

JRC SCIENTIFIC AND POLICY REPORTS

ERAWATCH COUNTRY REPORTS 2011: Slovak Republic

Vladimír Baláž

2013



Report EUR 25725EN

European Commission
Joint Research Centre
Institute for Prospective Technological Studies

Contact information

Address: Edificio Expo. c/ Inca Garcilaso, 3. E-41092 Seville (Spain)

E-mail: jrc-ipts-secretariat@ec.europa.eu

Tel.: +34 954488318

Fax: +34 954488300

<http://ipts.jrc.ec.europa.eu>

<http://www.jrc.ec.europa.eu>

Legal Notice

Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use which might be made of this publication.

Europe Direct is a service to help you find answers to your questions about the European Union

Freephone number (*): 00 800 6 7 8 9 10 11

(* Certain mobile telephone operators do not allow access to 00 800 numbers or these calls may be billed.

A great deal of additional information on the European Union is available on the Internet.

It can be accessed through the Europa server <http://europa.eu/>.

JRC77838

EUR 25725 EN

ISBN 978-92-79-28128-0 (pdf)

ISSN 1831-9424 (online)

doi:10.2791/58406

Luxembourg: Publications Office of the European Union, 2013

© European Union, 2013

Reproduction is authorised provided the source is acknowledged.

Printed in Spain

Acknowledgements and further information:

This analytical country report is one of a series of annual ERAWATCH reports produced for EU Member States and Countries Associated to the Seventh Framework Programme for Research of the European Union (FP7). [ERAWATCH](#) is a joint initiative of the European Commission's [Directorate General for Research and Innovation](#) and [Joint Research Centre](#).

The analytical framework and the structure of the reports have been developed by the [Institute for Prospective Technological Studies of the Joint Research Centre \(JRC-IPTS\)](#) and [Directorate General for Research and Innovation](#) with contributions from [ERAWATCH Network](#) Asbl. The report has been produced by the [ERAWATCH Network](#) under contract to JRC-IPTS. The first draft of this report was produced in November 2011 and is focused on developments taking place in the previous twelve months.

In particular, it has benefited from comments and suggestions of Hannes Leo, who reviewed the draft report. The contributions and comments of Laura de Dominicis from JRC-IPTS and DG-RTD are also gratefully acknowledged.

The report is currently only published in electronic format and available on the [ERAWATCH website](#). Comments on this report are welcome and should be addressed to jrc-ipts-erawatch-helpdesk@ec.europa.eu.

Copyright of this document belongs to the European Commission. Neither the European Commission, nor any person acting on its behalf, may be held responsible for the use of the information contained in this document, or for any errors which, despite careful preparation and checking, may appear.

Executive Summary

The Slovak Republic has area of 49,034 square kilometres and population of 5.4 million. It accounts for 1.17% of area and 1.08% of population of the EU-27. Slovak GDP per capita (based on purchasing power parities) was €18,100 (75.4% of the EU-27 average) in 2010.

Slovakia enjoyed a period of fast economic development in 2006-2011. Data by the Eurostat indicate that the estimated average annual rate of growth in GDP was 4.6% in Slovakia, while 1.1% in the abovementioned period. Far less progress was done in developing an efficient system of research and development. Gross expenditure on research and development (GERD) as % of GDP was 0.63%, far below the EU-27 average (2.00%) in 2010. Numbers of research personnel also were very low and decreasing over 1990s and 2000s (Figure 2, chapter 3.2).

The governance structure of the Slovak research system changed little over last decade. The top governance body in the field of science and technology is the [Ministry of Education, Science, Research and Sports](#) (MESRS). The MESRS is responsible for policy- and decision-making in the field of science and technology (Figure 1, chapter 1). National science and technology policy is prepared and coordinated by the MESRS with co-operation of other ministries (the Ministry of Economy, ME, in particular), the [Slovak Academy of Sciences](#) (SAS), higher education institutions (HEIs) and associations of employers, and industrial research organisations, respectively. The MESRS also administered the most important body for coordination of science and technology policies (S&T), the [Slovak Republic Government Board for Science and Technology](#) (SRGBST). The SRGBST was abolished with no replacement in 2011. The MESRS supports basic and applied research via state budget allocations and competitive grants given to a network of organisations and agencies important for development of S&T and higher education: The key research performers include the [Slovak Academy of Sciences](#) and 35 higher education institutions (HEIs). Key funding bodies include the [VEGA](#) agency (for basic research) and the Slovak [Research and Development Agency](#) (RDA, for applied research). The MESRS implements the [Operational Programme Research and Development](#) (OPRD) and the Operational Programme Education (OPE). As to manage the OPRD and OPE, the MESRS established the [Agency of the MESRS for the Structural Funds of the European Union](#) (ASFEU).

Since 2007, responsibilities for the research and innovation policies are separated between the ME and the MESRS. The ME implements the Operational Programme of Competitiveness and Economic Growth (OPCEG), major source of innovation finance. The innovation policy measures are implemented by the ME and its agencies, the [Slovak Innovation and Energy Agency](#) (SIEA) in particular.

Slovakia used to be a centralised country. The self-governing regions were created as late as in 2002 and got no legislative powers in higher education, research, development, and/or innovation policies. There are no regional research or innovation councils. All research and innovation policy measures are developed and implemented by agencies of central government.

The key challenges in the national innovation system have been continuing for many years and are identified in the key government documents on innovation policies:

- **Challenge 1: Weak R&D system disables co-operation between academia and industry sectors.** A common denominator for poor research and innovation performance was a near defunct research system. The Slovak R&D spending was one of the lowest in Europe and also very low against the reference group countries (CZ+IT+HU+SI+SK). Fall in business spending on R&D (BERD) was a striking feature in comparison with the reference group countries in 1990s and 2000s. The country was unable to shift from the low-cost, low-value added productions to competition mode based on high-tech, high-value added activities. High increases in tertiary education graduates were not reflected in increasing numbers of R&D workers. Low numbers of R&D workers also reflected limited interest by Slovak companies in R&D intensive production. The challenge is addressed by a numbers of schemes under the 2007-2013 innovation policy mix. The measures may help founding sound R&D system, if the policy mix is implemented in consistent way and the European resources are not diverted elsewhere.
- **Challenge 2: Underdeveloped system of innovation governance.** The history of modern innovation policy in Slovakia is quite short. Innovation was not considered a priority till 2004 when the Competitiveness Strategy (the Lisbon Strategy for Slovakia) was passed. The first [Innovation Strategy](#) was passed as late as in 2007 and in the same year the Slovak Innovation and Energy Agency was created. Co-ordination of the research and innovation policies is poor. Slovakia had no national innovation plan and/or national innovation council by 2011. The regional systems of research and innovation governance also were missing. Challenges in building efficient system of innovation governance concern also the system of higher education institutions (HEIs) and public research organisations (PROs). Implementing more efficient and transparent evaluation techniques and reforming some key research performer institutions should push HEIs and PROs from quantitative targets towards to qualitative ones and promote efficient use of public resources in education and research.
- **Challenge 3: Dual economy and low shares of domestic innovative enterprises limit competitiveness of the country.** The Slovak economy is largely foreign-owned and branches of the multinational companies (MNCs) provide for major part of Slovak industrial output and exports. The MNC were attracted by low cost of inputs (labour in particular), geographical location of Slovakia and favourable tax conditions. The MNCs did research in their headquarters and had limited interest in shifting their applied/industrial research to Slovak HEIs and public research institutes (PROs). Lack of strong national-based MNC (like Nokia or Volkswagen) in Slovakia significantly affected private spending on R&D. The R&D investment by the Volkswagen group (€5,790m), for example, was 19 times higher than total Slovak GERD and 55 times higher than Slovak BERD in 2009. Some 120 thousands of Slovak small and medium sized enterprises (SMEs) compete with low costs of inputs. Dual structure of national economy is reflected in low intensity of BERD, low shares of SMEs innovating in-house and low numbers of patents, industrial designs and other commercial results of research and innovations. Lack of strong domestic R&D-intensive companies may be partly alleviated by introduction of demand-side innovation and R&D policies.

Slovak R&D and innovation policies have been fairly generic and did not favour specific sectors. Most policies concentrated directly in the R&D and Innovation

domains, while interactions with the Finance and Human Resource domains were relatively weak in period 2007-2011. Public sector policies on R&D and Innovation domains targeted (i) institutional funding for R&D projects; (ii) reconstruction and modernisation of R&D infrastructure; (iii) selective support for centres of excellence in basic research and industry-academia co-operation in applied research; and (iv) institutional building and structural reforms of the public research system.

The **research policy** priorities and policy mix were set in the [Long-term Objective of the State S&T Policy up to 2015](#) and remained relatively stable since 2007. Targets related to (a) building high-quality R&D infrastructure and supporting development of human resources; (b) improving co-ordination of R&D, innovation, and human resource policies, (c) enhancing academia-industry co-operation, and (d) reforming the system of public support to R&D accounted for majority of attention by policy makers. Two routes have dominated policies aimed at stimulation of R&D investment in Slovakia in 2000s: (i) increasing R&D in public sector and (ii) stimulating greater R&D investment in R&D performing firms (mainly SMEs). The most important changes in policy mix refer to volume of financial support and systemic changes in support to R&D. Public support to R&D increased from €86.0m to €238.7m in period 2000-2010. Significant increases in support have been related to spending by the Structural Fund programmes (OPRD and OPE). Systemic changes in support to R&D were detailed in the 2010 [New Model of Financing Science and Technology in the Slovak Republic](#). The support is primarily channelled to infrastructure building, applied research, and international scientific-technical cooperation.

The **innovation policy** mix for period 2007-2013 basically resembles that applied in planning period 2004-2006. The most significant difference is much higher assistance provided to research, development and innovation policy measures in 2007-2013. Most financial assistance is provided via grants for technology transfers, building business and technology incubators, developing R&D infrastructure, supporting R&D co-operation networks, financing applied research and creating risk capital schemes. The state budget and the Community means are the main sources of the innovation financing.

The national policy mix is broadly aligned with the ERA pillars and objectives. The policy mix also benefits from significant volume of the European assistance. Progress towards the strategic ERA-objectives, however, is rather slow, given long-lasting problems of capacity building and dual economy. So far, the greatest progress was done in field of infrastructure building and modernising, via the inflow of the European assistance. Other challenges, namely improving working conditions for researchers and R&D workers, and building top-quality PROs and HEIs should be assisted by the national funding and accounted for limited progress.

The greatest challenges to be addressed by the national policy mix in medium term (with respect to the ERA pillars) include (a) improving working conditions for researchers and PhD students (creating attractive career prospects especially); (b) building and modernising research infrastructure, (c) building top quality PROs and HEIs (elite Universities in particular), and (d) encouraging research in private sector, and building strong ties between the industry and academia sectors.

TABLE OF CONTENTS

1	Introduction	7
2	Structural challenges faced by the national system	11
3	Assessment of the national innovation strategy	14
	3.1 National research and innovation priorities	14
	3.2 Trends in R&D funding	16
	3.3 Evolution and analysis of the policy mixes	19
	3.4 Assessment of the policy mix	21
4	National policy and the European perspective	24
	Annex: Alignment of national policies with ERA pillars / objectives	28
	References	42
	List of Abbreviations	43

Introduction

The Slovak Republic has area of 49,034 square kilometres and population of 5.4 million. It accounts for 1.17% of area and 1.08% of population of the EU-27. Slovak GDP per capita (based on purchasing power parities) was €18,100 (75.4% of the EU-27 average) in 2010.

Slovakia enjoyed period of fast economic development. Data by the Eurostat indicate that the estimated average annual rate of growth in GDP was 4.6% in Slovakia, while 1.1% in EU-27 in 2006-2011. Far less progress was done in developing an efficient system of research and development. Gross expenditure on research and development (GERD) as % of GDP was 0.63%, far below the EU-27 average (2.00%) in 2010. Numbers of research personnel also were very low and decreasing over 1990s and 2000s (Figure 2).

Slovakia accounts for extremely low level of R&D inputs and outputs. Total Slovak GERD and BERD as percent of GDP were respectively about four times and six times lower than those in the EU-27 in 2010 (Table 1, chapter 3.2). In the same year the number of total R&D personnel per million inhabitants was two times lower and number of business R&D personnel five times lower in Slovakia than in the EU-27. Low levels of R&D inputs corresponded with low level of knowledge-intensive outputs. Slovakia produced just some 8.8 patent applications to the EPO per million of inhabitants, while the EU-27 accounted for 115.8 applications in 2009 (source: Eurostat). Rates of the knowledge-intensive services (KIS) exports as % total service exports were 23.1% in Slovakia and 48.1% in the EU-27 in 2009. The license and patent revenues from abroad as % of GDP were 0.07% in Slovakia, but 0.51% in the EU-27. The employment rate in knowledge-intensive activities (manufacturing and services) as % of total employment was 10.1% in Slovakia, but 13.5% in the EU-27 in 2010. Value of the 2011 Summary Innovation Index for Slovakia (0.305) was 56% of the EU-27 average (source: the 2011 Innovation Union Scoreboard).

Slovakia has a small open economy and is strongly dependent on manufacturing exports. Manufacture of cars, car components and consumer electronics, and production of machinery, metals and metal products are major export-oriented Slovak industries. Influx of the foreign direct investment (FDI) was a major factor behind Slovakia's economic success. Arrival of the FDI was accompanied by massive transfers of top technologies and organisational innovations, but no MNCs shifted its research centres to Slovakia. The MNCs publish very little about their expenditure in Slovakia. The Eurostat data on GERD by sectors source of funds indicate that foreign enterprises spent some €28.5m in Slovakia, i.e. 6.9% of the total Slovak GERD in 2010. Both absolute and relative spending on R&D by foreign companies was low, given high dependence of Slovak economy on foreign capital. Allocation of GBAORD to socio-economic objectives reflected neither the sector structure of the economy nor the knowledge demand. The [ERAWATCH report on country specialisation](#) found that 'Slovakia's economic specialisation spreads over a large number of sectors', but there are 'no strong correlation in terms of economic specialisation, BERD and technological specialisation.' Lack of thematic focus is confirmed also by data on total GBAORD by NABS 2007 socio-economic objectives. Three most important themes (industrial production, health and agriculture) accounted for some 18.2% of the total GBAORD in 2010 in Slovakia. Investment in general advancement of knowledge, on the other hand, accounted for some 63.5% of

total GBAORD. No significant R&D investment was made in the key Slovak industries (manufacturing of cars, car components and consumer electronics).

The governance structure of the Slovak research system changed little over last decade. The top governance body in the field of science and technology was the Ministry of Education. It was renamed to the [Ministry of Education, Science, Research and Sports](#) (MESRS) in 2010, but there were no significant changes in competences and/or budgets. The MESRS is responsible for policy- and decision-making in the field of science and technology (Figure 1). National science and technology policy is prepared and coordinated by the MESRS with co-operation of other ministries (the Ministry of Economy ME, in particular), the [Slovak Academy of Sciences](#) (SAS), higher education institutions (HEIs) and associations of employers, and industrial research organisations, respectively. The MESRS also administered the most important body for coordination of science and technology policies (S&T), the [Slovak Republic Government Board for Science and Technology](#) (SRGBST). The Slovak Government abolished the SRGBST in 2011 and no new body was established. Since 2007, responsibilities for the research and innovation policies are separated between the Ministry of Economy (ME) and the MESRS. Innovation policy measures are implemented by the ME and its agencies. The ME drafted the 2007 [Innovation Strategy](#) and [2008 Innovation Policy](#) and the [2011 Innovation Policy](#) documents. It also established the [Slovak Innovation and Energy Agency](#) (SIEA) in 2007. This organisational division was prompted by introduction of the Structural Fund programmes. The ME implements the Operational Programme of Competitiveness and Economic Growth (OPCEG). The MESRS implements the [Operational Programme Research and Development](#) (OPRD) and the Operational Programme Education (OPE). As to manage the OPRD and OPE, the MESRS established the [Agency of the MESRS for the Structural Funds of the European Union](#) (ASFEU).

Slovakia used to be a centralised country. The self-governing regions were created as late as in 2002 and got no legislative powers in higher education, research, development, and/or innovation policies. These activities have traditionally been considered matters of central government. There are no regional research or innovation councils. Bratislava is the major centre of R&D activities, and accounts for about half of the Slovak R&D personnel and spending. The R&D capacities in Bratislava mostly are supported by the central government and/or large enterprises.

The MESRS supports basic and applied research via state budget allocations and competitive grants given to a network of organisations and agencies important for development of science & technology (S&T) and higher education: The key research performers include:

- The [Slovak Academy of Sciences](#) (SAS) is a research body providing the bulk of basic research in Slovakia. The SAS had budget of €59.55m and employed 3281 people in full-time equivalent (1812 of which held a scientific degree and 419 were PhD students, the rest of employees are technical staff.) in 2011 (source: the 2011 State Budget Law).
- **Higher Education Institutions.** There were 23 public and 12 private higher education institutions in Slovakia (as of 2011). Estimated share of public expenditure on the university system in GDP was 0.62% in 2011 (source: the

author's estimate based on the HEIs budget provided by the 2011 State Budget Law)¹.

The key funding agencies include:

- The [VEGA](#) is funding grant agency for the MESRS, and the SAS. The VEGA allocated €17.69m to 2102 research grants in 2011 (source: the VEGA [webpage](#)).
- The [Research and Development Agency](#) (RDA) provides mostly applied research grants for public and private bodies. The RDA budget increased from €0.15m in 2001 to €21.81m in 2012².

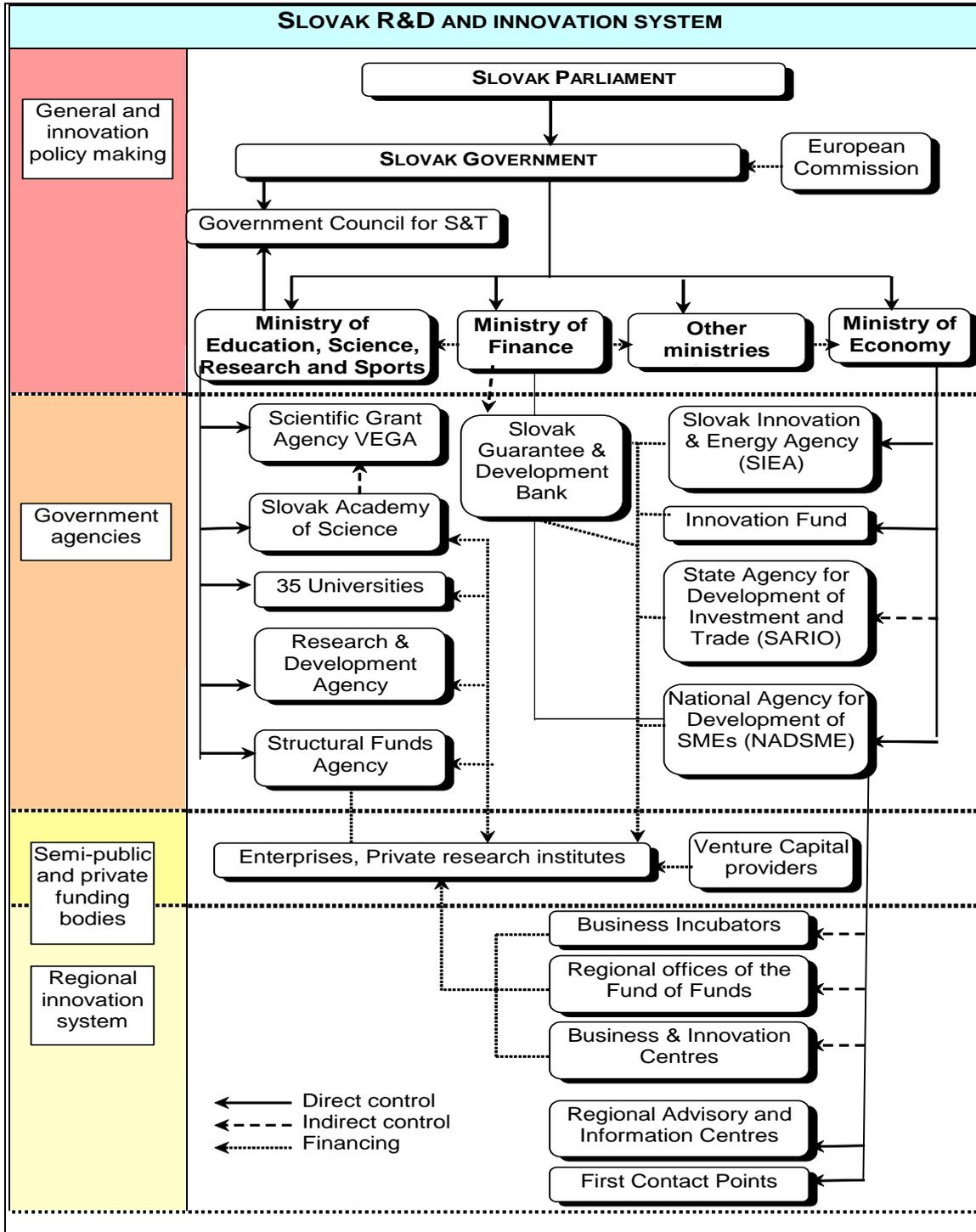
Most research was performed in the business sector (42.1% of total expenditure in the R&D), public research facilities (30.0%) and higher education facilities (27.6%) in 2010. Private non-profit sector accounted for less than 0.3% of total outlays in the same year.

Data on research by businesses are quite scarce in Slovakia. The 2006-2010 EU Industrial R&D Investment Scoreboards included no Slovak company. Branches of MNCs, which dominate the Slovak economy, concentrate on production activities. The R&D activities are mostly performed in the MNCs' headquarters and/or research centres. The great majority of some 120 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. Lack of large private R&D spenders is a serious problem in Slovakia. The Volkswagen group, for example, spent €5.79b on R&D in 2009; some 60 times more than all Slovak companies and 20 times more than total Slovak GERD in 2009.

¹ The 2012 State Budget Law set the SAS budget to €59.9m and the state support to higher education to €447.8m some 0.63% of the estimated 2012 GDP (author's estimate).

² The RDA budget peaked with €39.83m in 2009 and dropped to the €32.19m in 2010. The 2011 and 2012 budgets accounted for €20.51m and €21.84m respectively (sources: the 2011 and 2012 State Budget Laws). The government explained cuts in the RDA budgets via austerity measures and abundance of finance provided by the European programmes. National schemes supporting R&D, however, account for much higher flexibility and lower level of administrative burden.

Figure 1: Slovak R&D and innovation system



Structural challenges faced by the national system

Slovak economy enjoyed spectacular growth in 2000s. Economic growth was driven by a massive influx of the foreign direct investment (FDI), by the multinational companies (MNCs) in particular. The MNCs benefited from low costs of inputs and favourable business environment³. The influx of the FDI, paradoxically, was accompanied by relative decrease in private investment in R&D. Transfer of technologies and organisational innovation proved more important than (domestic) investment in research and innovations. A mode of competition based on low-cost, low-value added production, however, clearly had its limits. Slovak governments realised the dangers of the low-cost trap and tried to design and implement policies fostering the development of a knowledge-based economy. Progress towards this goal had limited success so far. The policies were introduced few years ago, heavily relied on the Structural Funds and accounted for relatively low levels of funding⁴.

Slovakia accounts for moderate innovation and poor research performance. Value of the Summary Innovation Index for Slovakia (0.305) was about half of that for the EU-27 (0.539) in 2011 (source: the Innovation Union Scoreboard 2011). The key challenges in the national innovation system have been continuing for many years and identified in the key government documents on innovation policies (the [2007 Innovation Strategy](#), and the [2008](#) and [2011 Innovation Policy](#) and research policies (the 2007 [Long-term Objective of the State S&T Policy up to 2015](#))⁵:

- **Challenge 1: Weak R&D system disables co-operation between academia and industry sectors.** A common denominator for poor research and innovation performance was near defunct research system. The share of gross expenditure on research and development (GERD) in the gross domestic product (GDP) fell from 3.88% in 1989 to 0.63% in 2010⁶. Slovak R&D spending was one of the lowest in Europe (EU-27 average = 2.00% in 2010), and also very low against the reference group countries (CZ+IT+HU+SI+SK = 1.27%)⁷. Fall in business spending on R&D (BERD) was a striking feature in comparison with the reference group countries in 1990s and 2000s. The share of business expenditure on research and development (BERD) in GDP was 0.27% in Slovakia while 1.23% in 2010 in the EU-27 (see chapter 3.2 for more details). Slovakia accounted for a relatively educated labour force, but failed to move to an R&D-intensive

³ Slovak government designed and implemented system of 19% flat income tax for businesses and individuals. The system was aimed at creating simple and transparent tax framework and accounted for few derogations and exceptions. The R&D tax stimuli were designed as late as in 2009 and accounted for minimal expenditure (€1.3 in 2009 and €1.2m in 2010).

⁴ Majority of support was channelled to loosely defined 'human resource policies'. Policy measures funded from the Structural Funds and supporting the RTDI activities only received €103.21m, of which €39.52m by the ERDF/ESF, €38.68m by the Slovak state budget and €17.22m by the private sector in 2004-2006.

⁵ For comprehensive list and details of key policy documents on research and innovations see the 2010 Mini Country Report for the Slovak Republic.

⁶ The 2009 share of GERD in GDP was 0.48%. Increase in intensity of R&D spending to 0.63% GDP reflects higher spending by the Operational Programmes 'Research and Development' and 'Competitiveness and Economic Growth' in 2010. The European resources provided some 63.0% total project finance in 2009, but 85.5% in 2010.

⁷ For country grouping see the [Innovation Union Competitiveness \(IUC\) report](#).

employment structure. The country was unable to shift from a blue collar structure to structure of employment based on tertiary education and high numbers of R&D workers. Low numbers of R&D workers also reflected limited interest by Slovak companies in R&D intensive production (see challenge 3). The challenge is addressed by a numbers of schemes under the 2007-2013 innovation policy mix⁸. The measures may help founding sound R&D system, if the policy mix is implemented in consistent way and the European resources are not diverted elsewhere⁹.

- **Challenge 2: Underdeveloped system of innovation governance.** The history of modern innovation policy in Slovakia is quite short. Innovation was not considered a priority till 2005 when the Competitiveness Strategy (the Lisbon Strategy for Slovakia) was passed. The [2007 Innovation Strategy](#) referred to an 'absence of strategic policies supporting innovations, low numbers and a fragmented system of explicit innovation policy measures, and poor innovation management, coordination and monitoring'. The Slovak Innovation and Energy Agency was created as late as 2007. Research bodies and policies used to be under aegis of the MESRS, while most innovation-related initiatives and agencies are managed by the ME. Co-ordination of the research and innovation policies was poor. Slovakia had no national innovation plan and/or national innovation council by 2011¹⁰. The regional systems of research and innovation governance also were missing. The regional governments account for very limited financial resources and have no legislative powers in field of research and innovation. The flagship initiative of the 2007 Innovation Strategy, the 'Regional Innovation Centres' (RICs), proved too complex to implement and was cancelled by the Slovak Government in 2011¹¹. The RICs were expected to promote commercial

⁸ Majority of the policy measures target building R&D infrastructure, building linkages between the academia and industry sectors and support to technology transfer. See chapter 3.4 for more details.

⁹ The Slovak government intended speeding up construction of motorways and reallocating €400m among several operational programmes. It wanted to deduct €180m from the Operational Programmes 'Research and Development' and 'Education' in February 2011. The European Commission opposed to the plan and suggested speeding up R&D spending instead. The government abolished its original plan and agreed to speed the R&D spending via support to low number of large infrastructure projects.

¹⁰ The Slovak Government passed the Government Resolution No. 620/2011 on 28 September 2011. The resolution named the Slovak Government Council for Science and Technology obsolete and approved statute of the new top body for co-ordinating central government agencies involved in development of the knowledge-based economy the Slovak Government Council for Innovations (SGCI). The government of Mrs Iveta Radicova lost power in October 2011 and future of the SGCI remains uncertain.

¹¹ The Regional Innovation Centres (RICs) should invest approximately €150m in the period from 2008 to 2013. The RICs should create platforms for cooperation in the field of innovations on regional, national and international levels. The RICs project should be implemented by three ministries and proved to be more complex than expected. The central, regional and local governments discussed details on numbers of the potential RICs, their legal form and activities. Regional governments, for example, should play a significant role in establishing and running RICs. These governments, however, accounted for limited legal powers in the field of innovations and low financial resources. It was originally understood that the ERDF and the state budget would provide approximately 90 % and the founding members (regional and local governments, universities and companies) the remaining 10 % of the total budget. The Ministry of Economy, however, was unsure how to implement Article 55 of Council Regulation (EC) No 1083/2006. Should the RICs generate revenues, they would have to be established as limited liability companies. Founding members would have to reimburse approximately 50 % of the costs. The regional and local governments, universities and companies refused to become the RICs founding members under such conditions. The RICs were replaced by the competence

innovations based on applied research and operate on the for-profit basis. Founding members would have to reimburse approximately 50 % of the RICs running costs. Potential funding members of the RICs (the regional and local governments, universities and companies) considered costs high and refused participation. Challenges in building efficient system of innovation governance concern also system of higher education institutions (HEIs) and public research bodies (PROs). Implementing more efficient and transparent evaluation techniques and reforming some key research performer institutions (RDA and SAS in particular) should push HEIs and PROs from quantitative targets towards to qualitative ones and promote efficient use of public spending on education and research¹².

- **Challenge 3: Dual economy and low shares of domestic innovative enterprises limit competitiveness of the country.** Dual economy probably is the most important barrier for developing strong private R&D sector and promoting innovations in Slovakia. Slovak economy is largely foreign-owned and branches of the multinational companies (MNCs) provide for significant part of Slovak industrial output and exports (Samsung, Volkswagen, Siemens, Hyundai-Kia, Peugeot-Citroen, US Steel). No MNC had its headquarters in Slovakia. The MNC were attracted by low cost of inputs (labour in particular), geographical location of Slovakia and favourable tax conditions. The MNCs did research in their headquarters and had limited interest in shifting their applied/industrial research to Slovak Universities and research institutes. The 2010 EU Industrial R&D Investment Scoreboard contains no Slovak company. Lack of strong Slovak-based MNC (like Nokia or Volkswagen) significantly affected private spending on R&D. The R&D investment by the Volkswagen group (€5,790m), for example, was 19 times higher than total Slovak GERD and 55 times higher than Slovak BERD in 2009 (source: the 2010 EU Industrial R&D Investment Scoreboard). Some 120 thousands of Slovak small and medium sized enterprises (SMEs) compete with low costs of inputs. Dual structure of national economy is reflected in low intensity of BERD, low shares of SMEs innovating in-house and low numbers of patents, industrial designs and other commercial results of research and innovations. Most Slovak SMEs considered investment in research and innovation risky and with uncertain result and bet on low costs of labour and good price/quality ratio. Average monthly labour costs in industry, construction and services were €1,093 in Slovakia, but €4,231 in Austria, €4,337 in Germany, €4,687 in Denmark and €4,639 in Belgium in 2009 (source: Eurostat). Some 15.0% Slovak enterprises innovated in-house, while 40.2% of enterprises were engaged into such innovation activities in Belgium, 34.4% in Austria, 34.1% in Italy and 29.6% in the Czech Republic in 2008 (source: the 2011 Innovation Union Scoreboard). A rather excessive focus on SMEs has been a potential weakness of Slovak innovation policies. Branches of MNCs accounted for the bulk of high and medium-tech

centres (set up by the higher education institutions and research institutes). Unlike RICs the competence centres do not associate some key stakeholders of regional innovations (regional and local governments, industry and employee associations, etc.). Total budget for the competence centres (€50m, of which €20m for the Bratislava Region) is three times lower than budget envisaged for the RICs.

¹² The [Webometrics Ranking of World Universities](#) contains only four Slovak Universities in list of top 1000 World Universities, of which the Comenius University in Bratislava (no. 490) and the Slovak University of Technology (no. 468, as of January 2012).

exports¹³ and high rates of technology transfer and diffusion, but were not targeted by any innovation policy measures in Slovakia. Lack of strong domestic R&D-intensive companies may be partly alleviated by introduction of demand-side innovation and R&D policies. Public procurement of research and innovation, however, is scarce in Slovakia. The former State Research and Development orders were abolished in 2006. Unfortunately, none Slovak innovation and/or research policy document mentions public procurement of innovative technologies¹⁴.

Assessment of the national innovation strategy

National research and innovation priorities

Attention to R&D and innovations paid by policy makers was minimal in 1990s and 2000s. Till 2004 innovations and R&D had not even been recognised development priorities. Since 2004 Slovak Government adopted a new position on importance of R&D and innovations for long-term development of the country and prepared several documents on building knowledge-based economy. Change in priorities ranking has been related to Slovakia's membership in the EU and opportunity to tap the European financial assistance. About one third of assistance (€3.5b) provided under the Structural Funds should go into the education, innovations and R&D in period 2007-2013. Building knowledge-based economy and switch to high value-added production is a leitmotif of the Slovak research and innovation policies.

The research policy priorities and policy mix were set in the [Long-term Objective of the State S&T Policy up to 2015](#):

- Higher involvement of S&T in the development of Slovakia, and more intensive participation by S&T in solving economic and social problems in Slovakia;
- Better conditions for S&T development inside Slovakia, and also for Slovakia's activities within the European Research Area;
- Setting targets for S&T development fields of (a) S&T policy co-ordination, (b) building and modernising R&D infrastructure, (c) institutional reform of public R&D, (d) reform of public financial support to R&D, (e) international co-operation and (f) monitoring and evaluation of public R&D system.

The three basic innovation policy priorities set in the [2007 Innovation Strategy](#) are:

- High-quality infrastructure and an efficient system for innovation development;
- High-quality human resources;
- Efficient tools for innovation.

¹³ The medium and high-tech product exports accounted for 61.5% of total exports of goods in Slovakia, while 47.4% in the EU-27 in 2008. Two industries, manufacture of car and car components, and consumer electronics accounted for major part of total Slovak exports of goods.

¹⁴ State Research and Development Orders (SRDO) were one-off contracts with research institutions for innovative and R&D solutions of some ad-hoc issues (e.g. construction of water works). The SRDO programme was affected by the budget cuts. R&D projects commissioned by the Ministry of Defence were closest thing to public procurement of innovative technologies. None of these projects accounted for commercial success. For more details see the 2011 Mini Country Report for the Slovak Republic.

Most important specific targets (in terms of financial and regulation support) include: (a) innovation governance (drafting and implementing strategic policy documents and research and innovation policies plus building institutional capacities); (b) support to research infrastructure; (c) support to applied research; (d) support to networking and co-operation by academia and industry sectors; and (e) support to SMEs via technology transfers and risk capital schemes.

Major changes in the R&I policies in the last three years refer to

- Increasing reliance on the EU financial resources and decreasing national public funding (see chapter 3.2); This trend also is related to efforts by the Slovak Government to decrease budget deficit and create sustainable system of public finance;
- Introduction of new types of the support measures, such as tax breaks and financial engineering tools (albeit on relatively small scale, see chapter 3.3);
- efforts to improve evaluation procedures and techniques for public R&I institutions and support measures (publishing annual reports R&D by the MESRS and evaluation reports on innovation policies by the ME, chapter 3.3).

Emerging topics in the R&I policy discussion include re-evaluation of thematic priorities and investment targets. The 2007 'Objective' contained 12 thematic priorities, which may have been too many for country with low R&D spending. The 2011 [Fenix](#) Strategy went into another extreme, and cancelled thematic priorities at all. In fact, over 63.5% of public support was channelled to non-oriented research and general University funds in 2010 (source: Eurostat data on Total GBAORD by NABS 2007 socio-economic objectives). Shares of government budget appropriations or outlays on research and development (GBAORD) in GDP (0.3%) accounted for about half of the EU-27 average and remained the same in period 2004-2010.). The [Fenix](#) and [Minerva 2.0](#) strategies suggested re-allocating finance provided by the Operational Programme Research and Development towards large-scale projects with strategic importance, (iv) creating national system for technology transfers, (v) introducing new programmes supporting new technology-based firms and innovation-oriented research, and (vi) starting co-operation with branches of multinational companies in Slovakia (e.g. establishing top-notch infrastructure for elite research). These documents, however, do not specify investment targets in terms of share of R&D spending in GDP and/or thematic funding. They contain references to major societal challenges such as energy/climate change, health, ageing and sustainable development, but do not specify targets and/or budgets related to these issues.

Priorities in R&D and innovation policies overlap in fields of capacity and infrastructure building, reform of public support to R&D and innovation policy tools, and (rather excessive) reliance on Structural Funds. Priorities set in main research and innovation policy documents are consistent with the structural challenges faced by Slovak economy and society. They in particular address challenges related to the capacity and infrastructure building, improving systems of research and innovation governance, and public financial support to R&D and innovation. As for the challenges related to dual economy, these are outside the remit of research and innovation policies. These policies, however, may support creating framework conducive for building a knowledge-based economy.

Trends in R&D funding

Major long-term trends in research funding in Slovakia included (a) decline of research funded by private sector and increase of relative importance of government finance, (b) decreasing importance of applied research and increasing importance of basic research, (c) falling shares of engineering and increasing shares of natural sciences (related to basic research), and (d) disappearing thematic focus and increase in non-oriented research and general University funds (Figure 2). These trends relate to overall fall in research spending, and decline in the domestic private research base in the 1990s in particular. Share of GERD in GDP was 3.88% by 1989, but 0.63% in 2010 (Table 1). Numbers of researchers were declining simultaneously with the GERD shares in GDP (Figure 2).

Table 1: Basic indicators for R&D investments in Slovakia

	2008	2009	2010	EU average 2010
GDP growth rate	5.9	-4.9	4.2	2.0
GERD as % of GDP	0.47	0.48	0.63	2.0
GERD per capita	56.5	56.0	76.8	490.2
GBAORD (€ million)	170.7	182.1	193.9	92,729.05
GBAORD as % of GDP	0.28	0.30	0.30	0.76
BERD (€ million)	130.8	124.4	175.2	151,125.56
BERD as % of GDP	0.20	0.20	0.27	1.23
GERD financed by abroad as % of total GERD	12.2	12.9	14.7	N/A ¹⁵
R&D performed by HEIs (% of GERD)	24.2	25.0	27.6	24.2
R&D performed by PROs (% of GERD)	32.7	33.9	29.9	13.2
R&D performed by Business Enterprise sector (as % of GERD)	42.8	41.1	42.1	61.5

Source: Eurostat. Note: The data was updated end of Nov – mid Dec 2011 by EUROSTAT;

The Slovak research system increasingly relies on European resources. Support to knowledge-based economy accounts for impressive increases in period 2007-2013 (source: Slovak Government: the National Reference Framework for the Slovak Republic for period 2007-2013). Total assistance by Structural Funds to human resources, R&D and innovation was some €436m for the period 2004-2006. Assistance to these fields should increase to some €5b in between 2007-2013. The European assistance, however, ousts national funding. This trend has been pronounced since the outbreak of the economic crisis in 2008:

- The 2009 State Budget Law envisaged total support of €295.55m for research policy measures, of which €171.79m (61%) came from the [Operational Programme Research and Development](#) (OPRD). The 2012 State Budget Law

¹⁵ 8.4 (2009), 9.04 (2005)

set total support of €501.41m, of which €404.41m (81%) comes from the OPRD.

- The Slovak Government pointed to the availability of the European resources for R&D funding and cut national support to research and development. The Slovak 2012 State Budget Law set the SAS budget to €58.98m (2010: €63.6m) and the budget of the RDA to €21.81m (2010: €32.19m).

Usual co-financing rate by the ERDF/ESF (for measures provided under the OPRD) is 85%-95%. Innovation policy measures almost completely rely on assistance provided by the Operational Programme Competitiveness and Economic Growth, and usual co-financing rate by the ERDF/ESF is 85%.

Slovak research funding relies almost exclusively on grants. In 2009 the tax stimuli were first time used though to a limited extent:

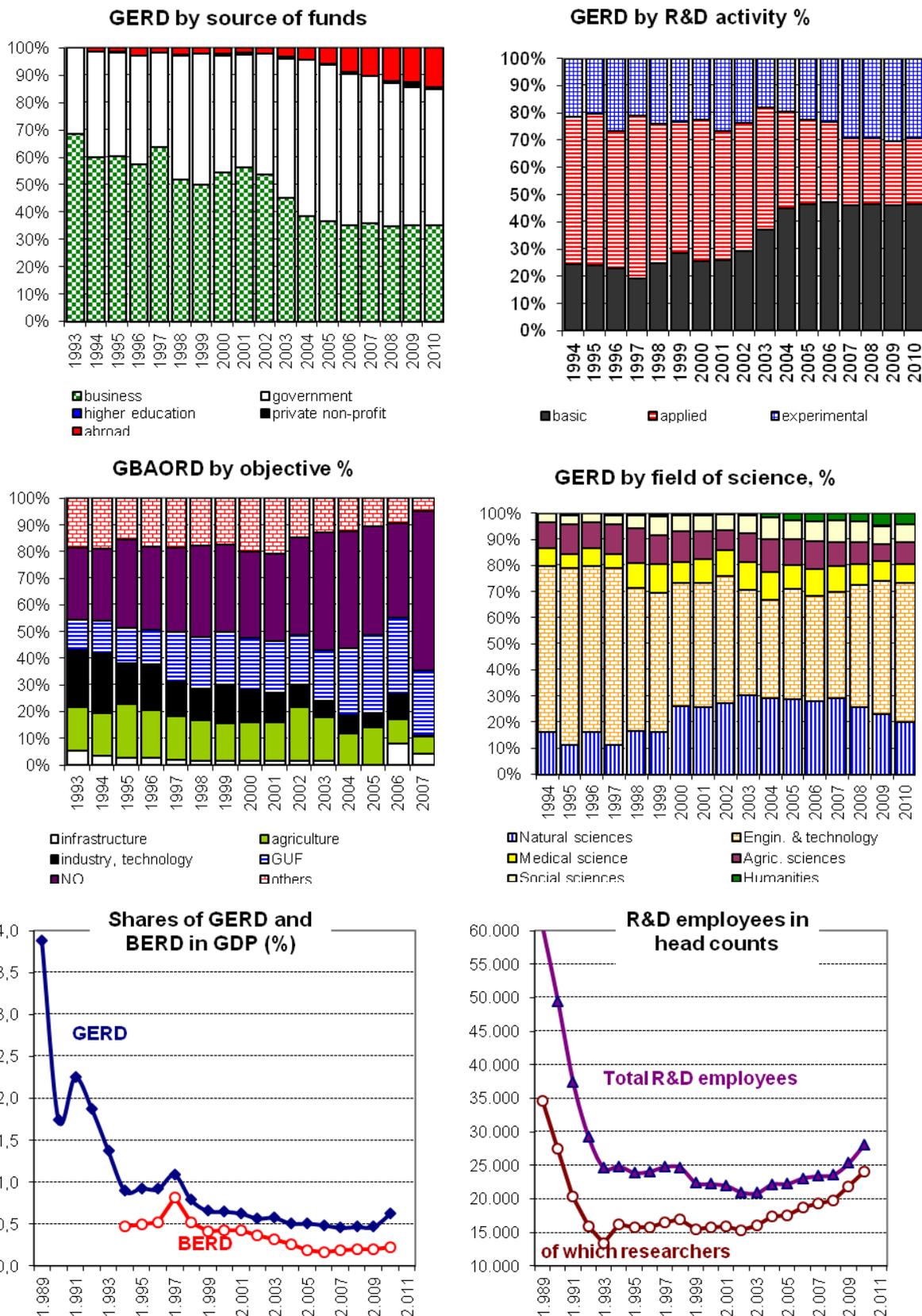
- **Institutional funding** supports basic research and is provided directly (via block grants) from the state budget divisions (ministries and other central authorities). Total volume of institutional funding from state budget was €39.48m in 2010 and increased by 14.6% since 2007..
- **Project finance** is provided from the national and European resources. The total volume of public support to project finance accounted for €229.2m in 2010. It increased by 6.8 times in the period 2007-2010. The increase is related to the financing of programmes through the Structural Funds.
- The Slovak Parliament passed the 185/2009 R&D Stimuli Law in April 2009. The law provides **tax breaks** for specific activities in applied research. Five firms were supported with €1.3m in 2009 and 15 ones with €1.2m in 2010 (source: the 2007-2010 Annual Reports on R&D).

Research and innovation traditionally were considered matters of central government in Slovakia. Slovak regions have no legislative powers in field of research and innovation. No explicit regional research and/or innovation programmes and policy measures have been developed in Slovakia. All research and innovation policy measures are designed and implemented by agencies of central government.

Public-private partnerships have had rather limited role in leveraging additional funding so far. The State Budget supported six horizontal and three thematic State Research and Development Programmes (SRDPs) in period 2003-2010. The SRDPs should (among other goals) promote co-operation by private and public sector in research and development. Total support by the state budget was €91.36m and the private sector provided €20.94m in the abovementioned period. No SRDP was launched in 2010 and 2011.

Role of inter-regional funding is quite unimportant for research and innovation in Slovakia. The Operational Programme INTERREG IVC supported seven Slovak firms with €2.9m in period 2008-2009. Transnational funding, however, increased in importance since 2008. The share of foreign funding in total funding increased from 2.3% in 2000 to 14.7% in 2010. The European Commission and other international organisations generated about 51.0% of total foreign funding (7.5% of the total GERD) and the business enterprise sector 46.7% of total foreign funding for Slovak research system (6.9% of the total GERD) in 2010.

Figure 2: Trends in research funding in Slovakia. Sources: Eurostat and the Statistical Office of the Slovak Republic



Evolution and analysis of the policy mixes

Slovak R&D and innovation policies have been fairly generic and did not favour specific sectors. Most policies concentrated directly in the R&D and Innovation domains¹⁶, while interactions with the Finance and Human Resource domains were relatively weak in period 2007-2011:

- Public sector policies on R&D and Innovation domains targeted (a) institutional funding for R&D projects; (b) reconstruction and modernisation of R&D infrastructure; (c) selective support for centres of excellence in basic research and industry-academia co-operation in applied research; and (d) institutional building and structural reforms of the public research system.
- There were some R&D specific human capital policies (the 'Support to Human Potential and Popularisation of Science' programme by the Research and Development Agency);
- The R&D specific financial policies were limited either by considerations of the fiscal stability (tax stimuli) or administrative complexity and evidence on mismanagement of public resources (risk capital schemes).

Research policy priorities and policy mix were set in the [Long-term Objective of the State S&T Policy up to 2015](#) and remained relatively stable till 2011, when they were cancelled by the Fenix Strategy. Targets related to (a) building high-quality R&D infrastructure and supporting development human resources; (b) improving co-ordination of R&D, innovation, and human resource policies, (c) enhancing academia-industry co-operation and (d) reforming system of public support to R&D accounted for majority of attention by policy makers. Institutional support to the higher education institutions and the Slovak Academy of Sciences, and project finance channelled via the State R&D programmes, Research and Development Agency grants and horizontal programmes remained major forms for direct assistance to R&D in Slovakia in 2007- 2010.

Two routes have dominated policies aimed at stimulation of R&D investment in Slovakia in 2000s¹⁷: (a) increasing R&D in public sector and (b) stimulating greater R&D investment in R&D performing firms (SMEs in particular). This policy mix was derived from some historical developments. In 2000s the applied research system deteriorated and public sector became major research performer. The government decided to improve R&D infrastructure and support human resources in public sector. The bulk of national assistance to R&D investment was channelled via the [Research and Development Agency](#) and [VEGA](#) grant agency, and aimed at supporting young researchers and basic research on Slovak Universities and the [Slovak Academy of Sciences](#). Assistance provided by Structural Funds was channelled to (privatised) industry research institutes and research units of (few) large domestic firms. Maintaining remnants of the pre-1989 network of some 40 (domestic) industry

¹⁶ For taxonomy of the policy type models see: Ken Guy, Patries Boekholt, Paul Cunningham, Reinhold Hofer, Claire Nauwelaers, and Christian Rammer. 2009. Designing Policy Mixes: Enhancing Innovation System Performance and R&D Investment Levels. Methodology Deliverable, Task 3. The "Policy Mix" Project; European Commission, DG Research

¹⁷ The 2009 ERAWATCH country reports identified six 'routes' to stimulate investment to R&D: (1) stimulating greater R&D investment in R&D performing firms; (2) promoting the establishment of new indigenous R&D performing firms; (3) stimulating firms that do not perform R&D yet; (4) attracting R&D-performing firms from abroad; (5) increasing extramural R&D carried out in cooperation with the public sector and (6); increasing R&D in the public sector.

research institutes was preferred to promoting new indigenous R&D firms and/or stimulating firms that do not perform R&D yet.

The most important changes in policy mix refer to volume of financial support and systemic changes in support to R&D:

- Public support to R&D increased from €86.0m to €238.7m in period 2000-2010. Significant increases in support have been related to spending by the Structural Fund programmes
- Systemic changes in support to R&D were detailed in the 2010 [New Model of Financing Science and Technology in the Slovak Republic](#). The support primarily is channelled to infrastructure building, applied research, and international scientific-technical cooperation.

The **innovation policy** mix has short history in Slovakia. The mix was set in the [2007 Innovation Strategy](#) (first coherent document on innovation development in Slovakia) for period 2007-2013 and specified for the 2008-2010 and 2011-2013 periods in the [2008 Innovation Policy](#) and the [2011 Innovation Policy](#). The policy priorities and mix of policy instruments applied in period 2007-2013 basically resemble those applied in planning period 2004-2006. The most significant difference is much higher assistance provided to research, development and innovation policy measures in 2007-2013.

Most financial assistance is provided via grants for technology transfers, building business and technology incubators, developing R&D infrastructure, supporting R&D co-operation networks, financing applied research and creating risk capital schemes. The state budget and the Community means are the main sources of the innovation financing. Private sector, foreign donors, non-profit bodies, and own resources by R&D centres and universities provide modest contribution to innovation finance. The Slovak innovation policy mix heavily relies on direct financial measures. Risk capital measures, equity and loan guarantees, and indirect incentives (tax stimuli) are provided to a limited extent¹⁸.

Policy mix may account for some important changes in the near future. The [2010 Evaluation Report](#) on implementation of the 2007 [Innovation Strategy](#), for example, recognised that SMEs were major target group and beneficiaries of most innovation policy measures in Slovakia but 'the multinational companies also should be motivated to enter the Slovak research system'. Several new policy measures promoted by the [2011 Innovation Policy](#) (the 'National motivation project for improving innovation performance', the 'Innovation voucher' project', the 'Intellectual property rights' project) aim at commercialisation of the research results and getting ideas to the market. Launch of the policy measures is expected in 2012¹⁹. The

¹⁸ Total amount of the tax allowance for R&D has been limited by considerations of fiscal stability. Schemes applied under the 185/2009 Law on R&D Stimuli supported some five companies with €1.3m in 2009 and 15 companies with €1.2m in 2010. The [JEREMIE](#) initiative should provide risk capital for small and medium enterprises. The scheme should start in 2008, but was delayed several times for administrative complexity. The first call under the scheme titled the 'First Loss Portfolio Guarantee Financial Instrument' was launched in October 2011 and allocated €38m. The second call was launched in January 2012 and allocated €31m, of which €3.3m comes from the [Operational Programme Bratislava Region](#) and €27.7m from the [Operational Programme Research & Development](#) (OPRD). The former programme supports the Seed Fund and the latter the Venture Capital Fund or Co-Investment Fund

¹⁹ The government did not disclosed details of the abovementioned programmes by end of 2011.

government recognises a significant deficit in innovation governance in Slovakia (no national innovation plan, no national and regional innovation councils). The [2011 Innovation Policy](#) envisages 'elaborating strategic and analytical materials on innovations'. The [2010 Evaluation Report](#) also suggested the need for 'creating top government body responsible for governance of innovation and research systems'. A new agenda emerging in innovation policies is related to clusters. The [2011 Innovation Policy](#) introduces a new policy measure: 'Support to innovative industrial clusters'. This measure should be ready by the end of 2012. The pro-active cluster policies are introduced with help of the regional governments. €4m are allocated to this programme. The [2011 Innovation Policy](#) keeps the main policy priorities as stated in the 2007 Innovation Strategy document, but also refers to the 'Europe 2020' strategy and promotes (i) 'creating a knowledge-based economy', (ii) 'supporting a green and competitive economy' and (iii) 'supporting job creation and social inclusion'. These European priorities are reflected in the Slovak innovation policy measures as well.

In July and August 2011 the Slovak Government presented drafts of two policy documents (the 'Fenix' and the 'Minerva 2.0' strategies) for the development of science and technology, and a knowledge-based economy. The documents try to integrate research and innovation policies, and suggest a range of institutional reforms for increasing the quality of higher education and research, notably: (i) implementing more efficient and transparent evaluation techniques, (ii) reforming some key research performer institutions (the Research and Development Agency and the Slovak Academy of Sciences), (iii) re-allocating finance provided by the [Operational Programme Research and Development](#) towards large-scale projects with strategic importance, (iv) creating a national system for technology transfers, (v) introducing new programmes supporting new technology-based firms and innovation-oriented research, and (vi) starting co-operation with branches of multinational companies in Slovakia (e.g. establishing top-notch infrastructure for elite research).

Assessment of the policy mix

The key challenges in the national research and innovation system have been continuing for many years and identified in the key government documents on innovation policies (the [2007 Innovation Strategy](#), and the [2008](#) and [2011 Innovation Policy](#)). Policy documents and research and innovation policy measures adopted since 2007 responded to the weaknesses in the Slovak research and innovation systems, and tried to address the major challenges in research and innovation funding, capacity and infrastructure building, creating supply of human resources, and strengthening industry-academia linkages.

So far the greatest improvements were achieved in capacity building (creating governance systems and infrastructure), and financing research and innovation.

- The Slovak Government drafted and implemented key strategies and policy documents, and started to publish evaluation reports on R&D and innovation performance. The annual reports provide basic overview on major developments in Slovak research and innovation systems. The government also created or reformed agencies implementing the Structural Funds assistance. The capacity building, however, was not without flaws. The flagship initiative of the 2007 Innovation Strategy, the 'Regional Innovation Centres', proved too complex to implement and was cancelled by the Slovak Government in 2011. Regional innovation governance structures are almost

missing. There are no regional innovation councils and/or regional innovation plans.

- Financial support to the Slovak research and innovation systems by public and business sectors decreased considerably in 1990s and 2000s. The Structural Funds provide impressive amount of funding and seem to replace the (admittedly inadequate) national policy initiatives. The massive spending for the demand-oriented projects from the Structural Funds (some €160m in 2010) helped to push share of GERD in GDP from 0.48% in 2009 to 0.63% in 2010 (level not seen since 2001). Whether these initiatives are sufficient to improve quality of research in Slovakia remains to be seen. Implementation of three key operational programmes aimed at building knowledge-based economy has been lagging behind the schedule. The Ministry of Finance reported following spending rates for the most important operational programmes by end of December 2011:
 - The [Operational Programme Research & Development](#) (OPRD) disbursed €244.1m, only 20.1% of the total EU assistance €1209.4m envisaged in planning period 2007-2013;
 - The Operational Programme Education (OPE) disbursed €82.6m, 13.4% of the total EU assistance €617.8m;
 - The Operational Programme Competitiveness and Economic Growth (OPCEG) disbursed €293.4m, 37.7% of the total EU assistance €777.0m;

It is too early to judge effectiveness of the implemented policy measures. The abovementioned operational programmes disbursed less than one fifth of their combined value and relatively few projects were completed by 2011. There are potential problems with the absorption capacity, and mismatches between supply and demand for knowledge in academia and industry sectors. Creation of efficient links between public research and the private sector research institutes may take years. Efficient use of European support requires improvements in evaluation practices and broader use of the international benchmarking and quality standards.

The main objectives of research and innovation policies applied in period 2007-2013 refer to building capacity and a framework conducive for development of knowledge-based economy. Major synergies are likely to originate from large numbers of projects on research infrastructure (supported by the OPRD) and applied research (supported by the OPCEG). More sophisticated innovation and R&D policies, such as targeting specific R&D fields, and/or supporting research-based spin-offs may come in next planning period.

Table 2: Assessment of the policy mix

Challenges	Policy measures/actions ²⁰	Assessment in terms of appropriateness, efficiency and effectiveness
<p>Weak R&D system</p>	<p>Infrastructure of Research and Development</p> <p>Infrastructure for research and development - Data centre for research and development</p> <p>National information system supporting research and development in Slovakia</p> <p>Transfer of knowledge and technology from research and development into practice</p> <p>Supporting innovative activities in enterprises</p> <p>Innovation and technology transfers</p> <p>JEREMIE Financial engineering tools for innovations</p>	<p>Capacity building.</p> <p>(+) Policies implemented under the 2010 'New Model of Financing Science and Technology in the Slovak Republic', and the Fenix and Minerva 2.0 strategies may improve excellence and efficiency of the public research system. New set of performance indicators may increase role of socio-economic impacts of research.</p> <p>(-) Limited commitment by successive government to policies drafted by the former government.</p> <p>Financial resources</p> <p>(+) The Operational Programmes 'Research and Development', 'Competitiveness and Economic Growth' and Education' provide great volume of R&D funding.</p> <p>(-) Significant increases in public support to R&D need not necessarily be reflected in corresponding investment by private sector.</p> <p>(-) Schemes funded from Structural Funds replace national funding. European finance is much more generous, but also rather bureaucratic, difficult to get and accounts for slow implementation.</p> <p>Research infrastructure and human resources</p> <p>(+) Higher support to R&D from the Structural Funds positively impacts inputs to R&D sector.</p> <p>(+) National projects on data centres, information infrastructure and knowledge transfer in place. New R&D infrastructure may improve linkages between industry and academia sectors, and between Slovakia and other ERA members.</p> <p>(-) Increased public investment in human resources and R&D infrastructure may prove unsustainable, once Structural Funds assistance stops.</p> <p>(-) Incumbent stock of human capital is low and ageing, and may not generate a critical mass needed for transition towards a knowledge-based economy. Brain-drain by young researchers remains a threat for development of highly skilled human resources in Slovakia.</p> <p>Support to applied research and academia-industry co-operation</p> <p>(+) Links between science & technology and innovation policies (including co-operation between public and private sectors) may be strengthened</p>

²⁰ Changes in the legislation and other initiatives not necessarily related with funding are also included.

Challenges	Policy measures/actions ²⁰	Assessment in terms of appropriateness, efficiency and effectiveness
Underdeveloped system of innovation governance	Policy documents and strategies: Long-term Objective of the State S&T Policy up to 2015 The Innovation Strategy for the Slovak Republic for years 2007-2013 The Innovation Policy of the Slovak Republic for 2011 to 2013 New Model of Financing Science and Technology in the Slovak Republic	Improvements in innovation governance. (+) Long-term Innovation Strategy and medium-term Innovation Policies in place. (+) The government publishes regular reports on implementation of innovation policy measures. (+) The Slovak Innovation and Energy Agency was created; it implements majority of the Structural Fund measures. (-) Underdeveloped evaluation culture. (-) Scheme implementing Regional Innovation Centres failed. Innovation finance (+) Structural Fund schemes are implemented. Significant increase in investment by innovation policy schemes. (-) There is low absorption capacity for innovative solutions by SMEs. (-) Risk capital schemes account for slow progress.
Dual economy and low wages generate low supply of and low demand for R&D solutions.		(-) Tackling this problem is outside of scope of explicit R&D policies. Barriers are likely to be removed by market forces and framework supportive policies. These developments can take years to materialise.

National policy and the European perspective

The national mix of the research and innovation policies should address challenges related to the weak R&D system, and underdeveloped system of innovation and research governance. Possible directions include policies aimed at (i) capacity building, (ii) better management of the European assistance and structural shifts in area of intervention, and (iii) strengthening role of the national financial resources for research and innovation.

The Slovak Republic probably should establish a top body for designing and co-ordinating research and innovation policies (e.g. the National Innovation Council), and make this body permanent and functional²¹. Creation of regional systems of research and innovation governance is no less challenging. The 'Building regional innovation centres' policy measure was the flagship initiative for building capacities on regional level. Failure of the measure may slow down implementation of some more sophisticated innovation policy measures (support to clusters, regional

²¹ Former top body for co-ordination of science and technology policies, the Slovak Government Council for Science and Technology, met quite infrequently (three times in 2007, once in 2008, 2009 and 2010, never in 2011). The Slovak Government abolished the body in 2011.

innovation poles, industry-academia co-operation schemes). These measures require proper innovation governance mechanisms, unlike simple schemes distributing grants for technology transfer and applied research.

The Structural Fund schemes generated over three quarters of total public outlays for R&D in Slovakia in 2011. The large influx of financial assistance benefited the Slovak R&D system in terms of infrastructure building in particular. Some Structural Fund schemes, however, struggled with the absorptive capacity of the country. The Operational Programme Research and Development accounted for slow spending rate. The assistance was fragmented to large numbers of relatively small projects and burdened with some extra layers of administrative requirements added by the Slovak Government. The possible solution (suggested by the Ministry of Education, Science, Research and Sports, and the Slovak Academy of Sciences) is to concentrate major part of spending to some ten large-scale infrastructure projects aimed at building top-notch research centres in biology, new materials and energy resources.

The European assistance has been crowding out national funding for Slovak research and innovation policies in 2008-2011. Rather excessive reliance on the Structural Fund schemes raises questions about sustainability of some policy measures once support from the European resources decreases. Slovak innovation and research policy makers realise this threat. The 2011 Innovation Policy, for example, pointed to 'disproportional reliance by innovation policies on the European and international financial assistance' and called for increased national funding for innovation. There is no immediate solution of the problem. As for the period 2011-2013 the indicative national assistance to innovation policies (€5.05m) is a fraction of the European one (€90.55m). European assistance also clearly dominates the research policy measures in the same period. In the medium term, Slovakia should develop a strong national system for funding research and innovation policies. Sustainability, flexibility and low level of administrative burdens may account for major advantage of national system of research and innovation funding.

The national policy mix (as defined in the major documents on research and innovation policies) is broadly aligned with the ERA pillars and objectives. The policy mix also benefits from a significant volume of European assistance. Progress towards the strategic ERA-objectives, however, is rather slow, given long-lasting problems of capacity building and dual economy. So far, the greatest progress was done in field of infrastructure building and modernising, thanks to inflow of the European assistance. Other challenges, namely improving working conditions for researchers and R&D workers, and building top-quality PROs and HEIs should be assisted by the national funding. Progress in solving the abovementioned challenges has been limited so far.

The greatest challenges to be addressed by the national policy mix in medium term (with respect to the ERA pillars) include (a) improving working conditions for researchers and PhD students (creating attractive career prospects in particular); (b) building and modernising research infrastructure, (c) building top quality PROs and HEIs (elite Universities in particular), and (d) encouraging research in private sector, and building strong ties between the industry and academia sectors.

Table 3: Assessment of the national policies/measures supporting the strategic ERA objectives (derived from ERA 2020 Vision)

	ERA dimension	Main challenges at national level	Recent policy changes
1	Labour Market for Researchers	<p>Improving working conditions for researchers and PhD students</p> <p>(+, -) Moderate supply of human resources for science & engineering, to a high extent matching the market demand</p> <p>(-) Overall highly unattractive working conditions for researchers.</p> <p>(-) Stopping or slowing down brain-drain by tertiary students and young researchers.</p>	<p>No recent changes. The Decree of the Government of the Slovak Republic No. 391/2004 enables access to Slovak labour market to citizens of all EU member states without any restrictions.</p> <p>Female researchers have right to return to the same position after maternal leave.</p>
2	Cross-boarder cooperation	<p>Exploiting benefits of joint programming, and jointly funded activities</p> <p>Opening national programmes to foreign participants</p> <p>(-) Slovak national programmes are closed to foreign participants.</p> <p>(-) Joint programming receives relatively low attention by policy-makers (in terms of policy measures and budgets).</p>	<p>No changes in design of national programmes; these remain closed for foreign participants.</p>
3	World class research infrastructures	<p>Drafting national ESFRI roadmap</p> <p>Building and modernising research infrastructure.</p> <p>(-) Lack of absorption capacity in regions outside Bratislava.</p>	<p>(+) Massive spending from Structural funds provided significant boost to building and modernising R&D infrastructure in Slovakia.</p> <p>(-) National Research Infrastructures Roadmap lacking by end of 2011.</p>
4	Research institutions	<p>Building high-quality public research organisation and higher education institutions</p> <p>(+) European money makes strengthening PROs and HEIs feasible.</p> <p>(-) High numbers of HEIs, but no HEI accounts for World class research</p> <p>(-) University ranking and evaluation procedures have to take into account generally low quality of research and are subject to lobbyist pressures.</p>	<p>The Operational Programme Research and Development invests some €1.4b in total to Slovak PROs and HEIs in 2007-2013.</p> <p>The government tries to improve quality of research in Slovak PROs and HEIs. University ranking and evaluation procedure should be reflected in amount of support.</p>

	ERA dimension	Main challenges at national level	Recent policy changes
5	Public-private partnerships	<p>Weak links between the academia and industry</p> <p>Low interest by Slovak SMEs in research and innovation</p> <p>(+) Structural Funds provide considerable resources for building institutions facilitating knowledge transfer between industry and academia sectors.</p> <p>(+) New R&D infrastructure may improve linkages between industry and academia sectors, and between Slovakia and advanced EU members.</p> <p>(-) Potential problems with low demand and absorption capacity.</p>	<p>The Operational Programme Research and Development allocates some €689m to projects supporting innovation culture in Slovak firms and transfer of knowledge in period 2007-2013.</p>
6	Knowledge circulation across Europe	<p>Low participation in knowledge circulation</p> <p>(-) Slovakia accounts for one of the lowest participation rates in European research initiatives.</p>	<p>Slovak government continues supporting limited numbers of projects within the FP, ESF, COST and EUREKA programmes.</p>
7	International Co-operation	<p>Low participation in international co-operation</p> <p>(+) Increased interest by Slovak government and research institutions in participation in European and international research initiatives.</p> <p>(-) Overall, very low resources provided for international co-operation in science and technology.</p>	<p>Slovak government continues supporting limited numbers of bilateral and multilateral projects within third countries.</p>

Annex: Alignment of national policies with ERA pillars / objectives

1. Ensure an adequate supply of human resources for research and an open, attractive and competitive single European labour market for male and female researchers

1.1 Supply of human resources for research

Slovakia and the EU-27 accounted for contrasting trends in numbers of researchers and R&D personnel. Numbers of researchers (in full-time equivalent) versus total population in Slovakia decreased from 0.09% to 0.06% in the period 2001-2010. Respective numbers increased from 0.25% to 0.29% in the EU-27 in the same period (source: Eurostat). Labour market for researchers accounted for a dramatic though not always positive changes in the past two decades in Slovakia. There were some 60,548 R&D workers (of which 34,685 researchers) in headcounts in 1989. Demise of central planning and immediate introduction of a market economy were reflected in deep fall in GERD and stocks of human resources in R&D in the early 1990s (Figure 2). In the period 1989-1994, numbers of R&D workers and researchers dropped to one third. By 2010 there were some 28,128 R&D workers (of which 24,049 researchers) in headcounts in Slovakia.

Data on the Human Resources in Science and Technology (HRST) indicate that Slovakia was unable to attract foreign professionals. Foreign nationals accounted for some 0.3% of total HRST in Slovakia in 2009. In Austria (Slovakia's developed neighbour), for example, foreign nationals accounted for 8.7% of total HRST in the same year (source: Eurostat). Data on the levels of inward versus outward flow of researchers is not available, but brain-drain is considered a serious problem for the development of human resources in Slovakia. Two basic research policy documents (the 2002 [Concept of the National Science and Technology Policy by 2005](#) and the 2007 [Long-term Objective of the State S&T Policy up to 2015](#)) contained priorities on:

- creating conditions for human resources development, with particular regard to careers of young research workers and their professional growth,
- creating working conditions (salaries, training, modern infrastructure) for R&D workers to stop a brain drain to more attractive jobs in Slovakia and abroad,
- supporting mobility of R&D workers between different R&D sectors;
- supporting international mobility of R&D workers via attracting foreign professionals to Slovakia and supporting return migration by Slovak nationals;
- developing careers of young researchers and supporting excellent mentors of PhD students.

The [Research and Development Agency](#) implements the 'Support to Human Potential in Research and Popularisation of Science' programme. The programme aims at 'improving attractiveness and increase in interest by young people in careers in research'. Some 205 projects were supported in 2010 with €4.58m from the state budget and €0.14m from other national resources (source: the 2010 Annual Report on R&D).

The OECD data on migration by tertiary students indicate negative balance by numbers of PhD student flows from/to Slovakia. Numbers of the Slovak PhD students participating in the advanced research programmes rose from 366 in 2004 to 1614 in 2009 (source: OECD StatExtracts: Education Skills). Numbers of foreign students participating in the advanced research programmes in Slovakia increased from 113 to 942 in the period 2004-2010. The Czech students accounted for about 50% of all foreign students in Slovakia. Combined shares of Greek, Norwegian and Serbian students were about 15% in 2010 (source: [the Institute for information and Forecasting in Education of the Ministry of Education](#)).

1.2 Ensure that researchers across the EU benefit from open recruitment, adequate training, attractive career prospects and working conditions and barriers to cross-border mobility are removed

Employees in public sector are considered as civil servants. Their remuneration is regulated by the official salary schemes set in the 553/2003 [Law on Remuneration of Civil Servants](#). These are based on education level, type of jobs and length of experience. The Law sets a special wage tariff scale for the University teachers and R&D workers. Tariff wage can be complemented by bonus, if available. In theory, higher education institutions and research institutes may determine salaries of the academic staff via allowances and extra remuneration. In practice, salaries are determined by the amount of funds provided from the state budget. The Slovak government decided to cut the budget deficit in 2011. Salaries for the Universities and the Slovak Academy of Sciences may drop in real terms (depending on pace of inflation).

The average (gross) monthly wage was €930 for science and technology workers, but €1,693 in financial services, €1,482 in information and telecommunication technologies and €1,477 in energy sector in July 2011. The national average wage was €781 (source: Statistical Office of the Slovak Republic). The average gross annual earnings in 'professional, scientific and technical activities' were vastly different in Slovakia if compared to developed EU members. The average annual earnings were €14,393 in Slovakia, but €52,600 in Germany, €49,663 in the UK, €57,594 in the Netherlands and €44,703 in Finland in 2010 (source: Eurostat).

The access to the Slovak national labour market depends on origin of an applicant. On the basis of the Treaty of Accession of the Slovak Republic to the European Union and the Decree of the Government of the Slovak Republic No. 391/2004, from 1 May 2004, the Slovak Republic enables access to its labour market to citizens of all the EU member states without any restrictions. According to the Law on Employment Services No 5/2004 a citizen of an EU member state and his/her family members shall have the same legal position in legal relations occurring pursuant to this Act as do citizens of the Slovak Republic. The rights relating to a citizen of an EU member state and his/her family members also refer to citizens and family members of states within the European Economic Area. Nationals from third countries have the same legal status as Slovak citizens, if they were issued a work permit and a temporary residence permit for the purpose of employment. The employer with a seat in the territory of the Slovak Republic may accept a foreign person in employment only if that person was issued a temporary residence permit for the purpose of employment and a work permit by the competent Office. Temporary work and residence permit effectively preclude researchers from third countries to apply for tenured position.

An EU researcher may, in theory, apply for any research job and/or post in Slovakia. In real life, some managerial posts require fluent Slovak, which few foreign applicants can prove. There were examples (if only a few) of foreigners applying and winning top posts in Slovak University system. A Polish catholic priest and polyglot, for example, is rector of the Catholic University in Ružomberok.

The 172/2005 [Law on Organisation of State Support to R&D](#) regulates provision of finance to public sector. Slovakia transposed the Council Regulation on special methods of accepting the citizens of third countries (outside the territory of the EU) into scientific research through the 2008 and 2011 amendments of the 172/2005 Law. The amendments specified the terms and conditions under which R&D organisations can accept researchers from third countries. Bodies established in Slovakia are eligible for support. Individual researchers (including citizens of the EU and third countries) may hold grants and transfer these within Slovakia, but they have to produce a work permit and acceptance documents by Slovak research institutions. Transfer of funds provided by the Slovak state budget to bodies/persons residing outside Slovakia is not allowed.

1.3 Improve young people's scientific education and increase interest in research careers

The 131/2002 [Law on Higher Education](#) distinguishes between postgraduate training and awarding PhD degrees. The postgraduate training is provided by (a) accredited higher education institutions and (b) accredited training places. The latter category refers to institutes of the Slovak Academy of Sciences in particular. All HEIs and training places other than HEIs must be accredited by the Ministry of Education, Science, Research and Sports. Accredited training places other than HEIs must prove compliance with qualitative standards (research infrastructure, research excellence and availability of scientific staff) and sign co-operation agreement with an accredited HEI. The HEI only can award the PhD title.

Two types of PhD courses are provided. The 'internal' (full-time) PhD students get fellowships paid by the state, and distributed via HEIs and accredited training places. Fellowships are awarded for three years. Internal PhD students are expected to participate in teaching and research. The 'external' (part-time) PhD programmes are designed for people employed outside the research and HEI sectors, and do not involve any direct financial support. External PhD students are expected to defend their theses within five years since commencement of their studies. Internal PhD students pay no fees for their studies within regular period of studies (three years). Typical annual fees for the external PhD students varied from 500 to 1000 euros, depending on field of study in 2011. Foreign PhD students paid about 5000 - 6000 euros in the same year. Some HEIs, however, discriminated between the EU and third countries residents and charge the same fees for the Slovak EU residents.

PhD students are offered two types of jobs, depending on their choice and availability of funding. Regular employment, usually fixed-term, is the first option, fellowship the second one. PhD students on fellowships pay no social insurance taxes. Net income from regular employment sometimes is lower than that from fellowship. Employers are allowed to renew fixed-term contract in three consecutive years as a maximum. After three years an employee must be offered a tenured job. For employers it is sometimes easier to get funds for fellowships than for regular employees. They also pay no health insurance taxes up to age of 30. Remuneration in regular employment, however, is higher. Foreign PhD students enjoy the same rights and duties as the Slovak nationals.

No distinction is made legally between the EU and non-EU researchers and PhD students.

Some postgraduate programmes are taught in English, for foreign students in particular. Postgraduate students can submit their PhD thesis in several World languages, including English.

The Slovak PhD students and researchers can and want to participate in the European and other international mobility programmes. The OECD database on foreign students indicates significant increases in numbers of the Slovak researchers participating in the advanced research programmes, from 366 in 2004 to 1614 in 2009. Some 13.7% of Slovak PhD students participated in the advanced research programmes abroad. The Czech Republic (77.6%), Austria (5.1%), and the UK (3.7%) were the most important destinations for the Slovak PhD students abroad in 2009.

International mobility by PhD students and young and experienced researchers is generally encouraged and enabled via a number of multilateral and bilateral programmes. Some 44 Slovak scientists, for example, obtained support of €5.5m under the Marie Curie Actions programme in the period 2004-2009. Participation in the mobility scheme, unfortunately, is not reflected in wage and/or career incentives.

An increased competition is being formed for the most talented R&D workers, however unfortunately mostly by the foreign R&D institutions, and domestic financial and IT sectors. In conclusion, low wages and unattractive working conditions (aged R&D infrastructure and lack of research funding) were major factors causing the low interest of young people for the careers in the research sector.

1.4 Promote equal treatment for women and men in research

No special provisions are made for equal gender representation in academic and research committees, boards and governing bodies in Slovakia. Women, however, are rather underrepresented in top managerial posts. There were, for example, only four female rectors in 35 Slovak higher education institutions by end of 2011.

However, all women in Slovakia are entitled to three years of maternity leave. The [Labour Code](#) (Law No. 311/2001) guarantees return to the same type of work after that leave. The only exception from this rule is fixed-term contracts.

Slovakia accounted for the above-average rates of female employment in the R&D sector. The shares of female R&D personnel (in full time equivalent) in the total R&D personnel were 44.8% in 2000 and 44.0% in 2010 in Slovakia, while 31.8% in 2000 and 33.0% in 2009 the EU-27 (sources: Eurostat and Statistical Office in the Slovak Republic).

2. Facilitate cross-border cooperation, enhance merit-based competition and increase European coordination and integration of research funding²²

The Slovak research policies have not considered opening-up national R&D programmes so far. The 172/2005 Law on Organisation of State Support to R&D in theory enables participation by foreign researchers in Slovak research programmes, but there is little experience with this issue, given limited interest by foreign researchers in working in Slovakia. Low salary and poor R&D equipment are major barriers for attractiveness of research careers in Slovakia both by the Slovak and foreign nationals. The Slovak law also does not allow for transfer abroad of funds provided by the Slovak state budget.

Co-operation with the EU and third countries is promoted both via the central government authorities and in particular by higher education institutions and public research organisations. The Slovak Ministry of Education, Science, Research and Sports signed co-operation agreements with partner ministries in 41 countries. The [Research and Development Agency](#) managed the 'Bilateral Co-operation in Science and Technology' scheme and supported 176 projects (€0.35m) with eight ERA countries (Austria, Bulgaria, the Czech Republic, France, Hungary, Italy, Poland and Slovenia) in 2010. Most important third countries involved Slavonic language countries (Serbia, Ukraine, and Russia), major economic and scientific powers (USA, Japan, India, China) and some important emerging markets (South Africa, Turkey). The mobility scheme covered costs of travel, accommodation and subsistence. Typical projects support joint research proposals, joint publications, joint participation on international conferences and workshops, joint use of research infrastructure and laboratory equipment, and joint data collection.

3. Develop world-class research infrastructures (including e-infrastructures) and ensure access to them

The 2007 [Long-term Objective of the State S&T Policy up to 2015](#) set priorities in 'human resource infrastructure' and 'technical infrastructure' for Slovak R&D system. The latter item includes ICT technologies, technology and laboratory equipment, purchase of intangible assets and creation of science & technology parks ('large technical infrastructure').

Development of research infrastructure is supported from national and European resources. National resources were provided via the State Programmes for Development of R&D Infrastructure. One programme, devoted to the development of infrastructure in field of biology and new materials, received support €1.1m from the state budget and €0.3m from the private sector in 2010.

The Cyclotron Centre probably is the largest national research infrastructure project. The centre was established by the [Slovak Government Resolution No. 659/99](#) of 4 April 1999. The [Slovak Office of Standards, Metrology and Testing](#) (SOSMT) has been building the centre and co-operating with the Ministries of Education, Economy and Defence. The initial building costs of the centre were €108m and were foreseen to be paid from recovered loans provided to Russia in the early 1990s (the same source was used for financing space flight of the first Slovak astronaut in 1999). The International Atomic Energy Agency and the Framework Programmes also contributed to the centre building. The SOSMT estimated costs of €100m needed for completion and running of the centre in the next 10 years. The Slovak Government considers issues related to the centre operations and handling of nuclear material sensitive. It publishes few details on the centre's budget staff technology equipment, etc. (see the 2010 ERAWATCH Report for more details).

European resources provide the bulk of assistance to development of research infrastructure in Slovakia in the period 2007-2013. Two priority axes of the [Operational Programme Research and Development](#) allocate some €311.0m and €149.0m respectively to projects supporting purchase of tangible and intangible assets for research centres and building broadband networks. Most support from the European

²² Promote more critical mass and more strategic, focussed, efficient and effective European research via improved cooperation and coordination between public research funding authorities across Europe, including joint programming, jointly funded activities and common foresight.

- Ensure the development of research systems and programmes across the Union in a more simple and coherent manner.
- Promote increased European-wide competition and access of cross-border projects to national projects funding

resources is channelled to generic infrastructure. Two important infrastructure projects have been developed since 2010: (a) the [National information system supporting research and development in Slovakia](#) and (b) the [Infrastructure for research and development – Data centre for research and development](#).

Slovakia participates also in the development of international infrastructures, but the amount of support is modest. The 2010 Annual Report on R&D mentions Slovak participation in some 11 initiatives, including the ESFRI projects. The most important activities include (a) the European X-ray Free Electron Laser Facility, (b) the Institut Laue-Langevin (ILL) projects, (c) the Facility for Antiproton and Ion Research (FAIR), (d) the European Social Survey and (e) the European Synchrotron Radiation Facility (ESRF). Cost of participation in the abovementioned initiatives was €7.26m in 2010. The Ministry of Education, Science, Research and Sports (MESRS) launched a scheme supporting six-month study stays by young researchers (up to age 35) in the European Research Infrastructure centres. Total 28 fellowships were awarded (€0.45) in biotechnologies, information technologies and physics, and supported study stays in the abovementioned centres in 2009-2010. A new scheme supporting study stays up to 3 years is prepared for period 2011-2012.

Some 70 Slovak project participations targeted the FP7 Capacities programme and were supported with €6.12m by 2010. Support amounted to some 22% of the total Slovak expenditure on the FP7 projects in 2010.

The MESRS submitted draft of the 'National Research Infrastructures Roadmap' (NRIR) in 2010. The NRIR should define funds and areas of specialisation for national research infrastructure. The roadmap also should contain targets, priorities and funds up to 2013, and includes qualitative and quantitative evaluation indicators and 'targets for underdeveloped regions'. The ESFRI roadmap was not yet approved (by end of 2011).

4. Strengthen research institutions, including notably universities

Academic autonomy

The 131/2002 [Law on Higher Education](#) awarded Slovak higher education institutions (HEIs) significant degree of autonomy. The HEI is represented by its rector. The rector is elected by the academic senate and appointed by the President of the Slovak Republic. The academic senate has at least 11 members. At least one third of these are students and the rest is elected by the academic staff. The rector is advised by the scientific board, the disciplinary board, the rector's collegiums and the management board. The management board discusses and approves HEI budget, all other important financial issues, and examines HEI's long-term development plans and annual reports. The management board has 14 members, six of whom are appointed by the rector, six by the Minister of Education, Science, Research and Sports, one by academic staff and one by students. The board members are elected from outstanding representatives of the business sector, regional government and central government. Faculty deans are elected by the faculty academic senates and appointed by the rector.

Broad autonomy sometimes conflicted with ethical standards. Some HEIs were reluctant to fire their staff even in cases of outright plagiarism and diploma-selling. The Minister of Education, Science, Research and Sports may criticise unethical conduct, but has no power to take punitive action. The Slovak Parliament passed amendment of the Law on Higher Education in 2010. The amendment aimed at fighting plagiarism and misconduct in awarding academic degrees. It sets that all diploma works, PhD theses and professor degree works should be published on the internet.

The HEIs are free to select and hire researchers and other research personnel for fixed-term contracts and/or tenure, as long as they have enough financial resources. Salaries consist of tariff wages and bonuses. Tariff wages are set by national regulations and depend on experience and excellence of the researchers. Bonuses depend on amount of financial resources available.

Candidates for directors of institutes in the [Slovak Academy of Sciences](#) are elected by the academic staff and appointed by the SAS presidium. Any EU national may apply for the post, but so far only Slovak directors were elected.

Landscape and Quality of National Higher Education System

As of November 2011, there were 35 higher education institutions, of which 23 public and 12 private in Slovakia. Numbers of HEIs students were strictly limited under central planning and it took long time to offset this problem. Access to higher education widened during transition to a market economy in the 1990s. Several new HEIs were established and, although of variable quality, partly satisfied increasing demand for higher education. The number of undergraduate students, for example, increased from 60,000 to 209,000 between academic years 1989/1990 and 2010/2011. There was an even sharper increase in the number of postgraduate students, from about 974 in academic year 1990 to 12,186 in 2010/2011 (Figure A1).

The main evaluation body for Universities is the [Accreditation Commission](#) of the Slovak Ministry of Education, Science, Research and Sports. It evaluated 20 public, four private and three state HEIs in 2009-2010. The HEIs were allocated to three categories: (i) Universities, (ii) Higher Education Institutions and (iii) Professional Higher Education Institutions. The Ministry of Education, Science, Research and Sports deemed there are too many HEIs. It rejected proposals for establishing several new private HEIs in 2010 and approved one in 2011.

Slovakia was catching up with European standards in provision of tertiary education. Numbers of tertiary students (ISCED 5-6, all ages) as % of 20-24 years old in the population rose from 26.0% to 54.7% in Slovakia and from 47.3% to 60.9% in the EU-27 in the period 1999-2009. Rapid growth in student and University numbers, however, has not been matched by adequate financial support. While numbers of undergraduate and PhD students rose 3.5 times in academic years 1989/1990-2010/2011, total public expenditure on education as % of GDP, at tertiary level of education (ISCED 5-6) fell from 0.98% to 0.72% in the same period. The Law on the 2011 State Budget set public support to higher education at €432.7m, some 0.62% of GDP estimated for 2011. Fall in real spending on higher education had significant effect on deteriorating quality of higher education. The development of higher education has been much more quantitative than qualitative since 1989. Slovak HEIs had very limited resources for R&D activities. The share of HERD in GDP was 0.11% in 2009. The business sector was investing almost nothing in University research. Share of HERD financed by industry in total GERD was 2.1% in 2009 (source: Eurostat). The quality of research was mostly poor due to the low investment in University research in general. The Shanghai list of top World Universities does not contain any Slovak University. The [Webometrics Ranking of World Universities](#) contains two Slovak Universities in list of top 1000 World Universities: the Comenius University in Bratislava (no. 496) and the Slovak University of Technology (no. 737, as of July 2011):

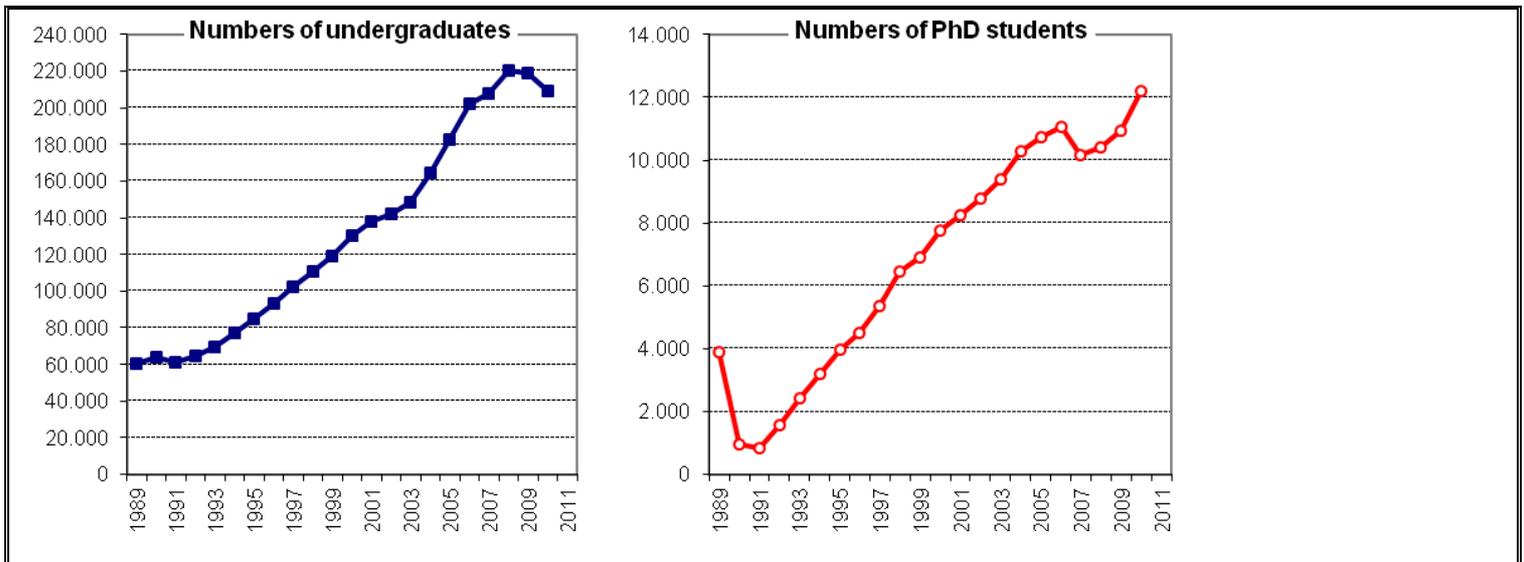
- The [Comenius University](#) had some 22,011 undergraduate and postgraduate students, of which 1,746 foreign in academic year 2010/2011. The [Accreditation Commission](#) found 'excellent research'²³ for medicine and pharmacology, social and behavioural sciences, physics and geosciences, mathematics and informatics.
- The [Slovak University of Technology](#) had some 16,496 undergraduate and postgraduate students, of which 554 foreign in academic year 2010/2011. Excellent research was found for nature science (physics, chemistry, mathematic), engineering (metallurgy, machinery, electrical engineering) and informatics.

The Comenius University in Bratislava and the Slovak University of Technology also are most frequent Slovak participants in the FP7, COST and Eureka programmes (the 2008 Annual Report in R&D mentions eight, the 2009 report five and the 2010 report 26 participations).

Slovakia ranked among countries with the highest emigration rates. Some 13.7% ISCED 5 and 13.8% ISCED 6 Slovak tertiary students studied abroad in 2009. Most Slovak students headed for the Czech Republic, Austria and Hungary. Foreign tertiary students (ISCED 5), on the other hand, accounted for 4.0% of total tertiary students in Slovakia in the same year (source: Eurostat). Quality of higher education was an important factor behind outflows by Slovak students abroad.

²³ Research outputs (usually papers, monographs and/or citations) are assigned to four qualitative categories, from the 'top-notch international quality (i.e. published in recognized journals included in the Current Contents database) to 'international', 'national' and 'lower than national' quality. Each category is given different weight. Total quality of research outputs is computed as weighted average of output numbers in particular categories.

Figure 3: Development of higher education in Slovakia. Sources: Ministry of Education, Science Research and Sports.



5. Facilitate partnerships and productive interactions between research institutions and the private sector

Co-operation by public and private sector

Mechanisms for facilitating partnerships and productive interactions between research institutions and the private sector were underdeveloped in Slovakia. Four policy measures try to improve co-operation by public and private sectors in fields of research and innovation.

Two programmes were funded from the state budget and implemented by the [Research and Development Agency](#) in 2007-2010.

- The 'Support to Cooperation between the Universities and the Slovak Academy of Sciences and Businesses' programme assisted costs of partnership creation and operation, and costs of basic research in centres established under this scheme. The programme supported eight projects with €0.93m in 2010. Private sector provided support €1.22m.
- The 'Support to R&D in SMEs' programme targeted micro-enterprises, spin-offs and start-ups, and supported feasibility studies, technology transfer and R&D project finance. Some 94 projects received support of €7.77m from the state budget and €4.81m from the private sector in 2010 (source: the 2010 annual report on R&D).

Two policy measures are supported from the [Operational Programme Research and Development](#) and implemented by the Structural Fund Agency of the Ministry of Education, Science, Research and Sports:

- The policy measure '[National infrastructure supporting technology transfer in Slovakia](#)' targets (a) creating technology transfer centre within the Slovak Centre of Scientific and Technical Information; (b) supporting Slovak scientific community in technology transfer activities; and (c) improving transfer of technologies and scientific knowledge to economic and social life via popularisation of science. The measure is co-financed by the ERDF and allocates €8.2m in period 2007-2013 (source: webpage of the programme).
- The [Transfer of knowledge and technology from research and development into practice](#) measure supports five framework activities: (1) raising innovation culture; (2) supporting applied R&D projects; (3) improving management of knowledge transfers from academia to industry sector; (4) increasing use of intellectual property rights by R&D bodies; and (5) building regional competence centres. Target groups of the measure include regional higher education institutions, the Slovak Academy of Sciences, public R&D organisations and regional businesses. The measure is co-financed by the Structural funds (ERDF). The ERDF contributes 85% and the Slovak state budget 15%. Overall budget of the measure is €226.90m in period 2007-2013 (source: webpage of the programme).

Intellectual Property Policies

The 2011 Innovation Union Scoreboard indicates that private-public co-operation in research is weak in Slovakia. There were just 10.3 public-private co-publications per million population in Slovakia, but 36.2 in the EU-27 in 2008. Numbers of the Community trademarks and designs per billion GDP (in PPS€) also were much lower in Slovakia (1.72 and 1.48 respectively) than in the EU-27 (5.59 and 4.77) in 2010. The Slovak Government tried to improve co-operation by public and private sectors in field of intellectual property rights and introduced several policy measure aimed at technology and knowledge transfer. The policy measure '[National infrastructure supporting technology transfer in Slovakia](#)' contains activities related to 'improving transfer of technologies and scientific knowledge to economic and social life via popularisation of science'. The measure also supports establishment of the knowledge transfer offices. Information on knowledge-transfer-offices, however, is scarce in Slovakia. The most important body is the Technology Institute of the [Slovak Academy of Sciences](#) (SAS). The institute was founded by nine institutes of the SAS in 2009. It aims at (a) support to interdisciplinary research in the field of new materials and technologies, (b) joint procurement of expensive equipment, and (c) complex services in commercialisation and management of R&D results and intellectual property rights. The institute 'wants to act as broker for patent rights', 'provide support to spin-offs' and 'manage transfer of knowledge'. No details on particular activities were provided. HEIs support exploitation of research outcomes via technology incubators and science and technology parks.

Lack of strong R&D-intensive domestic enterprises seems a major barrier for developing intellectual property activities in Slovakia.

Inter-sector mobility

There is no special programme aimed at the inter-sector mobility in Slovakia. The 'Support to Human Potential in R&D and Popularisation of Science Programme' which is implemented by the [Research and Development Agency](#) has multiple targets and supports (among other goals) also mobility of R&D workers between industry and academia sectors.

Involvement of private sectors in the governance bodies of HEIs and PROs

Private sector is involved in governance of the Slovak R&D system in several ways:

- The management boards of Slovak higher education institutions involve members drawn from outstanding representatives of the business sector.
- The State R&D Programmes are managed by the programme councils. Members of the councils include representatives of Slovak businesses.
- The most important body for co-ordination of science and technology policies– [Slovak Republic Government Board for Science and Technology](#) (SRGBST) – used to include several members representing Slovak industry. Since 2010 the body involved only representatives of the central government (Ministries of Finance, Economy and Education,), plus the president of the Rector Conference, chairman of the Slovak Academy of Sciences, and director of the Research and Development Agency.

6. Enhance knowledge circulation across Europe and beyond

The 2010 annual report on R&D lists several programmes developing bilateral and multilateral co-operation in R&D, and individual mobility of researchers. The programmes are managed by the [Research and Development Agency](#):

- The 'Support to Framework Programmes' scheme involves organisational and administrative resources plus financial support to the Slovak bodies involved in the Framework Programmes. Total support derived from 230 participations in the FP7 projects amounted to €27.81m by 2010 (source: the 2010 Annual Report on R&D).
- The 'Bilateral Co-operation in Science and Technology' scheme supports mobility costs (travel, accommodation, subsistence). Some 213 projects with 12 countries were supported with €0.45m in 2010.

- The ESF and RNP schemes support costs of participation of the Slovak scientists in selected multilateral co-operation programmes. Some 12 projects were supported with €0.12m in 2010.
- The 'Slovak participation in European and International R&D Centres' scheme supports costs of the Slovak scientists' participation in the selected multilateral research initiatives (EUROSTARS, ENIAC, ESFR, ILL, XFEL, CERN, Russian Centre for Nuclear Research, etc.). Some 11 participation projects were supported with €7.26m in 2010 (of which participation in CERN with €5.22m).

Except the national schemes, cross-border knowledge circulation is supported by the particular higher education institutions and research organisations. The [Slovak Academy of Sciences](#), for example, managed 62 bilateral agreements with 39 countries and 19 international research organisations (as of 2011). There is no evaluation report on these schemes, but bilateral and multilateral exchange provides Slovak scientists with welcome opportunities to keep in touch with the top-notch science initiatives.

7. Strengthen international cooperation in science and technology and the role and attractiveness of European research in the world

The 2007 [Long-term Objective of the State S&T Policy up to 2015](#) contains a chapter on international co-operation in science and technology. The rationale for national participation in inter-governmental schemes is 'benefits for economic and social development of Slovakia'.

National participation in intergovernmental organisations and schemes is managed by the [Research and Development Agency](#) (RDA). Some 83 Slovak organisations accounted for 230 participations FP7 by 2010. The total budget of support was €27.82m (Table A1). Increases in numbers of projects and budgets in 2010 (compared to previous years) were related to higher spending by the Structural Fund projects.

Most important research fields included information and communication technologies (€6.42m), nanotechnologies and new materials (€3.60m), security (€3.51m), health (€1.75m), transport (€1.41m), and food and biotechnologies (€1.24m). The annual reports on R&D mention project numbers and budgets, but give little details on rationale and results of the schemes supported (source: MESRS annual reports on R&D).

The RDA also supported three EUROCORES projects and nine Research Network Projects with €0.12m. The most important participations in intergovernmental organisations and schemes included CERN (Geneva), XFEL (Hamburg), and Joint Institute for Nuclear Research in Dubna (Russia). Total costs of the participations in intergovernmental organisations and schemes (outside the FP7) were €8.31m in 2010.

Table 4: Slovak participation in intergovernmental organisations and schemes

6th and 7 th Framework Programmes	2006	2007	2008	2009	2010
Numbers of projects	n.a.	30	74	51	230
Support, €m	n.a.	4.12	13.0	7.2	27.8
ESF, COST and Eureka					
Numbers of projects	7	35	28	21	33
Support, €m	0.03	0.33	0.45	0.29	8.31

Sources: (MESRS) The 2006-2010 annual reports on R&D. n.a. = not available

Support to other instruments of co-operation and co-ordination between national R&D programmes is relatively low, and information on the programmes is scarce. The [Research and Development Agency](#) (RDA) supports activities developed within the European Science Foundation via calls related to the Research Networking Programmes (RNP) and EUROCORES projects. Nine RNP projects were

supported with €0.02m in 2010. Participating organisation involved the Institute of Experimental Physics, Institute of Chemistry and Institute of Art History of the Slovak Academy of Sciences and several higher education institutions involved in nature science research. The Institute of Physics of the Slovak Academy of Sciences, and the Natural Sciences Faculty of the [Comenius University](#) developed three EUROCORES projects (supported with €0.10m) in 2010.

The [Slovak Academy of Sciences](#) (SAS) was a member in two ERA-NET initiatives. The Institute of Materials & Machine Mechanics was a member of the [NanoSci ERA-NET](#) initiative. The initiative aims at the development of new materials and technologies. The Institute of Physics, Institute of Materials & Machine Mechanics, Institute of Materials and the Institute of Experimental Physics were members in the Micro and Nano Technologies ERA-NET ([MNT-ERA.NET](#)) initiative.

The Slovak government decided to participate in joint programming on combating neurodegenerative diseases, in particular Alzheimer's. The Ministry of Education, Science, Research and Sports is responsible for participation and invests €1m. The Slovak Academy of Science attended the meeting on 'Health, food and prevention of diet related diseases' joint programming initiative. Participation in the initiative is considered.

International cooperation

Slovak policy documents assign no thematic priorities in international co-operation, but physics traditionally received major part of support. As for the important international research programmes, Slovakia was involved in two large-scale initiatives aimed at nuclear research:

- Slovakia is founding member (1956) of the [Joint Institute for Nuclear Research in Dubna](#) (Russia). The institute had 18 full members from Europe and Asia, and two associate members (Germany and Hungary). The research targeted theoretical physics, physics of heavy ions, solid materials physics, neutron physics and mathematics. Some 42 Slovak scientists from four institutes of the [Slovak Academy of Sciences](#), 12 faculties and two industry research institutes took part in the research and were supported with €1.1m in 2010.
- Since 1993, Slovakia has been member of the [European Organisation for Nuclear Research](#) (CERN), one of the world's largest and most recognized centres for scientific research. Some 103 Slovak scientists, PhD students and technicians focused on proton and particle research. The most important participations related to the [ATLAS](#) experiment (23 people) and the ALICE experiment (31 people) in 2010. Research was supported with €5.22m in 2010.

Mobility schemes for researchers from third countries

Mobility schemes for researchers are supported via bilateral and multilateral agreements signed by central government authorities, higher education institutions and the [Slovak Academy of Sciences](#).

Mobility grants support only the travel costs (fare, accommodation and subsistence). Numbers of bilateral mobility grants and volume of assistance provided within bilateral co-operation agreements increased in the past four years, but was quite low anyway (€0.45m in 2010, Table A2). The mobility grants supported 50 projects (€0.15m) with four non-ERA countries (China, Ukraine, Serbia, South Africa) in 2010. Details on thematic breakdown were not available. The annual reports on R&D and annual reports by the Research and Development Agency use to list numbers of projects and volume of assistance provided by the state budget, but do not provide for impact evaluation.

There is no central database on mobility projects supported by HEIs. The [Slovak Academy of Sciences](#) had signed 62 bilateral agreements with 39 countries in 2010. The agreements enable for mobility up to 5500 man/days per year. Some 404 scientists spent 3026 days in foreign research institutions in 2010. The EU countries (the Czech Republic in particular) were major destinations. The most important third countries included Russia, China, Japan, Turkey and India. Total support to bilateral projects was €0.98m in 2010.

Table 5: Bilateral agreements in science and technology supported by the Research and Development Agency (all partner countries)

	2006	2007	2008	2009	2010
Number of projects	130	160	141	177	213
Assistance, €m	0.20	0.26	0.31	0.41	0.45

Source: MESRS: 2006-2010 annual reports on R&D

References

- Baláž, V. (2010): ERAWATCH Analytical Country Report 2010 for the Slovak Republic, Available at: http://ERAWATCH.jrc.ec.europa.eu/ERAWATCH/opencms/information/reports/countries/sk/report_0004?tab=reports&country=sk
- EC, European Commission (2011): Innovation Union Scoreboard 2010, European Commission, Directorate-General for Enterprise and Industry, Available at: <http://www.proinno-europe.eu/innovometrics/page/innovation-union-scoreboard-2010>
- EC, European Commission (2011): Innovation Union Competitiveness report, the 2011 edition, European Commission, Directorate-General for Research and Innovation, Available at: <http://ec.europa.eu/research/innovation-union/pdf/competitiveness-report/2011/iuc2011-full-report.pdf#view=fit&pagemode=none>
- Eurostat (2011): statistics, Available at: <http://epp.Eurostat.ec.europa.eu/portal/page/portal/Eurostat/home>
- ERAWATCH Network (2007): The R&D Specialisation Report for the Slovak Republic, Available at: http://ERAWATCH.jrc.ec.europa.eu/ERAWATCH/opencms/information/reports/countries/sk/report_mig_0003?tab=reports&country=sk
- ERAWATCH Network (2011): Research inventory for the Slovak Republic, <http://ERAWATCH.jrc.ec.europa.eu/>
- MESRS, Slovak Ministry of Education, Science, Research and Sports (2010): The 2010 Annual Report on Higher Education, Available at: <http://www.minedu.sk/data/USERDATA/VysokeSkolstvo/VyrSprav/vyrspravavs2009.zip>
- Research and Development Agency (2010): The 2009 Annual Report, Available at: <http://www.apvv.sk/buxus/docs/agentura/vyrocnne-spravy/apvv-vs-2009.pdf>
- Slovak Government (2006): Národný strategický referenčný rámec Slovenskej republiky na roky 2007 – 2013 – upravené nové znenie (The National Reference Framework for the Slovak Republic for period 2007-2013 – amended new text), Slovak Government Resolution No. 457/2006.
- Slovak Government, (2007): 'Návrh Inovačnej stratégie SR na roky 2007 až 2013 - upravené nové znenie' {Proposal for the Slovak Innovation Strategy for period 2004-2013 – amended text}, in Slovak, Available at: <http://www.rokovania.sk/Rokovanie.aspx/BodRokovaniaDetail?idMaterial=5904>
- Slovak Government (2007): 'Operačný program Výskum a vývoj' {Operational Programme Research & Development}, available at: <http://www.asfeu.sk/operacny-program-vyskum-a-vyvoj/op-vyskum-a-vyvoj/>
- Slovak Government (2007): 'Operačný program konkurencieschopnosť a hospodársky rast' {Operational Programme Competitiveness and Economic Growth}, in Slovak, Available at: <http://www.opkahr.sk/>
- Slovak Government (2007): The Proposal for the Long-Term Objective of the State S&T Policy up to 2015, Government Resolution No 766/2007 of 12th September 2007' available at: <http://www.rokovania.sk/Rokovanie.aspx/BodRokovaniaDetail?idMaterial=1246>
- Slovak Government (2007): The 2006 Annual Report on R&D available at: <http://www.rokovania.sk/Rokovanie.aspx/BodRokovaniaDetail?idMaterial=528>
- Slovak Government (2008) Návrh inovačnej politiky SR na roky 2008 až 2010 - upravené nové znenie {Proposal for Innovation Policy for period 2008-2010, amended text}, Available at: <http://www.rokovania.sk/Rokovanie.aspx/BodRokovaniaDetail?idMaterial=1139>
- Slovak Government (2008): The 2007 Annual Report on R&D available at: <http://www.rokovania.sk/Rokovanie.aspx/BodRokovaniaDetail?idMaterial=14431>
- Slovak Government (2009): The 2008 Annual Report on R&D available at: <http://www.rokovania.sk/Rokovanie.aspx/BodRokovaniaDetail?idMaterial=1921>
- Slovak Government (2010): The 2009 Annual Report on R&D available at: <http://www.rokovania.sk/Rokovanie.aspx/BodRokovaniaDetail?idMaterial=18700>
- Slovak Government (2011): The 2010 Annual Report on R&D available at: <http://www.rokovania.sk/Rokovanie.aspx/BodRokovaniaDetail?idMaterial=20293>

Slovak Government (2011): Inovačná politika na roky 2011-2013 {*The Innovation Policy for 2011-2014*}, Available at:

<http://www.rokovania.sk/Rokovanie.aspx/BodRokovaniaDetail?idMaterial=19611>

Slovak Government (2011): Minerva 2.0 Strategy, Available at:

<http://www.rokovania.sk/Rokovanie.aspx/BodRokovaniaDetail?idMaterial=20088>

Slovak Government (2011): Správa o plnení opatrení Inovačnej stratégie SR a Inovačnej politiky SR za rok 2010 a prvý štvrtrok 2011 {*The 2010 Evaluation Report on implementation of the 2007 Innovation policy*}, Available at: <http://www.rokovania.sk/Rokovanie.aspx/BodRokovaniaDetail?idMaterial=19850>

Slovak Government (2011): The Fenix Strategy, Available at:

<http://www.rokovania.sk/Rokovanie.aspx/BodRokovaniaDetail?idMaterial=19944>

Slovak Parliament (2008): The 2009 State Budget Law 596/2008

Slovak Parliament (2009): The 2010 State Budget Law 497/2009

Slovak Parliament (2010): The 2011 State Budget Law 498/2010

List of Abbreviations

ASFEU	Agency for Structural Funds of the Ministry of Education, Science, Research and Sports (Agentúra pre štrukturálne fondy Ministerstva školstva, vedy a výskumu SR)
BERD	Business Expenditures for Research and Development
CERN	European Organisation for Nuclear Research
COST	European Cooperation in Science and Technology
EC	European Commission
ENIAC	European Nanoelectronics Initiative Advisory Council
ERA	European Research Area
ERA-NET	European Research Area Network
ERDF	European Regional Development Fund
ESA	European Space Agency
ESF	European Social Fund
ESFRI	European Strategy Forum on Research Infrastructures
ESRF	European Synchrotron Radiation Facility
EU	European Union
EU-27	European Union including 27 Member States
FAIR	Facility for Antiproton and Ion Research
FAIR	Facility for Antiproton and Ion Research
FDI	Foreign Direct Investments
FP	European Framework Programme for Research and Technology Development
FP	Framework Programme
FP7	7th Framework Programme
GBAORD	Government Budget Appropriations or Outlays on R&D
GDP	Gross Domestic Product
GERD	Gross Domestic Expenditure on R&D
GOVERD	Government Intramural Expenditure on R&D
GUF	General University Funds
HEI	Higher education institutions
HEIs	Higher education institutions
HERD	Higher Education Expenditure on R&D
HES	Higher education sector

ILL	Institut Laue-Langevin
IP	Intellectual Property
ISCED	International Standard Classification of Education
IUC	Innovation Union Competitiveness
KEGA	KEGA Grant Agency (Grantová agentúra KEGA)
KIS	Knowledge-intensive Services
ME	Ministry of Economy
MESRS	Ministry of Education, Science, Research and Sports
MNC	Multinational Company
MNT	Micro and Nano Technologies
NABS	Nomenclature for the analysis and comparison of scientific programmes and budgets
NADSME	National Agency for Small and Medium Enterprises (Národná agentúra pre malé a stredné podniky)
NRIR	National Research Infrastructures Roadmap
OECD	Organisation for Economic Co-operation and Development
OPCEG	Operational Programme 'Competitiveness and Economic Growth' (Operačný program Konkurencieschopnosť a hospodársky rast)
OPE	Operational Programme 'Education' (Operačný program Vzdelávanie)
OPRD	Operational Programme 'Research and Development' (Operačný program Výskum a vývoj)
PPS	Purchasing Power Standard
PRO	Public Research Organisations
R&D	Research and development
R&I	Research and Innovation
RDA	Research and Development Agency (Agentúra pre výskum a vývoj)
RI	Research Infrastructures
RIC	Regional Innovation Centre
RNP	Research Networking Programmes
RTDI	Research Technological Development and Innovation
S&T	Science and technology
SAS	Slovak Academy of Sciences (Slovenská akadémia vied)
SF	Structural Funds
SIEA	Slovak Innovation and Energy Agency (Slovenská inovačná a energetická agentúra)
SME	Small and Medium Sized Enterprise
SOSMT	Slovak Office of Standards, Metrology and Testing (Úrad pre normalizáciu, metrológiu a skúšobníctvo)
SRDO	State Research and Development Orders
SRDP	State Research and Development Programmes (Štátne programy výskumu a vývoja)
SRGBST	Slovak Republic Government Board for Science and Technology (Rada vlády SR pre vedu a techniku)
VC	Venture Capital
VEGA	VEGA grant agency (Grantová agentúra VEGA)

European Commission
EUR 25725 – Joint Research Centre – Institute for Prospective Technological Studies

Title: ERAWATCH COUNTRY REPORTS 2011: Slovak Republic

Author(s): Vladimír Baláž

Luxembourg: Publications Office of the European Union

2013– 40 pp. – 21.0 x 29.7 cm

EUR – Scientific and Technical Research series –ISSN 1831-9424 (online)

ISBN 978-92-79-28128-0 (pdf)

doi:10.2791/58406

Abstract

The main objective of the ERAWATCH Annual Country Reports is to characterise and assess the performance of national research systems and related policies in a structured manner that is comparable across countries. EW Country Reports 2011 identify the structural challenges faced by national innovation systems. They further analyse and assess the ability of the policy mix in place to consistently and efficiently tackle these challenges. The annex of the reports gives an overview of the latest national policy efforts towards the enhancement of European Research Area and further assess their efficiency to achieve the targets.

These reports were originally produced in November - December 2011, focusing on policy developments over the previous twelve months. The reports were produced by the ERAWATCH Network under contract to JRC-IPTS. The analytical framework and the structure of the reports have been developed by the Institute for Prospective Technological Studies of the Joint Research Centre (JRC-IPTS) and Directorate General for Research and Innovation with contributions from ERAWATCH Network Asbl.

As the Commission's in-house science service, the Joint Research Centre's mission is to provide EU policies with independent, evidence-based scientific and technical support throughout the whole policy cycle.

Working in close cooperation with policy Directorates-General, the JRC addresses key societal challenges while stimulating innovation through developing new standards, methods and tools, and sharing and transferring its know-how to the Member States and international community.

Key policy areas include: environment and climate change; energy and transport; agriculture and food security; health and consumer protection; information society and digital agenda; safety and security including nuclear; all supported through a cross-cutting and multi-disciplinary approach.