



ERAWATCH Research Inventory Report For: SLOVENIA

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

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Contents:

- Overview
- Research Policy
- Important policy documents
- Impact of EU developments
- Regional research policies
- Structure of the research system
- Main research policy making mechanisms
- Research Funding system
- Important research programmes
- Research performers
- Key research indicators

Overview

Basic characterisation of the research system

The level of research and development (R&D) investment in Slovenia in recent years has been under 1.5% of Gross Domestic Product (GDP) (the latest preliminary figure for 2006, is 1.59%, according to the Statistical Office of the Republic of Slovenia) for several years now. The business sector share of total investment in R&D is 59.2%, followed by government sources (29.0%) and sources from abroad (5.8%). Slovenia introduced the Lisbon and Barcelona targets into its R&D policy and is hoping to achieve 3% investment in R&D by 2010, yet the current trends, particularly the inability to increase public sector financing at the rate of growth of GDP, are not so optimistic. During the past few years, Slovenia has experienced a very high GDP growth rate (the rate of growth of GDP for 2007 was 6.1%), while public-sector financing of R&D activity has not increased at the same rate. In fact the 2007 report on the achievement of the Lisbon strategy goals noted that an increase in public R&D investment to 1% would be difficult to achieve (Government Office for Growth, 2007, <http://www.svr.gov.si/fileadmin/srs.gov.si/pageuploads/SI-NRP2007-slo.pdf>). In terms of R&D input indicators (the number of researchers, the amount of public R&D investment, and the still-positive trends in the growth of business R&D investment), Slovenia scores relatively well in comparison to the EU average. More problematic is the output side, particularly if measured by the number of innovative firms or the number of patents (European Innovation Scoreboard, 2007).

Key policy documents in the R&D area, the national research and development programme, prepared for five-year periods, and the legal documents regulating research (currently the 2002 Law on research and development) give the legal and policy frameworks for R&D. The emphasis of public research funding has been on the scientific excellence of the research per se, and only rather broad priority setting has been attempted. The influence of the scientific community on R&D financing system has been sufficient to guarantee that no major shift in policy has occurred. Yet the current national research and development programme argues in favour of more specific priority setting, with the introduction of socio-economic relevance as one of the important criteria in the programme/project selection process. Specific scientific fields were suggested and within them more focused research is to be prioritised. Several different financing schemes were developed in the 1990s, with five-year research group programme financing being the largest. Public funding is available for applied projects and for the support of participation in international research projects. Also, various infrastructure co-financing programmes are available for research organisations. The special scheme for targeted research projects, whereby research is commissioned by different government offices to support their decision-making process in the implementation of long-term policies, is also available. The diversity of funding mechanisms does not fully reflect the situation, since many instruments experience a lack of stable funding.

After the initial slow-down at the start of the 1990s, business sector R&D investment has experienced considerable growth in last decade. Business R&D investment reflects the predominant role of manufacturing; and within the manufacturing sector, two sectors stand out: chemicals, specifically pharmaceuticals, and machinery and equipment, especially electrical equipment. The share of services in BERD is 17% (2004) and hardly reflects the otherwise important role of the sector in the national economy, with over 62% of value added. While the business sector invests more in R&D than does the government, the number of researchers in public research institutions in full time-equivalent positions (in the universities 1,740 and in research institutes 1,805) is higher than in business (2,277). The business sector, on the other hand, employs a significantly larger number of technical personnel in R&D, suggesting that the activity is more "development" focused. Several recent measures support the employment of researchers, especially those with the PhD, in the business sector (mobility scheme, young researchers from industry, etc.)

Institutionally, Slovenia moved from the Ministry of Science and Technology to the Ministry of Education, Science and Sports to the current Ministry of Higher Education, Science and Technology. In 2004 the Slovenian Research Agency was established, acting as an executive agency in the area of science. In the area of technology development, the Slovenian Technology Agency was established, focusing more on business sector R&D and innovation. The establishment of the agencies was introduced in 2002 law on R&D activity, following the Scandinavian model and aiming at more efficient R&D and innovation policy implementation.

During the transition period in early 1990s, Slovenia managed to preserve its public R&D sector relatively untouched, since the increase in public expenditures outweighed the loss of business funds. The latter occurred as a consequence of the collapse of some of the large industrial conglomerates, which lost most of their markets and were slow to adjust. The majority of the larger public research institutes survived; only some of the R&D departments in industry were closed. The availability of public resources and the criteria for programme/project selection and evaluation, in which the publication of results was favoured, led to a shift towards more basic research in the public research institutions. The lack of cooperation between public research institutions and universities on one hand and the business sector on the other has often been identified as one of the key deficiencies in the Slovenian R&D and innovation system. Several measures to improve the poor linking between public R&D and manufacturing/service competencies have been tried in the past and are suggested in the current policy documents as well.

In the policy documents accepted by the government in 2005 (the Slovenian Development Strategy, National Research and Development Programme, National Reform Programme for Achieving the Lisbon Strategy Goals, and the Framework of the Reforms), the important role of R&D in creating more dynamic economic and social development has been recognised, and comprehensive reform of R&D and higher education sector was suggested. This reform was aimed at linking the research in the public sector and the needs of the business sector, thus contributing to more innovation and increased competitiveness in the Slovenian economy.

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Name of correspondent: Maja Bucar

Main challenges for research policies

ERAWATCH research inventory report: SLOVENIA

Among the main challenges for research policy in Slovenia, the following can be identified:

The adjustment of budgetary resources to sufficiently support the declared priorities needs to be intensified. Slovenia declared its intention to raise R&D investment to 3% of GDP by 2010. This would call for an annual increase in public financing of more than 0.1% of GDP for four consecutive years from 2006 on and the doubling of the business sector investment in the same period. Both targets seem increasingly more difficult to achieve, partly because, when set (2003), the preliminary data on R&D investment showed 1.6%, while, after adjusting for GDP growth, it was only 1.3%. Also, Slovenia experienced a high growth in GDP in 2006 and 2007. The increase of public resources for R&D in the required amount is a challenge due to already existing pressures on the budget, especially meeting the Maastricht criteria. Private-sector investment in R&D has so far followed an upward trend, yet not at the rate called for. Much is expected from the newly (2007) introduced tax incentives for private-sector R&D investment, which will be reflected in 2007 R&D data.

The implementation of policy documents, particularly in view of the fact that the past record was seriously deficient in this area. Several past policy documents have set similar objectives, but the specific measures were either underfinanced or did not address the set policy priorities (for example, the restructuring of public financing towards applied and development projects). Since several objectives in policy papers can only be implemented if additional resources will be provided, the current rate of the implementation is below expectations (Annual Development Report, 2007, IMAD).

The achievement of sufficient coordination of instruments and measures among different ministries and other support institutions to enable the smooth functioning of the national R&D and innovation system. This coordination is especially important with the current organisational scheme in which science and technology issues are within the Ministry of Higher Education, Science and Technology, while the Ministry of Economy is in charge of entrepreneurship, including segments of innovation policy (support for technology parks, for example). Along with the two ministries, two public agencies are involved in financing R&D at the operational level: the Research Agency and the Technology Agency. In addition, the Ministry of Defence is becoming an increasingly important player in the R&D field, in particular for industrial R&D. The government office for growth is to coordinate the implementation of the Slovenian Development Strategy and the National Lisbon Reform Programme. The presence of so many different stakeholders calls for a clear R&D governance scheme with a well-specified division of tasks. This has not yet been fully implemented.

The development of **closer cooperation between public R&D institutions, universities and the business sector** within set priorities is a challenge recognised in current policy documents (National Research and Development Programme, Slovenian development strategy, National Reform Programme). They call for the improvement of available instruments and the introduction of new support measures. The restructuring of public financing towards more applied research is one of the policy objectives set forth in these documents. On the other hand, a specific problem in this area is raising the absorption capability of the business sector, especially SMEs, for R&D results. Business R&D activity, led by large corporations, is increasing but remains highly concentrated on a few sectors. In particular, small businesses show little interest in innovation or R&D cooperation. The government expects that this should be in part resolved by the mobility scheme for researchers in the public research sector to move to the business sector, partly through a voucher scheme, under which consultancy costs of SMEs are subsidised by the government, as well as by other measures designed for the purpose.

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

New research policy developments

The strategic documents, accepted in 2005 (the Slovenian Development Strategy 2006-2013, the National Research and Development Programme 2005-2010, and the National Reform Programme for Achieving the Lisbon Strategy Goals) in the area of R&D and innovation are still valid for R&D policy and provide the framework for more specific policy measures and programmes.

One of such activities which is meant to take relatively broadly defined research priorities in the National Research and Development Programme a step further is the initiative by the Government's Office for Growth in the spring 2008 to establish the Competitiveness Council. The main objectives of the Council are:

- Ø the improvement of cooperation between the government, knowledge institutions and business sector in the area of design and implementation of the policies to promote technology development
- Ø stimulate technology development in Slovenia by selection of research and technology areas within the priorities defined in strategic government documents, to enable the concentration of resources and search for synergies among the selected fields;
- Ø through concentration of public and private resources to priority areas increase the share of resources for RTD as a share of GDP as well as increase of their efficiency.

The objectives have been translated also in measurable targets:

- Ø achievement of the 3% R&D investment by 2013-2015,
- Ø increase the number of innovation active SMEs to minimum 40% from 27% (2002-2004)
- Ø increase the number of patents at EPO to at least 110 patent applications per million population
- Ø increase the share of high-tech exports to 16% (EU 27 average).

The Competitiveness Council has 10 so called *development groups*, each with 16 members, representatives of the research-higher education and business sector. Seven groups follow the sectors (life and health, ICT, materials and nanotechnologies,

ERAWATCH research inventory report: SLOVENIA

environment and construction, energy and renewable energy sources, communications, transport and vehicles, process technologies), while three are meant to be horizontal (creative industries, business-finance and public research and higher education governance). The groups are expected to provide already by the fall of 2008 inputs in terms of priority research areas/themes both for basic and applied research, identify business interest and research capabilities as well as assess absorption capacity of Slovenian business and market potential at the global markets.

The Research Agency has published two major new calls this spring. Since the current financing under the research programme scheme comes to the end of its five-year term in 2008, a new call was issued for the financing of the scheme for the period 2009-2013. The selected research programmes/ groups will receive financing from 1st Jan.2009. Available funding for the 2009 is currently estimated at 55 million EUR. The proposed allocation of resources by the Ministry of Higher Education, Science and Technology is the following: 30% for natural sciences, 31% for technical sciences, 9% each for medicine, bio-technology and social sciences and 12 % for humanities. The call was opened until the beginning of May when the existing research groups, funded under the research programme schemes had to file their report for the years 2004-2007 as well as file the new proposals for the next five year period. In June - July 2008 the evaluation of the reports and proposals is taking place (a rather elaborate scheme of internal and external evaluations procedure), with the announcement of the results expected in the fall 2008. In the call, the Agency specified also that along with scientific excellence certain additional criteria will be taken under consideration in the selection process: socio-economic and/or cultural relevance, participation in international research projects/ teams, multi-disciplinarity, etc.

Also issued in the spring was the call under the Target Research Programmes, where different government departments announce the topics of policy research they need for their work, related to the implementation of the Slovenian Development Strategy. The total amount planned for the call is 11.1 million EUR, of which 6.45 million for the period 2008-2009. The call covers most of the government's Ministries and Offices, who proposed the topics in which the research input is required. The call is opened to research organisations or individual researchers, subject to their registration in Research Registry at Slovenian Research Agency.

During the first half of 2008 the discussion on the new legislation in the R&D field has not been very active both in view of numerous tasks of the Ministry, related to the Slovenian presidency of the Council of the EU (1 January 2008, to 30 June 2008, and the chairmanship of EUREKA from 1 July 2007, to 30 June 2008. In view of the forthcoming Parliamentary elections a more pro-active debate is not expected soon.

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Research policy

Relevance of research policy

The Relative Importance of Research Policy

While R&D had been mentioned in previous development documents, the central role that support of innovation and R&D enjoys in the Slovenian Development Strategy is relatively novel. Following the example of more developed industrialised countries, where rapid transformation of R&D results into innovation had secured a competitive advantage, the new development strategy, as well as the Reform Programme for Achieving the Lisbon Strategy Goals and Reform programme, count on the same developments in Slovenia as well. Better integration of the education and R&D systems along with fiscal policies should facilitate the technological restructuring of the business sector towards higher value added. All policy documents cite the 3% target and count on the business sector to increase even more dynamically its investment in R&D and innovation.

This would suggest an increased interest in R&D policy and the impact of R&D for the development of Slovenia. On the other hand, the public budget for R&D has not been able to increase at the rate of the growth of GDP during the past few years, accounting in 2006 for 0.54% of GDP despite a nominal increase over the 2005 percentage (Statistical Office, 2007). In 2001 the share of public funds was 0.6%. The implementation of the research policy objectives as set out in the National Research and Development Programme, the key policy document in the R&D area, will require additional public funds. The Ministry of Higher Education, Science and Technology expected an increased budget allocation in 2007, yet the growth of resources was less than the rate of the growth of GDP (Ministry of Finance, Budget 2007). At first glance, the planned increase for 2008 is more optimistic, since more than 6% in nominal growth of public funds is planned. Yet in view of the current rate of growth of GDP at close to 6% and an inflation rate above 3% (IMAD data, October 2007), the increase in funds is less impressive.

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Research policy

Recent political events relevant to research policy

Slovenia is the first new Member State to chair the EU. The Slovenian presidency officially began in January 2008, but the government was intensively involved in planning the presidency all through 2007. Even though the presidency itself does not have direct bearing on research policy, it does put the Ministry of Higher Education, Science and Technology under

ERAWATCH research inventory report: SLOVENIA

additional pressure, particularly in terms of human resources but also in terms of finances. The ministry will be relying much more on the two agencies (Research and Technology one) to implement their programmes independently. Also, fewer activities in the policy area are expected, in addition to decreased government attention to the issues of science, technology and innovation.

At the same time, the Ministry is directly involved with the presidency of the EUREKA programme from July 2007 to the end of June 2008. Particularly engaged are ministerial staff in the technology directorate, where in 2008 a significant increase in resources is planned due to the start of operational programmes under structural funds (2007–2013 financial perspective–national component). Implementation of these programmes will demand increased cooperation among different government institutions.

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Research policy

Policy goals and priorities

The basic R&D policy document that specifies key objectives in the area of research policy is the National Research and Development Programme. The programme is prepared by the Ministry of Higher Education, Science and Technology and must be approved by the National Council on Science and Technology as the top policy advisory body and passed as a legally binding document by the National Assembly. This procedure, and especially the content, of the policy document, which sets research priorities, specifies funding mechanisms, positions the role of research performers, sets guidelines as to R&D evaluation, etc. is what makes the National Research and Development Programme so important. The objectives of the current National Research and Development Programme, 2006–2010, include (taken from the document, published at the <http://www.mvzt.gov.si>):

- increasing public R&D investment to 1% of GDP by 2010;
- shifting the balance of public research funds from basic non-targeted research in favour of targeted (and applied) research;
- the introduction of support measures to stimulate the growth of investment by the business sector in R&D to help achieve a 2% target growth in the number of researchers with PhDs in the business sector;
- a higher rate of establishment of new high-tech firms, including the promotion of spin-offs from universities;
- continuous participation in international research, especially in the ERA;
- support for the growth of patents as an indicator of the relevance of research for business; and
- the growth of high-tech exports and value-added in the Slovenian economy.

Last update date: 21/02/2008

Name of correspondent: Maja Bucar

Research policy

Policy goals and priorities

Research policy focus

The National Research and Development Programme follows rather closely the priorities set in the EU 6th Framework Programme (concerning information and communication technologies, advanced (new) synthetic metal and non-metal materials and nanotechnologies, complex systems and innovative technologies, technologies for sustainable development and health and life-sciences) and adds to the list of priorities research of specific importance for the Slovenian culture and history. Yet these priorities were suggested a year after the major financing scheme "Research group programme" was approved and contracts signed with research groups for funding from 2004 to 2008, so their implementation has been limited only to new calls for research projects.

Generic versus thematic focus

The current funding of Slovenian research pays more attention to scientific excellence per se than to the selection of specific priorities. The proportions among scientific fields have not changed significantly over the years. Engineering and natural sciences have traditionally received more than half of public resources, followed by the social sciences, the humanities and medical sciences. Agricultural sciences received only a small proportion of public funding. Within a particular scientific field, priorities are mostly determined by the scientific community itself on the basis of peer review of submitted projects.

Thematic areas

The National Research and Development programme suggested certain priorities, which are now being followed by the Slovenian Research Agency when it issues new calls for basic or/and applied research projects. Since the financial resources allocated to these new calls are approximately one-half of the funds available for the research programme scheme, priority setting has so far had limited impact.

However, the Agency and the Ministry of Higher Education, Science and Technology are sponsoring the second stage of the foresight project (the preliminary foresight project was the basis for priority-setting in the current National Research and Development Programme), which is expected to be completed by the end of 2008. It is expected to provide elements for the selection of programmes/projects within the new cycle of the *research group programme scheme*, to be launched in 2009.

Target groups

ERAWATCH research inventory report: SLOVENIA

According to the data on gross R&D expenditure in accordance with socio-economic objectives, as much as 62% of government-financed research is for non-oriented research. On the other hand, business R&D expenditure is heavily concentrated in industrial production and technology (48%). Most of the public funds go to research institutes and universities (89.7%), just as most of business sector R&D investment goes to R&D performed within the sector (all figures are for 2005; [Statistical Office of Rep. of Slovenia: January 2007](#)).

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Research policy

Thematic priorities

In the area of regionalisation of R&D, the most important policy document will be the law on the formation of administrative and political regions, currently in the government's procedure. This will define which activities/policies will be the responsibility of the region and which will remain centralised. In view of the high number of proposed regions (14), the splitting of R&D and innovation policies into 14 regions carries the danger of fragmentation of resources, yet the government seems convinced that there are more benefits in decentralisation.

Last update date: 21/02/2008

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Research policy

(Main aims of research policy)

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Last update date: 15/01/2008

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Research policy

Main instruments of research policy

Slovenia uses a relatively broad mix of policy instruments, several of them inspired by the practice seen in other EU countries but also introduced as a response to a particular problem in the research structure. While the instruments used in financing public-sector research institutions can be assessed as relatively stable, more dynamic development can be observed in the R&D policy towards the private sector, especially in the area of support measures for technology development.

Block funding is provided for public research institutes when the government is the key funder. Yet the funds are usually limited to covering only what is defined as basic infrastructure costs, so the institutes still need to apply for programme/project funding. Universities receive their block funding for education programmes, and only a minor percentage (4%) of these funds are for research infrastructure. For all registered research organisations, public funds are available for infrastructure; through annual calls the Slovenian Research Agency co-finances the purchase of new research equipment. Most of the public resources, however, go for research programmes/projects. Here several major instruments have been established (see also Section 8.6. Important Research programmes): [research programme/groups scheme](#) (every five years), [basic and applied annual research projects calls](#) and [targeted research programme](#) calls (annually or bi-annually). Through the support of the European Regional Development Fund, an instrument supporting the establishment of centres of excellence was introduced in 2004. University incubators, initiated under the PHARE project in 2005, have been supported to promote the creation of spin-off companies by university professors/students.

In principle, all of the above instruments are also available to research organisations established by the private sector, as long

ERAWATCH research inventory report: SLOVENIA

as they are able to meet the strict selection criteria, based to a large extent on the bibliometric achievements of the key researcher. Other instruments have been available over the years specifically for business-sector R&D projects, such as co-financing of joint research projects and support for technology centres, clusters, networks and platforms.

In the area of human resources, one of the most successful Slovenian instruments has been the young researchers programme, started in 1985. The programme finances students, selected by public research institutes and universities, through their PhD studies. A spin-off the programme is a special programme for young researchers from industry, helping to increase the number of PhD researchers in the business sector. More recently, schemes promoting mobility from public research institutes to the private sector have been introduced.

Different instruments in fiscal policy have been applied to support R&D investment. Currently a 20% corporate income tax reduction is available to the business sector for investment in R&D. With the help of the Slovenian Entrepreneurship Fund, loan guarantees and subsidies are available for SMEs who invest in new technology.

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Research policy

Main instruments of research policy

Public-private collaboration

Public-private partnership is a relative novelty in Slovenia. As examples of such relationships in the field of research, the formation of clusters, technology centres and, more recently, centres of excellence and technology platforms can be mentioned. In the first case, a new legal entity is established through the cooperation of mainly business enterprises and some public research organisations to jointly perform research in areas defined by cluster members. Support for technology centres is one of the oldest instruments, bringing together the business sector with an interest in a particular technology area and researchers from both the public and private sectors. The activities of a technology centre are financed both from private and public sources. In the case of centres of excellence, cooperation is pledged on a contractual basis and joint application is made for public/EU funding for research projects. A more recent instrument to support the establishment of technology platforms was modelled after the EU instrument and is one more attempt to increase science-industry linkages. Implicitly, one could also list applied research projects with co-funding from business enterprises as a sort of public-private partnership.

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Research policy

Related policies in other domains

Fiscal Policies

A call for the more active application of fiscal policies to promote business-sector investment in R&D was answered in 2006 by the introduction of a new tax incentive, under which investment in R&D is tax deductible in the amount of 20%. The enterprises can reduce their taxable income by 20% of their investment in R&D in general and by an additional 10% if the investment was made in the regions up to 15% under the average development level and by 20% for the R&D investments in regions where the development gap is more than 15%. Eligible costs comprise the purchase of equipment and new technology for the purposes of R&D, the cost of labour in R&D activities and the purchase of licences. However, the tax incentive for the employment of PhD-holding staff in the private sector ended in 2007.

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Research policy

Human Resource Policies

Slovenia is experiencing a common problem, the decreasing interest among young people in pursuing S&T studies (IMAD Development Report, 2007). Even though enrolment in higher education has increased significantly in the recent years, to reach more than 50% of the generation, this increase was not equally spread: social sciences, economics and law attracted the most new students. An active promotion of S&T studies was started in 2006 by the minister of higher education, science and technology in senior high-school classes, promising more scholarships and better employment possibilities for S&T students. The reforms suggested for the higher education system also argue in favour of new programmes and facilities for S&T studies and a more restrictive policy towards social science studies and economics. Yet it was in the social sciences and economics where the Bologna reform was first introduced, while natural sciences and technical studies programmes are only very slowly undertaking required changes, which makes their programmes less attractive.

ERAWATCH research inventory report: SLOVENIA

The programme for young researchers has been one of the most successful Slovenian instruments in stimulating young people to pursue scientific careers. Launched in 1985, it provides funds for post-graduate studies and PhD work for people who wish to work as researchers after completing their education. The programme is explained in more detail in the template [Young Researchers scheme](#).

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Research policy

Interaction between Innovation and Research Policies

Under the [Ministry of Higher Education, Science and Technology](#), five basic lines of action are supported that are designed to support innovation but have implications for research as well:

- the horizontal support of R&D projects of small- and medium-sized enterprises;
- initiation of technology programmes in priority technology fields and technology platforms;
- support of R&D infrastructure and the development of human resources (technology centres);
- the participation of the business sector in international projects (EUREKA and 6th Framework); and
- the special programme young researchers from business sector.

The innovation infrastructure support programme envisages the continuation of existing support to technology centres, which currently receive support channelled via structural funds for the infrastructure and can access the public call by MHEST for operational costs. The participation of the business sector in international projects, especially in EUREKA, is also encouraged.

The [Ministry of Higher Education, Science and Technology](#) and the [Ministry of Economy](#) since 2000, have published public calls for more or less the same type of measures, regardless of their current affiliation:

- support for modernisation, construction and equipment of technology centres, parks, and incubators;
- support for the preparation of strategies and programmes as well as the development of services of technology parks/centres/incubators, technology networks and clusters;
- the financing of joint research and development projects; and
- the development of the research infrastructure of the centres of excellence.

In addition, the financial resources available to SMEs through subsidised credit and technology equipment subsidies, provided by the Slovenian Entrepreneurship Fund and ERDF, directly assist SMEs in modernisation of their activities.

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Research policy

Other Policies

The policies in other areas (agriculture, competition policy, public administration, transport, housing, etc.) do not have a major direct impact on R&D policy. But through a funding scheme of a [targeted research programme](#) with an approximate annual value of €2.5m, different ministries and government offices fund research projects they need as a support to their policy decision-making, especially in relation to the implementation of the [Slovenian Development Strategy, 2006–2013](#). This way the specifics of their policies are introduced into the R&D sphere, since the research themes are selected by the ministries, and the project proposals have to address them rather strictly.

The [Defence Ministry](#), however, has become a more important player in the research area in recent years. It runs two different programmes, one through the [Slovenian Research Agency](#) (€6.7m for the 2007–2009 call) and another one through the [Technology Agency](#) (€9.5m for the 2007–2009 call). While the first one is focusing more on basic and applied research within public-sector research institutions (called "Science for peace and security"), the second one is focusing on technology development in the business sector for defence purposes (called "Technology for peace and security").

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Research policy

Policy mixes to stimulate research

The debate on the National Research and Development Programme during 2005 exposed how different stakeholders view research policy. The majority in the public research institutes wants to protect the current status of relative independence in the determination of research priorities and finds scientific autonomy an important asset. Each field of science strongly protects its turf and allows little room for interdisciplinary approaches. In spite of the criticism of the current evaluation system, strong objections to the introduction of criteria of economic relevance have been voiced. Arguments such as those for

ERAWATCH research inventory report: SLOVENIA

the protection of a national heritage are cited, along with the need to stay in touch with world knowledge in all fields of science regardless of its relevance for socio-economic development of Slovenia. On the other hand, stakeholders from the business sector demand a shift in research policy towards more specific projects that would help to improve the competitive position of Slovenia in the global economy.

More recent public debate related to research policy focused on the draft law on higher education and research. While all stakeholders agree on the need for reform of the higher education system and, within the reform, of the position of research activity at the universities, the government's position is that increased competition (through the establishment of new higher education institutions) would improve the quality of higher education. Universities, on the other hand, see fragmentation of the programmes as a way to lower the quality. Also, while the public research sphere, in principle, supports the government proposal to engage researchers in the educational processes as well as to support the research work of university professors, they watch with caution the solutions proposed in practice. From the draft law, it seems the government is primarily interested in increased control of the two sectors and of the actors within them.

The European Commission Policy Mix Web Portal

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Research policy

Research policy trends

Recent trends in research policy can be described as dealing with two levels: at the level of policy formulation and at the level of the actual implementation of different measures. While the first has been very active, and several significant changes in R&D and innovation policy are suggested, these new ideas still need to be incorporated into day-to-day measures.

The trends include:

a) **more selectivity in R&D financing:** combining the 6th Framework Programme priorities and a sort of preliminary foresight, the National Research and Development Programme identified priorities towards which public funding should be oriented. All new allocations of public research money should follow the set priorities or at least positively discriminate against research in priority areas. In practice, some of the public calls (applied projects, the mobility scheme, etc.) stress the priorities, while others remain open to all fields on equal footing. A more significant change in the allocation of public funds in accordance with priorities will only be possible when the on-going phase of research group programme scheme is completed (2008).

b) **the restructuring of public research funding from programme to project funding:** new policy documents call for shifting the structure of public funds away from research-programme funding (basic research) in favour of project funding (targeted basic research and applied and developmental research projects). Programme funding should receive only half of the resources it receives now. Again, this is difficult to achieve, since the contracts are binding till 2008, and unless serious breaching of the contract terms is proven on the part of the recipient of the financing, no redirection can be executed till the end. Slovenian Research Agency is involved in the preparation of new criteria for research-programme funding for the period 2009–2014, yet at this stage discussion is restricted to internal bodies of the agency.

c) **the move towards increasing competitiveness in higher education and R&D:** policy documents, especially the Framework of Reforms, argue for increased competition in higher education by the creation of several new, smaller universities and the introduction of tuitions and stricter promotion criteria. Increased competition should result in higher quality. The reform trend is observed with caution by the existing universities, which stress academic freedom and independence as key values of higher education.

To follow the directives of the reform programme, the government prepared a resolution on higher education. The resolution on the national programme in higher education was accepted by the government in October 2007 (<http://www.uradni-list.si/1/ulonline.jsp?urlid=200794&dhid=92016>), in spite of opposition from several higher-education institutions in rather heated public debate from May 2006 on. A draft of the law on higher education and research was released by the Ministry of Higher Education, Science and Technology for public discussion in spring 2007 and was met by significant opposition by universities and research institutes. The draft law increases the government's role in both sectors, gives significant authority to the minister and introduces more systematic supervision of both fields. The common stance of major three universities (Ljubljana, Maribor and Primorska), together with public research institutes, was that the draft needs to be withdrawn and a new text prepared, where all stakeholders are invited to contribute to its development. The opposition to the law was strong enough that it, together with some other issues, forced the minister to step down in September 2007. The new minister has not yet made public what her plans are in connection with the law.

d) **developments in R&D evaluation system:** a lack of interest among public researchers in cooperation with the business sector has often been explained by the current R&D evaluation system for researchers, research programmes or/and projects and public research organisations, which awards scientific excellence as measured by number of publications.

Research-policy debates suggest a change to this, attributing credits also for the socio-economic relevance of research, demonstrated by the ability to draw additional funding from non-government sources. This trend can be observed in the Research Agency evaluation of the annual reports of the research programme groups, which give increasing weight to socio-economic relevance. Yet, in 2006 the same agency published its evaluation criteria, which specifies the criteria for eligibility for public R&D funding, where bibliometric results are by far the most important elements, both for individual researchers and for research teams.

e) **a policy of increasing budget allocation for R&D:** ever since the Slovenian government endorsed the Barcelona target of 3% of GDP as investment in R&D, this goal has been included in all research policy documents. Yet the budget allocations do not follow the required dynamic for the growth of public resources for R&D.

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

ERAWATCH research inventory report: SLOVENIA

SLOVENIA - Important policy documents

Title of document	Date	Organisation responsible	Type of Document
<u>Slovenian Development Strategy</u>	2005-06-23	The Government of Slovenia / The Government of Slovenia	Official government strategy paper, accepted by the Government of Rep. of Slovenia in June 2005 as the main long-term development programme.
<u>Resolution on National Research and Development Programme (NRDP)</u>	2006-01-10	Ministry of Higher Education, Science and Technology / Ministry of Higher Education, Science and Technology	Key programme document in the area of science and technology, setting priorities in public R&D funding, key organisational structures and programmes as well as evaluation criteria.

Impact of EU developments

Overview

The impact of EU developments on the Slovenian research policy, instruments and processes has been significant. Many of the policy issues in the R&D area were introduced in stakeholders' debates under the influence of European documents. Slovenia embraced the Lisbon and Barcelona targets of increasing R&D investment and included the issue of R&D and innovation in national policy documents. A number of policy measures and instruments introduced over the last 10–15 years have direct origin either in EU policies or policies of other EU Member States that were singled out as good practices. Increased attention to evaluation of the policies, programmes and instruments is the result of EU policies. Even though financial contributions of structural funds or framework programmes may not seem like a major new influx of resources, both had much wider policy consequences.

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Impact of EU developments

Towards ERA and Lisbon

Towards European Research Area

The integration of the Slovenian research sphere into the ERA is one of the priorities in the area of international cooperation and as such actively supported by the Ministry of Higher Education, Science and Technology (MHEST). The active participation of researchers in the ERA is called for in the National Research and Development Programme, 2006–2010, as well.

The Ministry of Higher Education, Science and Technology promotes and informs the Slovenian professional public about the conditions of co-operation and calls for proposals published by the European Commission. In the light of this, the ministry organised more than 150 public presentations and seminars concerning these calls as well as workshops on methods and conditions for participation in the framework programmes. The ministry took an active part in the formation of the European Research Area (ERA) and the preparation of the 7th Framework Programme (FP7) for European R&D activities.

In 2007, both the Ministry of Higher Education, Science and Technology and the Slovenian Research Agency informed research institutions of the public consultations on the Green Paper on the ERA and invited individual researchers and organisations to take an active role in commenting on the paper.

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Impact of EU developments

Lisbon-strategy related activities

In accordance with the policy agreed upon at the EU level, a National Reform Programme for Achieving of Lisbon Strategy Goals was prepared in November 2005. In the opening statement of the reform programme, it is stated that the objectives and priorities of the Slovenian Development Strategy correspond closely with the goals set forth in the Lisbon strategy. In beginning of 2006 the government established a special Government office for growth (<http://www.svr.gov.si/en/>), with the task of coordinating the implementation of both the Slovenian Development Strategy and the Reform Programme for Achieving the Lisbon Strategy Goals. With the appointment in spring 2007 of a new minister, who is also the national coordinator for Lisbon, to the office for growth, the office gained new momentum.

Key tasks of the reform programme, for which the Ministry of Higher Education, Science and Technology is responsible, include securing the targeted level of funding for R&D, the development of comparable university programmes at the EU level, the promotion of life-long learning and the opening of higher education to public research institutes. To reflect its

ERAWATCH research inventory report: SLOVENIA

mission, the ministry aimed at achieving the target of 5% of GDP for R&D and higher education by 2010 (more than doubling the amount allocated now).

In October 2007 the second Implementation Report of the Reform Programme for Achieving the Lisbon Strategy Goals was published by the government of Slovenia. It analyses the process of implementation of the planned measures and indicates key activities to take place in the near future. The report stresses that overall progress towards achieving the Lisbon targets has been satisfactory, yet there are deficiencies in certain sectors where the implementation of the strategy is likely to take a longer time. This is the case also with the implementation of reforms in the area of R&D. For the first time, the October 2007 report hints at the fact that the 3% target for R&D investment is not likely to be achieved. Part of the reason is the exceptionally high GDP growth in recent years, but also mentioned is the recalculation of the R&D investment level in the base year of the reforms.

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Impact of EU developments

Impact of EU instruments

Impact of Structural Funds on Research Funding

During the period 2004–2006, when Slovenia as a new member country was first able to draw on structural funds, two key projects in the R&D sphere were co-financed by European Regional Development Fund. One enabled the establishment and purchase of the research infrastructure of eight centres of excellence. The initiative was partly modelled after the 6th Framework Programme's "Networks of Excellence", in which several Slovenian R&D institutions took part, including some currently involved in the national centres of excellence. The centres of excellence combine research facilities at different public research units (both institutes and universities are involved) with research units in the business sector – members of the centres of excellence. The second project, also co-financed with ERDF resources, supported joint research projects proposed by different forms of networks: technology centres, platforms, clusters, centres of excellence, etc. Even though the amount of resources available through this channel does not account for a major increase in R&D funding (a total of €21.7m for the whole period, with €16m coming from ERDF), it was important, since it enabled the implementation of two policy measures suggested in the National Research and Development Programme: the establishment of centres of excellence and increased financial support to joint research projects. Neither would be possible solely on a national basis.

A much more significant amount of resources is available to Slovenia under the new financial perspective, 2007–2013. In particular, the Operational Programme for Strengthening Regional Development Potentials in the National Strategic Reference Framework^[1] includes as a development priority "Competitiveness and research excellence", for which as much as 23.5% of total resources of this OP (or €402m) have been earmarked. According to the language of the OP, "...In addition to research and development projects in companies and knowledge institutions for research results transfer, also the investments into modernisation of development-research equipment and modernisation of technological equipment in these organisations will be supported." Since the operational programmes were approved by the European Commission in late August 2007, specific calls for co-financing are expected by the end of the year or within the first months of 2008. In practice, it is proposed that the schemes introduced during the previous period should continue (centres of excellence, joint research projects, etc.). Also, several existing measures in the area of R&D and innovation policy will be boosted by the structural funds (young researchers' programmes, technology centres/platforms support, the consultancy voucher scheme, etc.).

[1]

http://www.svlr.gov.si/fileadmin/svlsrp.gov.si/pageuploads/KOHEZIJA/kohezija-200207/National_Strategic_Reference_Framework.pdf

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Impact of EU developments

Impact of EU framework programmes

No publicly released framework programme impact studies have so far been conducted, but the participation of Slovenian research organisations in framework programmes is actively encouraged by the government. Special information days have been organised by the Ministry of Higher Education, Science and Technology to inform researchers of the possibilities in addition to seminars on the application for particular types of projects, on management and reporting issues as well as on the preparation of financial statements. After an initial reluctance, Slovenian research organisations were relatively successfully participating in the 6th Framework Programme as well as in the current 7th Framework Programme.

According to the internal report of the Ministry of Higher Education, Science and Technology, research organisations from Slovenia cooperate in 473 projects for which the contracts had been signed by January 2007. Altogether there are 561 participants from Slovenia. Still, except for the largest research institutes, acting as a main contractor is difficult due to the lack of qualified administrative support. The total value of the resources that Slovenian research organisations will receive is €70.2m. The amounts in individual contracts vary significantly depending on the instrument or the programme.

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Impact of EU developments

Other EU developments and impacts

EU membership stimulated discussion in the area of R&D, particularly in relation to the achievement of both the Lisbon and the Barcelona objectives. Slovenia put the 3% investment in R&D as an objective in its policy documents, yet current analyses show that this target will be difficult to achieve. To promote business investment in R&D, tax incentives were introduced in 2007 and, according to preliminary data, contributed to a significant increase in business R&D.

The priorities identified by National Research and Development Programme correlate closely with the priorities of the 6th Framework Programme, with the addition of nationally specific areas such as national history and culture.

Benchmarking exercises and evaluations of instruments and programmes in the area of RTDI have increased at the level of funding agencies and ministries. EU innovation and R&D policies are closely followed. Several elements of the EU research and innovation policy had been introduced in public debate, including the need to formulate policy in a more horizontal manner, to assign to the investment in research and development a higher policy priority and, in general, to recognise this area as a more central focus of the overall development policy. The participation in EU research of Slovenian R&D organisations, from both the public and business sectors, is actively encouraged, both in Framework Programmes and in EUREKA.

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Regional research policies

Overview and governance

Overview

Due to the size of its population (2m), Slovenia is considered a single region at the NUTS 2 level. The National Research and Development Programme has no specific regional focus. On the other hand, the Slovenian Development Strategy sees a need for more coherent regional development, which would decrease the currently existing differences in development level. Up till now, one could not talk about a specific regional research policy. In the National Development Programme for the next financial perspective (2007–2013) and in the National Strategic Reference Framework, the government plans the development of several regional business-infrastructure-technology poles, where, besides the development of the necessary business infrastructure, there is also envisaged the development of R&D and innovation facilitators. This corresponds with the planned decentralisation of higher education as well as the decentralisation of R&D resources. There are currently no regional R&D agencies or councils, nor are they anticipated in the future.

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Regional research policies

Regional responsibilities

Currently, Slovenia functions as a single region (NUTS 2). At the NUTS 3 level, the country is divided into 12 statistical, but not administrative, regions. This means that current regions have no formal responsibilities. There is on-going discussion on the formation of 14 regions, which would also be administrative and could pool and manage development resources and policies at the regional level. A law on the establishment of the regions is in the government's procedural plan. In Slovenia, there are 210 municipalities (NUTS 4), of which 11 are urban, but more than 110 of these have fewer than 5,000 inhabitants. The support of R&D and innovation policy is not mandatory for municipalities, yet the larger urban municipalities do run their specific projects in the field and provide financial support to research dealing with the most pressing issues for their municipality. This means that there is no formal responsibility of the local governments in the area of research policy.

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Regional research policies

Research governance

At the level of NUTS 3, currently Central Slovenia particularly stands out among the 12 statistical regions in terms of

ERAWATCH research inventory report: SLOVENIA

economic development, employment levels, education attainment and research capacities. The distribution of R&D expenditures by region should improve in the next financial perspective, 2007–2013, since the development level of a particular region will be an important determinant of its eligibility for support from structural funds. According to the available operational programmes, the share of available public/EU funding for envisaged measures/projects will be higher for the applicants from statistical regions with lower GDP per capita.

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Regional research policies

Research policies and programmes

The National Research and Development Programme has no specific regional focus.

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Regional research policies

Research policies and programmes

Important policy documents

In the area of regionalisation of R&D, the most important policy document will be the law on the formation of administrative and political regions, currently in the government's procedure. This will define which activities/policies will be the responsibility of the region and which will remain centralised. In view of the high number of proposed regions (14), the splitting of R&D and innovation policies into 14 regions carries the danger of fragmentation of resources, yet the government seems convinced that there are more benefits in decentralisation.

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Regional research policies

Additional information

As of now, one can hardly talk of official regional research policies and programmes. With the progress towards political and not just statistical regions, there will be a growing need to also elaborate regional research policies. Even where Slovenia takes part in INTEREG programmes, it does so as a country, not as specific regions.

R&D indicators are available for Slovenia as a whole (as a single region) and some at the level of statistical regions, but only if the survey on statistical regions takes them into account. The figures regularly collected by the [Office of Statistics](#) treat R&D activity as national activity only.

A high concentration of public research capacity is typical for Slovenia, specifically in Ljubljana, since 93.5% of all research performed by the government sector (public R&D institutes) and 78.4% of research performed by the higher-education sector is done in Central Slovenia.

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Structure of research system

Overview of structure

Organogram



Last update date: 15/01/2008

Name of correspondent: Maja Bucar

ERAWATCH research inventory report: SLOVENIA

Structure of research system

Brief description of the structure of the research system

The National Assembly is the top legislative body, and its Committee on Higher Education, Science and Technological Development is in charge of discussing the legal and policy documents related to R&D policy. Once cleared by the committee, the main legal documents (the Law on Research and Development, the National Research and Development Programme) are passed on to the Assembly for approval.

The Ministry of Higher Education, Science and Technology is responsible for the preparation of the policy documents in the R&D area, for implementation of R&D policy (that is, implementation of the National Research and Development Programme), the public R&D budget and international cooperation in the area of R&D. An advisory body to the government in the R&D area is the National Science and Technology Council, with members from the research community, higher-education institutions, the business community and the government. For the execution of R&D and innovation policy, two special public agencies have been established: Slovenian Research Agency and Slovenian Technology Agency. The first is responsible for the execution of public research financing, for the professional and independent selection/evaluation process of projects and programmes and the monitoring of research implementation. The Slovenian Technology Agency is in charge of programmes promoting technology development.

The Ministry of Economy is covering the programmes in which entrepreneurship and innovation policy are combined, so certain of its policy measures are also relevant for R&D, such as the researchers' mobility scheme. The Government Office for Growth is responsible for the implementation of the Slovenian Development Strategy as well as the National Reform Programme for Achieving the Lisbon Strategy Goals.

The four universities and public research institutes constitute the main public research capability.

Most of the financial resources for their work come from the government and are channelled through the Slovenian Research Agency. All research organisations and individual researchers must be registered with the Slovenian Research Agency if they wish to apply for public funding.

The business sector is increasingly important both as a source of financing and as an R&D performer. Major industry sectors in R&D are pharmaceuticals, communications equipment and machinery and equipment.

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Structure of research system

Public Private Collaboration

Overview

From independence in 1991 on, Slovenia had a Ministry of Science and Technology, responsible for research and innovation policy. In 2000, the Ministry was dissolved, with the science part joining the Ministry of Education and Sports and the technology part joining the Ministry of Economy. In 2004, another reorganisation of the government happened and Ministry of Higher Education, Science and Technology was established.

The new organization set-up has integrated more firmly science, higher education and technology within a single ministry (Ministry of Higher Education, Science and Technology, but left some of the content more focused on entrepreneurship with the Ministry of Economy. This is hoped to have a positive impact on coordination of higher education and research. Office of Science within the Ministry (<http://www.mvzt.si>; <http://www.rtd.si>) is responsible, in co-operation with other ministries, for most of the public programmes in the fields of science and technology. The establishment of Slovenian Research Agency in 2004 led to a move of implementation of programmes under the Agency, with Ministry retaining its key role in the policy design.

Originally, the Law on Research and Development (2002) envisaged the establishment of two Agencies within a year from passing of the Law: Agency for Scientific Research and Agency for Technology Development. The idea behind such institutional setting was that the agencies (each in its sphere) would be responsible for permanent, professional and independent selection process of projects and programmes, which are to be financed from public resources. Each agency has its board of directors, a manager and a scientific (expert) council, as set forth by the law. The Law on R&D specifies also the main tasks for each agency, but leaves some room for the scientific council of each agency for additional programmes.

The Slovenian Research Agency has begun its operation in the end 2004. Technology Agency was formally established, but its function was so far seriously inhibited due to the procedural issues caused by the reorganisation of the government. Initially, the Technology Agency (TIA) was to be under the Ministry of Economy- since that is where the technology and innovation department was, but according to the current set up, it should move (just as the department did) under the Ministry of Higher Education, Science and Technology. This organizational solution was opposed strongly by the business community. Finally in the summer of 2006, the Agency's status was resolved by putting it under the Ministry of Higher Education, Science and Technology.

Last update date: 16/01/2008

Name of correspondent: Maja Bucar

Structure of research system

ERAWATCH research inventory report: SLOVENIA

Relation between public and private actors

Public private partnership is a relative novelty in Slovenia. As examples of such relationships in the field of research, formation of clusters and more recently, centres of excellence can be mentioned. In the first case, a new legal entity is established in cooperation of mainly business enterprises and some public research organisations to jointly perform research in the areas defined by cluster members. In the case of centres of excellence, cooperation is agreed on contractual basis and joint application for public/ EU funding is made for research projects. Implicitly, one could also list applied research projects with co-funding from business enterprises as a sort of public private partnership.

Last update date: 16/01/2008

Name of correspondent: Maja Bucar

Main Research policy making mechanisms

Policy making and coordination

Government policy making and coordination

The Ministry of Higher Education, Science and Technology is responsible for the preparation of the National Research and Development Programme. The National Research and Development Programme must be discussed in public and accepted by the Council for Science and Technology of the Republic of Slovenia prior to its submission to the government. During the discussion at the government level, all ministries are invited to comment, especially the Ministry of Finance and Ministry of Economy. The Ministry of Finance needs to check the resources available and the dynamics of R&D financing. The Ministry of Economy must check the compatibility of R&D policy with the innovation policy and the policy to support entrepreneurship.

Upon government approval, the National Research and Development Programme is submitted to the National Assembly, first to its Committee on Higher Education, Science and Technological Development and then to the Assembly itself. The National Research and Development Programme is the basis for the annual programme of work of the Ministry of Higher Education, Science and Technology and the budget for research. The budget allocation is negotiated first at the level of government and finally agreed to by the National Assembly. On the basis of its resources, the Ministry of Higher Education, Science and Technology funds various programmes, including those of the Slovenian Research Agency. The Slovenian Research Agency prepares its annual programme, consisting of a financial plan for its own operation as well as the funding of various research programmes, and presents it to its board of directors. Once the programme has been approved, the Ministry of Higher Education, Science and Technology presents it to the government for approval. The Agency is responsible for the implementation of the programmes and the correct use of the resources allocated to them.

The measures directly relevant to innovation policy are prepared by the directorate for entrepreneurship at the Ministry of Economy. The framework for these measures must be approved by the government, which again means that all other ministries are invited to comment and suggest changes. Once approved, the programmes are the responsibility of each respective ministry.

In the second half of 2006, a non-formal coordinating body at the level of design and implementation of various measures was formed, yet the formal coordination of the activities between different ministries is carried out at the level of the government. One of the tasks of the government's Office for Growth, established in January 2006, is the coordination of different policies, including R&D and innovation policy, but this task has not been yet implemented. This absence of better co-ordination of policies is a hindrance to more efficient policy implementation.

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Main Research policy making mechanisms

Science Policy Advice

The Council for Science and Technology is the top body for science and technology policy. According to the Law on Research and Development (2002), its composition is such that six members come from research sector, six from the business sector, one from the public research sector and one from the union representing the researchers. As a rule the automatic members are the minister of finance, the minister of higher education, science and technology, the president of the Chamber of Industry and Commerce, all three rectors of the universities and the president of the National Academy of Science and Arts. The Council for Science and Technology has a mandate to accept the National Research and Development Programme (NRDP) and pass it on to the Parliament for final approval. Also, the current NRDP (2006–2010) gives specific responsibilities to the council in terms of final approval of evaluation criteria and several other policies in the R&D field.

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Main Research policy making mechanisms

ERAWATCH research inventory report: SLOVENIA

Actors in policy implementation

The formal mechanisms for research policy setting as well as the roles of different stakeholders in the policy implementation processes are described in the Law on Research and Development (<http://www.uradni-list.si/1/ulonline.jsp?urlid=200622&dhid=81171> - in Slovenian). With the establishment of the two agencies, the Slovenian Research Agency and the Slovenian Technology Agency, most of the responsibilities for the implementation of research and technology/innovation policy lie with them. They prepare their annual programme of work and their financial statement, which needs government approval. Both agencies are also required to present annual reports to the government. The Ministry of Higher Education, Science and Technology needs to monitor the overall results of research policy and propose new measures to be introduced to secure the implementation of the National Research and Development Programme.

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Main Research policy making mechanisms

Tools for policy advice

The most elaborate scheme for applying tools for policy advice is usually used in the preparation of the National research and Development programme. According to the law, the ministry responsible for science should prepare the draft text of the basic policy document in the area of R&D, the National Research and Development Programme. Various stakeholders may be involved in the preparation of the text. The *expert groups*, appointed by the ministry during the preparation of the current National Research and Development Programme, were composed of experts from science community, industry and government. Most of the experts were selected by the minister, not as representatives of each community, but as individuals with relevant knowledge in the area of research policy. The ministry also commissioned research projects for the preparation of a series of background studies as well as a preliminary foresight exercise.

Once the draft of the National Research and Development Programme is prepared, the law requests the draft be open for *public discussion* among different stakeholders. The Slovenian Chamber of Industry and Commerce organised the debate on behalf of the business sector, since traditionally this is the forum for business to express its opinions on various government policies. The coordination of directors of research institutes, KORIS, is quite active in presenting its comments and proposes changes and amendments to various policy documents. The Rectors' Conference acts on behalf of universities. All of these bodies have a consultative function, but no formal powers in the process of accepting the policy documents, yet the rectors can use their membership status in the Council for Science and Technology. The final version of the policy documents must be approved by the Council for Science and Technology.

The application of such a complex scheme is put into effect for the policy-making process on day-to-day basis, but only when a major policy shift is being prepared.

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Role of Evaluation

During the last decade, several system evaluations have been completed. Some were carried out within PHARE programmes and some by different departments in the government. The accession period provided several benchmarking exercises whereby the R&D indicators for Slovenia were compared with those of the EU 15. The setting up of the two agencies is one of the outcomes of such evaluations, as along with several measures in R&D and innovation policy.

The most comprehensive recent system evaluation was carried out during the preparation of the National Research and Development Programmes, when the Ministry of Higher Education, Science and Technology engaged several outside institutions and its own staff in analysis and benchmarking of the entire S&T system. A rather standard set of R&D indicators (EU Key Figures in R&D, European Innovation Scoreboard, OECD R&D) were compared as were the trends for the years from 2000 on to see where Slovenia is catching up and where the country is seriously falling behind. The institutional settings of the NIS in different countries have been examined in detail, as well as the most common support measures used by more advanced countries. Parallel to this, an internal evaluation of the measures in the area of R&D and innovation was performed and an assessment of the results of the first five years of research-programme financing. The outcome of the evaluations was reflected in the setting of R&D policy and funding priorities for the current National Research and Development Programme.

The evaluation practice for research programmes and measures to promote R&D has been developing gradually and is becoming more systematic. The overall research policy was evaluated at the end of the previous National Research and Development Programme (Sorcan et al., *Raziskovalna dejavnost na Slovenskem v 90. letih dvajsetega stoletja – Research Activity in Slovenia in the nineties*. Ljubljana: Slovenska akademija znanosti in umetnosti, 2002). In addition, an evaluation of research policy and research results (benchmarking) was carried out within a special project, funded under the Targeted Research Programme, and was used as the background material for the group of experts preparing the current National Research and Development Programme.

Research programme evaluations depend on the type of the programme and are described in more detail in specific research programme templates (Research Group Programme, Applied Projects, Young Researchers' Programme, Targeted Research Programme, etc.). In general, the basic criteria employed by the ministry responsible for science and now by the Research Agency have been quantitative appraisals of bibliographic references of the members, and especially the heads of, the research programme/project. A new regulation on the evaluation of the researchers and research organisations/teams was passed in

ERAWATCH research inventory report: SLOVENIA

April 2006, introducing a complex point system for bibliographic references. This system is to be applied in the evaluation of the annual reports submitted by the research programme groups and also used to prescribe the eligibility criteria for the selection of basic, applied or developmental research projects. Weaknesses of the R&D projects' evaluation practice so far have been that evaluation criteria were often set only once the specific research programme/project had been completed or that the criteria changed during the duration of the programme/project.

The evaluations are usually performed by a combination of internal staff and outside experts. The Research Agency occasionally uses external foreign evaluators and is planning to do so systematically in the near future (pending the availability of resources). The agency now performs both ex-ante and ex-post evaluations: the first are practised in the selection process of research programmes/projects to be funded and the second at the end of the funding. Systematic use of the ex-post evaluation results of a particular research group/individual in the next round of financing is becoming a more regular practice.

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Research funding system

Overview of funding flows

Funding Flow diagram



Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Research funding system

Brief description of funding flows

The major source of R&D funding is business sector, which accounted in 2005 for 55.3% of R&D investment. Government funds account for 36.8% and higher education for 0.7%, while funds from abroad reached 7.1% in 2005 ([Slovenian Statistical Office](#), first release, November 2007). 91.6% of the business sector investment in R&D is spent within business R&D units. Government resources are predominantly focused on public R&D institutions (52.8%) and higher education R&D units (36.8%). Business sector R&D units receive 57.4% of resources obtained from abroad (see detailed chart on funding flows in the organogram).

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Research funding system

National public research funding

Overview

The [Ministry of Higher Education, Science and Technology](#) presents its programme during government budget negotiations. The budget is first approved at the level of the government, which then submits the bi-annual budget proposal for the procedure to the [National Assembly](#). Once the ministry's budget is approved, most of the public research funds are then channelled through the [Slovenian Research Agency](#). The agency is the main implementation body for public R&D and distributes the resources according to the main programmes it runs.

Few specific programmes in the directorate for technology at the [Ministry of Higher Education, Science and Technology](#) are still coordinated by the ministry itself. In 2006, these included the following: the support for technology centres, support for innovation organisations and support for development projects. The implementation of these programmes was moved to the [Slovenian Technology Agency](#) in 2007.

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Research funding system

Institutional Support

ERAWATCH research inventory report: SLOVENIA

According to the provisions of the Law on Research and Development (Official gazette of the Republic of Slovenia 96/02 and 115/02), institutional funding is the obligation of the founder (the government) towards public research and infrastructural institutes (the infrastructure institutes are the Institute of Information Science, which operates the Information System on Slovenian Science [SICRIS] and the Co-operative Online Bibliographic System and Services [COBISS]). Through these funds, the Research Agency covers the fixed operating costs of the research or infrastructural activities of these institutions. Universities receive their institutional funding from another channel specifically dedicated to higher-education institutions' research institutional funding (not to be confused with the institutional funding the universities receive for their teaching activities).

The covering of costs under the founder's obligations comprises administrative costs, fixed operating costs and the fixed costs of maintaining and repairing property and equipment. The total amount allocated to institutional funding through the Research Agency in 2007 was €16.8m (13%) (Source: www.arrs.si).

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Research funding system

Project-based funding

The largest share of the basic research is funded through so called "research programme funding", a system established in 1999 to secure stability in funding basic research. This type of programme fits well into "responsive mode" funding where funding is provided directly to research teams to carry out specific projects of their own choosing. The system provides for formation of research groups, formed within specific science disciplines. Programme groups comprise a head of group, at least five researchers holding a doctorate and technical staff from one or more research organisations. Programme members can take part in only one research programme. Researchers must have a doctorate, a record of research and development results for the last five years and research titles in line with existing regulations. Young researchers may also participate in a programme group. The evaluation process is spelled out by the Slovenian Research Agency, which is responsible for monitoring and administering programmes. So far, bibliometric criteria have been favoured, especially scientific articles and citation indexes. Increasingly, however, the Research Agency is requesting the reports provide information on the socio-economic relevance of the research. This indicator is based on the amount of funding that a particular research group was able to secure on top of the direct government funds.

In 2007 the Slovenian Research Agency funded research group programmes in the amount of €43m (Source: <http://www.arrs.gov.si/sl/finan/letpor/Report/fin-por.aspx?Leto=2007>, November 2007)., The share of natural sciences at 32.1% is the highest, followed by engineering (technical sciences) at 27.1%. Humanities accounted for 15%, followed by medical sciences at 10.4% and social sciences at 8%. The lowest was the share of research programmes in biotechnology at 7.1% (still the share of funding had increased in comparison to previous years). In terms of research performers, most of the financial resources went to public research institutes (54.6%), higher education institutions were the recipients of 43.4%, the business sector received 1.5% of the public funds and 0.2% went to private non-profit institutions, according to the Agency's financial report.

Besides research group programmes, another scheme for financing basic research projects is operated by the Slovenian Science Agency, distributing funds in 2007 in the vicinity of 22% of the research programme financing. This scheme funds basic research projects of shorter periods (up to three years), and in 2007 the leading recipients in terms of science field were the natural sciences, the humanities and the technical and medical sciences.

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Research funding system

Other modes of funding

Public resources are also available to support scientific publications and periodicals, the participation of researchers in international meetings/conferences and the organisation of scientific workshops or conferences.

The structure of research funding does not include the category of contract research.

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Research funding system

Targeted or Thematic Funding

While the funding of the basic research, organised via research group programmes, does not define specific thematic

ERAWATCH research inventory report: SLOVENIA

priorities, and the selection of programme groups depends primarily on the scientific excellence of the research programme group and its head researcher, a more targeted funding mode is used for commissioning specific research to assist in public policy. These schemes are known as *targeted research projects*. The thematic priorities are specified by each of the interested ministries, with the aim of the scheme being the provision of scientific support to policy-makers in the preparation of their programmes and policies or in the evaluation of the existing programmes.

An annual call coordinated by the Slovenian Research Agency is announced, divided into the thematic priorities in the Slovenian Development Strategy and attributed to a specific ministry. In each priority, the responsible ministry defines the topics of research connected to its policies (some more broadly, some relatively narrowly and specifically) and invites the research community to propose projects. Projects can run from one to four years, with semi-annual reporting and annual evaluation. In 2007, *targeted research projects* were allocated around €2.5m. The largest recipients of the funds were social sciences, since the majority of the targeted fields related to societal issues (human resources and social cohesion, balanced regional development, economic competitiveness, information society, etc.). In June 2006 a call for targeted research projects to support the implementation of the Slovenian Development Strategy, 2007–2013 was announced. As a rule, the Ministry of Higher Education, Science and Technology co-finances research set forth by other ministries and does not have its own independent agenda of priorities.

In 2006 the Ministry of Defence commissioned the Research Agency to coordinate a targeted research project named Development for Peace, for which topics of specific interest for the ministry were announced.

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Research funding system

Role of European and international funding

According to the Office of Statistics (Rapid Report No 206/2006), Slovenia received €42m in 2004 from abroad or 11% of gross domestic expenditure on R&D (GERD). The sources of these funds were the following: foreign business enterprises accounted for 77.6% of the total, followed by the European Commission, which contributed 9.7%. Other sources included 6.6% from higher education, 1.3% from private non-profit organisations and 1.1% from international organisations. Non-identified sources contributed 3%.

For 2005, only broad information on the structure of sources of finance is available. It shows that funds from abroad had dropped to 7.1% (Office of Statistics, First release January 2007).

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Research funding system

Private research funding

Intramural

While still below the EU average, business sector investment in R&D in Slovenia has experienced steady growth for the last decade. In 1996 the share of business sector expenditure on R&D (BERD/GDP) was 0.68%; it reached 0.97% in 2004 (Statistical Office of the Rep. of Slovenia, Rapid reports 206/2006). Business expenditure now accounts for 58% of the GERD. Business sector R&D investment is much more sector specific than public research. There is still a predominant role of manufacturing (81% of total BERD in 2004) and within manufacturing a rather narrow list of business sectors that play major roles. In particular, the chemicals, specifically pharmaceuticals, stand out since this sector alone accounts for 41% of total BERD. Another concentration of business R&D can be found in fabricated metal products, machinery and equipment (31%), especially in TV and communication equipment (21.4%). The share of services in R&D expenditures was 17%, and while it still hardly reflects the otherwise important role of the sector in national economy with over 62% of value added, it has increased by more than 60% from the 2003 level. Most of this increase happened on account of the growth of intramural R&D expenditures in the "research and development" industry (Statistical Office of Rep. of Slovenia, Rapid reports No. 206, 2006).

In terms of main R&D investors, the two large pharmaceutical companies, Krka and Lek (owned by Novartis), are in the lead. Other firms known for relatively high R&D investment come from electrical and electronic equipment sectors (Iskratel, a joint venture with Siemens; Gorenje; Hydria group; Kolektor; etc.). Since 2000, several small firms have achieved impressive growth thanks to their investment in R&D and innovation and have become highly successful in their niche (for example, the SMEs Akrapovic, Pipistrel and Seaway).

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Research funding system

ERAWATCH research inventory report: SLOVENIA

Extramural

The business sector is a source of funding for approximately 8% (2005) of expenditures in the government sector and in the higher-education sector. The percentage has not changed since 2000 in spite of several attempts by the government to stimulate cooperation between the two sectors. While no official data is available to verify this except the annual reports of public research institutes, it is again the pharmaceutical sector and machinery and electronic equipment sector that finance most of the public R&D. They have established contacts with key faculties and institutes and support specific research programmes in line with their interests. This may suggest that the challenge of weak cooperation between public R&D and BES is not only an aggregate problem but is also a problem of the structural performance of public R&D and BES.

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Research funding system

Charitable foundations and not-for-profit funding

The only not-for-profit organisation in the area of R&D in Slovenia is the Slovenian Science Foundation. The SSF is involved in the promotion of science and in providing scholarships for young researchers, but not in research funding.

Currently, there are no charitable foundations operating in the R&D area in Slovenia.

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

SLOVENIA - Support Measure(s)

Title of support measure	Start Date	Organisation responsible
<u>Research Group Programme Financing Scheme</u>	1999	The agency administering the scheme is Slovenian Research Agency (Javna agencija Republike Slovenije za raziskovalno dejavnost, ARRS)

Research performers

Higher Education Institutions

Currently, Slovenia has four universities: the University of Ljubljana; the University of Maribor; the University of Primorska and Politehnika. The first three are public universities, funded for their academic tasks mostly by the government. Their research activities are financed in the vicinity of 80% by public sources. In the spring of 2006, a new university was established (Politehnika, Nova Gorica), the first example of private public partnership in this area. Politehnika has existed as a higher-education institution for more than a decade now, but with the expansion of its programmes, it has initiated a process of transformation into a university.

According to the Slovenian Development Strategy and the National reform programme, Slovenia will establish new higher-education institutions to increase the possibilities of achieving higher education and also to curtail the current dominance of existing universities, especially Ljubljana, which is among the largest in Europe in terms of the number of student.

Current regulations allow regular teaching staff with 100% pedagogical assignment to participate in up to 20% of the FTE (full-time equivalent) in publicly funded research. This explains the difference between the head count of the number of persons employed in R&D in higher education and the figure expressed in FTE. While the former is 2,688 researchers, the FTE count shows only 1,246 (Statistical Office of the Rep. of Slovenia, 2006).

The university system is gradually being restructured to meet Bologna objectives, but so far this process has developed slowly. The Ministry of Higher Education, Science and Technology prepared a draft law on higher education and research, with the objective of speeding up reform of the higher-education sector and preparing common-ground criteria for research and teaching evaluations, promotions and eligibility. The draft was heavily criticised and led to the minister's resignation in September 2007.

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Public research organisations

There are 47 research institutes in the government sector, employing 1,313 researchers (head count). Those having the Ministry of Higher Education, Science and Technology as their founder are entitled to institutional funding. The percentage that institutional funding represents varies from institute to institute, but, on average, institutes report that 10–30% of their budget is covered in this way. Institutes can apply with their research groups for research programme funding, for applied projects if they have co-financing from business sector or for direct contracts with the business sector (National Research and

ERAWATCH research inventory report: SLOVENIA

Development Programme).

The most important national and public research institutes are:

- Agricultural Institute of Slovenia;
- Educational Research Institute;
- GeoZS, Geological Survey of Slovenia;
- IER, Institute for Economic Research;
- Institute for Hydraulic Research;
- IJS, Jozef Stefan Institute;
- IMT, Institute of Metals and Technology;
- INV, Institute for Ethnic Studies;
- INZ, Institute of Contemporary History;
- National Institute of Chemistry;
- NIB, National Institute of Biology;
- Slovenian Forestry Institute;
- UI, Urban Planning Institute;
- ZAG, National Building and Civil Engineering Institute; and
- ZRC SAZU, Scientific Research Centre of SASA.

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Private research performers

According to the [Statistical Office](#) Rapid Report No. 206 of December 2006, there are 277 research organisations registered in the business sector, employing 3,855 R&D personnel (FTE), with 1,657 classified as researchers, 1,767 as technicians and 431 as other personnel in 2004. The research organisations in the business sector have a significantly lower educational level than those in the public research sector, since only 8% of all researchers holding the PhD work in the business sector. Sixty-five per cent of gross domestic expenditure of research organisations in the business sector (BERD) is dedicated to engineering research and 31% to medical research. These high percentages correspond to the distribution of investment in R&D by business sectors. More than 56% of the research conducted in the business sector is applied research, and an additional 40% is experimental development.

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Research performers

Private research performers

Private Research and Technology Organisations

One of the early measures that Slovenia introduced to promote cooperation between the business sector and public research was the formation of *technology centres*. The system of technology centres has been promoted and systematically developed over the last 10 years. Technology centres are independent legal entities established by several companies for the purpose of R&D in a specific field or branch as well as for the provision of R&D equipment subsequently made available to companies for their development projects. If a company is understaffed in the R&D field, personnel from the technology centre provide services for them. Some of the centres were newly established in partnership with the business sector in a particular area and involved some research capabilities either at the centre itself or in cooperation with public research institutes or higher-education organisations. Some were formed at the level of industrial associations and transformed themselves into technology centres. There are currently 25 active technology centres operating in fields ranging from textile processing, footwear, toolmaking, electrical engineering and information and safety technologies (<http://www.mvzt.gov.si>).

Last update date: 15/01/2008

Name of correspondent: Maja Bucar

Key research indicators

Overview

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

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

Description of the four categories of indicators

ERAWATCH research inventory report: SLOVENIA

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

Expenditures on R&D

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

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

Researchers

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

Publications

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

Patents

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

Additional notes

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

Relative performance

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

Last update date: 14/02/2008

Expenditures on R&D

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

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

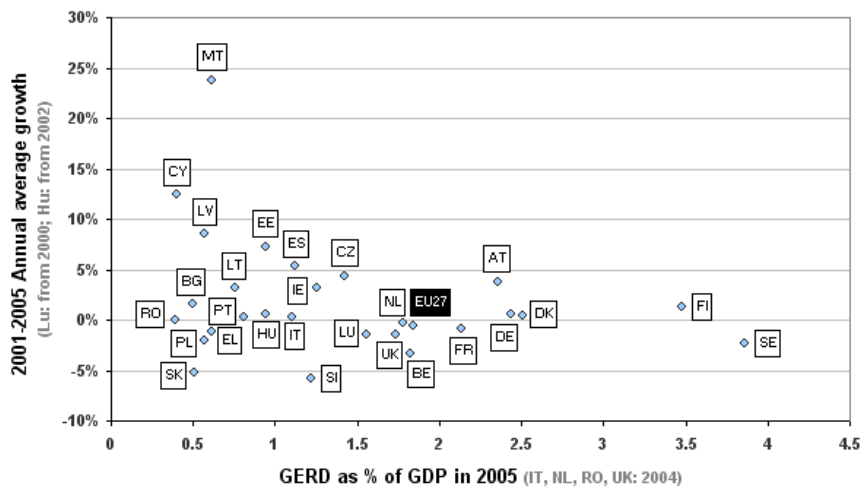
ERAWATCH indicators follow the Eurostat geographical data coverage.

[Download the data in Excel format](#)

Gross expenditure on R&D (GERD)

ERAWATCH research inventory report: SLOVENIA

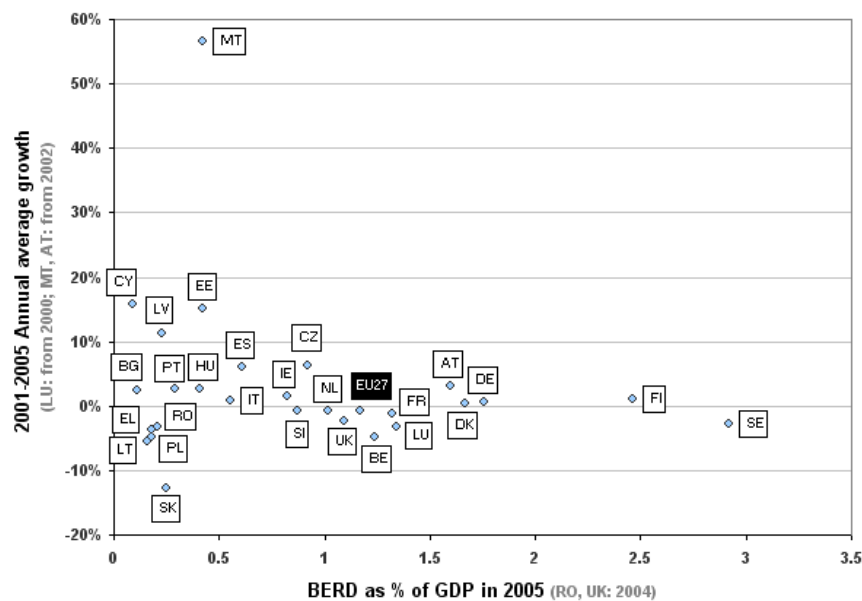
Gross expenditure on R&D



Source : Eurostat compiled by ERAWATCH

Business Expenditure on R&D (BERD)

Business expenditure on R&D

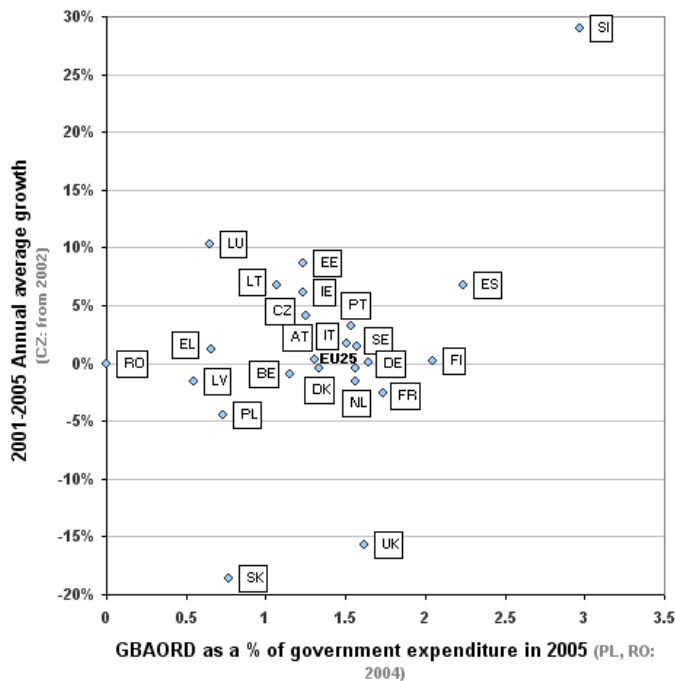


Source : Eurostat compiled by ERAWATCH

Government budget appropriations or outlays

ERAWATCH research inventory report: SLOVENIA

Government budget appropriations or outlays (GBAORD)



Source : Eurostat compiled by ERAWATCH

Last update date: 14/02/2008

Researchers

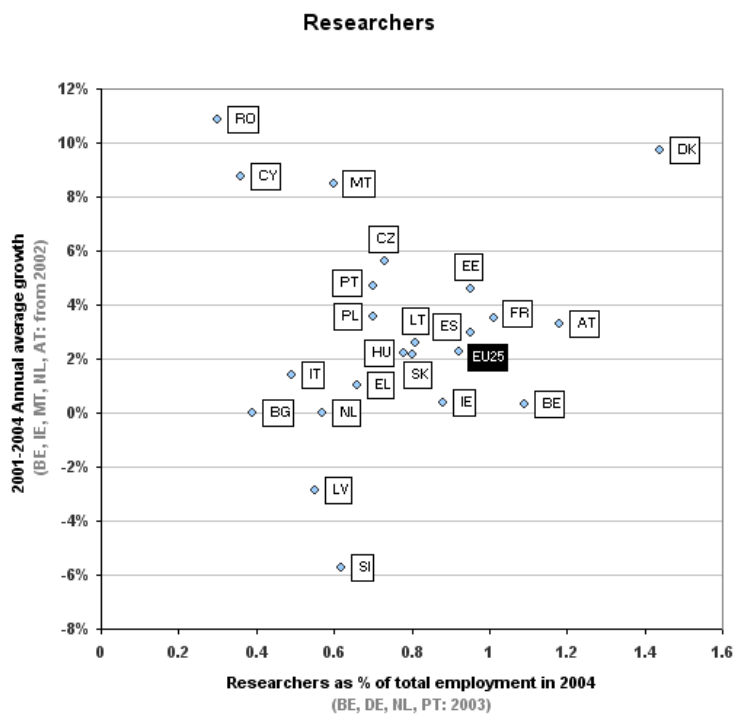
Human resources play a crucial role in knowledge production; they produce and convey knowledge. This page displays the number of researchers found in the different sectors, such as business enterprise, government, higher education and private non-profit institutions.

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

ERAWATCH indicators follow the Eurostat geographical data coverage.

[Download the data in Excel format](#)

Researchers



Source : Eurostat compiled by ERAWATCH

Last update date: 14/02/2008

Publications

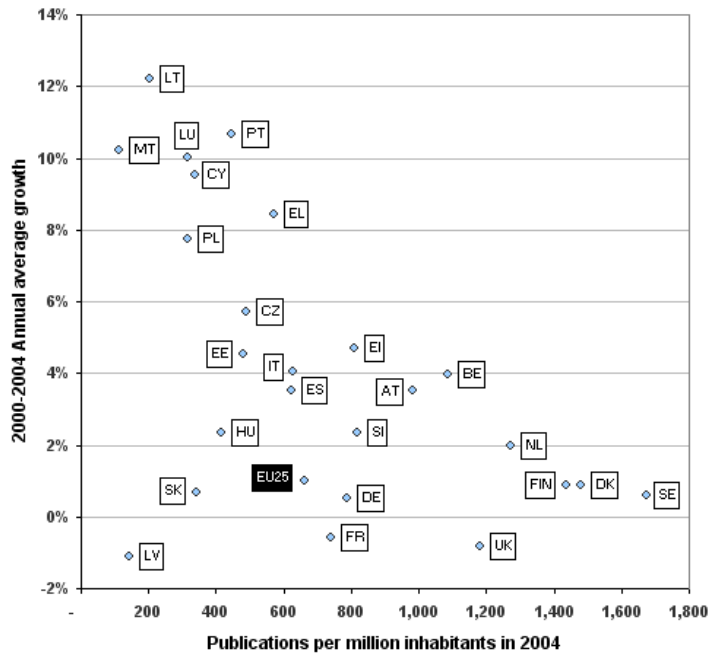
Publications are one of the most common indicators used to measure the output of scientific research. The number of scientific articles (deflated per million inhabitants) produced by a country can be considered as a basic proxy for the national scientific knowledge productivity.

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

[Download the data in Excel format](#)

Scientific publications

Publications



Source: DG Research compiled by ERAWATCH

Last update date: 14/02/2008

Patents

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

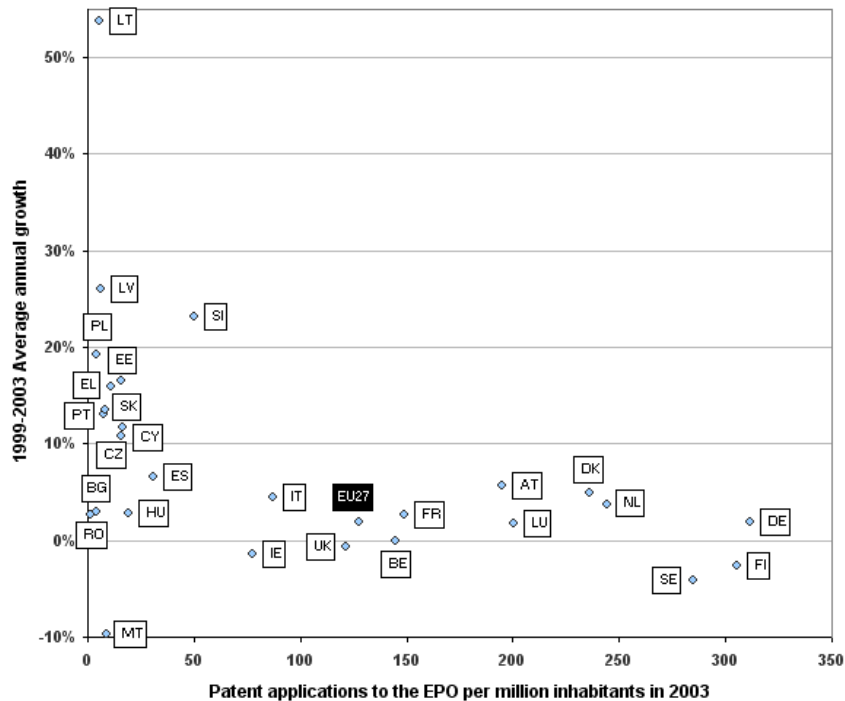
- The charts use an annual percentage of change for the y axis, providing a dynamic dimension for the interpretation of the indicators. Moreover, the charts give a comparative insight: the countries covered by Erawatch (where data is available) are grouped in one single graph
- The data (time series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

ERAWATCH indicators follow the Eurostat geographical data coverage.

[Download the data in Excel format](#)

Patents

Patents



Source : Eurostat compiled by ERAWATCH

Last update date: 14/02/2008

Relative performance

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

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

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

ERAWATCH indicators follow the Eurostat geographical data coverage.

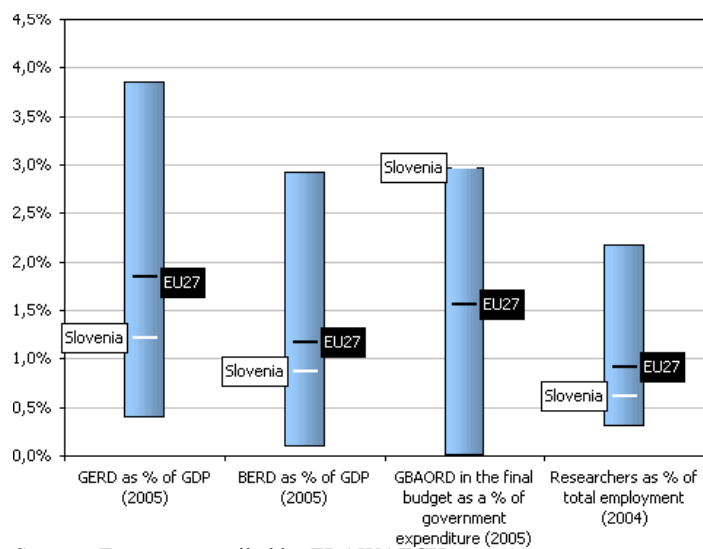
Notes

- GERD: 2004 for IT, NL, RO, UK
- BERD: 2004 for RO, UK
- GBAORD: EU25 instead of EU27. 2003 for BE, DE, GR, LU, NL, PT, SE
- Researchers: EU25 instead of EU27. Full counting method has been used at country level.
- Publications: EU25 instead of EU27. Full counting method has been used at country level. At the aggregate level for EU25, double counting was avoided.

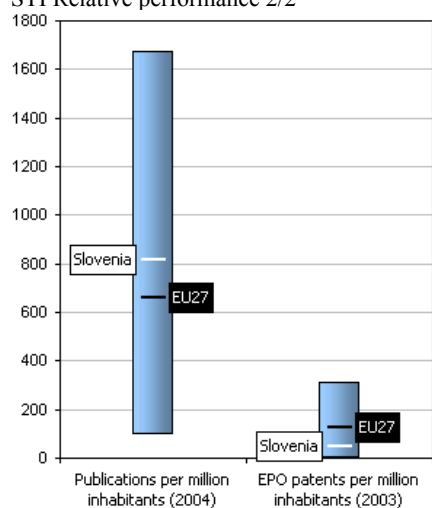
[Download the data in Excel format](#)

STI Relative performance 1/2

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Source : Eurostat compiled by ERAWATCH
STI Relative performance 2/2



Source : Eurostat and DG Research compiled by ERAWATCH

Last update date: 14/02/2008