework Programmes.

In February 2007 the Research and Development Agency (RDA) prepared several new programmes aimed at the development of a knowledge-based society and the transfer of knowledge between industry and academia. These programmes included:

Support for the creation of, and activities of, Centres of Excellence. The programme supports projects developed by centres of excellence in research and education. Evaluation criteria for supported projects include numbers of jobs for PhD students and post-docs, centres' infrastructure, their ability to tap resources supported by the FP7 and structural funds, and dissemination activities, as well as numbers of publications, citations and patents.

Support for the preparation of the FP7 projects. The programme targets Slovak institutions and researchers wishing to participate in FP7 projects. The rationale behind the programme is to address the low success of Slovak institutions when applying for projects supported by former FP initiatives. Evaluation criteria for this programme include numbers of FP7 projects with Slovak coordinators and/or participants, and volume of financial assistance obtained from the FP7 projects.

These programmes target some most serious problems of the Slovak RTDI system: the low financial support of R&D; the lack of partnerships between industry and academia; very low levels of innovativeness from Slovak SMEs; and limited participation by Slovak institutions in FP-type programmes. Financial resources allocated to four programmes are rather modest: €8.82m for Centres of Excellence and €1.76m for support of FP7 in 2007-2010.

Last update date: 17/09/2008

Name of correspondent: Vladimir Balaz

Impact of EU developments

Lisbon-strategy related activities

The first government document recognising the importance of research policies for economic and social development was the "Competitiveness Strategy" for Slovakia till 2010 – The Lisbon Strategy for Slovakia". The strategy was adopted by the Slovak government in 2005. Activities aimed to support the building of knowledge economy included four major action plans:

1. information society;
2. science, R&D and innovations;
3. education and employment;

4. business environment.

Most of the important aspects of the strategy were adopted and further developed by the new Slovak government after 2006. The Position of the Slovak Government in relation to the Annual Report of the European Commission on Lisbon Strategy prepared for the 2007 Spring Council recognises that policies for research, development, innovations and education have been poorly developed and lack clear priorities and strategies. The government decided to pass the National Innovation Strategy and the " Long-Term Objective of the State S&T Policy till 2015".

This document specified some important details of direct and indirect S&T policy tools. It set a clear target of 1.8% share by GERD in GDP by 2015. Some 2/3 of total GERD should be provided by business sector. Structural Funds should become another important resource for the Slovak R&D system. The document also envisaged some important changes in structure of public support to R&D. Institutional finance accounted for about one half of total support in 2007. By 2015 institutional support should decrease to one third, while the project finance should generate some two thirds of the total outlays on R&D by the State Budget. Institutional support to universities and the Slovak Academy of Science, and project finance channelled via the state R&D programmes, RDA grants and horizontal programmes remain major forms for direct assistance to R&D in Slovakia till 2015. Indirect assistance may include tax incentives, but these must be approved by the Ministry of Finance first. The government also promised to amend the "172/2005 Law on the Organisation of the State Support of Research and Development". The amendment should support increases in R&D spending. The government also wants to improve R&D infrastructure, to support the establishment of more national centres of excellence, and to promote regional R&D centres, so as to decrease the vast disparities in regional R&D systems.

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Name of correspondent: Vladimir Balaz

Impact of EU developments

Impact of EU instruments

Impact of Structural Funds on Research Funding

Two Structural Fund schemes supported R&D activities in Slovakia in the planning period 2004-2006.

- The "Development of Life-Long Learning and Support to R&D Related to Human Development" scheme was developed under the Single Planning Document – Objective 3 in the Bratislava Region. The Scheme had a budget of €10.33m, of which the ERDF/ESF provided €5.42m and the Slovak state budget €4.91m.
- The "Support of Industry Research and Pre-Competitive Development" (SIRPCD) Scheme matched Measure 1.3, of Priority I of the Sectoral Operational Plan for Industry and Services, and was applied in all Slovak regions except for Bratislava. The Scheme had a budget of €22.10m, of which the ERDF provided €7.73m, the Slovak state budget €6.63m and Slovak businesses €7.73m.

The total sum of Community and national assistance to projects in Slovakia between 2004 and 2006 was almost €2b, of which some €32m was spent for R&D projects; that means only some 1.62% of the structural fund was allocated to research-related activities. Slovak gross expenditure on R&D amounted to some €570m in the same period. The two

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abovementioned schemes provided an equivalent of some 5.7% of this sum. (However, it should be noted that while the two Schemes were designed for the 2004-2006 planning period, most of their expenditure occurs in 2006-2008).

There should be considerably more assistance to research in the planning period 2007-2013. The Operational Programme "Research and Development" allocates some €1.2b for support to research: this is an equivalent of 10% of total structural funds for Slovakia, which was set to €11.2b in the planning period 2007-2013. Increased spending on RTDI could have a significant impact on Slovakia's competitiveness. Two potential problems may arise when support for research from structural funds is applied in Slovakia:

- The Bratislava region accounts for some 50% of total Slovak R&D resources. The region, however, has not qualified for the assistance provided under Objective 1 measures. The great majority of the assistance provided by the Operational Programme "Research and Development" will go to regions with poor R&D infrastructure, low stocks of human resources, and therefore, poor absorption capacity.
- Provision of assistance depends on co-financing R&D projects with Slovak businesses. This could be problematic, because of the dual structure of the Slovak economy. The majority of Slovak SMEs are too small, and lack the financial and intellectual resources needed for pursuing research activities. So far, interest from Slovak enterprises in research has been falling. Branches of multinational companies (MNCs), which generate a substantial part of Slovak GDP, seldom carry out research in Slovakia.

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Name of correspondent: Vladimír Balaz

Impact of EU developments

Impact of EU framework programmes

The 2006 Annual Report on R&D states that there were some 1560 Slovak applicants and/or co-applicants for the FP6 projects in 2002-2006. Some 270 projects (with 334 Slovak participants) were approved, and funding of €25.7m obtained in the same period. Slovakia ranked as the least successful country within the FP6 programme, as it obtained only 0.15% of the total FP6 financial resources in the abovementioned period.

The EU-Framework Programmes have had different impacts in the private and public sectors. The public sector in general, and the higher education facilities in particular, benefited from better access to research networks and research funding. Less progress was made in the business sector. The dual structure of the Slovak economy seems a major drawback for participation in the ERA programmes by Slovak firms. Branches of multinational companies operating in Slovakia have their headquarters and R&D centres located outside Slovakia, and do not participate in the ERA programmes. Slovak SMEs in general account for low R&D expenditure. The analysis "Towards an SME-friendly IST programme. Lessons learned from FP6 and policy recommendations for FP7 with special emphasis on the situation in the new Member States" (D. Spichtinger and M. Morron 2006) identified several obstacles to participation by Slovak SMEs in ERA programmes (1) lower levels of proficiency in English, (2) low numbers of consortia requesting partners from Slovakia and (3) slow and late payment flows in projects developed within the ERA programmes.

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Impact of EU developments

Other EU developments and impacts

The 2006 Annual Report on R&D makes brief reference to Slovak R&D institutions participating in schemes supported by the European Science Foundation (the RNP and Eurocores programmes). No impact assessment of these activities was provided.

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Name of correspondent: Vladimir Balaz

Regional research policies

Overview and governance

Overview

Slovakia used to be a centralised country and its first self-governing regions were created as late as in 2002. The country is subdivided into eight self-governing regions. Governments in the eight Slovak regions were given powers over regional development, basic and middle education, social care, health care, regional culture, transport and trans-border cooperation. No special arrangements were made for research and development, science, technology and/or innovation. These activities have traditionally been considered matters for central government. The university system is an explicitly national affair. Regional governments may establish and support regional R&D centres and/or technology parks, but they lack financial resources and, in the case of less developed regions, professionals.

No regional R&D programmes and policy initiatives have been developed so far in Slovakia. Bratislava is the major centre of R&D activities, and accounts for about one half of Slovak R&D personnel and R&D spending. R&D capacities in Bratislava, however, are mostly supported by the central government, and/or large enterprises. Bratislava got its own Operational Programme in the planning period 2007-2013. A significant part of the Programme was to go to the support of R&D, innovation and human resources. The Programme was designed by central authorities (comments by regional government were taken into account). Programme implementation and monitoring also was to be carried out by the central government.

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Regional research policies

Regional responsibilities

Slovakia used to be a strongly centralised country. Some decentralisation programmes were introduced as late as in 2002-2003. Regional governments in the eight self-governing regions (SGR) were established in 2002. The parliaments and presidents of the SGR have been directly elected. Each SGR president ("predseda") appoints a regional government, and has executive authority at the regional level.

All regions have the same powers. Law 302/2001 on Self-Governing Regions provided eight regional governments (NUTS III level) with considerable responsibilities related to the "design and implementation of programmes for the social, economic and cultural development of the regions". The SGR were given powers in regional planning and development, regional transport, middle-level education, healthcare and social welfare, culture and cross-border co-operation. Law 302/2001 made no special reference to research policies and/or governance. Research on universities and the Slovak Academy of Science is funded from the state budget.

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Name of correspondent: Vladimir Balaz

Regional research policies

Research governance

Research policy and governance is considered a matter for central government in Slovakia. No special arrangements were made for regional governance of R&D.

The decentralisation programme was rather ambiguous, because the regional governments were given more responsibilities than resources. The real powers of the SGR are limited because of their financial resources. The total income of the SGR was planned for €806m, or 1.53% of GDP in 2007 (central government budget accounted for some 19.5%, and the municipalities budget for 4.7% of GDP in the same year). The SGR have no sources of income of their own and rely entirely on transfers from the national budget. Regional budgets contain no special provision for research funding.

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Regional research policies

Research policies and programmes

Slovakia has no specific regional research policies and/or policy documents. So far, only regional innovation strategies have been developed and adopted by the regional governments.

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Regional research policies

Research policies and programmes

Important policy documents

Financial assistance to R&D provided under the Operational Programme "Research and Development" (OPRD) is primarily directed to regions outside the Slovak capital in the planning period 2007-2013. The Bratislava region is excluded from this assistance (as it did not qualify as an Objective 1 region). The lion share of the R&D funding in Slovakia follows the OPRD. The OPRD, however, is non-discriminatory, and does not contain specific regional policies and/or targets defined for selected regions.

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Regional research policies

Additional information

Table: Basic indicators of regional R&D capacities and performance in Slovakia

Region	Western Central Eastern				Slovakia				
	Bratislava	Slovakia	Slovakia	Slovakia	national totals				
Indicator	Trnava	Trencín	Nitra	Žilina	Banská Bystrica	Prešov	Košice		
R&D organisations 1)	105	22	33	20	27	21	19	25	272
R&D personnel in FTE	7 813	728	829	1 332	1 118	681	436	2 092	15 029
GERD total, € million	105.85	16.48	26.39	17.31	13.65	8.15	4.70	23.94	216.48
of which capital exp.	9.72	4.53	2.26	16.23	1.31	0.60	0.20	2.73	37.58

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BERD total, € million ²⁾	34.79	14.91	23.52	6.40	9.71	3.28	2.82	10.89	106.32
Share GERD/GDP, % ³⁾	0.88	0.49	0.64	0.26	0.35	0.26	0.17	0.36	0.51
Share BERD/GERD, %	9.18	27.51	8.57	93.74	9.61	7.32	4.15	11.42	17.36

Source: Statistical Office of the Slovak Republic (2008): Yearbook of Research and Development in the Slovak Republic. Notes: 1) R&D organisations include legal and physical entities of research and development that provided data in business, government, higher education and non-profit sectors. 2) By source of funding. 3) Refers to 2005. All other data refer to 2006. Exchange rate was 1 € per 37.248 SK in 2006. GERD = Gross research expenditure on R&D; BERD = Business expenditure on R&D. FTE = Full time equivalent.

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Regional research policies

Additional information

Region 1

RTDI capacities are quite unevenly distributed in many European countries. Slovakia provides a good example of a country with high concentration of R&D in the capital. Bratislava clearly differs from the rest of Slovakia in terms of per capita GDP, investment, unemployment and also has a higher share of the population with a tertiary education. Differences between western, central and eastern Slovakia are much smaller. There are several common factors limiting the growth potential in these regions: underdeveloped transport and R&D infrastructures, less human capital, lack of FDI and high unemployment. Bratislava accounts only for 9% of the total Slovak population, but comprises some 50% of Slovakia's total R&D capacity in terms of numbers of R&D organisations, R&D expenditure and employment in R&D sector in 2005. Bratislava profited also from the fact that it hosted most of national organisations important for R&D development. Bratislava's R&D organisations also generated half of the total active licences sold in the current year. The somewhat lower share of BERD in GERD is explained by the high concentration of public R&D facilities (universities and Academy of Science) in the capital. High concentration of R&D infrastructure in Bratislava helps to explain the limited absorption capacity of the RTDI measures implemented by structural funds in Slovakia in the planning period 2004-2006. Most of these measures were introduced via Sectoral Operational Programmes 'Industry and Services' and 'Human Resources' operational programmes, for which Bratislava does not qualify (the National Development Plan contained several Sectoral Operational Programmes in 2004-2006. Two of these were 'Industry and Services' and 'Human Resources').

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Regional research policies

Region 2

There are no regions with significant R&D intensity outside Bratislava in Slovakia.

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Regional research policies

Region 3

There are no regions with significant R&D intensity outside Bratislava in Slovakia.

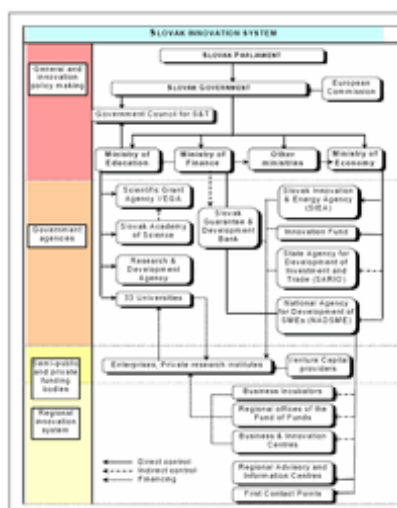
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Structure of research system

Overview of structure

Organogram



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Structure of research system

Brief description of the structure of the research system

Slovak research systems consist of the following parts:

1. **R&D governance bodies.** (Ministry of Education and Slovak Republic Government Board for Science and Technology);
2. **Intermediary (funding).** Agencies directed by the Ministry of Education (VEGA, Structural Fund Agency of the Ministry of Education and RDA) and the Ministry of Economy (SIEA, NADSME);
3. **Research performers.** (i) Slovak Academy of Sciences (SAS) and other governmental research institutes; (ii) higher education facilities; and (iii) industry research institutes, commercial research organisations and R&D departments of businesses.

The key research performers include:

- **The Slovak Academy of Science (SAS)** is a research body providing the bulk of basic research in Slovakia. Its primary mission is to acquire new knowledge of nature, society and technology, specifically targeted at building a scientific basis for the advancement of Slovakia. The Slovak Academy of Sciences currently comprises 74 organisational units, 47 of which are budgetary and 27 contributory. It edits and issues 42 scholarly and professional journals and 11 yearbooks. It has 46 scholarly affiliate societies operating as civic associations. In 2007 the SAS had budget of €46.7 million and employed some 3150 people (1568 of which held a scientific degree and 765 were PhD students).

- **Higher Education Facilities** There are 23 public and 10 non-state Universities and Higher Education Facilities in Slovakia (as of 2007). Most of them, however, are small and regional and account for poor R&D activities. In nominal terms, the 2007 total public University funding increased by 4.6% to SK 12.127 billion (€ 351.8 million) compared to 2006. This nominal increase, however, is lower than expected growth in GDP. In 2007 public expenditure on the university system is likely to drop from 0.71 to 0.68% of GDP. The government decided to adopt Euro by 2009 and limits public spending in many areas, including education.

The key funding agencies include:

- **The VEGA Grant Agency** was established by an agreement between the Slovak Ministry of Education and Slovak Academy of Science (SAS) in January 1996. The VEGA is a funding and advisory body for the Ministry of Education and the SAS in field of implementation of S&T policies, financing basic research and evaluation of research projects. Between 2002 and 2005, the Agency sponsored 1586 grants with €7.26 million. In 2006 the VEGA supported some 2251 projects with €19.1 million (€8.5 thousands per project). The VEGA provided institutional and project funding based on peer review process. Research teams from the higher education facilities and the SAS are eligible to apply for the VEGA projects.

- **The Research and Development Agency (SK 04)** provides for tendering and funding grants to public and private research bodies. The Agency has become an increasingly important source of finance for many R&D activities, in particular in applied research. The Agency's budget increased from €0.15 million in 2001 to €27.797 million in 2007. Unlike VEGA, the RDA provides project funding for firms and individuals.

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Structure of research system

Public Private Collaboration

Overview

While system of research performers significantly dilapidated, research governance system remained largely immune to changes after 1989.

1. Since 1989, the Ministry of Education has been responsible for co-ordination of R&D activities. The Ministry also co-ordinates the national participation in the EU Framework programmes. The Slovak Republic Government Board for Science and Technology is an advisory body established with the Ministry of Education. It discusses any document of substantial relevance to S&T (R&D) and expresses its opinion before the document is submitted to the Government.
2. Bulk of competitive research funding is provided by the Research and Development Agency. The Agency was set in 2001 and provides grants for basic and applied research. Some applied research projects also are supported by the Slovak Innovation and Energy Agency, and National Agency for Development of Small and Medium Enterprises.
3. The Slovak Academy of Sciences carries out bulk of basic and strategic applied research. Higher Education Facilities have increased in numbers after 1989, but their research activities remained rather limited. Applied research and development concentrate in R&D units of selected large enterprises and in industry research institutes. The latter bodies receive about 20 percent of public R&D funding and are remnant of a large and strong industry research system, which operated before 1989.

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Structure of research system

Relation between public and private actors

The current situation of the relationship between the research community and industry cannot be understood without taking its historical context into consideration. In the former Czechoslovakia, the socialist reforms attempted to change this relationship by suppressing informal networks. However, at the moment of the political crisis the informal linkages were revived (e.g. in the periods of the 1960s and the 1980s). As a result of economic reforms during the 1990s, the deconstruction of informal networks between industrial and academic scientists took place and scientists from both institutions had to compete over a very limited amount of R&D funding which did not lead to co-operative approaches. During the systemic economic reform, the relation between the scientific and industrial communities has thus been narrowed to the commercial interchanges between the public R&D organisations and industrial firms.

In the last 2-3 years, informal contacts and the communication between the research community and industry are being revived. The government focuses its support on

co-operative activities between the science community and industry representatives. For example, the programme Transfer 2005 is aimed at supporting projects dealing with the transmission of new scientific and technical knowledge into business practice, at increasing co-operation between public research and development organisations with SMEs, and its implementation. This programme, supported by the Research and Development Agency, has started August 2005 and is going to run until August 2007.

The technology based and most dynamically growing segment of the domestic economy -larger foreign-based companies - has still a minimal impact on domestic research and education, even if its technology potential may soon contribute to more intensive interchanges between the domestic research community and industry.

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Main Research policy making mechanisms

Policy making and coordination

Research policy and governance is considered a matter for central government in Slovakia. No special arrangements were made for regional governance of R&D.

The decentralisation programme was rather ambiguous, because the regional governments were given more responsibilities than resources. The real powers of the SGR are limited because of their financial resources. The total income of the SGR was planned for €806m, or 1.53% of GDP in 2007 (central government budget accounted for some 19.5%, and the municipalities budget for 4.7% of GDP in the same year). The SGR have no sources of income of their own and rely entirely on transfers from the national budget. Regional budgets contain no special provision for research funding.

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Main Research policy making mechanisms

Policy making and coordination

Government policy making and coordination

National science and technology policy is prepared and coordinated by the Ministry of Education with the co-operation of other ministries, the Slovak Academy of Sciences, higher education facilities and associations of employers, and industrial research organisations, respectively. The Ministry of Education also administers the most important body for coordination of S&T policies – Slovak Republic Government Board for Science and Technology (SRGBST).

The SRGBST originated in the former Slovak Government Council for Science and New Technologies and was restructured in 1999. The Statutes of the SRGBST declares that “the Council is a permanent advisory body of the Slovak government in field of the state science

and technology policies....It discusses and evaluates conceptual and strategic materials on S&T policies elaborated for the Slovak Government, EU organisations or other international organisations'. The SRGBST is administered by the *Slovak Ministry of Education*. Both the structure and responsibilities of the Council underwent thorough revisions 2006. These changes aimed at simplifying the Council's structure and orientating it towards development of S&T policies, while innovation issues should be handled by the *Ministry of Economy (The Strategy and Industry Units)* and its agencies.

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Main Research policy making mechanisms

Science Policy Advice

The most important advisory body for the preparation and execution of the state-governed policy for science and technology is the Slovak Republic Government Board for Science and Technology (SRGBST).

The Statutes of the SRGBST declare that "the Council is a permanent advisory body of the Slovak government in the field of state science and technology policies....It discusses and evaluates conceptual and strategic materials on S&T policies elaborated for the Slovak government, EU organisations or other international organisations". The SRGBST is administered by the Slovak Ministry of Education.

The Rectors' Conference is an informal body to advise the authorities on a wide range of issues, especially budgetary policy with respect to higher education institutions, and science policy.

The Association of Industrial Research Institutes is an informal body of institute directors. It advises the authorities on issues of technology policy.

The Slovak Ministry of Education is responsible for policy- and decision-making in the field of R&D. The Ministry uses a range of methods and instruments for policy advice:

- all R&D and S&T policies drafted by the ministry are consulted with other bodies of central government and most important R&D policy stakeholders;
- the ministry regularly evaluates the performance of State R&D programmes;
- it also prepares final and interim reports on the performance of State Concepts of S&T policies;
- in 2002 the ministry commissioned the "Technology Foresight Programme". The Programme was selected as one of 10 State R&D Programmes, and was developed by the Institute for Forecasting of the Slovak Academy of Science in 2002-2004;
- since 2005 the Annual Reports on R&D in Slovakia have been prepared. The reports contain comprehensive information about public R&D policies implemented in Slovakia, as well as abundant international comparisons and lists of benchmarking indicators.

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Main Research policy making mechanisms

Actors in policy implementation

The organisation providing specific support or expertise was the Centre for Advancement, Science and Technology (SARC). This was an organisation supported by the government and directed by the Ministry of Education. It has built a database for technology transfer, which, by providing necessary information and services, helps to publish the R&D results. Training which was provided by the SARC was sponsored by the PHARE programme, and it was devoted to managers in the sphere of science and technology, focusing on technology-oriented SMEs. The Centre was abolished on March 2006, but its services are currently provided by the Slovak Research and Development Agency.

Most important agencies in R&D policy implementation in Slovakia include:

- The Ministry of Education and its agencies are responsible for the design and implementation of R&D policies.
- Other ministries of central government carry out specific tasks to implement state R&D policies. These include the preparation and management of the state research orders, state R&D programmes and public R&D procurement in relevant fields (health care, defence, etc.). The Ministry of Finance has a special position. It prepares Laws on the current state budget and 3-year predictive state budgets. The budget laws contain lists of (a) state R&D funding initiatives and (b) benchmarking indicators for public R&D programmes.
- The Slovak Academy of Sciences and some 33 universities and higher education facilities are most important research agencies, in basic research in particular.
- Employers Associations and the Association of Industrial Research Organisations are important for developing partnerships between public and private sectors. They also participate in drafting public R&D policies.

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Main Research policy making mechanisms

Tools for policy advice

The Technology Foresight Programme was commissioned by the Ministry of Education and conducted in 2003-2005. The overall objective of the Technology Foresight programme was to raise quality of professional decision-making of the SR central authorities in the field of science and technology. The programme should indicate thematic and systemic priorities for research and development up to 2015. Particular projects of the Programme were implemented by consortia consisting of companies, public and private research institutes and universities. Companies and private research institutes benefited from research results. The Programme was considered successful and inspired policy learning. The Long-term Objective of the State S&T Policy up to 2015, basic S&T policy document in Slovakia since September 2007, states that all S&T strategies in Slovakia should be based on the Technology Foresight exercises. The Objective also set that the Slovak Republic

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Government Board for Science and Technology would become responsible for preparing S&T policies. Special S&T management units should also be established with central government ministries and regional governments. The Technology Foresight exercise should be used for preparation and evaluation of the S&T policies.

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Role of Evaluation

Structural evaluations

Back in the 1990s, process of evaluation was underdeveloped. Since the early 2000s, the Slovak government increasingly became aware that developing the Lisbon National Reform Programmes (set in the Competitiveness Strategy, National Reference Framework and related Operational Programmes) depends on the quality of policy-making and/or benchmarking and evaluation practices. In 2001 the Ministry of Education prepared a report on "The Assessment of the actual state of the Infrastructure of Research and Development Organisation Workplaces" and provided suggestions for appropriate measures aimed at improvements in the research infrastructure. In 2003 the same ministry prepared an Interim Report on the Performance of the "Concept of the State-Governed Scientific and Technical Policy up to the Year 2005" (the basic S&T policy document in 2002-2005). Evaluations of the S&T policies resulted in transformation of the system of the state support for R&D. This support increased somewhat, and elements of competitive bidding for R&D projects were strengthened. The Law on the Organisation of the State Support of R&D was passed in 2005. The Law laid down a system of public financial support for R&D agencies and indicated rules for evaluating their performance. Since 2005 the Ministry of Education has published an Annual Report on R&D, the most comprehensive evaluation of the Slovak R&D system and S&T policies. The 2006 Report, for example, provided an in-depth analysis of projects supported by the SRDP, the RDA and the VEGA grant agencies, analysis of industry research and university R&D facilities, and evaluation of R&D investment allocations (private/public sector). It also provided for a comprehensive overview of R&D activities co-financed by the Community initiatives.

Evaluations of research programmes

The Section for Science and Technology of the Ministry of Education carries out regular evaluations of the State Research & Development Programmes. Evaluation reports analyse the planned and actual results of the research projects and developments, and calculate financial indicators related to supported activities. Evaluation reports are published on the section's website.

Assessment of research grants and technological projects is carried by:

- the Ministry of Education, Slovak Academy of Science and their grant agencies (RDA, VEGA);
- the Ministry of Economy on its own agencies (NADSME, SIEA).

Evaluations of individual research performers

Universities and higher education facilities are evaluated by the accreditation commission of the Slovak government. Institutes of the Slovak Academy of Sciences have been evaluated regularly by their own accreditation commission from 1992 onwards. Other research institutes are evaluated from time to time. Negative results of evaluations were reflected in cutting budgets of under-performing institutes. A few Institutes and Faculties

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did not pass accreditation and were abolished.

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Research funding system

Overview of funding flows

Funding Flow diagram



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Research funding system

Brief description of funding flows

The Slovak national research system consists of a number of governmental, private and non-profit organisations controlled and/or supported by the ministries of Education and Economy. The **Ministry of Education** manages the following agencies:

- **The Slovak Academy of Science** (SAS) provides for the bulk of basic research in Slovakia. It comprises 74 organisational units with a budget of €46.7m and employs some 3,150 people.
- **Higher Education Facilities** There were 23 public and 10 non-state Higher Education Facilities in Slovakia in 2007. The 2007 total public university funding was €351.8m.
- **The VEGA Grant Agency** is a funding and advisory body with the Ministry of Education and the SAS which implements S&T policies, financing basic research and

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the evaluation of research projects. In 2006 the VEGA supported some 2251 projects with €19.1m (€8.5 thousands per project).

- ***The Research and Development Agency*** was established in 2001, and became an increasingly important source of finance for many basic and applied research projects. The RDA had a budget of €27.797m in 2007.

- ***The Structural Fund Agency*** was established in 2007 and should manage SF calls in planning period 2007-2013.

The ***Ministry of the Economy*** manages a network of agencies concerned with business promotion, innovation and applied research. Two agencies support applied research projects:

- ***The National Agency for the Development of Small and Medium Enterprises*** (NADSME) was appointed as managing authority for calls related to Measure 1.2 "Business Incubators, Technology Parks and R&D Centres" of the Sectoral Operational Plan for the Industry and Services (SOPIS).

- ***The Slovak Innovation and Energy Agency*** (SIEA) manages programmes related to Measure 1.3 "Support of business, innovations and applied research" of the SOPIS. In April 2007 the SIEA started to be transformed into the national innovation agency.

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Research funding system

National public research funding

Overview

Gross expenditure on R&D (GERD) has been on the decline since its peak in 1989, when the share of GERD in GDP reached 3.88%. By 2006 the R&D intensity dropped to 0.49%, leaving Slovakia among the least R&D intensive countries in the EU27. In terms of GOVERD (government expenditure on R&D) as a share of GDP, Slovakia's share declined from 0.18% in 1999 to 0.15% in 2001/2002 and was 0.30% in 2006.

Table: Basic data on R&D performance in Slovakia in 2000-2006.

	2000	2001	2002	2003	2004	2005	2006
GERD as % of GDP	0.65	0.64	0.58	0.58	0.51	0.51	0.49
Share of BERD in GERD, %	54.4	56.1	53.6	45.1	38.3	36.6	39.9
<i>R&D infrastructure</i>							
No. of organisations reporting R&D	303	326	270	265	272	273	x

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of which business sector	151	176	168	167	168	170	x
Total R&D personnel, FTE	15,221.0	14,422.5	13,631.3	13,353.6	14,328.0	14,403.6	15,027.9
of which researchers	9,955.0	9,584.8	9,181.1	9,626.5	10,717.8	10,920.6	11,775.9
Business R&D personnel, FTE	5,171.8	4,756.6	4,470.5	3,651.2	3,473.0	3,524.0	x
of which researchers	2,420.3	2,256.4	2,168.9	1,913.9	1,814.8	1,946.5	x
R&D expenditure by source of finance							
GERD: total, € million	142.846	149.349	> 148.317	170.343	173.94	194.491	216.474
GERD: government source, € million	60.846	61.616	65.415	86.597	99.348	110.808	130.205
BERD: total, € million	77.745	83.756	79.447	76.816	66.605	71.150	86.270

Source: Statistical Office of the Slovak Republic: The 2001 - 2006 R&D yearbooks and Selected Data on R&D Organisations in Slovakia. Notes: FTE = full time equivalent; GERD = Gross expenditure on R&D; BERD = Business expenditure on R&D.

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Research funding system

Institutional Support

In the 2000s, the Slovak government became the major provider of research funding. Nominal and real government expenditure on R&D doubled in 2000-2005. Nominal business expenditure stagnated and the real one decreased in the same period. The shift in funding source structure was reflected in the shift in the type of research structure. The public sector (universities and the Slovak Academy of Sciences) became the main research agency and basic research the main type of research. The share of basic research in total funding increased from 25.7% to 46.7% in the period 2001-2005. The share of applied research dropped from 47.6% to 30.9%, and the share of development from 26.7% to 22.4%.

The government provided public research funding via two major channels: institutional funding and project funding.

Institutional funding supports basic research and is provided directly from the State budget divisions (ministries and other central authorities, e.g. Slovak Academy of Sciences) and also via the VEGA Scientific Grant Agency.

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Research funding system

Project-based funding

Project finance is provided either via funding agencies (R&D Agency, NADSME, SIEA) or via State Research Orders and State R&D Programmes. This type of funding supports mostly applied research and development, and is based on competitive grants and peer review mechanisms.

Table: Types of research, percentage shares in total funding

	2001	2002	2003	2004	2005
Basic research	25.7	28.4	37.3	44.7	46.7
Applied research	47.6	47.3	44.7	36.2	30.9
Development	26.7	24.3	18.0	19.1	22.4

Source: Statistical Office of the Slovak Republic: The 2001 – 2006 R&D yearbooks and Selected Data on R&D Organisations in Slovakia.

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Research funding system

Other modes of funding

Other modes of funding include mainly financial means provided by the European Union. The importance of this mode has increased significantly since 2004.

For more details in role of Structural Funds in Slovak R&D systems see section on “Impact of Structural Funds on Research Funding”.

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Research funding system

Targeted or Thematic Funding

The Long-term Objective of the State S&T Policy up to 2015, the basic document on research policy, sets horizontal (cross-cutting) and vertical (thematic) levels of priorities. These priorities are supported by the State R&D Programmes (SRDP) and State Research Orders (SRO). The former instrument accounted for some 28% and the latter some 10% of total public spending on R&D in 2005.

The R&D cross-cutting programmes include:

- Establishing information society;
- Quality of life - Health - Nutrition - Education;
- Development of progressive technologies for efficient economy;
- Utilization of domestic raw materials and resources;
- Application of progressive principles of production and transformation of energy;
- Participation of social sciences in the development of society.

The R&D thematic programmes include:

- economic competitiveness;
- human resources development;
- internal and external state security;
- R&D integration into the European Research Area.

Agencies managed by the Ministry of Education and Academy of Science channelled about 80% of total public support for research in 2005. Divisional ministries disbursed some 20% of total public support to research in the same year.

There are no details on funding flows by thematic priorities. Chapter 2.7.4 on other policies, however, provides some basic information about funding resources managed by selected Slovak ministries.

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Research funding system

Role of European and international funding

International funding in general, and European funding in particular, have been of growing importance. The share of international funding in total funding increased from 1.9% in 2001 to 6.0% in 2005. About one half of international funding was channelled to the private sector in 2005. In the same year, international resources (most of which came from the structural funds) generated about 5.3% of total BERD.

The importance of European/international funding is likely to increase in the planning period 2007-2010. The 2006 GERD, for example, is estimated at some €200m. If €1.2b were to be spent on R&D, as envisaged in the National Strategic Reference Framework, structural funds may provide as much as half of total GERD in Slovakia.

No data is available on the share of R&D funding from abroad other than EU funding, but this funding source is likely to be quite unimportant.

For more details in role of Structural Funds in Slovak R&D systems see section on “Impact

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of Structural Funds on Research Funding”.

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Research funding system

Private research funding

Intramural

Prior to 1989 the Slovak economy was organised into a relatively small number of divisional monopolies from 2000 to 80,000 employees. These monopolies had their own networks of well-equipped applied research institutes. Share of GERD in GDP was 3.88% in 1989. Most of GERD was generated in industry research institutes. In the early 1990s communist monopolies were dissolved and privatised, mostly by foreign investors. Applied research institutes lost major sources of funding and either ceased to operate or had to change the composition of their activities towards certification and metrology. Enterprises privatised by multinational companies (MNCs) seldom retained research activities, as research was usually carried out in the MNCs' headquarters. A few research centres were established in the electrical engineering, electronics and metal processing industries.

Domestic SMEs have had limited financial and intellectual resources and competed with low costs of labour rather than R&D inputs. Several large enterprises remained in domestic ownership and continued pursuing research activities (the manufacture of rubber and tyres, and the pharmaceutical industry). The top five R&D spenders in 2005 in Slovakia included:

1. Matador (tyre manufacturer)
2. US Steel Košice (steel production)
3. Biotika - Zentiva (pharmaceuticals)
4. Železničná spoločnosť (State Railways Company)
5. Slovenský vodohospodársky podnik (Slovak Water Company)

Source: The IPTS 2006 R&D scoreboard

These developments explain why the importance of intramural private research has been falling over the last 10 years in Slovakia. In 1997 BERD generated some 63.5% of GERD. By 2005 the share of GERD dropped to 36.6%. The decline in business investment was mirrored in the relative increase in importance of public spending: the share of public spending in total R&D spending increased from 34.5% to 57.0% in the period 1997-2005.

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Research funding system

Extramural

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Most industry research is performed in manufacturing, namely in machinery, metal processing, the chemical industry, the manufacture of rubber and tyres, and electrical engineering. Particular divisional ministries have tried to nurse remnants of the former network of applied research institutes via research grants, with varying success. The state budget is the main source of extramural research. The funding is channelled via government agencies (RDA, SIEA, NADSME) and/or provided directly by the government ministries (in case of the State Research and Development Programmes and State Research Orders) and is based on competitive tenders for grants, procurement, etc. Funding from abroad is quite low.

The business sector is investing almost nothing in university research: HERD financed by industry generated some 6% of total extramural funding in 1991, but this share dropped to 0.7% in 2005.

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Research funding system

Charitable foundations and not-for-profit funding

Not-for-profit funding is a quite unimportant source for R&D projects in Slovakia. It provided some €0.17m, or 0.1% of GERD in 2005.

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SLOVAKIA - Support Measure(s)

Title of support measure	Start Date	Organisation responsible
<u>Quality of life - Health - Nutrition - Education</u>	2003	Subprogramme PP1 - Genomics of cancer, cardiovascular and transmitted diseases for healthier population of people and animals - the Slovak Academy of Sciences; Subprogramme PP2 - Ecologisation and economic rationalisation of primary agriculture production - Ministry of Agriculture; Subprogramme PP3 - Food - quality and security - Ministry of Agriculture ; Subprogramme PP4 - Impacts of constructing materials, constructions and geological factors on quality of life - Ministry for Construction and regional development; Subprogramme PP5 - Food and health in education and training - Ministry of Education.

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<u>Development of progressive technologies for efficient economy</u>	2003 Ministry of Economy
<u>Utilization of domestic raw materials and resources:</u>	2003 Ministry of Economy
<u>Application of progressive principles of production and transformation of energy</u>	2003 Ministry of Economy
<u>Participation of social sciences in the development of society.</u>	2003 Slovak Academy of Sciences Subprogramme 1 - PP1 Realisation of excellent projects and support to professional career of young employees and doctoral students - was administered by the Slovak Academy of Sciences. Subprogramme 2 - PP2 Stabilisation of young employees and doctoral students by improving their social insurance - was administered by the Ministry of Labour, Social Affairs and Family. Subprogramme 3 -PP3 Improving societal position of science and technology and formation of scientific career - was administered by the Ministry of Education.
<u>Development of personality and talent of young employees and doctoral students in research and development up to the age of 35</u>	2003
<u>Complex Solution of Support and Efficient Use of Research and Development Infrastructure</u>	2003 Ministry of Education
<u>Forecast of Development and Use of Science and Technology up to 2015</u>	2003 Slovak Academy of Sciences
<u>Actual Issues in Society Development</u>	2003 Ministry of Education
<u>Support of Industry Research and Pre-Competitive Development (SIRPCD)</u>	The Slovak Innovation and Energy Agency is administering agency for this support measure.

Research performers

Higher Education Institutions

The university system experienced rapid, if rather more quantitative than qualitative development, after 1989. The number of undergraduate students, for example, increased from 60,000 to 202,000 between 1989 and 2007, while age-specific university admission rates increased from 13.0% to 43.0% in the same period. Numbers of postgraduate students increased from about 600 in 1990 to 10600 in 2006.

There were 23 public and 10 non-state Higher Education Facilities (HEF) in Slovakia in 2007. Rapid growth in student and university numbers, however, has not been matched by adequate financial support. While numbers of undergraduate and PhD students, and enrolment rates rose 3.5 times in 1989-2006/7, share of public expenditure on higher education in GDP fell from 0.98% to 0.68% in the same period. Fall in real spending on higher education had a significant effect on the deteriorating quality of the university system. The share of HERD in GDP was 0.1% in 2005. The business share of HERD as % of GDP was next to nothing. Consequently, the research quality was mostly poor. No Slovak universities ranked in the top 500 world universities (Comenius University occupied 554th place in the world in a league of top 3000 world universities).

The Ministry of Education manages a central portal for the higher education facilities. Slovak universities and higher education facilities are associated in the Rectors' Conference. This is an informal body to advise the authorities on a wide range of issues, especially budgetary policy with respect to higher education institutions, and science policy.

Universities and HEF receive public funding for science and technology in two forms:

- institutional funding of R&D organisations and workplaces (transfer from the state budget and VEGA grants);
- competitive project funding (RDA grants, State R&D programmes, calls related to structural funds, etc.).

A new component in funding of higher education institutions was the change of their budgetary management form to the public non-profit one. The change should provide higher education institutions with a more efficient multiple source of funds for their own development. The development of closer links between higher education institutions in the regions and the business sector is expected.

The Slovak Parliament passed an amendment of the Higher Education Law in July 2007. The amendment allows universities to charge fees for study programmes arranged for distance-learning students. It should bring more transparency in distance-learning, increase the quality of learning, and improve universities' budgets.

The activities of the Slovak HEF and universities have been evaluated by the Slovak Academic Rating and Ranking Agency since 2005. The evaluation results generated a lot of interest from the broader public (and some angry reactions from under-performing institutions), but so far have not initiated significant improvements in the operations of universities.

The most important universities in Slovakia include:

Slovak University of Technology in Bratislava
Slovak University of Technology in Košice
Comenius University, Bratislava
Technical University in Zvolen
Technical University of Zilina
Matej Bel University in Banska Bystrica
Slovak Agricultural University in Nitra
University of Veterinary Medicine
Pavol Jozef Safarik University
University of Trnava
Univerzita Sv. Cyrila a Metoda v Trnave
University of Presov
University of Economics in Bratislava

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Public research organisations

R&D organisations and workplaces of the public sector (institutes of the Slovak Academy of Sciences and divisional R&D institutes) carry out the function for which they were set up by the State. Their R&D priorities are designed to meet socio-economic needs of the State. The State funds the main activities of public research organisations via institutional funding under the heading "R&D internal projects".

The single largest public research organisation is the Slovak Academy of Science (SAS). In 2007 the SAS comprised of 74 organisational units, 47 of which are budgetary and 27 contributory ones. The SAS had budget of €46.7 million and employed some 3150 workers in the same year.

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Private research performers

Branches of MNCs which dominate the Slovak economy concentrate on production. R&D activities are mostly performed abroad, in the MNCs' headquarters and/or research centres. The great majority of some 60 thousand Slovak firms are SMEs, which lack adequate R&D backing. Many of them have been able to import and adopt advanced technologies and know-how, but only few perform their own R&D activities. The small number of R&D agencies consists of two separate groups: one is formed by some 40 industry research institutes (a remnant of the pre-1989 R&D system) and another one by large domestically owned Slovak firms. The vast majority of R&D performers in the private sector rely on (insufficient) in-house R&D. This severely limits their capacity to adapt to new production (market) requirements or to meet the demands of structural adjustment.

The top five R&D spenders in 2005 in Slovakia include:

- (1) Matador, the tyre manufacturer
- (2) US Steel Košice, the steel producer

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- (3) Biotika-Zentiva, producer of pharmaceuticals
- (4) Železničná Spoločnosť, the State Railways Company
- (5) Slovenský Vodohospodársky Podnik, the Slovak Water Company.

Biotika-Zentiva and US Steel are former Slovak national enterprises. They were sold to foreign investors, but retained their R&D departments (established prior to 1989). The only Slovak company on the list of the 1000 most R&D-intensive EU firms was Matador (rank 594, ICB sector 335 – automobiles & parts).

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Research performers

Private research performers

Private Research and Technology Organisations

Successive Slovak governments have tried to save at least fragments of the pre-1989 industry R&D infrastructure, and nursed industry research institutes and R&D departments of major Slovak companies with grants distributed under the State R&D Programmes and State Research orders. Most industry research institutes cluster in six technology centres:

- Centre for Energy Development (workplace of VUJE Trnava, a.s. Trnava);
- Centre for Development of Chemical and Pharmaceutical Industry (VUSAPL, a.s. Nitra);
- Centre for Development of Electro-Technology and Information Technology (EVPU, a.s. Nová Dubnica);
- Centre for Development of Processing Industry (VIPO, a.s. Patrizánske);
- Centre for Development of Wood, Forestry and Pulp and Paper Industry (VUPC, a.s. Bratislava);
- Centre for Development of Mechanical Engineering (VYVOJ Martin, a.s. Martin).

The geographical distribution of the Technology Centres copies the pre-1989 layout of industrial cores in central and western Slovakia. The main areas of activity of the Technology Centres include:

- the joint development of strategic plans for R&D,
- the co-ordination of solutions for integrated science and technology projects;
- the co-operation in the development of technical standardisation and harmonisation with EU standards;
- the co-ordinated development of testing, the promotion of quality assurance;

- analytical activities.

The largest private research institute in Slovakia is the VUJE Trnava. The VUJE had some 650 employees, turnover of 50 million Euro and performed design, supply, implementation, research and training activities, particularly in the field of nuclear and conventional power generation. Other institutes were considerably smaller. The EVPU Nová Dubnica had some 224 employees, turnover of some 18 million Euro and performed research in electrical engineering and ICT. The ZTS VVU Košice had some 99 employees, turnover of 4 million Euro and performed research in conveyor systems, packaging lines and mobile robotic carriage systems.

Private research institutes concentrate almost exclusively in manufacturing and energy sectors. They publish very little information about their economic performance. It is also difficult to establish, how much these bodies concentrated on engineering, metrology and certification and how much on R&D activities.

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Key research indicators

Gross domestic expenditure on R&D (GERD) in Slovakia has risen between 1995 - 2005 from SKK 5.4 bill. to SKK 7.5 bill. (in current prices). In 2005, the share of GERD by source of funds was as follows:

- public (government) sector: 57.0% (37.8% in 1995),
- business enterprise sector: 36.6% (60.4% in 1995),
- other national - 0.4% (0.1% in 1995).
- abroad: 6.0% (1.6% in 1995),

Total GERD amounted 7.503 bill. SKK (in current prices) in 2005. The share of natural sciences reached 29.0 %, engineering 42.1 %, medical sciences 9.2 %, agricultural sciences 9.9 %, social sciences 7.1 % and humanities 2.7 %.

In 2005, the aim of R&D activity by current expenditures was as follows:

- basic research 46.7 % (24.3 % in 1995),
- applied research 30.9 % (55.7 % in 1995) and
- experimental development 22.4 % (20.0 % in 1995).

It is clear that the dramatic decline in applied research was caused by a declining R&D support in the business enterprise sector.

All indicators are provided by the Statistical Office of the Slovak Republic.

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Key research indicators

Overview

ERAWATCH presents four categories of key R&D and other technology indicators and a relative performance chart. They are aimed at giving evidence of the overall national situation with regards to research activities by country and to enable a comparative overview of each country against the EU average.

The indicators monitor three groups of countries: EU Member States, associated countries and other countries.

Description of the four categories of indicators

The four categories of indicators presented are among the most disseminated, methodologically accepted and used descriptors of national research systems.

Expenditures on R&D

Three indicators are related to the structure of expenditures on R&D. The Gross domestic expenditure on R&D (GERD) gives an overview of the overall investment in R&D. The business expenditure on R&D (BERD) is the part of GERD financed by the business enterprise sector. The government budget appropriations or outlays for R&D (GBAORD) using data from budgets is linked to policy through classification by "objectives" or "goals".

- GERD: Gross domestic expenditure on R&D as a percentage of GDP is the sum of GERD financed by industry, GERD financed by government and GERD financed from abroad. "Research and experimental development (R&D) comprise creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society and the use of this stock of knowledge to devise new applications" (Frascati Manual, 2002 edition). R&D is an activity where there are significant transfers of resources between units, organisations and sectors and it is important to trace the flow of R&D funds (source: Eurostat).
- BERD: Business expenditure on R&D as a percentage of GDP is the part of GERD financed by business enterprise sector (Frascati Manual, 2002 edition) (source: Eurostat).
- GBAORD: Government budget appropriations or outlays for R&D are a way of measuring government support for R&D that has been developed using budget data. This essentially involves identifying all the budget items involving R&D and measuring or estimating their R&D content in terms of funding. The definitions are compatible with the methodologies developed by Eurostat (source: Eurostat).

Researchers

Researchers are professionals engaged in the conception or creation of new knowledge, products, processes, methods and systems, and in the management of the projects concerned (source: Eurostat).

Publications

Data on scientific publications has been extracted from the Science Citation Index (SCI) and related Citation Indexes on CD-Rom, produced by Thomson Scientific (formerly Institute for Scientific Information) and covering some 7,000 international journals in all domains of scholarship, with a good to excellent coverage especially in basic science. Data have been processed for DG research by CWTS-Leiden.

Patents

These indicators refer to data concerning patent applications to the European Patent Office (EPO) and patents granted by the United States Patent and Trademark Office (USPTO)

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(source: Eurostat).

Additional notes

- Eurostat data was downloaded in May and June 2007
- Absence of a country in the charts/tables is due to the absence of Eurostat data or insufficient data
- EU25 data is sometimes presented when data on EU27 is unavailable,

Relative performance

The chart on relative performance displays all four categories of indicators listed above. It provides a characterization of the national relative position compared to the EU average and to the highest and lowest performance of each one of the three groups of countries.

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Expenditures on R&D

There are two ways of measuring the funds spent on R&D. The first is to consider the units that carry out R&D (firms, institutes, universities, etc.) in order to identify the amount spent on R&D: this is the way GERD is calculated. The second way, using data from budgets, considers the government budget appropriations or outlays for R&D (GBAORD) identifying "socio-economic objectives". These different measures of R&D expenditures are presented below.

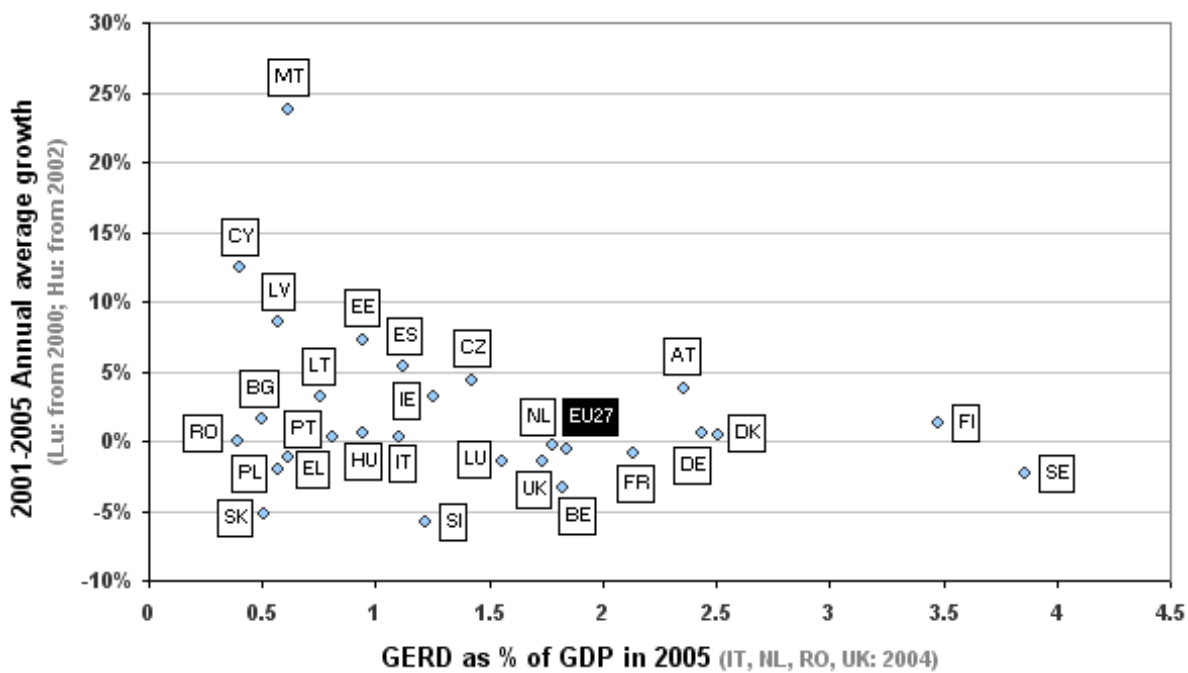
- The charts use an annual percentage of change for the y axis, providing a dynamic dimension for the interpretation of the indicators. Moreover, the charts give a comparative insight: the countries covered by ERAWATCH (whenever data is available) are shown on each graph.
- The data (time series from 1995 onwards) to be downloaded give access to a file containing all indicators for the specific country, including breakdown by sector of performance and by source of funds for the GERD and by socio-economic objective for the GBAORD.

ERAWATCH indicators follow the Eurostat geographical data coverage.

[Download the data in Excel format](#)

Gross expenditure on R&D (GERD)

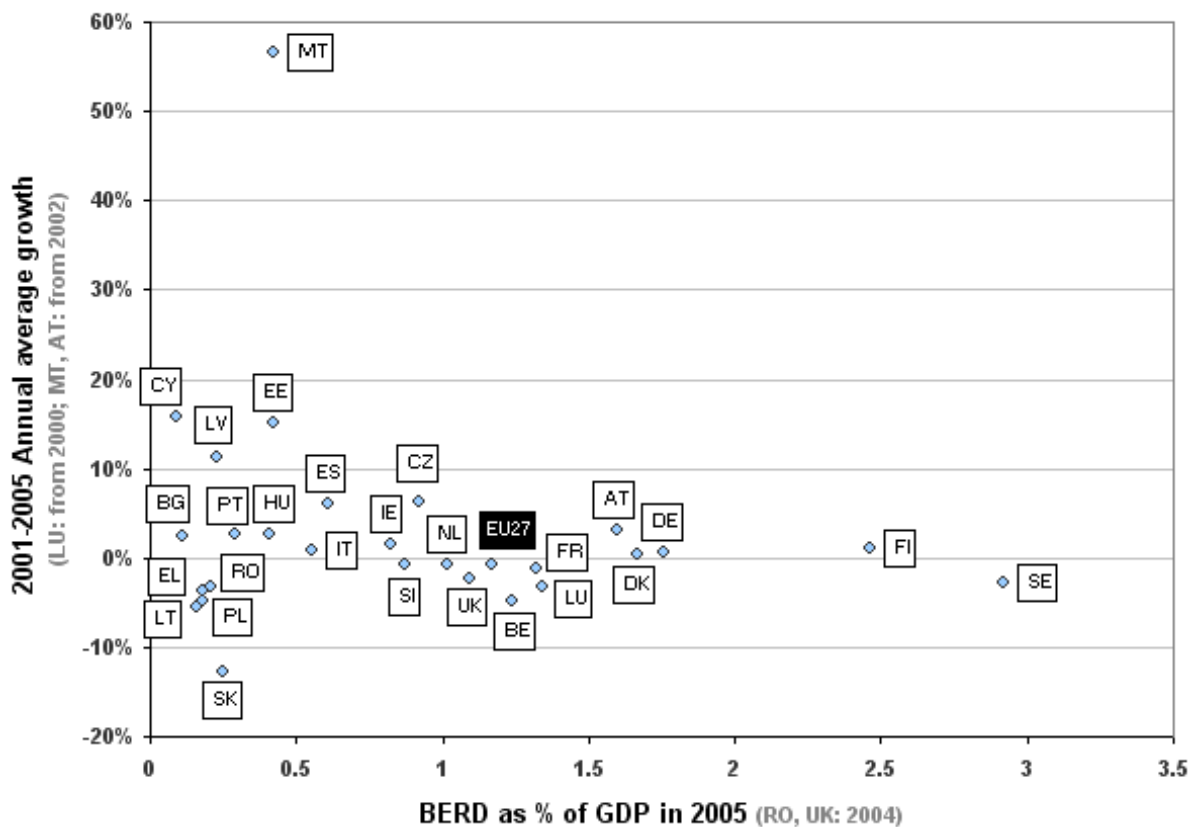
Gross expenditure on R&D



Source : Eurostat compiled by ERAWATCH

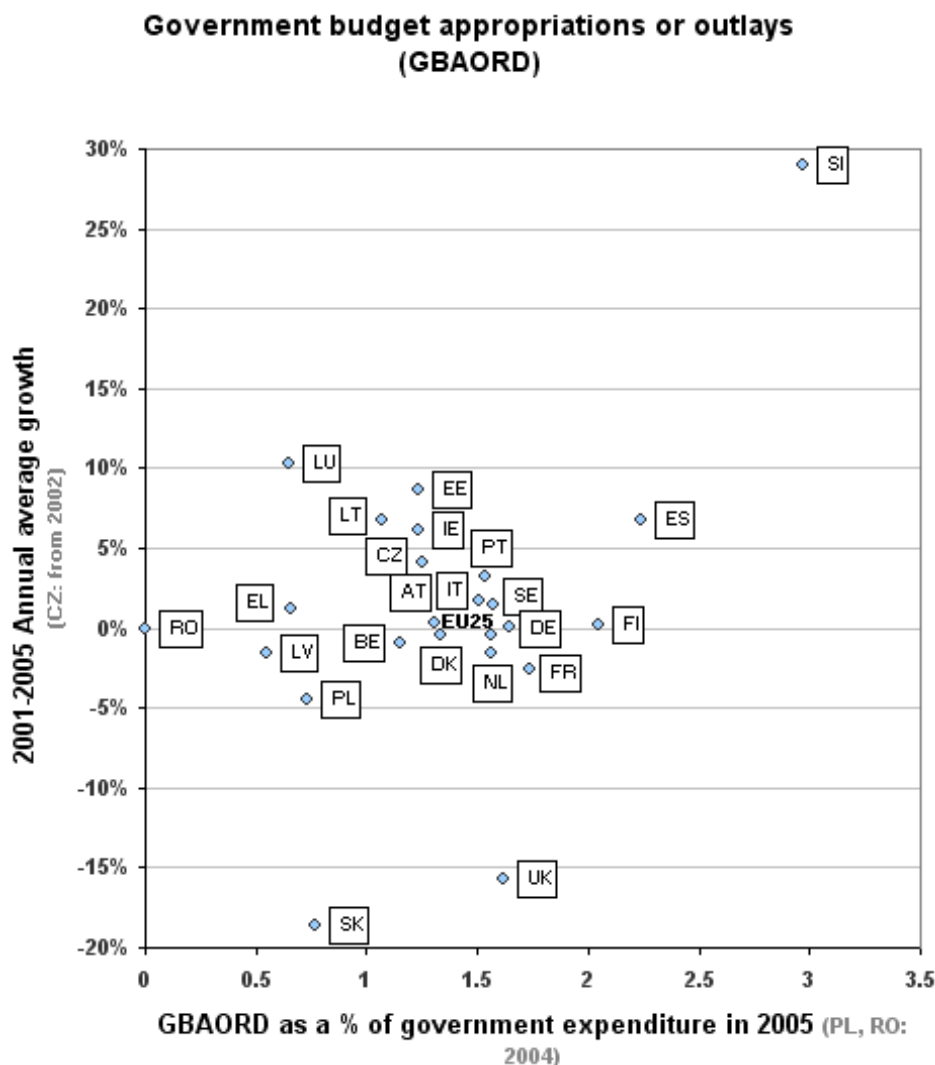
Business Expenditure on R&D (BERD)

Business expenditure on R&D



Source : Eurostat compiled by ERAWATCH

Government budget appropriations or outlays



Source : Eurostat compiled by ERAWATCH

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Researchers

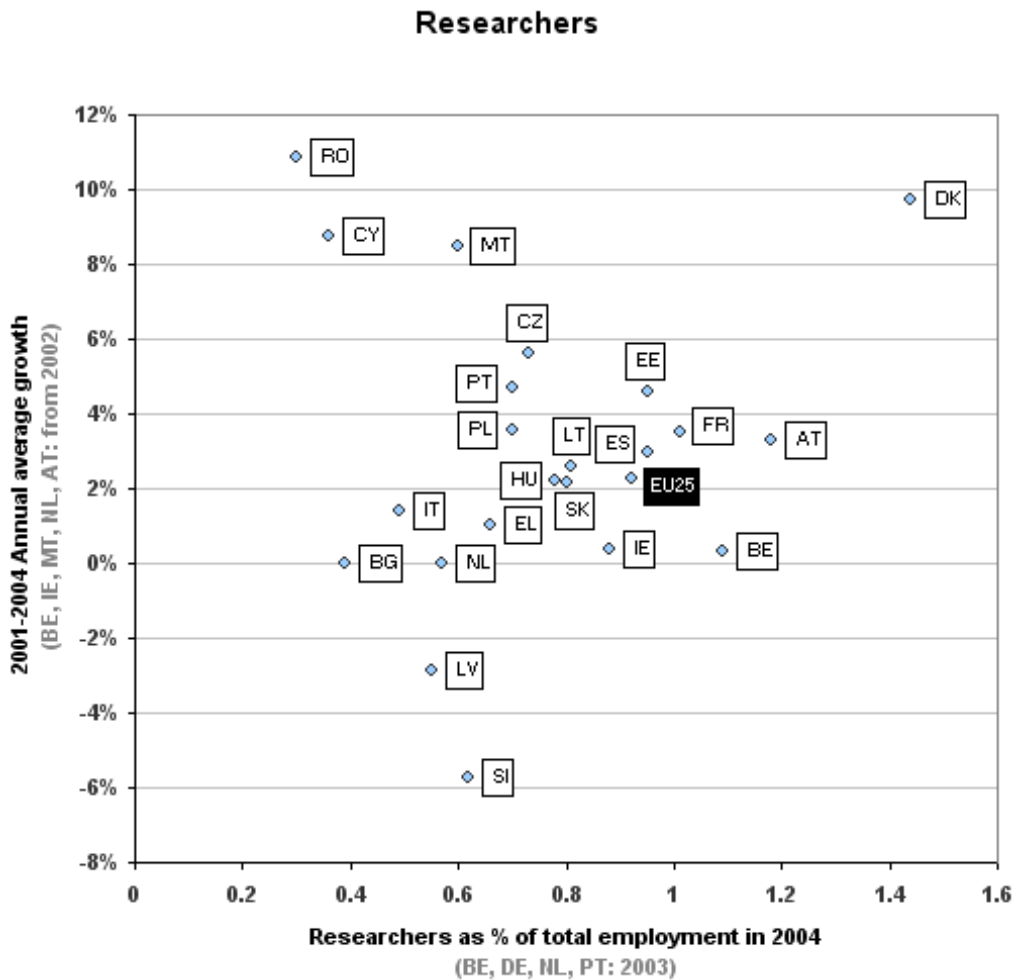
Human resources play a crucial role in knowledge production; they produce and convey knowledge. This page displays the number of researchers found in the different sectors, such as business enterprise, government, higher education and private non-profit institutions.

- The charts present an annual percentage of change for the y axis, providing a dynamic dimension for the interpretation of the indicators. Moreover, the charts give a comparative insight: the countries covered by Erawatch (where available) are grouped on one single graph
- The data (time series from 1995 onwards) to be downloaded give access to a file containing all indicators for the specific country, including a breakdown by sector of performance for the researchers.

ERAWATCH indicators follow the Eurostat geographical data coverage.

[Download the data in Excel format](#)

Researchers



Source : Eurostat compiled by ERAWATCH

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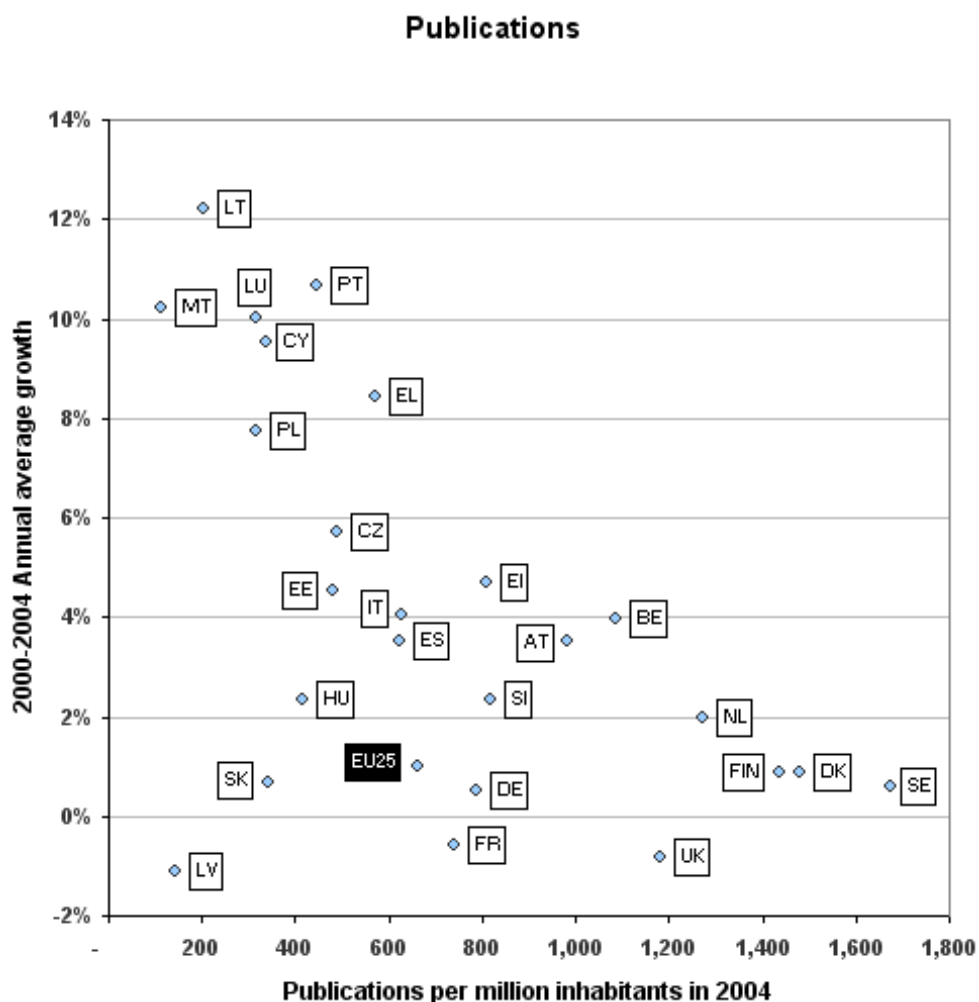
Publications

Publications are one of the most common indicators used to measure the output of scientific research. The number of scientific articles (deflated per million inhabitants) produced by a country can be considered as a basic proxy for the national scientific knowledge productivity.

- The charts present an annual percentage of change for the y axis, providing a dynamic dimension for the interpretation of the indicators. Moreover, the charts give a comparative insight: the countries covered by Erawatch (where data is available) are grouped in one single graph
- The data (time series from 1995 onwards) to be downloaded give access to a file containing all indicators for the specific country.
- Full counting method of the number of publications was used at country level. At the EU25 (EU27 is unavailable) aggregate level, double counting was avoided.

[Download the data in Excel format](#)

Scientific publications



Source: DG Research compiled by ERAWATCH

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Patents

Patents are one of the most common indicators used to measure the technological output of R&D. The number of patents (per million inhabitants) in a country can be considered as a basic proxy for the national technological knowledge productivity.

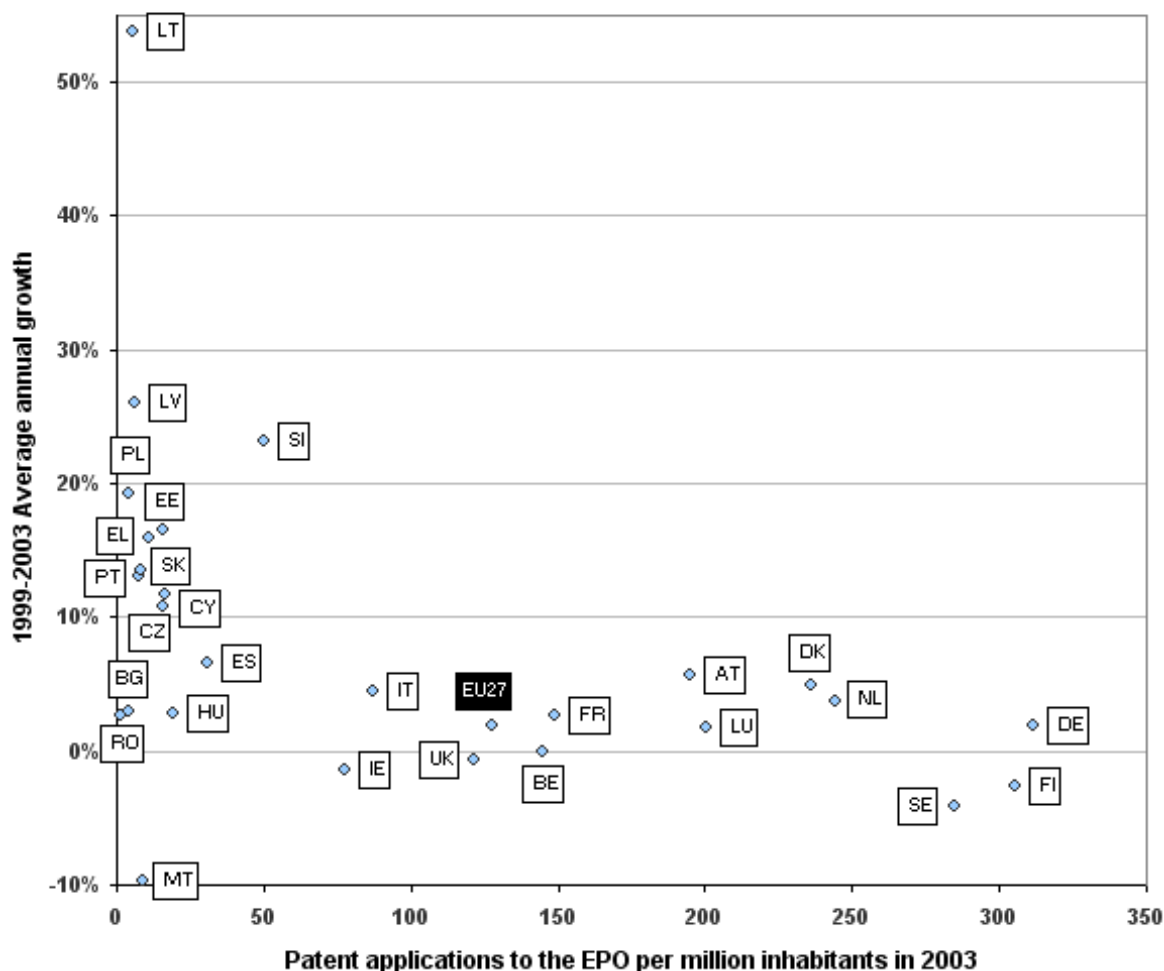
- The charts use an annual percentage of change for the y axis, providing a dynamic dimension for the interpretation of the indicators. Moreover, the charts give a comparative insight: the countries covered by Erawatch (where data is available) are grouped in one single graph
- The data (time series from 1995 onwards) to be downloaded give access to a file containing all indicators for the specific country, including a breakdown by European Patent Office patents and US Patent Office patents.

ERAWATCH indicators follow the Eurostat geographical data coverage.

[Download the data in Excel format](#)

Patents

Patents



Source : Eurostat compiled by ERAWATCH

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Relative performance

These charts display national relative performance regarding six key RTD indicators.

They give a comparative insight on the country position regarding on the one hand the range of EU Member States delimited by the lower and upper values of each indicator (shown as the blue bar) and on the other hand the EU 27 average (shown as the EU27 label).

The same presentation will soon be made available for Associated countries and Other countries. The data (time series from 1995 onwards) to be downloaded give access to files containing all the indicators for the specific country and for the EU 27.

ERAWATCH indicators follow the Eurostat geographical data coverage.

Notes

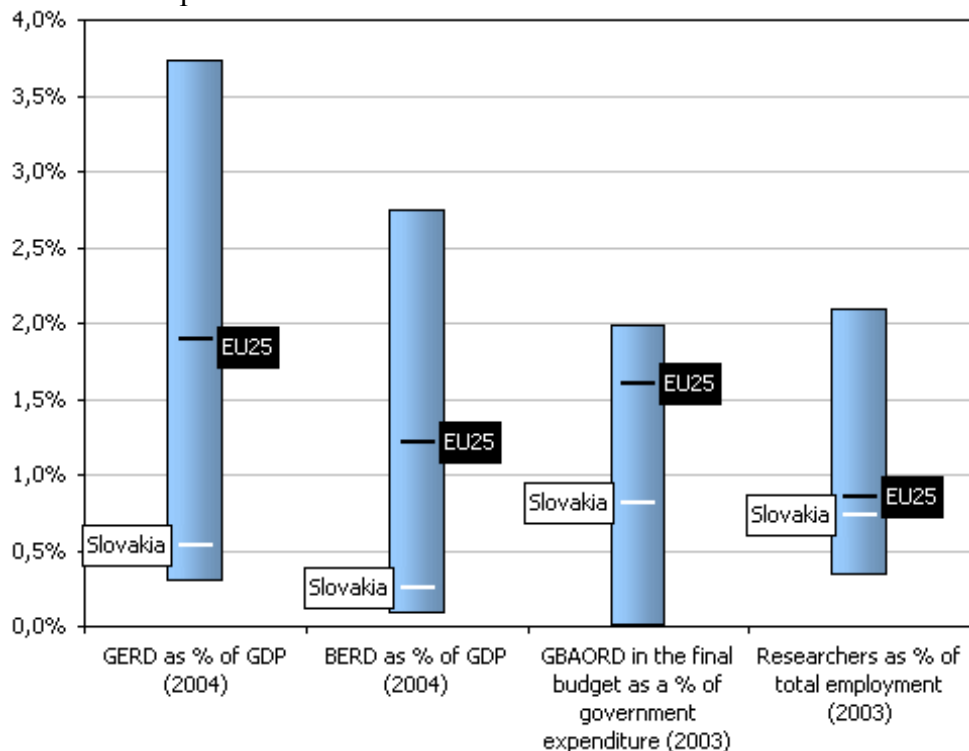
- GERD: 2004 for IT, NL, RO, UK
- BERD: 2004 for RO, UK
- GBAORD: EU25 instead of EU27. 2003 for BE, DE, GR, LU, NL, PT, SE

ERAWATCH research inventory report: SLOVAKIA

- Researchers: EU25 instead of EU27. Full counting method has been used at country level.
- Publications: EU25 instead of EU27. Full counting method has been used at country level. At the aggregate level for EU25, double counting was avoided.

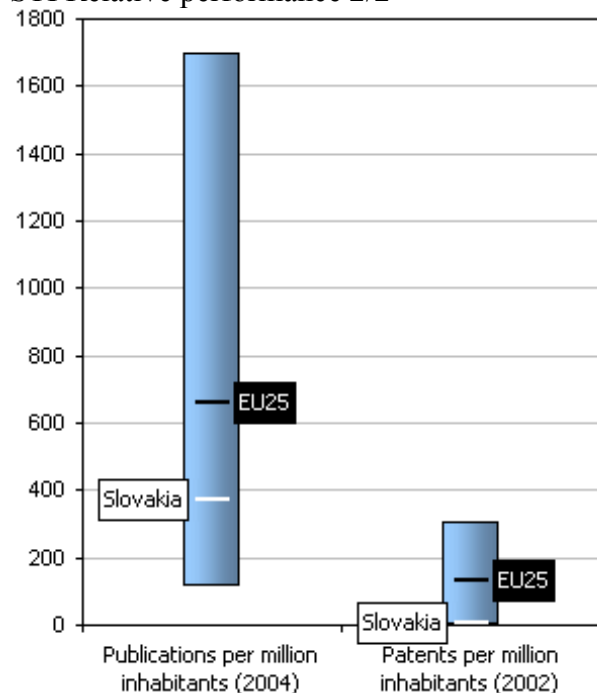
[Download the data in Excel format](#)

STI Relative performance 1/2



Source : Eurostat compiled by ERAWATCH

STI Relative performance 2/2




Source : Eurostat and DG Research compiled by ERAWATCH

Last update date: 14/02/2008

Additional relevant indicators

R&D intensity (GERD as % of GDP) was at 0.51% in 2005, only comparable with Cyprus, Latvia and Poland. Between 1997 and 2005 alone, Slovakia's R&D intensity decreased by more than 53% – a single record decline among all EU Member States. In terms of business expenditure on R&D (BERD), Slovakia was with 0.32% in 2003 well below EU-25 average (1.23%). Again, a marked decrease can be recorded from 1997 – 2005 of almost 70% (data source: the Slovak Statistical Office, Key Figures 2005).

Last update date: 17/09/2008

 **SLOVAKIA - Information source**

Name	Date
<u>Statistical Office of the Slovak Republic (SOSR)</u>	2008-06-18