

ERAWATCH Country Report 2009

Analysis of policy mixes to foster R&D investment
and to contribute to the ERA

Slovenia

Maja Bucar



EUR 23976 EN/19 - 2009

The mission of the JRC-IPTS is to provide customer-driven support to the EU policy-making process by developing science-based responses to policy challenges that have both a socio-economic as well as a scientific/technological dimension.

European Commission
Joint Research Centre - Institute for Prospective Technological Studies
Directorate General Research

Contact information

Address: Edificio Expo. c/ Inca Garcilaso, 3. E-41092 Seville (Spain)
E-mail: jrc-ipts-secretariat@ec.europa.eu
Tel.: +34 954488318
Fax: +34 954488300

IPTS website: <http://ipts.jrc.ec.europa.eu>
JRC website: <http://www.jrc.ec.europa.eu>
DG RTD website: <http://ec.europa.eu/research/>

Legal Notice

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

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

Freephone number (*):

00 800 6 7 8 9 10 11

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

A great deal of additional information on the European Union is available on the Internet. It can be accessed through the Europa server <http://europa.eu/>

JRC 53719
EUR 23976 EN/19
ISBN 978-92-79-13326-8
ISSN 1018-5593
DOI 10.2791/ 22174

Luxembourg: Office for Official Publications of the European Communities

© European Communities, 2009

Reproduction is authorised provided the source is acknowledged

Printed in Spain

ERAWATCH COUNTRY REPORT 2009: Slovenia

**Analysis of policy mixes to foster R&D
investment and to contribute to the ERA**

ERAWATCH Network – Independent Expert

Maja Bucar

Acknowledgements and further information:

This analytical country report is one of 33 reports for EU Member and Associated States prepared as part of ERAWATCH. ERAWATCH is a joint initiative of the European Commission's Directorates General for Research and Joint Research Centre. For further information on ERAWATCH see <http://cordis.europa.eu/erawatch>. The analytical framework and the structure have been developed by the Institute for Prospective Technological Studies of the European Commission's Joint Research Centre (JRC-IPTS) in collaboration with DG-RTD and the ERAWATCH Network.

The report has been produced by the ERAWATCH Network (<http://www.erawatch-network.eu/>) in the framework of the specific contract on ERAWATCH Policy Mix Country Reports 2009 commissioned by JRC-IPTS. It makes use of information provided in the ERAWATCH Research Inventory with support of the ERAWATCH Network.

In particular, it has benefited from comments and suggestions of Slavo Radosevic, who reviewed the draft report. The contributions and comments of Ales Gnamus from JRC-IPTS and DG-RTD are also gratefully acknowledged.

The report is only published in electronic format and available on the ERAWATCH website: <http://cordis.europa.eu/erawatch>. Comments on this report are welcome and should be addressed to Mariana Chioncel (Mariana.Chioncel@ec.europa.eu).

Executive Summary

As highlighted by the Lisbon Strategy, knowledge accumulated through investment in R&D, innovation and education is a key driver of long-term growth. Research-related policies aimed at increasing investment in knowledge and strengthening the innovation capacity of the EU economy are thus at the heart of the Lisbon Strategy. This is reflected in guideline No. 7 of the Integrated Guidelines for Growth and Jobs. This advocates increasing and improving investment in research and development (R&D), with a particular focus on the private sector. This report aims at supporting the mutual learning process and the monitoring of Member States efforts. Its main objective is to characterise and assess the evolution of the national policy mixes in the perspective of the Lisbon goals, with a particular focus on the national R&D investments targets and on the realisation and better governance of the European Research Area. The report builds on the analytical country reports 2008 and on a synthesis of information from the ERAWATCH Research Inventory and other important available information sources.

The level of research and development (R&D) investment in Slovenia in recent years has been under 1.5% of Gross Domestic Product (GDP), with a slight increase in 2006 to 1.59% (SURS, February 2008), followed by a decline again in 2007 to 1.45% (SURS, February 2009). In nominal terms this relative decline was actually the increase of €16.5m in 2007. 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 was 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 (6.1% in 2007), are not so optimistic. This led to official postponement of the target to 2013. Both times the target was set more as a mobilisation target than a realistic one, since its achievement isn't only the issue of financial resources, but the lack of human resources and absorption capacity as well.

An increased investment in R&D had been clearly stated priority in all the main policy papers (National Research and Development Programme 2006-2010 (NRDP, 2005), Slovenian Development Strategy 2005-2010 (IMAD, 2005), National Reform Programme 2005- 2010 (Republic of Slovenia, 2005). Several support measures, introduced to stimulate business R&D investment, proved to be insufficient to achieve Lisbon targets. Partly the reason lies in fragmentation of policies, where the numerous and changing instruments to stimulate business R&D spread the resources too thinly. While one can say that every challenge/ problem had its policy solution in a measure or support instrument, available funds were insufficient to make the impact. On the other hand, high concentration of business R&D in some industries shows that most problematic segment of business sector are R&D and innovation inactive enterprises, particularly SMEs. These have only recently become the target of the support measures.

Barriers to R&D investment	Opportunities and Risks generated by the policy mix
Insufficient growth of public and business sector investment in R&D	Opportunity: New funds allocated for business R&D within the “crisis package”. Risk: slow-down in economy may further limit the capability of business sector to invest in R&D
Non-coordination of R&D policies towards public sector and for business community	Opportunity: continuous promotion of closer cooperation of public R&D organisations with business sector through instruments like centres of excellence Risk: relatively complex process of restructuring public R&D in terms of priority setting
Significant share especially among SMEs of firms with no R&D activity	Opportunity: concentrate efforts of support institutions on promotion of R&D and innovation in SMEs Risk: unfavourable economic climate may deter SMEs from risk-taking and investing in R&D.

From the policy mix perspective the main imbalance lies in the structure of public R&D funding for two R&D communities: the public and the business one. While at the top policy level Slovenia has a single document (NRDP), in the implementation phase the two have been effectively separated: Slovenian Research Agency mainly took care of R&D in public sector and Ministry of Higher Education, Science and Technology with Technology Agency and Ministry of Economy with Public Agency for Entrepreneurship and Foreign Investment focused on business sector. There had been no systematic and joint policy development or coordination of instruments, so one could really not talk about the true policy-mix. So while Slovenia was making some progress in R&D and innovation (according to the S&T indicators as well as innovation data), this was not optimal from policy mix perspective. In addition, other policies, affecting R&D investment were seldom employed with the exception of fiscal policy (R&D tax subsidy).

	Short assessment of its importance in the ERA policy mix	Key characteristics of policies
Labour market for researchers	<ul style="list-style-type: none"> • Small and financially less attractive for the inward mobility, increasing outward mobility of younger researchers 	<ul style="list-style-type: none"> • Slow progress, since many legal provisions and a need for cross-coordination take time • Not very active policy
Governance of research infrastructures	<ul style="list-style-type: none"> • Growing interest of individual research organisations, which requires more systematic approach 	<ul style="list-style-type: none"> • Lack of clear policy as to the type of support provided or the priorities
Autonomy of research institutions	<ul style="list-style-type: none"> • HEI entangled in Bologna has not yet requested more autonomy, PRO have relatively high level of autonomy under the current financing 	<ul style="list-style-type: none"> • No clearly defined policy
Opening up of national research programmes	<ul style="list-style-type: none"> • Very important in principle, but still at the planning stage 	<ul style="list-style-type: none"> • Preparation of the strategic national policy document

ERA and ERA related policies are having significant impact on the national research policies by raising issues which may otherwise be given less attention of the policy makers. Besides additional financial resources made available to Slovenian research organisations through different programmes, probably most important effect has been on policy concepts and on evaluation practice. Issues of policy coordination, policy mix, R&D policy implementation, governance etc. are much more in the forefront of the policy-makers discussion than they would be without ERA. Still, the next step is to move beyond discussion towards integral R&D policy mix, where national R&D system is systematically “upgraded” with ERA-related policies, which

are assessed as beneficial. So, the challenge is shift from narrow R&D policy towards broader scope of R&D policy, where all dimensions of R&D, private and public, national and international would be synchronised and thus leading to better results.

TABLE OF CONTENTS

Executive Summary.....	3
1 Introduction.....	8
2 Characteristics of the national research system and assessment of recent policy changes.....	9
2.1 Structure of the national research system and its governance.....	9
2.2 Summary of strengths and weaknesses of the research system	13
2.3 Analysis of recent policy changes since 2008.....	14
2.3.1 Resource mobilisation.....	15
2.3.2 Knowledge demand	15
2.3.3 Knowledge production.....	16
2.3.4 Knowledge circulation	17
2.4 Policy opportunities and risks related to knowledge demand and knowledge production: an assessment	18
3 National policy mixes towards R&D investment goals.....	19
3.1 Barriers in the research system for the achievement of R&D investment objectives	19
3.2 Policy objectives addressing R&D investment and barriers	20
3.3 Characteristics of the policy mix to foster R&D investment.....	21
3.3.1 Overall funding mechanisms.....	21
3.3.2 Policy Mix Routes.....	21
3.4 Progress towards national R&D investment targets	28
4 Contributions of national policies to the European Research Area.....	29
4.1 Towards a European labour market for researchers	30
4.1.1 Policies for opening up the national labour market for researchers.....	30
4.1.2 Policies enhancing the attractiveness of research careers in Europe	31
4.2 Governing research infrastructures	31
4.3 Research organisations	32
4.4 Opening up national research programmes	32
4.5 National ERA-related policies - a summary.....	33
5 Conclusions and open questions.....	34
5.1 Policy mix towards national R&D investment goals.....	34
5.2 ERA-related policies.....	35
References	36
List of Abbreviations	38

1 Introduction

As highlighted by the Lisbon Strategy, knowledge accumulated through investment in R&D, innovation and education is a key driver of long-term growth. Research-related policies aimed at increasing investment in knowledge and strengthening the innovation capacity of the EU economy are thus at the heart of the Lisbon Strategy. This is reflected in guideline No. 7 of the Integrated Guidelines for Growth and Jobs.¹ This advocates increasing and improving investment in research and development (R&D), with a particular focus on the private sector. For the period 2008 to 2010, this focus is confirmed as main policy challenge and the need for more rapid progress towards establishing the European Research Area, including meeting the collective EU target of raising research investment to 3% of GDP, is emphasised.

A central task of ERAWATCH is the production of analytical country reports to support the mutual learning process and the monitoring of Member States' efforts in the context of the Lisbon Strategy and the ambition to develop the European Research Area (ERA). The first series of these reports was produced in 2008 and focused on characterising and assessing the performance of national research systems and related policies in a comparable manner. In order to do so, the system analysis focused on key processes relevant for system performance. Four policy-relevant domains of the research system have been distinguished, namely resource mobilisation, knowledge demand, knowledge production and knowledge circulation. The analysis within each domain has been guided by a set of generic "challenges", common to all research systems, which reflect possible bottlenecks, system failures and market failures which a research system has to cope with. The analysis of the ERA dimension still remained exploratory.

The country reports 2009 build and extend on this analysis by focusing on policy mixes. Research policies can be a lever for economic growth, if they are tailored to the needs of a knowledge-based economy suited to the country and appropriately co-ordinated with other knowledge triangle policies. The policy focus is threefold:

- An updated analysis and assessment of recent research policies
- An analysis and assessment of the evolution of national policy mixes towards Lisbon R&D investment goals. Particular attention is paid to policies fostering private R&D and addressing its barriers.
- An analysis and assessment of the contribution of national policies to the realisation of the ERA. Beyond contributing to national policy goals, which remains an important policy context, ERA-related policies can contribute to a better European level performance by fostering, in various ways, efficient resource allocation in Europe.

¹ COM(2007) 803 final, "INTEGRATED GUIDELINES FOR GROWTH AND JOBS (2008-2010)", http://ec.europa.eu/growthandjobs/pdf/european-dimension-200712-annual-progress-report/200712-annual-report-integrated-guidelines_en.pdf

2 Characteristics of the national research system and assessment of recent policy changes

2.1 Structure of the national research system and its governance

Slovenia is among the smaller EU member countries with its 2 million inhabitants and GDP of €34.471m or €17,076 per capita in 2007 (SURS, Rapid Reports, No.40, 2008). The level of research and development (R&D) investment in Slovenia in recent years has been under 1.5% of Gross Domestic Product (GDP), with a slight increase in 2006 to 1.59% (SURS, February 2008), followed by a decline again in 2007 to 1.45% (SURS, February 2009). In nominal terms this means €500.5m in 2007. 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 was 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 (6.1% in 2007), are not so optimistic. In fact the 2008 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 by 2010 and postponed the goal to 2013². The government has, however, provided in the revised 2009 budget additional €48m for measures stimulating business R&D investment as part of the anti-crisis package (MHEST, 2009).

Table 1: Basic data on R&D funding³

	2005	2006	2007	2008	EU-27 (latest year)	
					Average	Year
GERD (euro million)	413	484	529	na	226120	2007
R&D intensity (GERD as % of GDP)	1.44	1.56	1.53	na	1.83	2007
GERD financed by government as % of total GERD	37.2	34.4	33.8	na	34.2	2005
GERD financed by business enterprise as % of total GERD	54.8	59.3	60,3	na	54.5	2005
GERD financed by abroad as % of total GERD	7.3	5.8	5.4	na	9.0	2005
GBAORD (euro million)	167	173	226	na	87639	2007
GBAORD as % of general government expenditure	1.28	1.26	1.55	na	1.55	2007
BERD (euro million)	243	291	324	na	144089	2007
Business sector R&D intensity (BERD as % of GDP)	0.85	0.94	0.94	na	1.17	2007
BERD financed by government as % of total BERD	7.0	5.6	7.1	na	7.2	2005

Data Source: Eurostat

Note: Values in italics are estimated or provisional. na = not available

² Republic of Slovenia (2008) Reform Programme for Achieving the Lisbon Goals. <http://www.svr.gov.si/fileadmin/srs.gov.si/pageuploads/Dokumenti/SI-NRP2008-en.pdf>

³ Data in the table are taken from Eurostat and the figures for 2007 are based on preliminary data, while data in the text are taken from final data for 2007, released by Statistical Office of RS in February 2009 (SURS, Feb. 2009).

Main actors and institutions in research governance

The Ministry of Higher Education, Science and Technology (MHEST)⁴ 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- NRDP)⁵, 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 Council⁶, 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 in 2004: Slovenian Research Agency (SRA)⁷ and Slovenian Technology Agency (TIA)⁸. The first is responsible for the execution of public research financing, for the professional and independent selection/evaluation process of R&D projects and programmes and the monitoring of research implementation. The Slovenian Technology Agency is in charge of programmes promoting innovation and technology development in business sector.

The Ministry of Economy (ME)⁹ 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. Some of the programmes and measures of the ME are executed by TIA, while several measures, more focused on the entrepreneurship promotion, are entrusted for the execution to the Public Agency for Entrepreneurship and Foreign Investment- PAEFI¹⁰. In recent years, Ministry for Defence has become more engaged in financing R&D as well by running two major programmes, one with SRA (Knowledge for peace) and one with TIA (Technologies for peace). The Government Office for Growth¹¹ is responsible for the implementation of the Slovenian Development Strategy¹² as well as the National Reform Programme for Achieving the Lisbon Strategy Goals¹³. The Office also coordinates the preparation of the annual National report on the Implementation of the NRP for Achieving the Lisbon Strategy Goals.

⁴ <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=org.document&UUID=7D87CCA5-C9B9-0313-70C787F348DE4F64&hwd=>

⁵ <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=policy.document&UUID=7D87A9BB-B3F1-0959-F567E3A894EDC30B&hwd=>

⁶ <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=org.document&UUID=1686F32D-0661-2236-95DF8D150AB32B38&hwd=>

⁷ <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=org.document&UUID=7D87C86F-B1EA-8535-7A0946A6B127BC61&hwd=>

⁸ http://www.tia.si/o_agenciji,533,0.html

⁹ http://www.tia.si/o_agenciji,533,0.html

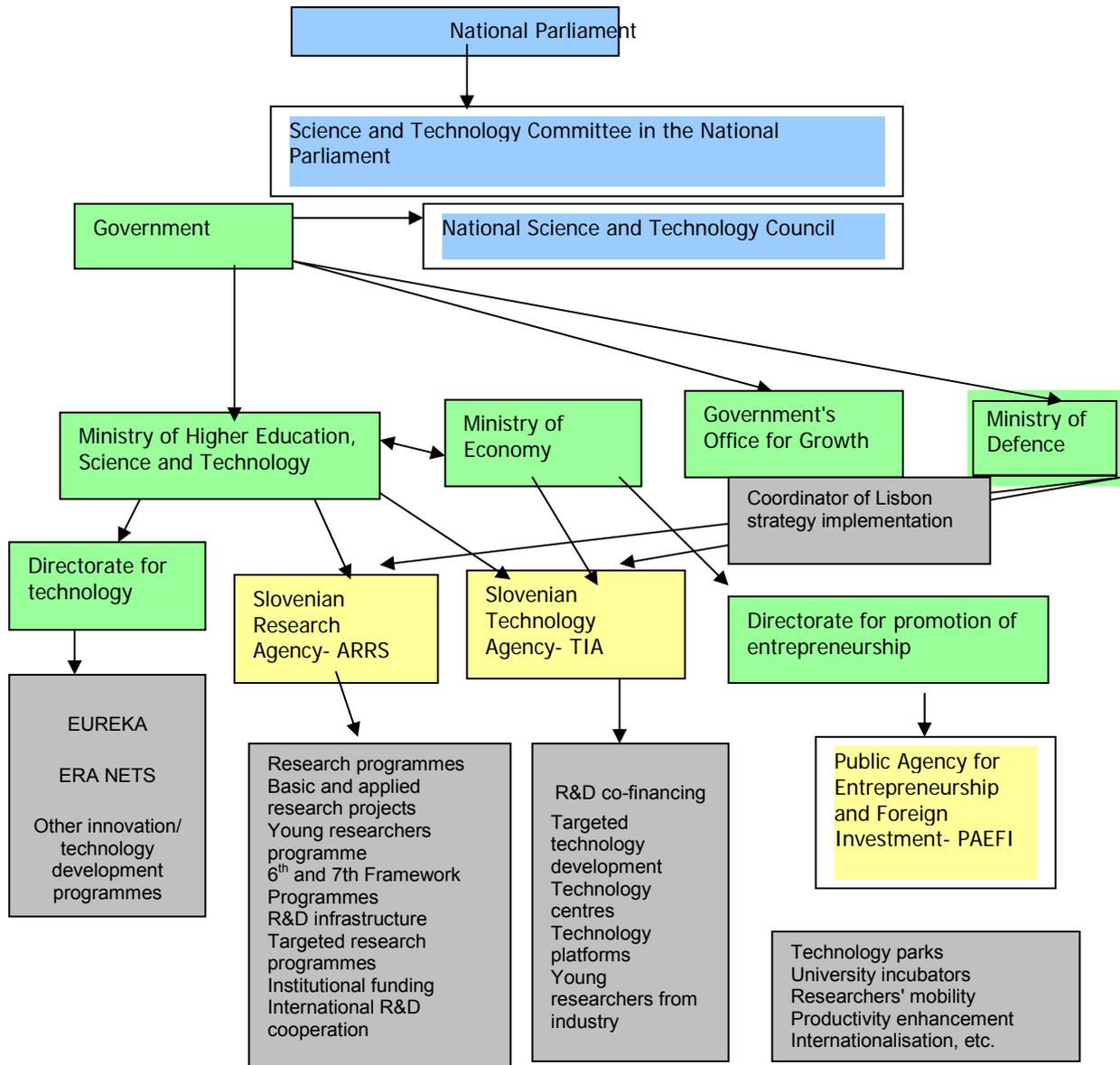
¹⁰ <http://www.japti.si/home>

¹¹ <http://www.svr.gov.si/en/>

¹² <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=policy.document&UUID=7D87A4CA-C30B-7F76-24B2D3F6E1735FDE&hwd=>

¹³ <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=policy.document&UUID=FD89615B-034B-D2FD-865A648C56CA12E5&hwd=>

Figure 1: Overview of the governance structure of the Slovenia's research system



Legend:
 Blue: advisory bodies
 Green: government
 Yellow: executing agencies
 Grey: measures

Source: [ERAWATCH Baseload Inventory, Slovenia](#)

The institutional role of the regions in research governance

Due to the size of its population (2m), Slovenia is in the current financial perspective still considered as a single region at the NUTS 2 level. Still, for the purposes of cohesion policy, it was agreed that two cohesion regions were formed.¹⁴ Gradually, development of regional research infrastructure is planned. In the [National Development Programme](#) for the financial perspective 2007–2013 (NRP, 2007) and in the NSRF¹⁵ (NSRF, 2007), the government plans the development of several regional business-infrastructure-technology centres, 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. During 2008, Ministry of the Economy issued several public calls for the assessment of viability of setting up such regional centres. On the basis of their findings, the final decision on the institutional set-up at the regional level will be made.

Main research performer groups

The four universities and a number of public research institutes constitute the main public research capability. More than 30% or 1,805 of researchers (in FTE) in 2006 were employed in research institutes, and only slightly fewer (1,740) at higher education institutions. In recent years several new higher education institutions have been established by private funds as well. Substantial amount of R&D is carried out in the business sector as well, especially in pharmaceutical industry (36% of total intramural BERD in 2006) and various industries grouped statistically under “fabricated metal products, machinery and equipment, instruments and transport”, accounting for 37.6% (SURS, February 2009). These sectors have traditionally been important R&D performers and have maintained constant increase of investments, resulting in much more dynamic growth than in the public sector.

Table 2: R&D expenditure by sources of finance and sector of performance, 2007

<i>Performers</i> <i>Funders</i>	Higher education sector	Government research institutes	Business enterprises	Total	Share of GERD
Government	33.0%	53.5%	13.4%	100% (€178.2m)	35.6%
Business	2.8%	5.5%	91.5%	100% (€287.8m)	58.3%
Abroad	30.7%	38.3%	30.0%	100% (€28.8)	5.8%
Higher education sector	100.0%	0.0%	0.0%	100% (€1.7m)	0.3%
Share of total R&D expenditures	15.5%	24.5%	59.0%	100% (€500.5m)	100.0%

Source: SURS, February 2009. Note: The share of the Private non-profit sector is only 0.1%.

¹⁴ See details in ERAWATCH Baseload Inventory Slovenia; <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=ri.content&countryCode=SI&topicID=4>

¹⁵ http://www.svlr.gov.si/fileadmin/svlr/srp.gov.si/pageuploads/KOHEZIJA/Programski_dokumenti/NSRF_Slovenia_18_06_07_Unoff_eng_trasl.pdf

2.2 Summary of strengths and weaknesses of the research system

The analysis in this section is based on the ERAWATCH Analytical Country Reports 2008 which characterised and assessed the performance of the national research systems. In order to do so, the system analysis focused on key processes relevant for system performance. Four policy-relevant domains of the research system have been distinguished, namely resource mobilisation, knowledge demand, knowledge production and knowledge circulation. The analysis within each domain has been guided by a set of generic "challenges", common to all research systems, which reflect possible bottlenecks, system failures and market failures a research system has to cope with. The Analytical Country Report for the Slovenia can be found on the [ERAWATCH web site](#).

Table 3: Summary assessment of strengths and weaknesses of the national research system

Domain	Challenge	Assessment of strengths and weaknesses
Resource mobilisation	Justifying resource provision for research activities	The recognition of the importance of R&D and innovation for long-term growth and increased competitiveness in all strategic papers has not been translated in more dynamic allocation of public resources for R&D.
	Securing long term investment in research	Relative stability of public resources in spite of other pressures on the budget expenses is a result of medium-term contractual commitments of Slovenian Research Agency. Also, the inclusion of different R&D and innovation support measures in OP 2007-2013 provides for certain stability in public investment in R&D.
	Dealing with barriers to private R&D investment	Several support measures for R&D in business sector exist, but their fragmentation and insufficient coordination can be seen as a weakness. Venture capital is lacking.
	Providing qualified human resources	A well-developed system of support for young researchers, both in public R&D as well as in business sector can be considered as a strength, while limited interest of youth to pursue S&T studies as well as inefficient higher education system in terms of length of studying weakens the supply of human resources. Slow transition to Bologna system in higher education can be depicted as weakness, too.
Knowledge demand	Identifying the drivers of knowledge demand	Several systems for identification of knowledge demand exist, but translation of identified priorities and knowledge demand to funding programmes of the public institutions is slow and not systematic. Particularly in public R&D sphere internal setting of priorities dominates, with little regard for external knowledge demand.
	Co-ordination and channelling knowledge demands	Non-existence of a system for co-ordination and channelling of identified knowledge demand into public R&D financing is a serious weakness.
	Monitoring of demand fulfilment	Development of a more systematic ex-ante and ex-post evaluation at the level of research programmes/ projects by SRA as well as the introduction of socio-economic relevance as one of the assessment criteria has improved evaluation practice. Still, this remains an internal system within publicly funded science and does not assess how the knowledge demand in society/ economy at large is met.

Domain	Challenge	Assessment of strengths and weaknesses
Knowledge production	Ensuring quality and excellence of knowledge production	With increased internationalisation also improvement in publications, citations and impact factors of Slovenian science. Higher education still lacks systematic practice of independent evaluation of quality of teaching and overall output.
	Ensuring exploitability of knowledge	Increased attention to socio-economic relevance of research for obtaining further/ additional financing makes cooperation with business sector more important for public R&D units, but at the same time the scientific excellence prevails as key criterion, maintaining current gap between the two sectors.
Knowledge circulation	Facilitating circulation between university, PRO and business sectors	Many different bridging institutions to facilitate knowledge flow exist, but are not sufficiently specialised. Lack of systematic coordination of support measures and institutions prevents optimal functioning of the support network.
	Profiting from international knowledge	Stable and continuous support to participation in international R&D programmes, including the ERA-NETs, ETPs, JTI, EUREKA has been beneficial for the participants as well as policy makers, since Europeanization of R&D and innovation policy accounts for several improvements of the system.
	Enhancing absorptive capacity of knowledge users	Increased BERD as well as swift response to tax subsidy suggest there is significant absorptive capacity of certain knowledge users in business sector, yet low innovation activity among small enterprises may indicate both low demand and low absorption capacity for new knowledge there.

One of the relative strengths of the Slovenian research system is its in-built stability in terms of knowledge production, both in public and private sector. The main actors in the public research system demonstrate certain ability to sustain the changes of the institutional set up and policy changes with no drastic shift in their output (Bučar and Stare, 2006). This stability could also be considered as the weakness of the system in a sense that it makes it more difficult to respond to desired (planned) changes in terms of research priority settings. Also, it limits the coherence between the knowledge production and knowledge demand. This is reflected in sub-optimal knowledge circulation between university, PRO and business sector, additionally constrained by lack of coordination among different stakeholders in the national innovation system.

2.3 Analysis of recent policy changes since 2008

The contribution of research and research policies to Lisbon goals (as well as to other societal objectives) goes beyond the fostering of R&D investment. It is therefore important to also analyse how other remaining shortcomings or weaknesses of the research system are addressed by the research policy mix. The focus of the section is on the analysis of main recent policy changes which may have a relevant impact on the four policy-related domains.

2.3.1 Resource mobilisation

Box 1: Changes in National Reform Programme regarding the role of research in the broader economic growth strategy

[Slovenian Development Strategy](#) was the main policy document on basis of which the Slovenian National Reform Programme was prepared in 2005. Since most of the objectives of the SDS are still valid, the policy priorities in the Reform Programme 2008 have not changed either (Republic of Slovenia, 2008). At the time the document was written (Aug.-Sept. 2008), the impact of the financial crisis and changed economic environment was not yet fully taken into account, which is reflected in the action plans as well. No new measures were foreseen at the time. Particularly in the area of R&D, the reiteration of the same policy objectives and priorities, based on the National Research and Development Programme 2006-2010, are to be found, with only significant change being the postponement of the 3% target to 2013. Since National Reform Programme 2008-2010 was published, Slovenia has introduced so called “crisis package” of measures, where the allocation of public resources for technology development (business R&D) has increased with additional €48m for 2009.

Table 4: Main policy changes in the resource mobilisation domain

Challenges	Main policy changes
Justifying resource provision for research activities	<ul style="list-style-type: none"> All research programmes/ projects have to report on socio-economic relevance of their research at the end of the programme/ project.
Securing long term investments in research	<ul style="list-style-type: none"> By inserting many of R&D support measures in the Operational Programme till 2013, the Slovenian co-financing share is to a large extent also secured for this duration.
Dealing with uncertain returns and other barriers to business R&D investments	<ul style="list-style-type: none"> Increased resources for innovation and R&D support measures for enterprises through Structural Funds Additional allocation of budget resources for R&D and innovation in 2009-2010 budget
Providing qualified human resources	<ul style="list-style-type: none"> Expansion of the Young Researchers Schemes Increased scholarships for S&T students to stimulate enrolment Various researchers’ mobility schemes

2.3.2 Knowledge demand

To improve the identification of knowledge demand as well as business opportunities, supported by new knowledge, the Competitiveness council, established in 2008, organised 10 so called “development groups”. Their task is to suggest future direction of allocation of public R&D funding (see details in [ERAWATCH Country Report 2008: Slovenia](#)). Yet the impact of their work has not yet been translated in the funding priorities of the main stakeholders (MHEST, SRA, Office for Growth, Ministry of Economy, TIA). MHEST has, however, announced that it will base its priorities for business R&D funding (executed via TIA) on the recommendations of the technology platforms¹⁶. A public call for support of R&D and investment projects¹⁷, announced

¹⁶ <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=prog.document&UUID=FDC89821-F688-43EF-79AF72D50A885CB3&hwd=>

jointly by MHEST and TIA in December 2008 had already specified some of these priorities.

Table 5: Main policy changes in the knowledge demand domain

Challenges	Main policy changes
Identifying the drivers of knowledge demand	<ul style="list-style-type: none"> • Establishment of the development groups within the Competitiveness Council • Establishment and support to Technology platforms
Co-ordinating and channelling knowledge demands	<ul style="list-style-type: none"> • Continuation of status quo in terms of lack of effective policy coordination
Monitoring demand fulfilment	<ul style="list-style-type: none"> • More systematic ex-ante and ex-post evaluation at the level of research programmes/ projects by SRA, TIA and PAEFI • Introduction of socio-economic relevance as one of the assessment criteria for public R&D funding, introduced in annual reports on programme implementation (ex-post).

More cooperation has been established by the MHEST also with Chamber of Commerce and Industry¹⁸ as well as with Ministry of Economy to strengthen the impact of business sector on policy priorities in R&D funding.

2.3.3 Knowledge production

The improvement of quality and excellence in knowledge production has been one of the major goals of the current NRDP. Among the specific targets in this category were: increase in number of articles and citations as recorded in ISI Web of Knowledge, Essential Science Indicators as well as increase in participation of Slovenian researchers in international projects (Sorcan et al, 2008a). Several policies have been introduced with this in mind. Probably most direct impact on the increase of quality (especially if measured by bibliometric criteria) has been the evaluation system for publicly funded research and the promotion criteria in R&D and higher education sphere. The evaluation of socio-economic relevance of research was also introduced, but based only on the indicator of generated additional resources from non-budget sources.¹⁹

The achievement of closer alliance between the needs of business sector and knowledge production in public R&D has also been set as a target in NRDP. The NRDP anticipates a shift from programme financing towards project financing within the Programme's period (2006-2010), which would allow for more target-oriented research and more focused support to research priorities. More project financing, where typically co-financing from business sector is required, should also increase the exploitability of knowledge production. Yet with limited additional public resources for R&D the planned shift is not being implemented as suggested in the strategy documents: the ratio between programme and project financing has not changed at all in the period from 2005 to 2008 (SRA, 2009). One of the implemented measures in this area had been the formation of centres of excellence in 2006-2007. The

¹⁷ <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=prog.document&UUIID=CE09B7D8-0067-447B-A187590A1D7B4733&hwd=>

¹⁸ <http://eng.gzs.si/slo/>

¹⁹ See detailed description of the evaluation system in Erawatch Baseload Inventory, Slovenia, <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=ri.content&countryCode=SI&topicID=4>

established ten Centres of Excellence²⁰ 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 research projects financed within these centres need to be cofinanced by the business sector and thus contribute to the higher share of priority research.

Gradual modification of the structure of public R&D investments, with an increase in the ratio in favour of technology, has been set as a priority measure in NRP for 2008-2010 (Republic of Slovenia, 2008: part III/ p.17). The proposed changes in the budget allocation for 2009, announced by the government in February 2009, show an increase of resources for technology development to €98m up from €24m in 2008 (MHEST, 2009).

Table 6: Main policy changes in the knowledge production domain

Challenges	Main policy changes
Improving quality and excellence of knowledge production	<ul style="list-style-type: none"> • A new evaluation system developed by SRA for public research funding • Setting up centres of excellence
Ensuring exploitability of knowledge production	<ul style="list-style-type: none"> • Increased importance of socio-economic relevance of research for obtaining further/ additional financing.

2.3.4 Knowledge circulation

Over the years, Slovenia has built relatively extensive R&D, innovation and entrepreneurship support network. Several bridging institutions were introduced with the aim of improving knowledge flows from public R&D institutions to business enterprises. The key objective of setting up this wide variety of support institutions has been the promotion of the cooperation between public R&D sphere and business sector. This, however, remains one of the deficiencies of the Slovenian R&D and innovation system. In fact, in spite of growing business sector R&D investment, improving participation rate of enterprises in innovation activity²¹ and the support network, the figures reflect lower cooperation levels than in the 1990s.

One of the reasons for low effectiveness of the support network is insufficient coordination and specialisation, where no clear demarcation of the tasks is done. Many of the existing institutions are underfinanced and understaffed and preoccupied with their own survival. In many ways, the fragmented network is a reflection of numerous actors involved in R&D and innovation policy at the level of government: Ministry of Higher Education, Science and Technology; Ministry of Economy; Ministry for local self-governance and regional development²² and the Office for Growth, each working with its own set of supporting institutions / instruments.

The promotion of knowledge transfer has been set as one of the national objectives supported also through the Operational Programme for Strengthening Regional Development Potentials (OP SRDP) as a part of the financial perspective 2007-2013. This is to provide additional financial resources to support the network of bridging institutions and offers a good opportunity to build a more transparent and user-friendly support network. Further changes in industrial policy and in the system of financing research activities so as to encourage cooperation between research

²⁰ http://www.sycp.si/sycp/Centres_of_Excellence_RTD.wlgt

²¹ 35.1% of enterprises were active in innovation during 2004-2006; up from 27% during 2002-2004 (SURS, April 2008).

²² In charge of coordination of EU Cohesion and Structural Funds.

companies and industry are planned in NRP 2008-2010, including the continuation and expansion of the joint R&D projects²³.

Table 7: Main policy changes in the knowledge circulation domain

Challenges	Main policy changes
Facilitating knowledge circulation between university, PRO and business sectors	<ul style="list-style-type: none"> • Increased financial support for different types of bridging institutions • Support to centres of excellence • Increased support to joint R&D projects
Profiting from access to international knowledge	<ul style="list-style-type: none"> • Continuous support to participation in international R&D programmes, both for public and private R&D sector
Absorptive capacity of knowledge users	<ul style="list-style-type: none"> • Mobility schemes • Voucher scheme • Support to joint research & development teams

2.4 Policy opportunities and risks related to knowledge demand and knowledge production: an assessment

Following the analysis in the previous section, this section assesses whether the recent policy changes respond to identified system weaknesses and take into account identified strengths.

Table 8: Summary of main policy related opportunities and risks

Domain	Main policy related opportunities	Main policy-related risks
Resource mobilisation	<ul style="list-style-type: none"> • Continued support to R&D in business sector • Higher education reform to stimulate enrolment in S&T studies 	<ul style="list-style-type: none"> • Pressure for public budget allocation to other, non R&D related issues and consequent relative decline of public funds available for R&D • Insufficient measures to support human resource development in S&T area.
Knowledge demand	<ul style="list-style-type: none"> • Improved system of identification of knowledge demand in business sector 	<ul style="list-style-type: none"> • Insufficient policy coordination • Lack of appropriate mechanisms to translate knowledge demand of business sector in public R&D priorities
Knowledge production	<ul style="list-style-type: none"> • Regularity and stability of evaluation procedures in public R&D • Systematic development of independent evaluation body in higher education 	<ul style="list-style-type: none"> • Powerful internal lobby groups who have strong impact on evaluation criteria • Difficulty in assuring objectivity in relatively small R&D and higher education community
Knowledge circulation	<ul style="list-style-type: none"> • Additional financial resources to support knowledge transfer • Built a transparent and sufficiently client-friendly support network 	<ul style="list-style-type: none"> • Fragmented support network/instruments for knowledge transfer • Low absorption capacity of SMEs, especially small enterprises

²³ <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=prog.document&UUID=60EFAE02-AF6B-17F4-BD689944B2DC2282&hwd>

3 National policy mixes towards R&D investment goals

The aim of this chapter is to deepen the analysis of national policy mixes with a focus on public and in particular **private R&D investment**. The Lisbon strategy emphasises an EU overall **resource mobilisation objective** for 2010 of 3% of GDP of which two thirds should come from private investment. R&D investment is seen as important yardstick for the capacity of an economy to turn the results of science and research into the commercially viable production of goods and services and hence knowledge into growth. Corresponding investment policies are mainly pursued at national level and determined with a national focus.

The chapter is structured around five questions:

1. What are the specific barriers in the country that prevent reaching the Lisbon goal? What barriers exist in the country to prevent reaching the specific targets, particularly related to the private sector R&D investments?
2. Given the above, what are the policy objectives and goals of the government that aim to tackle these barriers?
3. What Policy Mix routes are chosen to address the barriers and which specific instruments and programmes are in operation to implement these policies?
4. What have been the achievements in reaching the above mentioned R&D investment objectives and goals?
5. What are the reasons for not reaching the objectives, adaptation of the goals?

The chapter aims to capture the main dimensions of the national policies with an emphasis on private R&D investment. The chosen perspective of looking at investments in R&D is the concept of Policy Mixes. The analysis and assessment follows a stepwise approach following the five questions mentioned above.

3.1 Barriers in the research system for the achievement of R&D investment objectives

While all of the strategic documents recognise the potential impact of R&D and innovation on economic growth, this has not been translated in long-term increase of budget allocation for R&D and innovation. In 2006, the increase of both public and private resources for R&D was noted (1.59% of GDP), only to be followed in 2007 with a set-back again (1.45% of GDP). The government cites the fact that Slovenian GDP has grown significantly in recent years, making even the maintenance of the same percentage of resources available for R&D a challenge. In view of many other pressures on the budget, the relative stability of resources was already considered as a strength (Republic of Slovenia, 2008, part I, p.5). This stability is likely to be maintained throughout the 2007-2013 financial perspective, since significant number of measures for the promotion of business R&D has been incorporated in the Operational Programme for Strengthening Regional Development Potentials and thus needs to be steadily supported by the national resources as well.

One of the strengths of resource mobilisation in Slovenia has been the growth of business R&D investment. Still, the overall level of 0.93% of GDP in 2007 is far from the planned Lisbon/ Barcelona target of 2% of GDP from business sector. While the business sector had responded positively to the introduction of tax subsidy in 2006,

resulting in 22.6% growth of R&D investment in comparison to 2005 level, by 2007 it looks like the subsidies were insufficient stimuli to keep up the trend- at least by the slow down in business R&D investment in 2007.

Part of the reason for slow-down in 2007 may lie in the delays in the Structural Funds absorption. As mentioned above, most of the government's support measures have been included in Operational Programme (OP) for Strengthening Regional Development Potentials in the National Strategic Reference Framework²⁴, under the development priority »Competitiveness and research excellence«. For this priority as much as 23.5% of total resources of this OP (or €402m) have been earmarked (primarily from European Regional Development Fund). The OP was approved only in fall of 2007 and the first calls issued in mid-2008. For some of the most important measures like centres of excellence first call is being planned for spring 2009. The government had recognised this problem and is putting in place several measures to eliminate some of the administrative barriers and simplify the procedures.²⁵

3.2 Policy objectives addressing R&D investment and barriers

The National Reform Programme 2008 recognised the inability of Slovenia to achieve the 3% R&D investment target by 2010, as originally planned (see the box 1 on page 14 for details). Yet even the postponement of the target to 2013 will demand a set of parallel goals to be achieved. On one hand, the public investment in R&D will have to increase: a policy goal is to increase the allocation for R&D by at least 0.1% of GDP annually thus meeting the target of 1%. On the other hand, business expenditures can be raised further only, if the enterprises currently inactive in R&D and innovation are stimulated and their absorption capacity sufficiently increased. This is a much more complex task, which the government is trying to achieve through design of different mobility measures²⁶, support to development & investment projects (where resources are not only available for research part of the project, but also its developmental and investment component in initial production capacities), support to intermediary institutions, which provide consultancy to small and medium enterprises (SMEs) and special calls focusing on start-up companies. These measures, along with raising awareness and promoting R&D and innovation have as their objective the increase of business R&D investment to the level of 2% of GDP by 2013. Yet this target is not a realistic one, taking into account that 2007 level of R&D investment was at 1.45% of GDP with 6250 researchers (in FTE). Doubling the financial resources is just as impossible as doubling the number of available human resources, considering Slovenia's output of S&T graduates.²⁷

²⁴ http://www.svlr.gov.si/fileadmin/svlr/srp.gov.si/pageuploads/KOHEZIJA/kohezija-200207/National_Strategic_Reference_Framework.pdf

²⁵ New directive on procedures to spend resources of the European Cohesion policy in the republic of Slovenia for the programme period 2007-2013 was passed on March 5th, 2009. <http://www.svlr.gov.si/si/splosno/cns/novica/article/558/1926/7d3e8f633d/>

²⁶ See <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=prog.document&UUID=F1AC7932-543A-4150-993362D290CA95F2&hwd=> .

²⁷ For illustration, in 2007, 1104 students graduated from university in S&T area, 123 received their MSc and 191 PhD (SURS, May 2008). Annual increase in number of researchers in FTE from 2006 to 2007 was 394, with business sector employing 309 new researchers, government sector 194 and higher education losing 105 FTE.

3.3 Characteristics of the policy mix to foster R&D investment

This section is about the characterisation and governance of the national policy and instrument mix chosen to foster public and private R&D investment. While policy goals are often stated at a general level, the policy mix has a focus on how these policy goals are implemented in practice. The question is what tools and instruments have been set up and are in operation to achieve the policy goals? The following sections will each try to tackle a number of these dimensions.

3.3.1 Overall funding mechanisms

The R&D funding follows the institutional scheme of R&D system: SRA is in charge of financing basic and applied research primarily in public research sector, while TIA and the MHEST itself finance the R&D activity in business sector or in projects, where both public and private R&D institutions are involved. In addition, some resources are provided through PAEFI for measures supporting the mobility of researchers and the intermediary institutions (technology parks, university incubators, etc.).

Major share of the SRA funding is taken up by so called Research programmes²⁸, where contract period is usually five years- this by itself secures important part of public R&D investment. A gradual shift in the structure of financing with a reduction of share of programme financing in favour of more project-based financing was planned in NRDP, but the recent analysis of SRA showed that from 2005 to 2008 this had not been implemented (SRA internal evaluation, January 2009). SRA annual budget is around €140m.

TIA has been involved in R&D financing for business sector, but up to 2008 in much smaller amounts - annual budget was under €30m. More resources were planned already for 2008, but were not fully distributed due to the delays in issuing of public calls²⁹. For 2009, as much as €80m are planned to be distributed through TIA's different support programmes (joint development-investment projects, young researchers from industry³⁰, technology for security and peace, technology platforms, etc.).

3.3.2 Policy Mix Routes

The "Policy Mix Project" identified the following six 'routes' to stimulate R&D investment:

1. promoting the establishment of new indigenous R&D performing firms;
2. stimulating greater R&D investment in R&D performing firms;
3. stimulating firms that do not perform R&D yet;
4. attracting R&D-performing firms from abroad;

²⁸ <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=prog.document&UUID=7D87B479-BAD1-C57F-1B12AB4FE1C719C5&hwd>

²⁹ As already mentioned, most of the measures have been included under the Operational Programme for strengthening regional development potentials, under priority »Competitiveness and research excellence« (OP Regional, 2007). This makes the execution a much more complex procedure, since each call not only has to be screened by the Ministry responsible for a particular measure but also by the Government's Office responsible for the implementation of OP as a whole.

³⁰ <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=prog.document&UUID=60F03F40-9287-2F04-D84A300B8F3D44A5&hwd=>

5. increasing extramural R&D carried out in cooperation with the public sector or other firms;
6. increasing R&D in the public sector.

The routes cover the major ways of increasing public and private R&D expenditures in a country. Each route is associated with a different target group, though there are overlaps across routes. The routes are not mutually exclusive as, for example, competitiveness poles of cluster strategies aim to act on several routes at a time. Within one 'route', the policy portfolio varies from country to country and region to region depending on policy traditions, specific needs of the system etc.

Route 1: Promoting the establishment of new indigenous R&D performing firms

Promotion of entrepreneurship has been one of the priorities of Slovenian government. The Slovenian Development Strategy, National Reform Programme and the Reform Framework all call for measures to stimulate entrepreneurship. All documents even include numerical figures in terms how many new high tech enterprises should be established in the specified period on the basis of the measures to be introduced. The most extensive document in this regard is the Programme of Measures to Stimulate Entrepreneurship and Competitiveness 2007-2013 (Ministry of Economy, 2007 and [INNO – Policy TrendChart – Policy Trends and Appraisal Report SLOVENIA, 2008](#)). Different programmes, supporting and promoting establishment of firms are run by intermediary organisations, but do not focus only on R&D performing firms. Still, the objectives of such measures usually stipulate that high tech and R&D intensive new firms are their priority.

The Slovene Enterprise Fund (SEF)³¹ supports the start-ups in technology parks and university incubators through direct subsidies³². The measure was started in 2007 and has been further expanded in 2008, providing also a continuous support to the newly established firms, which have already received an initial subsidy to meet their further development costs. SEF provides for supplementary guarantees, which helps SMEs in obtaining bank loans.

The Chamber of Industry and Commerce (<http://eng.gzs.si/slo/>) has launched a venture capital fund in 2006 to assist enterprises in new ventures in high-tech areas³³. The government has been planning since 2005 to form a private-public partnership to start a venture capital fund, and has in 2008 got the legal clearance, yet the Fund has not been established yet. Overall, venture capital is still relatively underdeveloped in Slovenia. There are several smaller private venture companies, which do not necessarily finance projects in Slovenia only. First within PAEFI, an initiative was launched to form a club of so called "Business Angels"³⁴, through which successful individual entrepreneurs support new potentially profitable projects, proposed by individuals. For the potential entrepreneurs support programmes under the Operational Programme "Developing of Human Resources" (OP Human, 2007) are also of interest: several programmes in entrepreneurial training are planned with special attention to employability, self-employment, life-long learning, entrepreneurial and management skills etc.

³¹ <http://www.podjetniskisklad.si/index.php?id=86>

³² <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=prog.document&UUID=913B7879-1A84-46F3-A8F94E6E348BCB40&hwd=>

³³ RSG Capital – venture capital management, <http://www.rsg-capital.si/eng/intro> .

³⁴ <http://www.poslovniangeli.si/Domov/o-klubu.aspx>

In addition to the government, several other institutions are also involved in promoting entrepreneurship. The Chamber of Commerce and Industry provides info desk to new entrepreneurs and offers consultancy, so does the Chamber of Crafts. Local communities, especially larger ones, like the City of Ljubljana, have their own entrepreneurship promotion centres, where SMEs can find necessary information and support for their ideas. Also, some private consultancy firms are engaged in providing assistance to SMEs, either through voucher scheme³⁵, financed by PAEFI or their service is being subsidised by the local community.

Route 2: Stimulating greater R&D investment in R&D performing firms

While support to business R&D is high on the government's priority list in the strategic documents, the actual allocation of R&D funds shows that most of the public resources are still directed to government R&D sector and higher education sector (SURS, February 2009). In 2006, only 10.1% of public R&D funds went to business sector. Gradual increase of funds for programmes, stimulating greater business R&D, has occurred already in 2008, and a much more substantial allocation of resources is planned for 2009 (MHEST, 2009³⁶).

The measures designed to stimulate private R&D investment include corporate income tax subsidy, different ways of co-financing of R&D projects³⁷, subsidised loans for R&D investment³⁸, support to technology centres³⁹, and technology platforms, co-financing of the services offered to business sector by technology parks business / university incubators⁴⁰ as well as mobility schemes.

One of the most important measures aimed at stimulating greater R&D investment in R&D performing firms was the new tax incentive, introduced in 2006⁴¹, under which investment in R&D is tax deductible in the amount of 20%. The enterprises can reduce their taxable income for corporate tax by 20% of their investment in R&D in general and by 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 both 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. In total, the enterprises have claimed €72.2m in 2007 on account of R&D tax relief (IMAD, 2008).

³⁵ <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=prog.document&UUID=C5FEDE03-8B63-407C-B123BD02B261FFDD&hwd=>

³⁶ <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=org.document&UUID=7D87CCA5-C9B9-0313-70C787F348DE4F64&hwd=>

³⁷ <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=prog.document&UUID=60EF90E6-FD6A-3F37-3D0FE66601485DA3&hwd=>

³⁸ <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=prog.document&UUID=C4E193D9-AF28-42DF-B49CA40E0CFC5078&hwd=>

³⁹ <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=prog.document&UUID=60F03EA4-E7E6-92A7-F6A02B8C22A75659&hwd=>

⁴⁰ <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=prog.document&UUID=3DA441A5-ED12-4779-BBB116C858F284E1&hwd=>

⁴¹ <http://www.uradni-list.si/pdf/2006/Ur/u2006136.pdf>

Route 3: Stimulating firms that do not perform R&D yet

Slovenia has established a rather complex set of support institutions, with the objective to stimulate both, the entrepreneurship as well as greater R&D and innovation activity in particular among SMEs. These include: technology parks and centres, business/ university incubators, various networks, technology platforms, centres of excellence⁴², etc. The policy papers, however, acknowledge that more needs to be done to increase the absorption capacity of business sector, since there are still many sectors where investment in R&D and innovation is critically low. According to Community Innovation Survey V (SURS, April 2008) there are still more than two thirds of SMEs, which do not engage in innovation activity at all.

Some of the measures for which the policy makers hope will attract firms that do not yet perform R&D are the co-financing of interdisciplinary R&D teams⁴³ as well as the mobility schemes. Financial assistance is offered for the formation of interdisciplinary development teams (researchers coming from public R&D or elsewhere) for work on technology development projects in enterprises. The eligible costs are the costs of consultancy of highly qualified experts hired to help with specific technology development project. The mobility scheme⁴⁴ is implemented via PAEFI and it provides for co-financing of the salaries of the researchers who have been working in public R&D units and are to move to business sector. In addition, it encourages the transfer of highly-skilled personnel from large enterprises (presumably active in R&D) to the small ones, where they lack sufficient personnel of their own to be able to implement R&D projects.

Also, the activities in the area of R&D and innovation promotion (exhibits, annual Innovation forums and innovation awards) and support to organisations promoting innovation⁴⁵ are aimed at stimulating firms to consider R&D activity.

Route 4: Attracting R&D-performing firms from abroad

This route has not been exploited at all in policy-making. While there is an active policy, implemented by PAEFI, to attract foreign investment, this was not specifically addressed to businesses in R&D area. Foreign investment is not seen as an option for stimulating overall R&D investment in Slovenia⁴⁶, partly due to relatively modest research potential (human resources) which would attract FDI in R&D.

Route 5: Increasing extramural R&D carried out in cooperation with the public sector

Support to cooperation between public R&D organisations and business sector has been in the forefront of many Slovenian policy documents (SDS, NRDP, and NRP⁴⁷).

⁴² <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=prog.document&UUID=60F00BDE-BAB4-F8AA-788CC80F3C6C9B99&hwd=>

⁴³ <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=prog.document&UUID=9DBE8A5D-EC52-A194-7CFC9A9F6826C5D9F&hwd=>

⁴⁴ <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=prog.document&UUID=F1AC7932-543A-4150-993362D290CA95F2&hwd=>

⁴⁵ <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=prog.document&UUID=09425FC2-D9D7-4495-9069CFBDBF81D492&hwd=>

⁴⁶ There was even an opposition voiced at occasions of larger foreign investor entering a local firm with substantial R&D capacities, warning that the foreign owner may close down this segment of the firm - for example, with the take over of Lek, Slovenian pharmaceutical firm by Novartis. The fears have so far not materialised.

⁴⁷ <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=search.resultList>

Insufficient transfer of knowledge from public R&D to business sector had been identified as a major constraint to faster technological restructuring. To stimulate more cooperation, different mechanisms where resources are available to either business R&D subject to cooperation with the public R&D, or vice versa, where public research institutions get extra resources in the case they prove cooperation with business have been employed over last years.

One of very well received measures has been the support to the establishment of centres of excellence within the financial perspective 2004-2006. The established ten Centres of Excellence⁴⁸ 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 financial resources go to the main research unit, but co-financing must be coming from business sector for each individual project. The formation of the Centres of Excellence provided an opportunity to join together key researchers and their institutions in a particular area, regardless of the sector/ discipline they belong to. The novelty is also joint sharing of the research equipment not only between different public research units, but in particular with the business community. Most of the high tech equipment for research in the areas where centres of excellence have been established is for Slovenian circumstances extremely expensive and only the formation of such Centres and co-operation at such scale made it possible for the researchers in both sectors to get access to this type of equipment. The current model of centres of excellence provides for the high participation of business sector in setting the priorities and thus helps in changing the orientation of basic research towards higher level of relevance for Slovenian economic and technology development. The continued support to centres of excellence is planned for the current financial perspective 2007-2013 (OP Region, 2007).

Route 6: Increasing R&D in the public sector

An increase of public resources for applied projects, technology development and targeted research programmes was incorporated in the policy documents on R&D (SDS, NRDP and NRP)⁴⁹. Most common target in these documents is that each year (from 2006 on) the public resources should increase by 0.1%. Yet, as already mentioned, this dynamic was not sustained in the annual budgets during these years. Even though more financial resources for R&D are planned within so called “crisis package” in the 2009 budget, majority of resources will not be directed towards basic research but focused on technology development, R&D activities in business sector and for stimulating investment in new production facilities in high-technology area.

The importance of education reforms and innovation policies for R&D promotion

Slovenia is experiencing a common EU problem of low interest among young people in pursuing S&T studies (IMAD, 2008)⁵⁰. This has already caused some problems, particularly for the business firms, located outside the capital, to recruit R&D staff. An active promotion of S&T studies started in 2006 by the Minister of Higher Education, Science and Technology in the senior high school classes, promising more scholarships for S&T students. Additional funds were made available through the

⁴⁸ http://www.sycp.si/sycp/Centres_of_Excellence_RTD.wlgt

⁴⁹ <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=search.resultList>

⁵⁰ In 2006, the share of enrolment of students in S&T was 21.1% (below EU average of 24%).

Slovene Human Resource Development and Scholarship Fund⁵¹: new scholarships for Slovenian students to study abroad, for promotion of the enrolment in S&T studies and for the enrolment of foreign students especially in S&T studies in Slovenia. Some of these programmes are supported by the European Social Fund as well.

The NRP⁵² suggested for higher education system more favourable treatment of new programmes and facilities for S&T studies in parallel with more restrictive policy towards social science studies and economics like limiting the enrolment (Republic of Slovenia, 2007). One of the ambitions of NRP has been to increase the competitiveness within higher education organisations by allowing more private initiative in establishing new universities/ faculties. Increased competition would positively influence the quality of teaching and research. With the non-existence of independent quality assessment body⁵³, the approval of several new programmes was criticised as being politically biased against the existing universities and not really adding to the quality of higher education or to research.

Higher education sector is undergoing EU Bologna reform where it is planned that all programmes will be adjusted by 2009/10 enrolment. In the preparation of the new programmes, business sector was only occasionally consulted as potential employer. An un-intended, yet from the view-point of availability of personnel for R&D positive change is more flexibility for academic employees in combining teaching/research commitments during a particular school year.

The programme of *young researchers*⁵⁴ 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 Ph.D. work. Between 200 and 250 new junior researchers complete the training programme every year, with the same number of new junior researchers being included in the programme. In cooperation with the Ministry of Economy, a new sub-programme was opened in 2001 specifically to *young researchers from business sector* that pursue graduate studies, attracting initially around 30 students per annual call. By 2007 the funding increased to approximately 150 young researchers from industry at a cost of €4.2m annually. In 2008, the financing had been supplemented by the European Social Fund (ESF) and available resources increased to the level of €5.96m. This should make possible to annually add 80 new young researchers to the scheme.

This measure is a direct response to the lack of highly skilled researchers in business R&D and has been well received by the enterprises. It opens, however, a question of sufficient number of candidates for both schemes of Young researchers, in particular of the candidates from Science and technology (S&T) area.

As for other policies with impact on R&D, fiscal policy needs to be mentioned through the corporate tax incentive for investment in R&D. Some claim that the cancellation

⁵¹ In 2008, the Fund offered €1.2m for approximately 50 scholarships for Slovenian S&T students abroad and €500,000 for those, studying social sciences and humanities. For foreign S&T students in Slovenia, a scholarship fund of €250,000 was designed (Javni sklad, 2008). See details on: <http://www.ad-futura.si/>

⁵² <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=policy.document&UUID=C413FF8B-B88F-322D-7378CD97C4C12D96&hwd=>

⁵³ More details on Analytical country report Slovenia 2008: <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=intService.display&topicID=642&countryCode=AT&parentID=592>.

⁵⁴ <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=prog.document&UUID=60F03F40-9287-2F04-D84A300B8F3D44A5&hwd=>

of tax on higher salaries will also have a positive impact on employment of R&D staff, since this will lower the costs of employing highly educated personnel.⁵⁵ More important than a particular other policy for R&D investment, are different administrative barriers and regulations in the area of physical investment, where sometimes the location and building permits restrain firms from expanding: this is being tackled by setting up technology or business parks, where subsidised premises are offered to high-tech R&D intensive firms.

Assessment of the importance of policy mix routes and their balance

The policy framework and targets for R&D area are provided with the NRDP⁵⁶. On the basis of these, each of the responsible ministries/ agencies designs its own instruments/ measures towards the implementation. While officially there exist a coordination body at the government level, in practice each Ministry has a significant level of independence in policy design and implementation. This sometimes results in conflicting measures or duplication of measures, instead of coherent policy mix. The gap is particularly vivid between the financial support mechanisms for public R&D, designed and administered by SRA and the support measures for business R&D, executed via TIA or directly by the MHEST, as well as among the support measures introduced by MHEST and those by ME (and administered through PAEFI). This lack of coordination and rather non-transparent support schemes resulted in less effective system, criticised in particularly by business community.

Table 9: Importance of routes in the national policy and recent changes

Route	Short assessment of the importance of the route in the national policy	Main policy changes since 2008
1	Promotion of start-ups is important, but is not limited or focused only on R&D firms, but entrepreneurship in general	Expansion of support measures for the establishment of new firms, with high-tech firms mentioned as priority
2	Major share of measures and resources are within this route	Allocation of ERDF resources to the measures supporting industrial R&D; Tax subsidy for R&D investment
3	Gradually growing in importance	Expansion of R&D and innovation awareness raising programmes
4	Non important	No change in policy
5	Certain measures	Evaluation criteria of SRA stimulating cooperation with business sector Co-financing of research projects of centres of excellence
6	In terms of allocation of financial resources, very important, but due to its long-term focus, not very operational as a policy-mix measure	In budget restructuring for 2009, technology development which includes co-financing of business R&D costs, received increased funding by €58m.

⁵⁵ Slovenia taxed salaries of employees with the above average salary till 2009. The tax had to be paid by the employer and not the employee.

⁵⁶ <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=policy.document&UUID=7D87A9BB-B3F1-0959-F567E3A894EDC30B&hwd=>

3.4 Progress towards national R&D investment targets

In spite of clearly stated objectives in all the main policy papers and several support measures, introduced to stimulate business R&D investment, the latest figures (2007) on R&D gross domestic expenditures as percentage of GDP by sectors of activity show a declining trend: BERD/GDP ratio was 0.94% in 2006 and dropped to 0.87%, GOVERD/GDP declined from 0.38% to 0.35% and HERD/GDP from 0.24% to 0.23%. Even though in nominal terms the GERD increased from €484.7m to €500.5m, in terms of ratio to GDP it declined from 1.56% to 1.45% (SURS, February 2009).

In particular the decline in business R&D investment came as a surprise, since the trends have been encouraging, following the tax subsidy introduction as well as several other support measures. Yet they confirmed what was observed in some of the analyses of Slovenian R&D policy⁵⁷ that the achievement of the Lisbon/Barcelona target of 3% will not be possible without significantly increased allocation of both, public and private resources to R&D. Interestingly enough, the share of public resources in business R&D performance has increased to 13.4% (SURS, February 2009). Important increase happened also in the area of employment of researchers in business sector from 2262 FTE in 2006 to 2571 FTE in 2007 (or to 41% of all researchers in Slovenia) (SURS, February 2009).

One of the measures to fight the effects of financial crisis that the government introduced in January 2009 (so called "crisis package") is significant increase of resources for technology development in business sector: the regular MHEST budget has already been increased from €24 to €40m, but the latest decision will allocate additional €58m, particularly for more dynamic technological restructuring through business R&D. The government hopes that this will reverse the trend of relative decline of business investment in R&D in 2007.

Targeting particularly business R&D and not R&D in general follows another objective of the NRDP: the re-distribution of budget resources for R&D between science and technology towards a targeted ratio of 55:45. It is believed that business R&D is much more oriented towards applied and developmental projects, while public R&D remains too concentrated in basic science, so favouring business R&D will bring around the planned restructuring of research from more general to more target/priority focused.

⁵⁷ ERAWATCH, 2007: Monitoring and analysis of policies and public financing instruments conducive to higher levels of R&D investments: The policy Mix project; Country Review Slovenia; IMAD (2008), ERAWATCH Analytical Country Report Slovenia 2008 (<http://cordis.europa.eu/erawatch/index.cfm?fuseaction=intService.display&topicID=642&countryCode=AT&parentID=592>).

Table 10: Main barriers to R&D investments and respective policy opportunities and risks

Barriers to R&D investment	Opportunities and Risks generated by the policy mix
Insufficient growth of public and business sector investment in R&D	Opportunity: New funds allocated for business R&D within the "crisis package". Risk: slow-down in economy may further limit the capability of business sector to invest in R&D
Low transferability of R&D outputs from public sector to business community	Opportunity: continuous promotion of closer cooperation of public R&D organisations with business sector through instruments like centres of excellence Risk: relatively complex process of restructuring public R&D in terms of priority setting
Significant share especially among SMEs of firms with no R&D activity	Opportunity: concentrate efforts of support institutions on promotion of R&D and innovation in SMEs Risk: unfavourable economic climate may deter SMEs from risk-taking and investing in R&D.

4 Contributions of national policies to the European Research Area

ERAWATCH country reports 2008 provide a succinct and concise analysis of the ERA dimension in the national R&D system of the country. This Chapter further develops this analysis and provides a more thorough discussion of the national contributions to the realisation of the European Research Area (ERA). An important background policy document for the definition of ERA policies is the Green paper on ERA⁵⁸ which comprises six policy dimensions, the so-called six pillars of ERA. Based on the Green Paper and complementing other ongoing studies and activities, this chapter investigates the main national policy activities contributing to the following four dimensions/pillars of ERA:

- Developing a European labour market of researchers facilitating mobility and promoting researcher careers
- Building world-class infrastructures accessible to research teams from across Europe and the world
- Modernising research organisations, in particular universities, with the aim to promote scientific excellence and effective knowledge sharing
- Opening up and co-ordination of national research programmes

In the ERA dimension, the *wider context of internationalization of R&D policies* is also an issue related to all ERA policy pillars and is normally present in the dynamics of national ERA-relevant policies in many countries.

⁵⁸ Commission of the European Communities: Green paper: The European Research Area: New perspectives. Brussels 4.4.2007, COM(2007) 161final (see http://ec.europa.eu/research/era/pdf/era_gp_final_en.pdf).

4.1 Towards a European labour market for researchers

According to the statistics, number of personnel in R&D is increasing both in business sector as in public: from 9796 FTE in 2006 to 10,369 FTE in 2007 (all figures on the basis of SURS, February 2009). The highest growth is noted in number of researchers in business sector (309 new researchers), in government sector (194), but a decline of research personnel is seen in higher education (-105)⁵⁹.

The number of new PhDs is gradually increasing: from 355 in 2004 to 415 in 2007 (SURS database⁶⁰). No detailed analysis on where there is lack of candidates for job openings in R&D sector has been undertaken, but business firms occasionally report on difficulties in finding the engineering and IT experts, especially for openings outside major cities. The unemployment data shows that among registered unemployed there are 6.8% of job seekers with tertiary education⁶¹, but mostly from humanities and social studies. Recent trends show increase in number of young people with completed higher education, looking for their first employment.

4.1.1 Policies for opening up the national labour market for researchers

With the membership of Slovenia in the EU one could witness dynamic expansion of various exchange and mobility programmes in the area of higher education. One of the barriers still existing in Slovenian higher education is legal binding to provide teaching and teaching material in Slovenian language. Gradual introduction of joint PhD programmes at different universities allows for greater flexibility in use of language and opens doors to students from abroad.

Most of the new/ junior job openings in public research sector are on limited-time basis only, for the duration of the Young Researchers programme⁶² funding or duration of the individual project. While in principle all public calls are opened to EU nationals, in practice it is not noticeable that there would be growing inward researcher mobility.

SRA has introduced a special measure where financing is provided to a visiting renown researcher from abroad⁶³, who joins for up to three months to one of the research programme groups and helps increase the international publication output of the Slovenian team. This measure was introduced to help Slovenian researchers increase the quality of their work and not to promote mobility, for which several bi-lateral cooperation agreements are available as well as EU programmes (Marie Curie, for example).

While there is little systematic research on inward mobility, R&D institutes report on complicated legal procedures for obtaining working/ residence permit for non-EU researchers. On the other hand, the outward mobility is gradually rising (IER, 2008).

⁵⁹ Since the published statistics is only at the level of aggregate figures it is difficult to detect, who the researchers who left are: it could be junior researchers who have completed their education (Ph.Ds) and have left for employment either within government sector or business sector or is this decline the result of increased pedagogical commitment of academics at higher education institutions. Any policy reaction to this trend would need to look more precisely in the causes behind this figure.

⁶⁰ http://www.stat.si/pxweb/Database/Dem_soc/Dem_soc.asp#09 (accessed May 1st, 2009).

⁶¹ http://www.ess.gov.si/slo/Dejavnost/StatisticniPodatki/MesecneInformacije/2009/T08_slo09.xls

⁶² <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=prog.document&UUIID=60F03F40-9287-2F04-D84A300B8F3D44A5&hwd=>

⁶³ <http://www.arrs.gov.si/sl/progproj/rproj/razpisi/08/razp-tuji-razisk-09.asp>

4.1.2 Policies enhancing the attractiveness of research careers in Europe

Public research organisations and higher education institutions in Slovenia have so far not signed the Charter for Researchers, but the MHEST is actively working on promotion of the signature and elimination of the obstacles in cooperation with other government departments (Ministry of Labour, Ministry of Internal Affairs). The reluctance so far derives from certain collision of the Slovenian national legislation regarding remuneration of researchers.

Salaries in public research organizations are regulated through a Public Sector Wage System Act and a collective agreement for all public sector employees⁶⁴. To certain extend, the individual research institutes may increase the salaries of their staff on account of so called "market funds" (the earnings from research financed by business sector), yet this option is limited especially for public (state) research institutes. Slovenian labour market for researchers is not a particularly open one: much of the recruiting is in-house, through the Young researchers programme. The lack of possibilities that the public salary system offers for differentiation of remuneration, based on quality is often heard complaint from directors in public R&D organizations and is even more pronounced within the universities.

Promotion of women in science has been for several years in the forefront of the MHEST policies with a special working group dedicated to this issue. Specific arrangements exist for young researchers in case of maternity leave⁶⁵, where their status can be extended for the period of their absence from work. Same applies also for women working at higher education: their status is maintained and the leave does not count into re-election time frame. There are no national policy level regulations which would in any way discriminate on the basis of gender, yet statistics still show that the higher up the academic ladder one moves, fewer women can be found⁶⁶. Also, among research programme group leaders or heads of research project proposals, approved by SRA, there is clear gender discrepancy (ibid).

4.2 Governing research infrastructures

Slovenia's public research sector is relatively fragmented and only within the largest institutes⁶⁷ is the issue of research infrastructure a relevant one. While SRA provides annually funding for research equipment, these funds are very limited (€4.2m for 2008) and for most of the largest research infrastructure investments the research institutes have to find other sources, either from business sector, through international projects, or more recently through centres of excellence.

The exact share of public R&D resources for investment in research infrastructure is difficult to assess, since some of the funds are distributed by SRA (specific call for research equipment as well as financing of institutional costs of public (state founded) research institutes), some directly by the MHEST as infrastructure

⁶⁴ http://www.mju.gov.si/en/legislation/legal_acts_in_force/

⁶⁵ Slovenia provides for relatively favourable maternity/ parental leave of nearly a full year.

⁶⁶ http://www.mvzt.gov.si/si/delovna_podrocja/znanost_in_visoko_solstvo/znanost/dejavnost/zenske_v_znanosti/

⁶⁷ For example, the largest public research institute, Institute Jozef Stefan (<http://www.ijs.si/ijsw/JSI>) has currently 799 employees (not all are full time equivalent), accounting thus for 24% of all employed in public R&D sector.

investments to higher education and PRO and some through specific calls (like centres of excellence, technology centres, etc.).

Slovenia is participating at the level of experts in European Strategy Forum on Research Infrastructures (ESFRI) and is currently working on the methodology and strategy for participation in new transnational infrastructures as proposed by ESFRI roadmap. As a small country with limited resources it needs to decide on the principles of selecting where to actively participate with financial input. This strategy is being prepared by the MHEST.

4.3 Research organisations

Slovenia decided to implement Bologna educational reform by 2010 and integrated the reform in its Law on higher education (2004)⁶⁸. Still, the implementation of the reforms and programme changes were left to the individual universities and within them individual faculties. This “autonomy” led to certain difficulties in the reform process, since it allowed different interpretations as to the depth of changes in curriculum, in the ratio of teaching vs. research commitments of professors and especially funding issues. In practice this means that some of the faculties within the same universities have introduced new Bologna curriculum in the academic year 2005/06, while others are still waiting for the last legal date: school year 2009/2010; some have decided on 3 + 2 option, while others for 4 + 1. These differences make the management of such system very difficult and are often found unfriendly both to the staff and especially to the students.

Currently prevailing funding system for higher education separates the educational funding, which in principle follows the number of students enrolled, the number of staff employed and the number of programmes, from the research one. HEIs are treated as any other public research unit and apply for research funds through public calls for research programmes/projects at SRA, so one could say competitive funding prevails. The HEIs can also raise support for the research activity from business sector. There is a high level of autonomy as to the research specialisation within the universities, even within the faculties or their departments - much higher than in terms of education, where a relatively strict code of conduct is enforced as to the programme area to be covered by individual faculty.

At the university level, there is more systematic involvement of external stakeholders in the governance, at least at the formal level by appointment of the representatives of business sector, students and interested public on the administrative board(s). Still, both at the university level and especially at the faculty level the recruitment of Rector/ Deans are elected among the peers.

4.4 Opening up national research programmes

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 MHEST and the SRA. SRA supports the involvement in the Framework programmes by special financial award to all research units who prepare project applications for the EU FP calls.

⁶⁸ <http://www.uradni-list.si/1/content?id=511192>

At the same time, several of the existing programmes have in principle been opened to the EU participants: for example Young Researchers Programme⁶⁹. Still, the practicalities, such as low awareness of this possibility, payment scheme, language barrier, often limit the extent to which foreign (EU) researchers apply.

Slovenia is actively involved in different ERA-NETs, JTI as well as several EU level technology platforms (TPs)⁷⁰. MHEST had a special measure through which it supports the creation of Slovenian TPs⁷¹ as a platform for further cooperation at the EU level i.e. in the European Technology Platforms (ETPs). Part of the financial support to Slovenian TPs was directed specifically for their active participation in the respective ETPs. Also, Slovenia is a member of several EU and intergovernmental research institutions.

The MHEST in fact assessed that the interest for participation in international cooperation exceeds the resources available; hence a more thorough long term strategy considering the areas, modalities and criteria for participation of Slovenia in these initiatives will be needed. This relates as well to joint programming. While Slovenia in principle highly supports the idea and sees it as an opportunity for a small country to engage in highly expensive and complex research in some areas, one of the identified obstacles may be the resource limitation. This requires a need to restructure existing allocation of public R&D funding and preparation of comprehensive criteria for selection of priorities at international and national level.

4.5 National ERA-related policies - a summary

While Slovenia at the policy level tries to participate in ERA-related policies and Slovenian research organisation are actively involved in several EU programmes (FP, ERA-Nets, JTIs, ETPs, EUROSTARS), the integration of ERA in the national policy-mixes is yet to be undertaken. Up to now most of the emphasis was given to increase the national participation and support research organisations in their efforts to join various projects and programmes at EU level.

The NRDP⁷² based the priorities in close alliance with the priorities of the FP6, but at the very broad level. With growing interest and involvement of research organisations in EU financed research, next NRDP needs to make a step further in aligning research priorities at the national level with those at the international and integrate ERA concept and policies more closely in the national R&D policy. This would help to avoid current situation where there was little if any subsidiarity achieved through national and FP projects, rather it was found that the two are seen also in the research community as two separate tracks of raising finance (Sorcan, S., 2008b).

⁶⁹ <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=prog.document&UUID=60F03F40-9287-2F04-D84A300B8F3D44A5&hwd=>

⁷⁰ http://www.sycp.si/sycp/Technology_Platforms_RTD.wlgt

⁷¹ <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=prog.document&UUID=FDC89821-F688-43EF-79AF72D50A885CB3&hwd=>

⁷² <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=policy.document&UUID=7D87A9BB-B3F1-0959-F567E3A894EDC30B&hwd=>

Table 11: Importance of the ERA pillars in the ERA policy mix and key characteristics

	Short assessment of its importance in the ERA policy mix	Key characteristics of policies
Labour market for researchers	<ul style="list-style-type: none"> • Small and financially less attractive for the inward mobility, increasing outward mobility of younger researchers 	<ul style="list-style-type: none"> • Slow progress, since many legal provisions and a need for cross-coordination take time • Not very active policy
Governance of research infrastructures	<ul style="list-style-type: none"> • Growing interest of individual research organisations, which requires more systematic approach 	<ul style="list-style-type: none"> • Lack of clear policy as to the type of support provided or the priorities
Autonomy of research institutions	<ul style="list-style-type: none"> • HEI entangled in Bologna has not yet requested more autonomy, PRO have relatively high level of autonomy under the current financing 	<ul style="list-style-type: none"> • No clearly defined policy
Opening up of national research programmes	<ul style="list-style-type: none"> • Very important in principle, but still at the planning stage 	<ul style="list-style-type: none"> • Preparation of the strategic national policy document

5 Conclusions and open questions

5.1 Policy mix towards national R&D investment goals

In spite of several policies introduced over the years the dynamics of business R&D investment has been insufficient in terms of reaching the Lisbon strategy goals. Partly the reason lies in fragmentation of policies, where the numerous and changing instruments to stimulate business R&D spread the resources too thinly. While one can say that every challenge/problem had its policy solution in a measure or support instrument, available funds were insufficient to make the impact (INNO – Policy TrendChart – Policy Trends and Appraisal Report SLOVENIA, [2007](#), [2008](#), European Commission, 2008). On the other hand, high concentration of business R&D in some industries shows that most problematic segment of business sector are R&D and innovation inactive enterprises, particularly SMEs. These have only recently become the target of the support measures.

The public research sector weathered the transition thanks to increase of public funding for basic research. During the years 2004-2007 on, the percentage share of public R&D funding in total R&D expenditures had not been maintained and even less so increased as planned in NRDP. This shows that although the policy papers recognised the important contribution of R&D and innovation to the economic growth and increased national competitiveness, this was still insufficient to change the budget allocation significantly.

From the policy mix perspective the main imbalance lies in the structure of public R&D funding for two R&D communities: the public and the business one. While at the top policy level Slovenia has a single document (NRDP), in the implementation phase the two have been effectively separated: SRA mainly took care of R&D in public sector and MHEST with TIA and ME with JAPTI focused on business sector. There had been no systematic and joint policy development or coordination of instruments, so one could really not talk about the R&D policy-mix. While Slovenia was making some progress in R&D and innovation (according to the S&T indicators

as well as innovation data), this was not optimal from policy mix perspective, where different measures should be designed in cohesion with one another, seeking synergies and reinforcement of each other. In addition, other policies, affecting R&D investment were seldom employed with the exception of fiscal policy (R&D tax subsidy).

5.2 ERA-related policies

ERA and ERA related policies have significant impact on the national research policies by raising issues which may otherwise be given less attention of the policy makers. Besides additional financial resources made available to Slovenian research organisations through different programmes, probably most important effect has been on policy concepts and on evaluation practice. Issues of policy coordination, policy mix, R&D policy implementation, governance etc. are much more in the forefront of the policy-makers discussion than they would be without ERA. Still, the next step is to move beyond discussion towards integral R&D policy mix, where national R&D system is systematically “upgraded” with ERA-related policies where assessed as beneficial. This relates to the promotion of cooperation in ERA projects in alignment with national priorities, needs and capabilities and identification of common objectives for national research programme and the participation in the international programmes. So far the policy focused on promotion of participation per se, regardless of where and with what benefit to Slovenian science, society or economy. It is expected that the recent personnel changes at MHEST will result in clearer R&D policy, integrating coherently also the engagement in ERA.

References

- Bučar, M. and M. Stare (2006): From quantity to quality: critical assessment of Slovenia's potential for knowledge-based growth. V: PIECH, Krzysztof and Slavo RADOŠEVIĆ (eds.) The knowledge-based economy in Central and Eastern Europe: countries and industries in a process of change. Basingstoke, New York: Palgrave Macmillan, pp. 239–55.
- Bučar, M. (2009): ERAWATCH Country Report 2008, An assessment of research system and policies: Slovenia
<http://cordis.europa.eu/erawatch/index.cfm?fuseaction=home.downloadFile&fileID=903>
- European Commission (2007): Green paper: The European Research Area: New perspectives. Brussels 4.4.2007, COM(2007) 161final (see http://ec.europa.eu/research/era/pdf/era_gp_final_en.pdf).
- European Commission (2008): European Innovation Scoreboard 2007 Comparative analysis of Innovation Performance, INNO Metrics. Available at: http://www.proinno-europe.eu/admin/uploaded_documents/European_Innovation_Scoreboard_2007.pdf.
- ERAWATCH (2007): Monitoring and analysis of policies and public financing instruments conducive to higher levels of R&D investments: The policy Mix project; Country Review Slovenia. Available at: <http://www.policymix.eu/PolicyMixTool/doc.cfm?pageID=201&docID=107>
- ERAWATCH (2009): Baseload Inventory- home page on Slovenia <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=ri.content&countryCode=SI&topicID=4>
- IER (2008): Preliminary investigation in researchers' mobility, internal research document.
- IMAD (2005): Slovenian Development Strategy 2006-2013. Ljubljana. Institute for Macroeconomic Analysis and Development. Available at: http://www.umar.gov.si/fileadmin/user_upload/projects/slovenia_development_strategy.pdf.
- IMAD (2008): Development Report (Poročilo o razvoju). Ljubljana: Urad za makroekonomske analize in razvoj – Institute for Macroeconomic Analysis and Development. Available at: http://www.umar.gov.si/en/publications/development_report/?no_cache=1.
- INNO – Policy TrendChart – Policy Trends and Appraisal Report SLOVENIA (2007): Available at: http://www.proinno-europe.eu/docs/reports/documents/Country_Report_Slovenia_2007.pdf.
- INNO – Policy TrendChart – Policy Trends and Appraisal Report SLOVENIA (2008): Available at: http://www.proinno-europe.eu/extranet/upload/countryreports/Country_Report_Slovenia_2008.pdf
- Javni sklad (2008): Javni sklad Republike Slovenije za razvoj kadrov in štipendije: Poslovni načrt. (Ad futura annual programme 2008). Available at: http://www.ad-futura.si/datoteke/clanki/poslovni_nacrt/Poslovni_nacrt_2008_web.pdf.
- Ministry of Economy (2007): Programme of Measures to promote entrepreneurship and competitiveness 2007-2013. Available at:

- http://www.mg.gov.si/fileadmin/mg.gov.si/pageuploads/DPK/Program_ukrepov_angl_071009.pdf.
- MHEST (2009) Press Release; Jan.30th, 2009: New resources for R&D. Available at: http://www.mvzt.gov.si/nc/en/splosno/cns/news/article/94/5988/8c92361b89/?tx_ttnews%5BYear%5D=2008&tx_ttnews%5Bmonth%5D=07
- NRP (2007): Nacionalni razvojni program 2007-2013 (National Development Programme); http://www.svlr.gov.si/si/delovna_podrocja/drzavni_razvojni_program/
- NSRF (2007): Nacionalni strateški referenčni okvir 2007-2013 (National Strategic Reference Framework 2007-2013). Available at: http://www.svlr.gov.si/fileadmin/svlr.gov.si/pageuploads/KOHEZIJA/kohezija-200207/nsro-vlada-150207_koncno.pdf or http://www.svlr.gov.si/fileadmin/svlr.gov.si/pageuploads/KOHEZIJA/Programski_dokumenti/NSRF_Slovenia_18_06_07_Unoff_eng_trasl.pdf.
- NRDP (2005): Nacionalni raziskovalni in razvojni program (National Research and Development Programme 2006-2010): The Ministry of Higher education, Science and Technology. Available at: <http://www.uradni-list.si/1/content?id=67936> and selected chapters in English at: http://www.mvzt.gov.si/fileadmin/mvzt.gov.si/pageuploads/pdf/znanost/ang_ve_rzija/NRDP.pdf.
- OP Region (2007): Operativni program krepitve regionalnih razvojnih potencialov 2007-2013 (Operational Programme for strengthening regional development potentials 2007- 2013), Office of Government for Local Self Government and Regional Policy; published in June 2007. Available at: http://www.svlr.gov.si/fileadmin/svlr.gov.si/pageuploads/KOHEZIJA/Programski_dokumenti/OP_Strength_regional_dev_potentials_FINAL.pdf.
- OP Human (2007): Operativni program za razvoj človeških virov 2007-2013 (Operational Programme for Human Resources Development 2007-2013), Office of Government for Local Self Government and Regional Policy; published in October 2007. Available at: http://www.svlr.gov.si/fileadmin/svlr.gov.si/pageuploads/KOHEZIJA/Programski_dokumenti/OP-HRD-Slovenia_FINAL.pdf
- Republic of Slovenia (2005): National Reform Programme for Achieving the Lisbon Strategy Goals, Oct. 2005. Available at: http://www.umar.gov.si/fileadmin/user_upload/projects/04_alizb-strategija.pdf.
- Republic of Slovenia (2007): National Reform Programme for Achieving the Lisbon Strategy Goals – Implementation Report, Office for growth. Available at: http://www.svr.gov.si/fileadmin/srs.gov.si/pageuploads/SI-NRP2007-eng_popravki.pdf.
- Republic of Slovenia (2008): Report on the achievement of the Lisbon strategy goals, <http://www.svr.gov.si/fileadmin/srs.gov.si/pageuploads/Dokumenti/SI-NRP2008-en.pdf>
- Sorčan, S., F. Demšar and T. Valenci (2008a): Znanstveno raziskovanje v Sloveniji: primerjalna analiza (Scientific research in Slovenia – comparative analyses). Ljubljana: Javna agencija za raziskovalno dejavnost Republike Slovenije.
- Sorčan, S. (2008b): Evaluation of the Slovenian participation in FP6, mimeo, SRA.
- SRA (2009): Evaluation of the implementation of NRDP- internal document.
- SURS (February 2009): Research and development activity, Slovenia, 2007. Available at: http://www.stat.si/eng/novica_prikazi.aspx?ID=2179

SURS (April 2008): Innovation activity in manufacturing and selected services, Slovenia, 2004-2006 – provisional data. Available at: http://www.stat.si/eng/novica_prikazi.aspx?ID=1592.

SURS database (2009):

http://www.stat.si/pxweb/Database/Dem_soc/Dem_soc.asp#09 (accessed May 1st, 2009).

Key Internet sources:

<http://www.vlada.si/index.php?lng=eng>

<http://www.arrs.gov.si/en/agencija/>

<http://www.mvzt.gov.si/en/>

<http://www.rtd.si/eng/>

<http://www.sycp.si/sycp/default.wlgt>

List of Abbreviations

BERD	Business Expenditures on Research and Development
CIS	Community Innovation Survey
EC	European Commission
ERA	European Research Area
ERA-Nets	Special EU Scheme for coordination and cooperation of national and regional programmes
ERDF	European Regional Development Fund
ESF	European Social Fund
ESFRI	European Strategy Forum on Research Infrastructures
EU	European Union
EUREKA	Europe-wide network for Industrial R&D
EUROSTAT	Statistical Office of the European Commission
FP	European Framework Programme for Research and Technology Development
GBAORD	Government budget appropriations or outlays on R&D
GDP	Gross Domestic Product
GERD	Gross Expenditures on Research and Development
HEI	Higher education institutions
HES	Higher education sector
IMAD	Institute of Macroeconomic Analysis and Development
JTI	Joint Technology Initiatives
MHEST	Ministry of Higher Education, Science and Technology
ME	Ministry of Economy
NRDP	National Research and Development Programme
NRP	National Reform Programme for the Achievement of the Lisbon Targets
OP	Operational Programme
PAEFI	Public Agency for Entrepreneurship and Foreign Investment

PRO	Public Research Organisations
R&D	Research and Development
RS	Republic of Slovenia
SDS	Slovenian Development Strategy
SEF	Slovenian Enterprise Fund
SF	Structural Funds
SRA	Slovenian Research Agency
S&T	Science and technology
SURS	Statistical Office of the Rep. of Slovenia
TIA	Technology Agency
(E)TP	(European) Technology Platforms

European Commission

EUR 23976 EN/19

**Joint Research Centre – Institute for Prospective Technological Studies
Directorate General Research**

Title: ERAWATCH Country Reports 2009: Analysis of policy mixes to foster R&D investment and to contribute to the ERA: Slovenia

Authors: Maja Bucar

Luxembourg: Office for Official Publications of the European Communities
2009

EUR – Scientific and Technical Research series – ISSN 1018-5593

ISBN 978-92-79-13326-8

DOI 10.2791/22174

Abstract

The main objective of the ERAWATCH Policy Mix Country reports 2009 is to characterise and assess in a structured manner the evolution of the national policy mixes in the perspective of the Lisbon goals, with a particular focus on the national R&D investments targets and on the realisation and better governance of the European Research Area. The reports were produced for all EU Member State and six Associated States to support the mutual learning process and the monitoring of Member and Associated States' efforts by DG-RTD in the context of the Lisbon Strategy and the European Research Area. The country reports 2009 build and extend on the analysis provided by analytical country reports 2008 and on a synthesis of information from the ERAWATCH Research Inventory and other important available information sources.

This report encompasses an analysis of the research system and policies in Slovenia.

How to obtain EU publications

Our priced publications are available from EU Bookshop (<http://bookshop.europa.eu>), where you can place an order with the sales agent of your choice.

The Publications Office has a worldwide network of sales agents. You can obtain their contact details by sending a fax to (352) 29 29-42758.

The mission of the Joint Research Centre is to provide customer-driven scientific and technical support for the conception, development, implementation and monitoring of European Union policies. As a service of the European Commission, the Joint Research Centre functions as a reference centre of science and technology for the Union. Close to the policy-making process, it serves the common interest of the Member States, while being independent of special interests, whether private or national.



ISBN 978-92-79-13326-8

