Policy Mix Peer Review

Latvia
Peer Review Outcome Report
(Final)

Prepared by
Erik Arnold, Technopolis
On behalf of

Geir Arnulf
Carl Jacobsson
Jari Romanainen
Keith Smith
Giedrius Viliūnas

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Policy Mix Peer Review:  
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Summary

This report has been produced to support the CREST OMC 3% Peer review of Member States. It represents the outcomes of a visit made by the members of the Peer Review team to Latvia on 17th and 18th December 2009. The members of the review team have collectively produced this report on the basis of their personal experience and views. It should not be taken to represent the position of the organisations for which they work or, indeed, of the European Commission.

In former times, Latvia was a significant trading and manufacturing hub with strong R&D capacities orientated to the needs of the Soviet system. Since independence, she has been confronted with a need to restructure but having taken the one-time benefits of systems change she settled into competing primarily on labour costs in low-knowledge-intensive sectors. The end of the recent foreign investment boom left an overheated economy that was making little progress in innovation or productivity and therefore trailed behind the innovation performance of most other European countries. The economy has started to restructure towards services but the manufacturing sector is small and focused in traditional industries. Such industries provide significant opportunities for innovation, competitiveness and growth but the extent to which these opportunities have been taken in Latvia is limited.

The legacy of the Soviet system includes a well-schooled labour force, but one where Higher Education qualifications are not necessarily well tuned to national needs, where the links between need and vocational training are similarly poorly articulated and where PhD production is sub-critical and inefficient. Higher Education institutions are old-fashioned in their governance and fragmented in their structure. Unlike the other Baltic countries, whose science systems have advanced more quickly since independence, Latvia’s scientific output has stagnated and is at the bottom of the European league in quantity and quality. Latvia has not kept pace with changes in innovation system governance implemented in other countries. Repeated attempts to improve the legal basis for research and innovation have met with limited response and do not appear to have captured the political imagination needed to drive through reforms. Administrative and managerial capacities in state institutions seem insufficient to implement many of the changes that are widely recognised as being necessary.

Since companies’ collective performance determines growth and welfare in an economy, it is vital for innovation policy to focus on companies’ innovation capabilities and performance. Latvia has imitated many intervention instruments used elsewhere to improve company innovation performance but the degree of localisation of individual instruments and of the mix of instruments as a whole in order to meet national needs seems limited. It has placed insufficient emphasis upon the vital non-
technological aspects\(^1\) of company innovation (without which technical innovation cannot succeed) and over-focuses on support relevant to research (often high-tech research) rather than innovation within the existing Latvian industrial structure. Building upon the existing structure, however, is necessarily the starting point for economic growth and development.

While there are strengths in the Latvian education system, the alignment between vocational training and the pattern of university education on the one hand and the needs of the economy on the other is insufficiently good. Flat fees and a loan system to ensure equitable access to the system would make it easier to achieve this alignment. In addition, better strategic intelligence and closer links between HE and industry will create the ‘focusing devices’ needed more clearly to signal to the education and training system about needs. Needed reforms include a requirement to de-fragment the HE system, open its governance to stakeholders and – over time – significantly to increase funding for both ongoing activities and infrastructure. Language laws need to be reformed, in order to enable influx and interchange with the global scientific community, which primarily communicates in English.

Latvian knowledge production needs to move towards internationally normal modes of assessment using international peers and systematic pressure to publish in international journals. Higher standards and more efficient processes are needed in PhD production. Funding allocation mechanisms and institutions’ internal incentive systems need reorientation towards rewarding scientific achievements measured by international indicators and the production of knowledge and human resources relevant to national needs.

Innovation and research have not had much priority in Latvian policy- and lawmaking during the last one or two decades. Interventions have been implemented weakly or not at all, owing to a combination of administrative inexperience and lack of political commitment. But the crisis could be a turning point – a shock and, via the Structural Funds, a major opportunity for change. Policy changes launched now will help determine the extent of Latvia’s longer-term sustainable recovery from crisis.

Latvia needs significant reforms in order to promote the recovery and development of the innovation system. In the current circumstances these have to focus on short-term needs to improve productivity and other aspects of industrial performance that will support sustainable growth. A wider series of reforms is needed to support other parts of the innovation system. In many cases the needed changes focus on governance or interventions that are not very expensive but that support the development of capacities and institutions needed for the future. Larger investments can initially be financed from Structural Funds and then gradually transferred to the state budget.

Our recommendations are as follows.

**Establish the importance of innovation (broadly defined) as an issue through debate at both political and public levels.** The lack of urgency about improving

\(^1\) These include business innovation skills in areas such as strategy, marketing and financing (including the development of new business models), quality management, technology and innovation management, project design and management, human resources management and the creation of absorptive capacity, Intellectual Property/technology acquisition and management
innovation in companies, reforming key institutions in the wider innovation system and investing as far as possible in human resources and knowledge development undermines the prospect of a sustainable economic recovery that leads back into a growth path.

**Establish a Strategic Innovation Policy** and governance system, or what is sometimes called a ‘holistic’ innovation policy that is consistent with the development of policy in leading countries. This typically involves

- Generating a national vision, with associated strategic priorities
- Helping articulate the priorities into a set of policies, together with other actors such as ministries and agencies, which will be involved in implementation
- Coordinating policies among different parts of the innovation system – notably between Research and Higher Education and Business
- Evaluation of the National Innovation System and associated policies
- Influencing the development of the budget for science, technology, higher education, training and business innovation support

**Establish a national arena, involving key ministers and stakeholders, in which to discuss age agree the elements of such a Strategic Innovation Policy.** The Chilean National Council for Innovation for Competitiveness (CNIC) provides a recent exemplar as well as one of the most complete examples of such a policy – inspired by the work of the Finnish Research and Innovation Council. However, the precise shape of such an arena has to fit the national context so a model cannot simply be imported from abroad without modification.

**Move endogenous company innovation to the centre of research and innovation policy.** This is the motor of improvements in productivity and competitiveness. Without company-facing measures to increase technological and innovative capacities it will not be possible to pay for the complementary measures needed elsewhere in the innovation system. Of course, no country can survive by focusing only on existing industry – it is necessary also to invest in the future technologies that will disrupt existing competition and lead to the growth of new industries. A balance is therefore needed between short- and long-term needs that – given the current stage of development and the economic situation – needs to focus significantly on the existing industry that will in practice serve as the base on which future industries can grow.

**Set thematic priorities based on the actual and potential strength of the economy and align research and innovation policy with these priorities.** Again, Chile provides a good example, where the CNIC identified a number of (mostly established) industry clusters whose performance is key to the economy and oriented the national strategy for innovation for competitiveness towards promoting capacity-building, research and innovation in these – without at the same time crowding out all activity in other thematic areas.

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2 Francisco Sercovich and Morris Teubal, “Strategic innovation policy: A systems evolutionary perspective,” (mimeo), 2009
Reform of the PhD education system through internationalisation of Latvian research, including international peer review when filling university positions, orienting publication strategies towards publication in journals found in international publication data-bases, and enhanced international collaboration. Language laws must be reformed to enable recruitment of international researchers.

Alter science-funding rules to give priority to research relating to the thematic priorities. The work funded may be fundamental or applied in nature but is also mission-orientated or ‘strategic basic’ research. This involves de-emphasising the funding of some areas, that may be regarded as scientifically interesting at the international level but that are remote from national capacities and needs.

Establish an integrated and coherent, competence-based qualifications framework from school to postgraduate level supported by a system of accreditation that allows transfer of credits among institutions and between levels. This should be linked to international norms, notably the Bologna process.

Rationalise and modernise the governance of the HE system. This should result in fewer, larger entities more able to attain critical mass in specialised areas of education and research and with governance systems that involve stakeholders and enable social influence over institutional strategies.

Build administrative and managerial capacity in state institutions, including ministries, agencies and operating organisations such as universities and institutes. This entails a combination of training, searching for international experience and selective recruitment.

Establish programmes to contact and network with the Latvian industrial and research diaspora, linked to instruments to provide incentives for successful entrepreneurs and researchers to move home. Good examples include Science Foundation Ireland and schemes in Korea and Taiwan that encourage homeward migration.

Increase efforts to encourage FDI. Focus incentives on non- and low-revenue items such as training and fiscal incentives, rather than those that have to be paid from current budget lines. The experience of the Irish Development Authority may be a useful example here.
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1 Introduction

This report has been produced to support the CREST OMC 3% Peer review of Member States. It represents the outcomes of a visit made by the members of the Peer Review team to Latvia on 17th and 18th December 2009. The programme and the people we met are listed in the Appendix. Prior to this visit, the Peer Review team were provided with Background Reports prepared by IPTS and Technopolis, containing a structured set of information relating to the overall innovation system of Latvia in the context of existing information and in the light of findings from a preliminary visit made to Riga in November 2009 by the review facilitator, Dr Erik Arnold.

Thanks not least to the efforts both the Latvian administration in connection with EU accession and membership and the work of the World Bank, much of the Latvian economic and innovation situation is well documented. A background report produced by IPTS is appended to this document. Given the background available, we do not go into much detail in Chapter 2, which sets out key elements of the Latvia’s performance with regard to economic development and innovation, but focus on telling and illustrating the ‘story’ in performance terms. We also summarise the major policy initiatives of recent years. In Chapter 3, we provide the team’s commentary on the situation and on policy needs, under the headings

- Business Innovation
- Economic and Market Development
- Human Resources
- Knowledge Infrastructure
- Innovation System Governance

Chapter 4 offers conclusions and recommendations. We have chose to focus on the big issues and to aim to identify opportunities that can be afforded in the current climate, rather than to produce a very long list of micro-advice (much of which is already available in the policy literature on Latvia that has appeared over the past decade).

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3 Universities, Research Institutes, Government Laboratories and Research and Technology Organisations
2 Latvia: The Context
In former times, Latvia was a significant trading and manufacturing hub with strong R&D capacities orientated to the needs of the Soviet system. Since independence, she has been confronted with a need to restructure but having taken the one-time benefits of systems change she settled into competing primarily on labour costs in low-knowledge-intensive sectors. The end of the recent foreign investment boom left an overheated economy that was making little progress in innovation or productivity and therefore trailed behind the innovation performance of most other European countries. The economy has started to restructure towards services but the manufacturing sector is small and focused in traditional industries. In reality, such industries provide significant opportunities for innovation, competitiveness and growth but the extent to which these opportunities have been taken in Latvia is limited.

The legacy of the Soviet system includes a well-schooled labour force, but one where Higher Education qualifications are not necessarily well tuned to national needs, where the links between need and vocational training are similarly poorly articulated and where PhD production is sub-critical and inefficient. Higher Education institutions are old-fashioned in their governance and fragmented in their structure. Unlike the other Baltic countries, whose science systems have blossomed since independence, Latvia’s scientific output has stagnated and is bottom of the European league in quantity and quality. Latvia has not kept pace with changes in innovation system governance implemented in other countries. Repeated attempts to improve the legal basis for research and innovation have met with limited response and do not appear to have captured the political imagination needed to drive through reforms. Administrative and managerial capacities in state institutions seem insufficient to implement many of the changes that are widely recognised as being necessary.

2.1 Business Innovation
Latvia has long traditions in industry. Riga has been a major centre for mechanical engineering as well as trade since Czarist times. Latvia occupied an important role in the Soviet economic bloc. It was a large developer and producer of vehicles and chemicals and a major R&D performer as well as producer in pharmaceuticals. In 1990, there were 17,700 researchers working in Latvia. By 1993, this number had fallen to 3,999. (The corresponding number for 2008 was 4,223.) A small number of research-based enterprises survive, especially in pharmaceuticals and related areas, based on the capacities built up during the Soviet era. In manufacturing, however, there is limited endogenous innovation capacity and a lot of the industry competes on labour cost in ‘make-to-drawing’ activities that involve neither R nor D.

The collapse of the Soviet bloc disconnected Latvia from many of the supply chains in which it had previously operated. After the large-scale destruction and privatisation of industry that ensued, Latvia entered a period of growth driven by the once-off impact of structural reforms, market-based resource reallocation towards more profitable firms and activities. Growth was buoyed up further by accession to the EU in 2004 and driven to very high (overheated) levels in 2005-7 by an influx of

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4 Trend Chart on Innovation, 2001
5 Alfred Watkins and Natalia Agapitova, Creating a 21st Century National Innovation System for a 21st Century Latvian Economy,
foreign capital and a boom in both construction and consumer spending. The result was the high real GDP growth rates shown in Figure 1, rising consumption and standards of living and (by EU standards) modest unemployment. But the collapse of foreign and then domestic demand as the current recession took hold was starkly reflected in Latvia’s growth rate in 2008 and 2009, so that the country had to turn to the IMF for support.

**Figure 1 Year-on-Year Real GDP Growth, 1993-2009**

![Year-on-Year Real GDP Growth, 1993-2009](image)

**Source:** IMF World Economic Outlook Database, accessed March 2010  *2009 rate is an IMF estimate

In contrast to the development of GDP, that of Total Factor Productivity (TFP) in recent years has been modest in key sectors of the economy (Figure 2).

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Normally, in growth accounting, changes in TFP are strongly driven by innovation (technological change). The average annual rates for the sectors shown for Latvia over the period are low. The highest is in the wholesale and retail trade (an average of 2.2% per year), where foreign firms have entered and played an important role in modernising the sector. Hotels and restaurants’ TFP has averaged a rise of 1.5% under the influence of foreign entrants and greatly increased tourism. Manufacturing industry’s modest average annual growth in TFP over the period (1.6%) indicates that it is making little progress in modernising and increasing its capacity for technological change. The three other sectors have barely progressed at all in TFP terms. This picture of low productivity advance is inconsistent, for example, with the wider national objective of securing 5% annual growth in the period to 2013-15, adopted by the Cabinet of Ministers on 10 October 2009.

Community Innovation Survey data confirm this picture of a low level of industrial innovation. The CIS 4 survey (reference period 2002-4 and the most recent for which reasonably complete analysis is published) indicates that the proportion of Latvian companies innovating during the reference period was ahead only of Bulgaria, among the EU-27 countries (Figure 3). In the 2004-2006 the proportion of innovators fell from 17.5% to 16.2%, rising to 19.5%7 in 2006-2008 – a rise that would not have been enough to change Latvia’s place in the ranking shown in Figure 3, had it occurred within the 2002-2004 period.

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7 Provisional number, supplied by the Latvian Ministry of Economics, December 2009
The failure to innovate is not only alarming in connection with domestically owned industry, whose competitive position it erodes. Much of the FDI from which Latvia has benefited in recent years has been attracted by low labour costs. As costs and incomes start to converge with wider EU norms, these companies need to find new reasons to stay in Latvia rather than to move on to other low labour cost countries.

The pattern of formal R&D is also not encouraging. Figure 4 shows the pattern of national sending, broken down between Higher Education (HERD), the rest of state expenditure (GOVERD) and Business Expenditure (BERD). Key points to note are the increase in expenditures after accession to the EU in 2004 and the fact that the ratio of BERD to total expenditure in 2008 was only 25% – a pattern normally seen with developing countries – after a brief surge in 2007/8, when it peaked at 50% of overall expenditure.
2.2 Economic and Market Development

The structure of Latvian industry is strongly biased away from technology-based industries. This is of itself not a problem – many countries do well in sectors characterised as low- or medium-technology; but they do so on the basis of willingness and ability to innovate that appear largely absent in the Latvian system. A key basis for successful innovation and competition is increasingly membership of industrial clusters. Watkins and Agapitova make the point that Latvian industry is not strongly organised in clusters, but is rather fragmented and in many cases orientated to low-cost exports. The resulting fragmentation impedes innovation and more directly exposes individual firms to the cold winds of international competition.

Figure 5 shows how the distribution of value added in the business sector has changed since the start of the 1990s, with primary industries rapidly declining in importance, traditional manufacturing shrinking but services gradually becoming more important.

Figure 6 gives a starker picture of how GDP dropped following the end of the Soviet era. Construction has never recovered and manufacturing is still much smaller than before. Again the increasing importance of services in GDP is clear.
Latvia has been running an increasing trade deficit for the last decade, in 2008 exporting goods worth 4.4 billion Lats and importing goods worth 7.5 billion\(^8\). Services – primarily transport – are sufficient to cover about a quarter of the resulting 3.1 billion Lat trade gap.

2.3 Human Resources

Latvia spends 0.74% of GDP on Higher Education. This proportion was 0.9% in 1995 and fell to 0.52% in 2003 but has been recovering in the period since EU accession. The private higher education system has been expanding over a protracted period (Figure 7), especially in the social sciences. The ‘hard’ sciences that rely on expensive infrastructure and research activity are still dominated by the six state universities.

Figure 7 Proportions of Fee-Paying and State-Funded Students in Higher Education, 1996-2008

The total number of qualified researchers (ie those with a PhD) in 2008 was 4024, of which 19% were in the business sector, 15% in government and the rest in Higher Education. PhD production remains at a low level, despite significant growth in the last decade (Figure 8). As a result, the ‘stock’ of PhD-qualified researchers is ageing and will decline unless steps are taken to increase the number of PhDs awarded annually.
2.4 Knowledge Infrastructure

The data for research outputs (publications) are disturbing. Figure 9 shows that publication productivity (in terms of ISI-indexed papers per million inhabitants) is among the lowest in Europe and that publications per head were falling over the period 2000-2006.

Whereas the two other Baltic states have rapidly increased both the quantity and quality of their scientific publications in the last decade, especially since EU accession, Latvia’s output has stagnated. Figure 10 shows fractionalised publications.
and fractionalised, field-normalised citations excluding self-citations (2-year citation window). The Latvian publications and citations have remained almost at the same level as 1993 (an increase with a factor about 1.5), while the Lithuanian and Estonian publications and citations have increased significantly, an increase by a factor 10-15 (Lithuania) and 3-4 (Estonia).

**Figure 10** Web of Science Publications and Citations 1990-2008 in the Baltic States

![Graph showing publications and citations in the Baltic States 1990-2008](image)

**Source:** Publication database of the Swedish Research Council, with data from Thomson Reuters.

Figure 11 shows fractionalised publications and fractionalised, field-normalised citations excluding self-citations (2-year citation window), total number for all ten years 1999-2008. The diagram shows the total number of publications and field-normalized citations for the ten years 1999-2008, the yearly average is thus a tenth of the value. In almost all subjects there are fewer field-normalised citations than publications, which means that we have a lower citation rate than the world average (when the blue line is above the red line.) The only two exceptions, Geosciences (citation rate 1,02) and Art (citation rate 1,14) are very small. Note that Chemistry has high publication output but low average impact; with the highest publication output (60 per year) Chemistry has fewer citations than Physics, and about the same number of citations as Materials Science, a subject field with less than half the number of publications.

9 Certain data included herein are derived from the Science Citation Index Expanded® prepared by Thomson Reuters®, Philadelphia, Pennsylvania, USA© Copyright Thomson Reuters® 2008. All rights reserved.
2.5 Innovation System Governance

The Latvian governance system for research and education is outlined in Figure 12. As in most countries, the Ministries of industry (in Latvia, Ministry of Economy) and education form the main ‘pillars’ of the system, although other sector ministries also have research responsibilities and budgets. As in other Soviet-inspired systems, the Academy of Sciences has the status of a Ministry, in so far as it reports directly to the government. Unlike in some other post-Soviet economies, Latvia has elected to retain research institutes within the Academy, which tend to do fundamental research. (Many of the Soviet-era industrial research institutes have closed – a minority survive as RTOs.)

A key missing feature is an ‘arena’ or Council that brings the stakeholders and actors involved with research and innovation policy together round a single table to discuss strategy and set priorities. Nor is there a minister with ‘lead’ responsibility for this integration.

Like other former Soviet Bloc economies, Latvia has suffered from a lack of administrative capacity that tends to induce caution and slow down the rate of decision-making.¹⁰

Accession to the EU has been accompanied by attempts to reform the legal system under which R&D is funded, partly supported by funding via European Structural

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Funds (ESF). The Law on Research Activity adopted in 2005 envisages an annual increase in public R&D funding of at least 0.15% of GDP up to a limit of 1% of GDP. Initially, annual increases were achieved but this aim has fallen victim to the need to cut the budget and the intervention of the IMF.

Figure 12 Latvian Research and Innovation Governance Structure

The Ministry of Education and Science set out guidelines for Development of Science and Technology for 2008–2013. They identified the following issues to be resolved by policy:

- Too few human resources in research and development (R&D) to ensure economic development and sustainable growth, the main problems being an ageing researcher labour force, falling numbers of research staff and an insufficient number of doctoral students
- Inadequate level of investment in R&D
- Poorly developed R&D infrastructure with a limited number of well-equipped laboratories, in particular in regional establishments of higher education
- Low number of patent applications in comparison to the European Union (EU) average and a lack of patents in high-tech sectors
- Limited opportunities/skills to ensure the commercialisation of knowledge
- Low awareness in society, and among youth in particular, about achievements in science and innovation

Source: Latvian Academy of Sciences, 2010

11 This section on laws and policies leans heavily on the ERAWATCH Latvia country report
The Guidelines set out the need to

- Rejuvenate and develop the current human resources and infrastructures
- Transform universities into internationally competitive R&D centres, with which regional higher education establishments and other public and private research organisations can co-operate
- Ensure a substantial increase in public R&D investment and develop funding mechanisms, which encourage co-funding from the private sector
- Strengthen the international competitiveness of national R&D performers and support international cooperation in S&T
- Support knowledge and technology transfer and develop an institutional environment and support mechanisms to facilitate innovation

While these and similar guidelines have been discussed since 2002/3, Guidelines were only finally approved by Government in 2009. According the Guidelines adopted for 2009/13, the key objective of the science and technology development policy is to develop science and technologies as the long-term development foundation of civic society, economy and culture, ensuring the implementation of knowledge economy and sustainable growth. The objective is to be achieved by implementing the following tasks

- To facilitate the recovery and development of intellectual potential and infrastructure of scientific activity by developing institutions of higher education into international, competitive S&D development centres, in cooperating with which higher education institutions in the regions develop, and to strengthen other public and private scientific institutions
- To ensure a significant increase in State investment in science and technology development so that the financing allocation mechanisms would ensure increasing attraction of private sector investments
- To facilitate competitiveness of scientific activity at the international level by promoting international cooperation in the field of science and technology development
- To promote science and technology transfer, by creating an institutional environment and supporting activities favourable for innovative activity, as well as to promote public and private partnership, as well the accepted priority scientific directions attachment

The main research policy funding trends over the last five years are

- Establishing thematic research programmes (2005 and 2006) in priority research areas (Organic synthesis and biomedicine; Material science; Information technologies; Forestry and wood processing technology; Latvian studies; environment; energy; medical science; and agro-biotechnology)
- Introducing institutional (‘core’) funding (2005) to strengthen research institutions, which earlier received only project-based funding
- New measures to support the modernisation of research infrastructure (2005 and 2006), co-funded by EU Structural Funds and a collaborative applied
research initiative to the update the applied research infrastructure, which was established 20 to 30 years ago and has since had little funding

- Introduction of a new measure "Support to the implementation of doctoral programmes and postdoctoral research" (2005) to facilitate the renewal of human resources in R&D
- Emphasis on supporting the application of research results (2005 and 2006), for example, by setting up technology transfer offices in higher education institutions
- Establishing guidelines and broad thematic priorities in 2009\(^\text{12}\)
  - 1. Energy and the environment (technologies for production and use of renewable energy resources, biodiversity, technologies for reduction of climate change).
  - 2. Innovative materials and technologies (informatics, information and signal processing technologies, nanostructure multifunctional materials and nanotechnologies).
  - 4. Social health (means and methods of prevention of illness, treatment and diagnostics, biomedical technologies).
  - 5. Sustainable use of local resources (mineral deposits, forest, food and transport) – new products and technologies.

**Figure 13 Science Funding 2004-2010**

![Science Funding 2004-2010](image)

**Note:** The budget was revised in mid-2009, which is why there are two bars for that year

In practice, funding for scientific research via the Education Ministry has been volatile – and certainly has not been in line with the hopes of the 2005 Law. Rather, the financial crisis has forced first a reduction in national spending and then a redirection of structural funds to make up the gap.

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\(^{12}\) Cabinet of Ministers Instruction Nr.594, Riga, 31 August 2009 (protocol Nr.54 24.§)
Commentary by the Team

Since companies’ collective performance determines growth and welfare in an economy, it is vital for innovation policy to focus on companies’ innovation capabilities and performance. Latvia has imitated many intervention instruments used elsewhere to improve company innovation performance but the degree of localisation of individual instruments and of the mix of instruments as a whole in order to meet national needs seems limited. It has neglected the vital non-technological aspects\(^\text{13}\) of company innovation (without which technical innovation cannot succeed) and over-focuses on support relevant to research (often high-tech research) rather than innovation within the existing Latvian industrial structure. It is revival in this industrial structure that is the key to development.

While there are strengths in the Latvian education system, the alignment between vocational training and the pattern of university education on the one hand and the needs of the economy on the other is insufficiently good. Flat fees and a loan system to ensure equitable access to the system would make it easier to achieve this alignment. In addition, better strategic intelligence and closer links between HE and industry will create the ‘focusing devices’ needed more clearly to signal to the education and training system about needs. Needed reforms include a requirement to de-fragment the HE system, open its governance to stakeholders and – over time – significantly to increase funding for both ongoing activities and infrastructure.

Latvian knowledge production needs to move towards internationally normal modes of assessment using international peers and systematic pressure to publish in international journals. Higher standards and more efficient processes are needed in PhD production. Funding allocation mechanisms and institutions’ internal incentive systems need reorientation towards rewarding scientific achievements measured by international indicators and the production of knowledge and human resources relevant to national needs. The language laws need to be reformed to enable international influx of researchers, e.g. at post-doc level.

Innovation and research have not had much priority in Latvian policy- and law-making during the last one or two decades. Interventions have been implemented weakly or not at all, owing to a combination of administrative inexperience and lack of political commitment. But the crisis could be a turning point – a shock and, via the Structural Funds, a major opportunity for change. Policy changes launched now will help determine the extent of Latvia’s longer-term sustainable recovery from crisis.

### 3.1 Business Innovation

The crucial point in the performance of an innovation system – where, as it were, the rubber meets the road – is company innovation. It is companies that produce the jobs and money needed for economic growth and development. While we prize good performance in other parts of the system such as education, training and science, in

\(^{13}\) These include business innovation skills in areas such as strategy, marketing and financing (including the development of new business models), quality management, technology and innovation management, project design and management, human resources management and the creation of absorptive capacity, Intellectual Property/technology acquisition and management.
economic terms that performance becomes useful only when companies can benefit from the resulting advantages to innovate more and in better ways. Especially in small countries and among those that are ‘catching up’ in economic development, science is much more significant as a source of trained people than as a generator of new knowledge, inventions and innovations.

Significant changes in the economic landscape and the policy environment have occurred across all EU Member States. The financial crisis, and the subsequent recession make a re-oriented growth strategy imperative. A major problem for EU countries concerns the development and implementation framework for this. In Latvia the fiscal crisis has led to large absolute cuts in R&D funding at a time when innovation-based growth is ever more important. The central challenge now is to integrate science, skills and business support into an innovation-oriented growth strategy.

Innovation strategies have two major dimensions at present. On the one hand there are major challenges – which are shared across all EU Member States - related to climate change and energy use, an ageing population and the implications of new technologies (most importantly in the life sciences). On the other there is a broader need to facilitate firm-level innovation and technological upgrading across the whole spectrum of industry in individual countries.

**Innovation Strategy and Growth**

Innovation matters for both business and government. For businesses, innovation is at the core of competitiveness. For government and society, innovative businesses drive GDP growth, productivity and employment.

We have substantial evidence on the links between innovation and growth. A large body of economic analysis shows significant statistical links between innovation investment and productivity growth. We know that growth correlates with business R&D investment, and that business R&D is supported by public R&D. We have massive case-study evidence showing that firm survival and growth is shaped by innovation performance. While innovation carries problems and risks, it is overwhelmingly positive in social effects - it feeds through to consumers in terms of product range and quality, lower prices, improved health care, and generally improved well being.

**Government and innovation**

There is a major role for the public sector in shaping private-sector innovation capability. For firms, innovation carries major problems of capability development, identification of opportunities, management of risk and uncertainty, skills development and financial commitment. Firms face problems in appropriating the benefits of knowledge creation. All of these problems represent areas of market failure where government can play important roles.

Beyond these market failures lies a wider issue. Innovation rests on knowledge, and innovating firms always draw on knowledge resources from outside the firm. These resources may be direct (in the form of consulting services or specific problem-solving for example), or indirect (from the science base, in terms of R&D results or search methods, for example). These innovation services spring in large part from a
knowledge and skills infrastructure – of universities, research institutes, etc. The publicly funded knowledge base and public sector applications have been integral to the development of most of the technologies that have driven productivity growth. Maintaining and shaping this knowledge infrastructure is an important responsibility of government.

What do we know about EU innovation?
The European Commission has been running a large-scale survey of EU innovation for many years. It currently covers about 100 000 firms in a representative sample of EU business. It provides a significant economy-wide picture of EU innovation, with of course significant differences across the Member States. Important and stable results from this and other survey work include

- Firms innovate in very different ways, with a widely differing mixes of innovation inputs – so policies that emphasize one aspect of innovation (such as R&D) are at best partial
- All sectors of the EU innovate – innovation is not confined to high-tech sectors
- Innovation is very unevenly distributed within industries – typically, each industry contains a small groups of highly innovating firms that are responsible for most of the industry’s innovation inputs and outputs
- There are very extensive links between EU firms and the research base – business-academia links are very frequent
- There are significant differences in industrial structure and technological specialisations across the EU Member States – in other words, the national innovation systems differ, and this needs to be taken into account in policy formation

Policy concepts and policy development in Latvia
The overarching context for innovation policy is the National Development Plan 2007-2013. Although the Plan has an overall focus on quality of life issues, its main methods are seen firmly in terms of skills, technological competitiveness of firms, and the quality of the science base. The National Plan is not in any way an operational document, but it does put forward a coherent set of implementation goals that are firmly innovation-focussed, around these three elements.

In general, Latvia has a full array of innovation policy support mechanisms available. The INNO-Policy Trend Chart Report (2009) lists 28 separate instruments in six main areas

- Public Research Organisations
- University research
- Strategic research policy
- R&D Cooperation
- Support to start-ups
- Direct support of business R&D

Current instruments are heavily oriented towards research-relevant support. There seems to be a relative neglect of two important dimensions of innovation support.
Firstly, management support in areas such as business management, marketing strategies, personnel management and so on: these corporate dimensions of innovation activity are often equally or more important than research-based knowledge inputs. These matters are not ignored in Latvia, but there could be further discussion of the balance of effort between instruments. Secondly, innovation involves significant non-R&D knowledge inputs, particularly in low-R&D industries (which Latvia has on a large scale). Non-R&D innovation includes the purchase of advanced machinery and computer hardware specifically purchased to implement new or significantly improved products or processes, the purchase of rights to use patents and non-patented inventions, licenses, know-how, trademarks and software, internal or external training activities for firm’s personnel aimed at the development or introduction of innovations, and internal and external marketing innovations aimed at the market introduction of new or significantly improved products. The composition of instruments between R&D and non-R&D functions could be reconsidered.

Latvia has a strongly high-tech focus in terms of innovation objectives. In this it reflects a trend across the EU. But its industrial structure is in fact heavily oriented to low- and medium-tech activities, and some consideration might be given to the growth potential of these industries. It is worth noting that some of the fields in which Latvia is reasonably strong (such as food products) are strongly growing in the EU at present, and are also strongly in need of infrastructural R&D support. These considerations can also be relevant to the choice of technology priorities, especially in areas such as ICT, biotechnology, materials and nano-science. It is important that technology priorities accord with the sectoral structure of potential growth in Latvia.

3.2 Economic and Market Development
Latvian industry is dominated by traditional industries and sub-contracting. The pattern of labour cost based competition by which Latvian industry in these sectors produces unattractive economic outcomes, but these traditional sectors are also capable of development, innovation and becoming sources of economic advantage and wealth.

The main sources of growth in recent years have been growing domestic consumption, based on high levels of investment. The industries experiencing the fastest growth – services and construction – have since also been those hardest hit by the recession. The focus of exports in areas where both cost competitiveness and the volatility of international demand are important has left the economy very vulnerable in the recession.

The extent of investment and change needed in the Latvian innovation system is very large – requiring far more resources than will be available in the short term. Structural Funds represent a big, one-off opportunity, providing at least some of the resources needed to ‘kick-start’ reform and processes of development that over time become self-sustaining.

As Keynes famously observed, “In the long run we are all dead.” It is vital to pay attention to surviving the short term. At the same time, the long term must not wholly

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14 http://www.proinno-europe.eu/page/non-rd-innovators-0
be neglected. The economy will for some time remain investment-driven, so any attempts to revitalise the economy rely on enhanced investment activity. Most of the available resources should therefore be targeted towards revitalising existing strong sectors of the economy, supporting their productivity and competitiveness. Smaller amounts of resources should nonetheless be allocated to measures that enable a transition towards more of a knowledge economy. In the context of limited resources selectivity is both unavoidable and desirable. The process through which Latvia chooses to focus resources is therefore important, in order to obtain a result consistent with national capabilities, needs and opportunities. The process must involve commitment from stakeholders and good analysis, avoiding the temptation simply to copy EU-level priorities (for example, in high technology industries) that may make sense at the European level but do not necessarily match with Latvian endowments or capabilities.

In the short term, the industry federation estimates that as many as 30% of existing firms could be eliminated in the recession. While this is immediately costly and painful, it also presents a big opportunity for restructuring and reallocation of industrial resources and capabilities to more efficient uses in the economy. Unemployment is likely both to reduce labour costs and to increase competitiveness in the short term, but the undesirability of labour cost based competition makes a policy-induced shift from this position towards innovation-based competitiveness urgent. Industry structure will necessarily remain dominated by traditional branches in the short term, and it will take a substantial amount of time to change this structure. One reason for this is that development trajectories cause economies strongly to lock into particular structures; another is the need to change the education and research systems to become much more supportive of national needs, and this can involve long time constants. While financial markets have been paralysed by the recession, developments in, for example, the USA and the UK show that these can also unlock quickly. In the meantime, structural funds represent a major investment opportunity that should be accompanied by increased efforts to attract Foreign Direct Investment (FDI) – both because of the money that it brings and because, properly supported and encouraged, FDI can provide a major source of learning and innovation. (For example, the Irish experience has been that even the more footloose multinationals have trained generations of Irish managers in management and entrepreneurship and acted as early customers for new Irish-owned companies.)

Knowledge-economy driven policies do not work in a country that is investment-driven and dominated by traditional low- to medium-technology industries. More emphasis needs to go on revitalising existing industries through innovation.

Entrepreneurship policies in Latvia appear weak. There is a lack of skills and competencies in developing international business in the knowledge-intensive sectors. Financial markets are not well developed, venture capital being among the least developed aspects. The public research and education systems are somewhat detached from industrial needs.

Policy therefore needs to focus on the renewal of existing strong industries, addressing the key sectors of the economy, including tourism. This should aim to use various public-private partnership models, including perhaps competence centre models and the use of open innovation organisations in the style of IMEC. That said,
these models must be carefully ‘de-tuned’ and adapted to local circumstances. The versions used in high-income countries are adapted to industry that has high levels of technological capability and cannot usefully be transferred to a less developed industrial context without adaptation.

Policies that strengthen inter-company and company-research links will be important, notably those that foster clusters. Cluster policies operate best when industry plays the major role in their governance and serve to empower industry by clearing blockages to networking and ensuring access to common ‘infrastructures’ that may range from technology centres and research institutes to training standards, labour markets or common marketing. There is also a need for a separate set of horizontal (ie not sectoral) actions addressing the creation and growth of new innovative clusters and companies. As far as possible, state resources should only be used to kick-start such initiatives – for example, launching a venture capital market with state funds and then encouraging the private sector to take over once demand is established. Foreign serial entrepreneurs, especially from the Latvian diaspora, should be encouraged to participate.

Innovation policies should also address key social challenges. Since all areas need reform, there is scope to select areas where the biggest changes are sought and to involve entrepreneurs through, for example, innovative public procurement in order to obtain new solutions in these areas. (Note that at the EU level, innovation policy is increasingly moving in this direction of more explicitly using demand to encourage innovation.)

Industrial linkage to external knowledge sources cannot be tackled without developing technological capabilities in industry. Once that is achieved, one can build on it by funding industrial-academic consortia. These provide information to the research community about what research areas have societal interest – and will be fundable also in the future. Many developed countries have found that this leads to co-evolution between business, research and higher education, with industrial needs acting as ‘focusing devices’ for research and education activities. Thus, with development and appropriate support, over time the science system becomes increasingly attuned to social needs.

3.3 Human Resources

Human Resources (HR) is a key element of an innovation system in a small open economy such as Latvia. The country suffered a haemorrhage of researchers in the period immediately following independence. It responded to this challenge and to the problem of highly unequal higher education provision across the country with a policy of massification and liberalisation of higher education that allowed the private sector to make a large contribution to expansion. As a result, post-secondary education and training provision in Latvia is good and has succeeded in narrowing the gap in the numbers of well-educated people between Latvia and the more affluent parts of Europe.

Nonetheless, there are still important issues in Latvian HR policy. One is that Latvia is losing ground in terms of the quantity and quality of young PhDs. The brain drain is not counteracted by a significant inflow of international students or researchers.
The proportion of science and technology graduates at university is also low – only 16%, in the cadre of 2006.

While the good educational level of the bulk of the population and the overall level of output from the HE sector are competitive strengths, state investment in HE has been too small and have – on the research side – almost wholly failed to attract private co-financing. The system has been biased towards subjects that are inexpensive to teach and where it is easier to establish new capacity, rather than being shaped towards national needs. The low level of state funding raises doubts about quality. High tuition fees make access to HE socially inequitable and the use of cost-based fees discourages or disbars many students from taking (expensive) subjects in the hard sciences that are need to be expanded to meet social needs. Latvia needs a system of flat fees for all students, in order to remove this distortion, financed by an efficient and effective system of student loans.

Ensuring the contribution of HE to the innovation system relies in part on the presence of attractive scientific careers. While in recent years, the salaries of Latvian academics rose to more attractive levels (even if these were well below European norms), it has been necessary to cut salaries dramatically as part of the response to the economic downturn. The higher level needs to be restored as soon as possible, in order to minimise brain drain and encourage entry to university professions.

While Latvia has a significant proportion of PhD students (2025 were registered in 2008), the rate of graduation is very low and would imply an average time of 15 years to achieve a PhD. The proposed doctoral grant scheme base on ESF money is therefore important. Further measures are needed to increase the number ad speed of PhD graduations, including careful evaluation to explain the intra-institutional reasons for this extremely low rate of productivity. The poor scientific productivity described earlier in this paper strongly suggests poor standards of supervision and inadequate skills among the pool of potential supervisors.

Latvia lacks a post-doctoral research scheme, forcing the few who obtain PhDs and who want to remain in academia to go abroad for the next stage of their career. It is in practice useful for a proportion of the graduating PhDs to build experience abroad, but they then need to be attracted back as part of a wider pattern of balancing the outflow of researchers with a corresponding inflow. The intention to launch a scheme for encouraging academics to come, or return, to Latvia is therefore a strong positive signal.

Language regulations that enforce the use of Latvian in the universities have roots in concerns that were understandable in the past but now serve as a barrier between the Latvian and world research communities. Since, in a very real sense, there is no such thing as national science, only global science, this must be a factor depressing the quality of Latvian research.

A further requirement for successful HR development and research in the universities and institutes is up-to-date scientific equipment and facilities. The Latvian system has received little such investment since independence. The ESF funding is an important opportunity to catch up and to launch a more generous policy – whose absence would undermine quality in the future.
However, the currently fragmented structure of Latvian HE is a serious threat. It encourages wasteful duplication of expensive infrastructure and effort, while preventing the development of the critical mass that is especially important to a small country. We strongly support the Informative Report of the Working Group created by Prime Minister proposing a profound restructuring of HE and research system and consider the implementation of its goals and tasks to offer a unique opportunity to galvanise the Latvian HE system.\footnote{15}

Vocational Education and Training (VET) enjoys a poor position in the overall education system, undermining both the availability of key middle-level skills for industry and the inflows of people into technical HE. There appear to be insufficient data and analysis about skill provision and requirements, especially at these middle levels. An effort is needed to improve the quantity and availability of this kind of strategic intelligence, so that skill needs can be forecast and the appropriate education and training can be delivered. This needs to be done in the framework of setting up a unified national competence-based qualifications framework, connected to existing efforts to align the Latvian system against international norms, notably in the Bologna process.

The draft Law on Education submitted to Seima proposes a reform of the governance of the HE institutions, which brings the stakeholders into governing bodies, as well as setting up the needed qualifications framework. This needs to be strengthened by more favourable tax treatment of industrial investments in HE and better links between private and public R&D performing organisations.

More broadly, the Latvian education system is in need of better funding, especially at HE level. This is difficult to achieve in a time of economic crisis but needs nonetheless to be a high policy priority with the eventual aim of implementing the national task of increasing investments in HE to 1.5% of GDP.

Thus, priorities for HR include: adopting the Law on HE; undertaking the structural reform proposed by the Prime Minister’s Working Group; speeding the integration of the Latvian and global HE and science systems; restoring the attractiveness of academic careers through higher wages; creating post-doctoral opportunities so that PhD graduates can build scientific careers; and creating more favourable conditions for private investment in HE.

3.4 Knowledge Infrastructure

In discussion in Riga, there was a strong impression of a shift from sustained funding of research institutions to use of project-based funding. The experience of other EU countries suggests that project-based funding is necessary but not sufficient to protect and manage research infrastructures. In general, innovation performance rests on infrastructures that conserve past investments in science and prepare new areas.

\footnote{15}{This group deployed a type of political coordination never used before in the country: co-chaired by the ministers of Education and Science, Economics and Finance, including main stakeholders from employers’ side and academia, it attracted much publicity and in principle has played the role of high level policy coordination body which is clearly lacking in Latvian NIS. (An interview with Prof. Janis Vētra, member of the Group)}
The fragmentation of the HE and research infrastructure in Latvia is a structural issue that urgently needs to be addressed. Despite the best efforts and good faith of those involved, the Soviet legacy of an Academy of Sciences that runs an institute system separate from the universities does not make sense. First, the Latvian Knowledge Infrastructure is no longer coupled to the wider Soviet-organised system and division of labour, so it has to be downsized and reorganised to meet national needs. Second, the need to align the HE and research systems (to increase quality and relevance and create career paths) makes it inefficient to operate research and higher education in different institutions. However, there remains a strong case to keep industrially applied research institutes (Research and Technology Organisations) outside the university sphere because of incompatibilities of mission, skill sets, competences and incentive systems. At the same time, the increasingly ‘scientific nature of engineering and production means that RTOs should maintain links with the universities at the level of PhD students and part-time university teaching.

There seems to be a lack of international competition and international peer review in Latvia. At the Latvian Academy of Sciences we were told that they considered starting to use international peers in the Latvian recruitment of researchers and university teachers and in the Latvian scientific journals. Today, only Latvian peers are used.

The internationalisation and international publication of research are problematic. The tradition to use Latvian peers only may also be a problem when research strategies are developed; the research profiles should preferably be considered in an international perspective. Latvia has a very modest production of research papers in international journals that occur in Web of Science. The citation levels of the few research papers published are the lowest in the EU. Starting at the same level as Lithuania (and at half the level of Estonia) after the fall of the Soviet Union, Latvia is now far behind the other two Baltic states in number of citations – a factor 9 lower than Lithuania and a factor 5 lower than Estonia. In Latvia, the subject fields with a high average citation per paper (for Latvia) have a low production and vice versa.

Latvian scientific publishing traditions seem antiquated. We were told that there exists a national list of the journals where the whole or the parts of a Latvian PhD thesis may be published. This list includes a number of Latvian journals, which are not in the Web of Science (or other international research publication data bases). As a consequence, many Latvian researchers publish in Latvian journals instead of trying to publish in international journals. Access to international journals and international publication databases seems also to be a problem, owing to cost. International collaboration can sometimes give indirect access but the funding need remains.

There seems to be a relatively large proportion of social science in the national research profile, but this lacks international publishing traditions. A profiling towards social science is not a weakness in itself (when the research base is considered), but the lack of internationalisation is. Of these issues, the most critical are

- The production of new PhDs
- The budget situation, in order to retain the human resources in research
- The international publishing of the research
Needed changes include

- A PhD study reform, where the thesis advisor, the study plan and the reasonable financing of the PhD students are considered. Possibly some financial incentives for good PhD examination
- Reliable R&D budget for the higher education system and the research institutes.
- New language laws for the higher education system and research institutes
- New publication standards and recommendations. Possibly financial incentives for internationally competitive research publications
- Allocating part of the R&D funding to the HEIs according to PhD examination and international publishing and/or according to some system of international peer review

The working conditions of university researchers must become more stable. Large increases in budget followed by drastic budget cuts do not bode well for Latvian science. Competitive research needs a long time commitment from the state, and preferably also from industry.

3.5 Innovation System Governance

Science and innovation policy span broad policy areas normally involving several ministries and a complex set of actors outside of government: higher education; research institutes; business and agencies. In order to formulate good, legitimate goals – and to implement them – effective governance is necessary. The Cabinet’s role in coordination of R&D&I policies at ministerial level does not appear to be clearly formulated. A formalised arena for dialogue between policy and main stakeholders is also missing in the Latvian system. Both the industry and the education ministries have advisory councils but horizontal coordination between them and with other ministries is absent.

Across the longer term, it appears that those who shape policy and culture in Latvia have not fully appreciated the importance of research and innovation and their coupling with economic performance. Some of our discussants spoke of a ‘mercantile’ culture in industry, and the consistent failure to ratify different generations of Guidelines on research and innovation or to implement the Law of 2005 suggest that research and innovation have little real political priority. At the more detailed level, a large number of programmes proposed by the education and economy ministries are held up at finance ministry and/or cabinet level for long periods of time. In some cases, this appears to be a result of uncertainty about how to interpret or implement state aid rules; in others the reason is simply not clear. The conclusion can only be that there is a combination of lack of political will and too little administrative capacity to implement reforms whose importance is obvious to most observers. There seems to be lack of trust between key actors in the innovation system, in particular a greater than normal distrust between the finance ministry and key spending ministries in the area (education and economy). There should always be a creative tension between Finance and the spending ministries, but in Latvia this tension appears to be too high.
Building administrative and managerial capacity for research and innovation in the state and in key organisations such as the universities is clearly a need, if some of the current roadblocks to development are to be removed.

Latvia is currently receiving significant structural funds from the EU. These can in part be used for R&D and innovation-relevant activities, but there seemed to have been serious lags in setting up procedures for the use of these funds. There should be a vigorous attempt to work out where the sources of this problem lie, and to implement active use of structural funds as soon as possible. This is particularly important in the context of the recession, during which major cuts have occurred across many R&D institutions in Latvia.

State aid rules, where programmes are implemented, are interpreted in a far more cautious way than in other European countries. Stakeholder representatives from academia, business and agencies raised issues on governance and bureaucratic obstacles – efficiency and coherence in decision-making, appropriate design of programmes and framework conditions. Establishing new programmes (example: competence centres) and reform (example: new law for HE-institutions) can be time demanding and inconclusive. Research policy and innovation policies setting non-matching priorities (health vs. chemistry) indicate lack of coherence. Several programmes and framework conditions seem to be designed in ways that create ‘Catch 22’s. The infrastructure programme, for example demands that the R&D-institutions contribute own resources at a time when such resources are non-existent. The research institutes are not allowed to use their own (public) resources to support national companies, apparently due to state aid regulations. As a consequence they do a lot of contract research for foreign firms. The IPR regime is unclear. Business support schemes (LIDA) are based exclusively on applications, not active intervention and dialogue between support agency and firms.

The crisis could be a turning point – an opportunity for change. There are resources available through the structural funds that could be used to build trust and support necessary reform. Some of the important challenges are not per se a question of (much) more resources, but could be tackled through improved organisation and by bringing in competence (example: state aid regulations).
4 Conclusions and Recommendations

Latvia needs significant reforms in order to promote the recovery and development of the innovation system. In the current circumstances these have to focus on short-term needs to improve productivity and other aspects of industrial performance that will support sustainable growth. A wider series of reforms is needed to support other parts of the innovation system. In many cases the needed changes focus on governance or interventions that are not very expensive but that support the development of capacities and institutions needed for the future. Larger investments can initially be financed from Structural Funds and then gradually transferred to the state budget.

The Higher Education and R&D systems were significantly modified in terms of governance and funding after 1990, and the general capacity of the system was expanded. However the financial crisis has evolved into a serious economic crisis, with contraction of output, slower productivity growth, company closures and unemployment. One Government response to this has been a major fiscal contraction, with substantial impacts on education and research budgets. The cuts to universities and the R&D system appear to have been on the order of 50% in many instances and this raises three large-scale threats. These are, firstly, the loss or postponement of research training opportunities; secondly, the loss through emigration of highly skilled researchers, and thirdly, loss of viability and function in key institutions. This raises a major innovation policy issue that does not seem to be being thought through at the moment, namely the role of innovation policy measures, and the R&D system, in recovery from the crisis. Ultimately the only solution to Latvia’s economic crisis is a return to growth, and this will have to be closely linked to innovation. The should be a serious debate on whether and how the recent cuts to higher education and R&D have impacts on this key objective.

There is neither the time nor the money needed to tackle the considerable reform and modernisation needs of Latvia’s innovation system all at once. In the context of the crisis, it is especially important to focus on measure that have an economic impact in the short to medium term and that do not cost too much to implement. More widely, policy priorities should meet at least some of these criteria.

Not to exceed the resources that can be allocated from ESF in the short run, though in the longer term (once, hopefully, economic recovery has become embedded) national resources must be available to continue needed lines of spending. They should ‘de-block’ significant blockages in the innovation system, as in the many cases where the action needed is already obvious but is held up. They should tend to build on existing capacities and resources rather than aim to start new things (like entering new and challenging sciences) from scratch. They should enable existing institutions to reform, restructure or function better. They should exploit foreign advice where necessary but detail design should be local so that capacity is built up.

Our recommendations are as follows.

Establish the importance of innovation (broadly defined) as an issue through debate at both political and public levels. The lack of urgency about improving innovation in companies, reforming key institutions in the wider innovation system
and investing as far as possible in human resources and knowledge development undermines the prospect of a sustainable economic recovery that leads back into a growth path.

**Establish a Strategic Innovation Policy** and governance system, or what is sometimes called a ‘holistic’ innovation policy that is consistent with the development of policy in leading countries. This typically involves

- Generating a national vision, with associated strategic priorities
- Helping articulate the priorities into a set of policies, together with other actors such as ministries and agencies, which will be involved in implementation
- Coordinating policies among different parts of the innovation system – notably between Research and Higher Education and Business
- Evaluation of the National Innovation System and associated policies
- Influencing the development of the budget for science, technology, higher education, training and business innovation support

**Establish a national arena, involving key ministers and stakeholders, in which to discuss age agree the elements of such a Strategic Innovation Policy.** The Chilean National Council for Innovation for Competitiveness (CNIC) provides a recent exemplar as well as one of the most complete examples of such a policy – inspired by the work of the Finnish Research and Innovation Council. However, the precise shape of such an arena has to fit the national context so a model cannot simply be imported from abroad without modification.

**Move endogenous company innovation to the centre of research and innovation policy.** This is the motor of improvements in productivity and competitiveness. Without company-facing measures to increase technological and innovative capacities it will not be possible to pay for the complementary measures needed elsewhere in the innovation system. Of course, no country can survive by focusing only on existing industry – it is necessary also to invest in the future technologies that will disrupt existing competition and lead to the growth of new industries. A balance is therefore needed between short- and long-term needs that – given the current stage of development and the economic situation – needs to focus significantly on the existing industry that will in practice serve as the base on which future industries can grow.

**Set thematic priorities based on the actual and potential strength of the economy and align research and innovation policy with these priorities.** Again, Chile provides a good example, where the CNIC identified a number of (mostly established) industry clusters whose performance is key to the economy and oriented the national strategy for innovation for competitiveness towards promoting capacity-building, research and innovation in these – without at the same time crowding out all activity in other thematic areas.

**Reform of the PhD education system** through internationalisation of Latvian research, including international peer review when filling university positions,

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16 Francisco Sercovich and Morris Teubal, “Strategic innovation policy: A systems evolutionary perspective,” (mimeo), 2009
orienting publication strategies towards publication in journals found in international publication data-bases, and enhanced international collaboration. Language laws must be reformed to enable recruitment of international researchers.

**Alter science-funding rules to give priority to research relating to the thematic priorities.** The work funded may be fundamental or applied in nature but is also mission-orientated or ‘strategic basic’ research. This involves de-emphasising the funding of some areas, that may be regarded as scientifically interesting at the international level but that are remote from national capacities and needs.

**Establish an integrated and coherent, competence-based qualifications framework from school to postgraduate level supported by a system of accreditation that allows transfer of credits among institutions and between levels.** This should be linked to international norms, notably the Bologna process.

**Rationalise and modernise the governance of the HE system.** This should result in fewer, larger entities more able to attain critical mass in specialised areas of education and research and with governance systems that involve stakeholders and enable social influence over institutional strategies.

**Build administrative and managerial capacity in state institutions, including ministries, agencies and operating organisations such as universities and institutes.** This entails a combination of training, searching for international experience and selective recruitment.

**Establish programmes to contact and network with the Latvian industrial and research diaspora, linked to instruments to provide incentives for successful entrepreneurs and researchers to move home.** Good examples include Science Foundation Ireland and schemes in Korea and Taiwan that encourage homeward migration.

**Increase efforts to encourage FDI.** Focus incentives on non- and low-revenue items such as training and fiscal incentives, rather than those that have to be paid from current budget lines. The experience of the Irish Development Authority may be a useful example here.
Appendix A  Programme and List of Discussants

Programme and Background for Policy Mix Review of Latvia
17_18 December, 2009

Examining Team
Erik Arnold, Technopolis Group, UK
Katrin Männick, Technopolis Group, EST
Carl Jacobsson, Swedish Research Council
Geir Arnulf, Department for Education and Research, Norway
Giedrius Viliunas, Head of the Research Policy Division, Research Council of Lithuania
Jari Romanainen, TEKES, The Finnish Funding Agency for Technology and Innovation
Keith Smith, Department for Business, Innovation and Skills, UK

European Commission
Maud Skaringer, European Commission, Policy Officer of Research Directorate-General

Organisation
Dr. Irina Arhipova, Ministry of Education and Science (Director of Department of Science, technology and innovation)
Dr. Ineta Kurzemniece, Ministry of Education and Science (Deputy Director of Department of Science, technology and innovation)
Kaspars Kuļikovs, Ministry of Education and Science (Counsel of Science, technology and innovation)

Participants from Latvia

Ministry of Education and Science
Kristīne Vāgnere, Deputy State Secretary on Policy Issues
Lauma Šīka, Deputy State Secretary on Structural funds Issues
Dr. Gita Rēvalde, Director of Department of Higher Education
Ennata Kivriņa, Director of Department of Structural Funds

Ministry of Economy
Una Vanaga, Reporter of Department of Business competitiveness, Industry and Innovation Division
Astrīda Burka, Department of Business competitiveness

Ministry of Finance
Aleksandrs Antonovs, Director of Department of European Union funds strategy
Dace Grūberte, Head of Entrepreneurship and Innovation Planning Division of Department of European Union funds strategy

Ministry of Regional Development and Local Government
Raivis Bremšmits, Head of Development Monitoring Division of Department of State strategic planning
**State Chancellery**
Valērijs Stūris, Consultant of Department of Policy Coordination of State Chancellery

**Science Institutions**
Prof. Juris Ekmanis, President of Academy of Sciences  
Prof. Elmārs Grēns, Chair of Latvian Council of Science  
Dr. Maija Bundule, Scientific Secretary of Latvian Council of Science  
Dr. Ivars Kalviņš, Association of state research institutes  
Prof. Andrejs Siliņš, Latvian Academy of Sciences, CREST member  
Prof. Mārcis Auziņš, Rector of University of Latvia  
Prof. Leonīds Ribickis, Vice-rector for Research of Riga Technical University  
Dr. Elita Jermolajeva, Pro-rector of Science of University of Daugavpils  
Dr. Andris Šternbergs, Director of Institute Solid State Physics, University of Latvia

**Agencies, other**
Māris Ėlerts, Investment and Development Agency of Latvia  
Prof. Tatjana Volkova, Chair of Latvian Rector’s Council, Rector of Bussiness School  
Prof. Andrejs Rauhvargers, Secretary General of Latvian Rector’s Council  
Dr. Jānis Stabulnieks, Director of Latvian Technological Centre  
Prof. Jānis Vētra, Chair of Council of Higher Education

**Industry**
Vitālijs Skrīvelis, Chairmen of Latvian Chemical and Pharmaceutical Entrepreneurs Association  
Vilnis Rantiņš, Chairman of Engineering and Metalworking Industries Association  
Andrejs Vasiljevs, Board Member of Latvian Information and Communications Technology Association

### Agenda and Timetable

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<tr>
<th>Time, place</th>
<th>Topics (Participants)</th>
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| 9:00 – 10:00 | • Closed meeting of the peers and the governmental experts  
Erik Arnold, Technopolis Group, UK  
Maud Skaringer, European Commission, Policy Officer of Research Directorate-General  
Katrin Männick, Technopolis Group, EST  
Carl Jacobsson, Swedish Research Council  
Geir Arnulf, Department for Education and Research, Norway  
Giedrius Viliunas, Head of the Research Policy Division, Research Council of Lithuania  
Jari Romanainen, TEKES, The Finnish Funding Agency for Technology and Innovation  
Keith Smith, Department for Business, Innovation and Skills, UK |
| Ministry of Education and Science (MoES)  
Meeting room No. 300, 3rd floor, Valņu iela 2 |  
| 10:00 – 12:00 | • Statistics about Latvian research  
• Reform of research and higher education system  
• Structural Funds and R&D, Latvian R&D tax policy  
Kristīne Vāgnere, (MoES) Deputy State Secretary on Policy Issues  
Lauma Sīka, Deputy State Secretary on Structural funds |
<p>| Ministry of Education and Science (MoES) |<br />
| 17 December, 2009 |</p>
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<td><strong>Meeting room</strong>&lt;br&gt;No. 300, 3rd floor, Vaļņu iela 2</td>
<td><strong>Issues</strong>&lt;br&gt;Dr. Irina Arhipova, (MoES) Director of Department of Science, technology and innovation&lt;br&gt;Dr. Gita Rēvalde, (MoES) Director of Department of Higher Education&lt;br&gt;Ennata Kivriņa, Director of Department of Structural Funds&lt;br&gt;Dr. Ineta Kurzemniece, (MoES) Deputy Director of Department of Science, technology and innovation&lt;br&gt;Kaspars Kuļikovs, (MoES) Counsel of Science, technology and innovation&lt;br&gt;Aleksandrs Antonovs, Ministry of Finance, Director of Department of European Union funds strategy&lt;br&gt;Dace Grūberte, Ministry of Finance, Head of Entrepreneurship and Innovation Planning Division of Department of European Union funds strategy</td>
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<td>12:00 – 13:00</td>
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<td>13:00 – 15:00</td>
<td>• Latvian research system and research policy&lt;br&gt;• Integrated research, studies and innovation centers&lt;br&gt;Prof. Juris Ekmanis, President of Academy of Sciences&lt;br&gt;Prof. Eimārs Grēns, Chair of Latvian Council of Science&lt;br&gt;Dr. Ivars Kalviņš, Association of state research institutes&lt;br&gt;Prof. Andrejs Šiliņš, Latvian Academy of Sciences, CREST member&lt;br&gt;Dr. Andris Šternbergs, Director of Institute Solid State Physics, University of Latvia&lt;br&gt;Dr. Irina Arhipova, (MoES) Director of Department of Science, technology and innovation</td>
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<td>15:00 – 18:00</td>
<td>Academy of Sciences&lt;br&gt;Assembly hall, 2nd floor, Akadēmijas laukums 1&lt;br&gt;• Future research and industry&lt;br&gt;• R&amp;D in international companies&lt;br&gt;• Knowledge transfer&lt;br&gt;Vilnis Rantiņš, Chairman of Engineering and Metalworking Industries Association&lt;br&gt;Vitālijs Skrīvelis, Chairmen of Latvian Chemical and Pharmaceutical Entrepreneurs Association&lt;br&gt;Dr. Jānis Stabulnieks, Director of Latvian Technological Centre&lt;br&gt;Andrejs Vasiljevs, Board Member of Latvian Information and Communications Technology Association&lt;br&gt;Dr. Irina Arhipova, (MoES) Director of Department of Science, technology and innovation</td>
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<td><strong>Innovation policy</strong>&lt;br&gt;<strong>Foresight of Latvian economy</strong>&lt;br&gt;<strong>Current competition-based funding of R&amp;D and support for innovation</strong>&lt;br&gt;<strong>Future prioritizing and programme funding for R&amp;D and innovation</strong>&lt;br&gt;Astrīda Burka, Department of Business competitiveness,</td>
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<td>Time, place</td>
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<td>Ministry of Economics</td>
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<td>Māris Ėleršts, Investment and Development Agency of Latvia</td>
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<td>Una Vanaga, Reporter of Department of Business competitiveness, Industry and Innovation Division, Ministry of Economics</td>
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<td>Dr. Irina Arhipova, (MoES) Director of Department of Science, technology and innovation</td>
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<td>Raivis Bremšmits, Ministry of Regional Development and</td>
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<td>Local Government representatives Head of Development</td>
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<td>Monitoring Division of Department of State strategic planning</td>
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<td>10:30 – 12:00</td>
<td><strong>Latvian research system and research policy</strong></td>
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<td>Ministry of Education and Science (MoES)</td>
<td><strong>Reform of research and higher education system</strong></td>
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<td>Academic hall No. 507, 5th floor, Valņu iela 2</td>
<td>Dr. Maija Bundule, Scientific Secretary of Latvian Council of Science</td>
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<td>Prof. Andrejs Rauhvargers, Secretary General of Latvian Rector’s Council</td>
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<td>Valērijs Stūris, Consultant of Department of Policy</td>
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<td>Coordination of State Chancellery</td>
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<td>Prof. Jānis Vētra, Chair of Council of Higher Education</td>
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<td>Prof. Mārcis Auziņš, Rector of University of Latvia</td>
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<td>Prof. Leonīds Ribickis, Vice-rector for Research of Riga Technical University</td>
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<td>Dr. Elita Jermolajeva, Pro-rector of Science of University of Daugavpils</td>
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<td>Prof. Tatjana Volkova, Chair of Latvian Rector’s Council, Rector of Business School</td>
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<td>Dr. Irina Arhipova, (MoES) Director of Department of Science, technology and innovation</td>
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<td>15:00 – 17:00</td>
<td><strong>Closed meeting of the peers and the governmental experts</strong></td>
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<td>Ministry of Education and Science (MoES)</td>
<td>Erik Arnold, Technopolis Group, UK</td>
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<td>Academic hall No. 507, 5th floor, Valņu iela 2</td>
<td>Maud Skaringer, European Commission, Policy Officer of Research Directorate-General</td>
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<td>Katrin Männick, Technopolis Group, EST</td>
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<td>Carl Jacobsson, Swedish Research Council</td>
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<td>Geir Arnulf, Department for Education and Research, Norway</td>
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<td>Giedrius Viliunas, Head of the Research Policy Division, Research Council of Lithuania</td>
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<td>Jari Romanainen, TEKES, The Finnish Funding Agency for Technology and Innovation</td>
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<td>Keith Smith, Department for Business, Innovation and Skills, UK</td>
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Appendix B  The OMC Peer Review of Latvia: A briefing paper for the OMC Peer Reviewers
The OMC Peer Review of Latvia: A briefing paper for the OMC Peer Reviewers

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1. The scope and relative scale of the challenges with which Latvia is confronted, both within each of the four innovation system domains and across them

1.1 Human Resources in Science and Technology

According to the Guidelines for Development of Science and Technology for 2009-2013 (hereafter: the Guidelines), the main weaknesses of Latvia in terms of S&T human resource are:

- Insufficient number of human resources in R&D to ensure economic development and sustainable growth, the main problems being an ageing researcher labour force, falling numbers of research staff and an insufficient number of doctoral students;
- Limited opportunities/skills to ensure the commercialisation of knowledge;
- Low awareness in society, and among youth in particular, about achievements in science and innovation.

Highlights/main numbers:

During the period of transition from planned to market economy in Latvia the number of R&D personnel decreased sevenfold.

Statistics:

- The average age of researchers is about 55 years, 35% of doctorate holders in the group of age 55-65 years (2007);
- The biggest number of doctorate holders is in: natural sciences, social sciences, engineering and technology (2007);
- Share of research and development personnel, head count (% of the labour force): 0.92 (EU 1.33) (2006);
- Total number of researchers: 4024, out of 19% in business sector, 15% in government sector, 66% on higher education sector (2006);
- Growth in S&E and SSH graduates (2008/2007): 8.2%; doctorate graduates: 25.7%; youth education: 1.6%

Policy challenges:

- Maintenance and promotion of qualified workforce
- Develop means for efficiently attracting foreign researchers
- Retain its national research potential

References to materials:

- The Guidelines for Development of Science and Technology for 2009-2013 (See “Information about science policy in Latvia”, Erawatch Research Inventory)
- Erawatch Research Inventory (http://cordis.europa.eu/erawatch)
- European Innovation Scoreboard 2008 (http://www.proinno-europe.eu/metrics/)
- R&D in Latvia, 2008. Ministry of Education and Science (available by the Ministry)
1.2 The Public Science Base

According to the Guidelines, the main weaknesses of Latvia in terms of the public science base are:

- Inadequate level of investment in R&D;
- Poorly developed R&D infrastructure with a limited number of well-equipped laboratories, in particular in regular establishments of higher education;
- Low number of patent applications in comparison to the EU average and a lack of patents in high-tech sectors.

Highlights/main numbers

Until 2004, the political elite did not consider science an area to be developed and supported nationally. The financial resources allocated to R&D from the Latvian State budget during the transition period gradually decreased. In 2005 the Law on Research Activity was adopted by the government which aimed to increase the government R&D funding at least by 0.15% of GDP until it reaches 1%.

Worryingly, under the economic crisis public R&D funding is expected to decrease considerably in 2009 since GBAORD will be reduced at least by 29% (even a reduction by 40% was mentioned in the PRO INNO Trendchart Report). It is not yet clear what the particular R&D investment goals for the new period of 2008-2010 are.

R&D expenditure by the higher education sector has doubled since 2004 reaching 0.27% of GDP in 2007. In absolute figures, the total R&D expenditure in HES made up €54m (2007).

Statistics:

- GERD as a % of GDP (2007): 0.63
- R&D financed from the State budget as a % of GDP (2007): 0.35
- The share of state budget in financing R&D (2007): 56%
- GERD in million LVL (2007): 87.9
- HERD as a % of GDP (2007): 0.27%
- Annual growth rate of number of total publications 2006/2005: -9.3
- Main fields of publications: physics and astronomy, engineering sciences, chemistry, clinical medicine
- Annual growth rate of number of total citations 2002/2001: 26.1
- Patent applications to the EPO per million inhabitants (2005): 5.2
- Patents granted to the USPTO per million inhabitants (2002): 0.9
- Growth in EPO patents (2008/2007): 13.7%

Policy challenges:

- Ensuring quality and excellence of knowledge production
- Ensuring exploitability of knowledge
- Profiting from international knowledge

References to materials:

- The law “On Research Activity” (2005)
- The Guidelines for Development of Science and Technology for 2009-2013
- Erawatch Research Inventory (http://cordis.europa.eu/erawatch)
1.3 Business R&D and Innovation

The main barriers of inhibiting the business R&D are found:

- economic crisis;
- the uncompetitive production profile of Latvian companies;
- weak academia-industry cooperation.

Highlights/main numbers

Business R&D plays a limited role in the national research system of Latvia, there are limited signs of any recent positive developments (0.19% of GDP in 2007).

The total number of businesses undertaking R&D activities in Latvia was 403 in 2007. A total of 1128 people were employed as R&D personnel (FTE) in this sector, which constitutes only 18% of the total number. Only 480 out of 3603 PhD holders were employed in the business sector.

The Summary Innovation Index of the European Innovation Scoreboard shows a certain stagnation of Latvia in 2008 having remained unchanged since 2007. Its innovation performance is well below the EU27 average (outweighing only Bulgaria and Turkey).

The share of SMEs innovating in-house is comparatively small in Latvia. In addition, the share of SMEs engaging in some form of innovation cooperation is low and lagging behind in relation to other EU countries.

Statistics:

- BERD as a % of GDP (2007): 0.19;
- The share of business sector in financing R&D (2007): 36%;
- Main fields of business R&D according to NACE (2006): real estate, renting and business activities; research and development; manufacture of wood and wood products, pulp, paper and paper products, publishing and printing; manufacture of coke, refined petroleum products and nuclear fuel, chemicals, chemical products and man-made fibres, rubber and plastic products;

Policy challenges:

- Dealing with barriers to private R&D investment
- Identifying the drivers of knowledge demand
- Facilitating circulation between university, PRO and business sectors
- Enhancing absorptive capacity of knowledge users

References to materials:

- Erarwatch Research Inventory (http://cordis.europa.eu/erawatch)
1.4 Economic and Market Development

General

As a result of the dismantling of the labour-intensive command economy, the emerging national economy has been mainly characterised by the predominance of a low skilled labour force and low value-added production.

Considering an industry structure in Latvia (2008), the most of value added is given by food industry (22.4%) followed by wood processing (14.3%), production of metals and metal articles (12.4%). The employment is biggest in: food industry (21.4%), wood processing (17.8%) and light industry (11.4%).

Latvia has attracted a significant amount of FDI during transition period. The bulk of inward FDI in Latvia comes from Nordic countries and Germany. Services, such as business services, finance, transport and telecom have attracted most of inward FDI. The high share of FDI related to transport, storage and telecommunication is specific to the whole Baltic region.

Impact of financial crisis

According to the forecasts made by the Employers’ Confederation of Latvia, around 70% of the currently active companies would survive the crisis. The number of unemployed has reached higher levels than a decade before (13% in June 2009), official unemployment is coupled with an increase in irregular and illegal employment. Employers admit that lapses in employment legislation prevent them from recruiting specialists needed to ensure innovation. The crisis has also increase a brain-waste of Latvians.

The crisis, accompanied by certain factors (lack of private finances to start business, tax burden, complicated administrative procedures), has resulted in steep decline of newly registered companies by 30% in January 2009 compared to 2008.

The decline of manufacturing after the crisis has continued in 2008. Production volumes of the sector have decreased by 8% within 11 months of 2008 in comparison with the respective period of 2007. The decrease of output was observed for most sectors, including production of non-metallic minerals, wood processing and light industry. Exceptionally, production of electrical and optical equipment and production of transport vehicles has increased substantially.

The reduction in manufacturing production was caused by: the rapid decline in the domestic demand, the relative fall in export demand, the slowdown of crediting, high prices of production resources, the increase of the labour costs. The processes in the global financial markets have affected the growth of the main export markets of Latvia – Lithuania, Estonia, the rest of the EU and Russia. The share of wood processing has considerably decreased in manufacturing both, in terms of the value added and the number of employed persons. The share of production of metals and metal products

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1 Manufacturing export structure remains almost unchangeable in the recent years. Almost 4/5 of the export of products is related to EU member states, a half of which to EU-15 member states and 31% to Lithuania and Estonia.
has increased due to the increase of export volumes of the sector, however, it has also started to decrease in the second half of the year.

Statistics:
- Real GDP growth rate (% change previous year, 2008): -4.6
- Labour productivity per person employed (EU27=100, 2008): 51.1
- General government debt as a % of GDP, 2008: 19.5

Policy challenges:

References to materials:
- Ministry of Economics of Republic of Latvia (http://www.em.gov.lv)
- INNO-Policy TrendChart. Latvia 2009 (http://www.proinno-europe.eu/)

1.5 Across four domains

The main challenges and issues for research policy during the transformation process were concerned:
- A redefinition of the role of the state in the research process;
- Reforming research governance and funding systems;
- The integration of research and higher education;
- Finding the right balance between support for basic and applied research;
- Integration into international and European circles.

Present policy challenges:
- Justifying resource provision for research activities
- Securing long term investments in research
- Coordination and channelling knowledge demands
- Monitoring of demand fulfilment.

Reference to materials:
- The Guidelines for Development of Science and Technology for 2009-2013 (See “Information about science policy in Latvia”, Erawatch Research Inventory)
- Erawatch Research Inventory (http://cordis.europa.eu/erawatch)
- INNO-Policy TrendChart. Latvia 2009 (http://www.proinno-europe.eu/)
- Erawatch Country Reports 2009: Latvia. Analysis of policy mixes to foster R&D investment and to contribute to the ERA (available from Technopolis Group)

2. The range of policy responses to these challenges and their “location” within the innovation system

Three main policy documents:
- The National Development Plan of Latvia for 2007-2013
- The National Lisbon Programme of Latvia for 2005-2008
- The Guidelines for Development of Science and Technology for 2008-2013 (approved recently on 25 October 2009)
There is a set of **tasks defined in the National Lisbon Programme to foster R&D** and to increase national innovation capacity but the ones for 2008-2010 particularly focus on:

- Increasing public investment and foster private investment in R&D;
- Ensuring renewal of intellectual potential in science, improving the system of doctoral grants and modernising scientific infrastructure;
- Promoting innovation and new technologies;
- Promoting distribution and efficient application of ICT, establish completely integrated information society.

**The Guidelines add:**

- Transforming universities into internationally competitive R&D centres, which regional higher education establishments and other public and private research organisations co-operate with;
- Strengthening the international competitiveness of national R&D performers and support international cooperation in S&T;
- Supporting knowledge and technology transfer and develop an institutional environment and support mechanisms to facilitate innovation.

**The main research policy funding trends over the last five years:**

- Establishment of thematic research programmes in priority research areas (ICT, Biotechnology, food and agriculture, Nanotechnology, nanosciences, materials and new production technologies, Health, Energy)
- Introduction of institutional funding to strengthen research institutions, that earlier received only project-based funding
- New measures to support the modernisation of research infrastructure and a collaborative applied research initiative
- Introduction of a new measure „Support to the implementation of doctoral programmes and postdoctoral research“ and „Attraction of human resources to science“ to facilitate the renewal of human resources in R&D
- Emphasis on supporting the applications of research results, for example, via the newly set-up technology transfer offices in higher education institutions.

**Most recent developments in the research policy and the governance (see further Erawatch Research Inventory):**

- National S&T guidelines approved
- New research priorities set
- National R&D funding reduced
- European Union Structural funds available for R&D
- Outmigration scientists
- Introduction of foreign expertise for the evaluation of project proposals
- Structural reforms anticipated in science and higher education

**Highlights**

**The Guidelines** (as so called White paper on research and innovation) was only recently approved by the government and do not specify the amount of funding to be allocated for implementation of the measures outlined in it. The guidelines neither make any reference to the Law on Research Activity. The funding of R&D measures is dependent on annual state budget decisions.
Since 2005, the variety of research policy instruments in Latvia has expanded due to a temporary increase in R&D funding (EU Structural Funds, national funding) and the introduction of several new instruments (institutional funding, support for technology transfer offices, grants for research infrastructures, etc.). However, research policy instruments in Latvia predominantly support public sector R&D, while there are fewer ones oriented towards private R&D.

Based on only PROINNO Trendchart data, most of research and innovation support measures address public research organisations (more than 50%) and the policy measures concerning excellence, relevance and management of research in universities. Only around 15% of support measures consist of R&D cooperation element (see Annex 1 Country report). See also appendixes 1 and 2.

Despite introducing new measures, still the institutional (block) funding and thematic state research programmes have been the main mechanisms for providing R&D support at HEIs and PROs in recent years. Investments into infrastructure serve as a basis for the attraction of human resources from abroad.

Business R&D is encouraged mainly through the state aid programmes for development of new products and technologies. There is also a range of measures promoting academia-industry linkages through market-oriented research projects, technology transfer contact points, and researchers placements. There is also a programme to encourage highly skilled personnel to join business companies in Latvia.

Participation of Latvian scientists in the European level research programmes and projects supported by national co-funding contribute to the development of ERA by providing the national input of knowledge and human resources as well as providing means for profiting from access to international knowledge. Several important structural changes in the legislation governing both research and education and higher education are still to be approved to foster the implementation of the ERA concept in Latvia and facilitate further internationalisation of these sectors.

There are no tax incentives aimed at promoting business R&D and also policies for the development of clusters and competence centres are still in an initial stage.

**Policy reaction to crisis**

Three main characteristics (PRO INNO Trendchart Report):

- State budget cut for R&D by 40%,
- tax raise, and
- the government’s indecision to introduce structural reforms.

In July 2009 the Ministry of Economics drafted its proposal for the mid-term recovery plan of the economy. It highlights to replace the current model of the economy, rooted in cheap labour, with one based on knowledge and innovation. The plan underlines the intrinsic necessity to promote competitiveness, productivity rise and high value added production to achieve the goals.

The five provisionally indicated priority sectors are as follows: food industry, wood-processing, chemical industry, industry of electric and optical machinery and metal-processing. These fields have been chosen due to their perceived capacity to increase the growth of value added, to export products as well as their potency of high growth in the future. The main types of the envisaged support include financial instruments, tax stimuli, state support programmes, education and science support measures, promotion of employment, including a support programme for micro companies, etc.

**References to materials:**

3. The match between the challenges and policy responses within and across domains

An important question is to what extent goals created by the Latvian government are realistic (See Policy Mix 2007). There are five research priority areas defined for Latvia (incl. ICT, Biotechnology). First, is it a well-founded assumption that innovations drive particularly in these sectors? Latvia lacks at present the resources of developing a cluster in these sectors. Second, should a small country in particular try to be more selective and more original? Third, why science-industry co-operation programmes particularly have remained as a secondary task for Latvian research policy makers? Fourth, why evaluation practises of the policy have been so limited in Latvia?

It seems that the chosen policy measures to some extent respond to the key challenges, objectives and priorities. The issue in the case of Latvia is not necessarily the coherence between policy objectives and instruments, but rather whether the many changes of government actually hamper reaching long-term goals. Particularly now after the crisis, if the state R&D budget has extensively reduced.

The present policy mix of Latvia has a decisive role to play towards reaching the Lisbon goals. It has an important impact on the creation and strengthening of the ERA dimensions and the overall national research development.

The „Policy Mix Project 2009“ identified the following six routes to stimulate R&D investment in Latvia:

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
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. See more Erawatch Country Report 2009 for Latvia (ch 3.3.2).

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2 See further about the evaluation culture from Erawatch Research Inventory ch. 7.5
See also the progress report of Lisbon Strategy and the impact of Structural Funds on research funding (Erawatch Research Profile ch 4.4).

References to materials:

- Erawatch Country Reports 2009: Latvia. Analysis of policy mixes to foster R&D investment and to contribute to the ERA (available from Technopolis Group)
- Erawatch Research Inventory (http://cordis.europa.eu/erawatch)

4. The conflicts and synergies between policies within and across domains

Policy Mix 2009

“It can be presumed that the government is presently affected by three conditions in terms of the future for R&D. Firstly, the disbelief in the potential contribution of science to the national economy that no longer has its own industrial production – an attitude having originated already from the government of the early 1990ties. Secondly, an appearance that the increase in public R&D funding over the course of the last five years has not yielded clearly identifiable returns to the national economy (though scientists are of the opposite view). And, thirdly, there is an uncertainty in regard to the future fate of Latvia under the conditions of the economic crisis.

Thereby at this point one can only state that on the backdrop of crisis Latvia has an opportunity to maintain the research support and facilitate application of some of the generated knowledge in the national economy by means of immediate promotion of public-private cooperation schemes. And the main risk here is related to the consideration that provided this opportunity is not taken, Latvia can experience a relapse of public research funding at the level present in 2004 with a high likelihood of a heavy brain drain.

With regard to the other main policy risks, they are as follows:

- Insufficiency of the present policy mix to ensure long-term effects of facilitating companies to carry on with their R&D activities after termination of specific state aid schemes;
- The undefined IPR regimes within the current cooperation-promoting measures serving as a hindering factor for their efficient uptake and implementation;
- Excessive paperwork withholding potential beneficiaries from making use of the available schemes and thereby from engaging in R&D activities.”

References to materials:

- Erawatch Country Reports 2009: Latvia. Analysis of policy mixes to foster R&D investment and to contribute to the ERA (available from Technopolis Group)

5. The governance of policies within and across domains

Main governing institutions of research policy:

- Ministry of Education and Science (the central financing institution of public R&D, also coordinates key research programmes);
- Latvian Council of Science (advise for policy-making, manages research programmes and the evaluation of projects, drafts proposals for the elaboration of S&T policy and the state budget for research funding);
Ministry of Economy (responsibility for innovation policy);
Academy of Sciences (main policy advice body), the Strategic Analysis Commission under the auspices of the President of Latvia (policy advice), the National Development Council (policy advice).

In 2009, a rather profound reorganisation of institutions under the jurisdiction of the Ministry of Education is envisaged whereby changes are expected also to affect the functions of the Council and the number of public research organisations.

Presently, most of the funding for R&D is managed by the Latvian Council of Science with selected policy measures administered by the State Education Development Agency and the Latvian Investment and Development Agency (LIDA). The LIDA is also said to be under reform with knowledge and innovation system support functions going to the Ministry of Economics (more centralisation seem to take place in terms of funding administration). Although there exist several policy advisory bodies in Latvia, so far the sole body on the political decision making level dealing with R&D issues is the parliamentary Commission on Education, Science and Culture.

No formal coordination body for research policy exists in Latvia. As well, informal coordination and cooperation among different ministries is poorly developed. Two main coordinating bodies so far have been – the Steering Council of the National Programme on Innovation (headed by the Minister of Economics) and the Supervisory Board of the Lisbon Strategy (headed also by the Minister of Economics and consisting of other responsible Ministers, members of the Parliament, representatives of local governments and social partners). However, these bodies have mostly dealt with coordinating certain documents, positive synergies between different policy fields have not been achieved.

Research institutions

See an overview of research institutions from R&D in Latvia 2008 and the information provided by the Ministry of Education and Science (ch 1.3).

As of February 2009, the Register of scientific institutions contains 131 entries: 9 HEIs, 50 structural units thereof, 14 agencies of universities, 18 commercial companies, 11 derived public persons, mainly state research institutes, 8 foundations, 7 societies.

Research funding flows

Since 2004, Latvia has access to EU Structural Funds for R&D and the research funding of national government has significantly increased. Considerable changes in research governance, policy and funding system are still going on. The research funding is mainly administrated by the Ministry of Education and Science as said earlier.

Main numbers:

- In 2008, almost half of the total R&D funding in Latvia came from the government (€67m in 2008);
- An important part of R&D funding comes from abroad (€32.7m in 2008) and is composed of money from the EU Framework Programmes as well as other international programmes and foreign companies;
- The business sector contribution to R&D funding is one fourth (€35.4m in 2008) of total funding.

Possible limitations for the governance and funding:

- Limited administrative capacities of fund-managing public authorities
- Complicated system of managing EU Structural Funds as well as national funds
- Centralisation of funding (the trend is continuous)
• Too many functions to carry by certain ministries (policy planning, implementation, etc)
• No one governing body for research policy
• Significant state budget reductions for R&D in 2009

References to materials:
• Erawatch Country Reports 2009: Latvia. Analysis of policy mixes to foster R&D investment and to contribute to the ERA (available from Technopolis
• R&D in Latvia. 2008 Ministry of Education and Science.
Appendix A - Estimated annual budget allocations per policy priority in Latvia (source: PROINNO Trendchart Country Report Latvia 2009)

- 2.3.1 Direct support of business R&D (grants and loans)
- 2.1.4 Research Infrastructures
- 3.2.2 Career development (e.g. long-term contracts for university researchers)
- 1.2.1 Strategic Research policies (long-term research agendas)
- Other
- 1.3.2 Horizontal measures in support of financing
- 2.1.2 Public Research Organisations
- 2.1.1 Policy measures concerning excellence, relevance and management of research in Universities
- 4.3.2 Support to risk capital
Appendix B - Target groups of support measures in Latvia compared to EU27 (source: PROINNO Trendchart Country Report Latvia 2009)
ERAWATCH COUNTRY REPORTS 2009: Latvia

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

ERAWATCH Network – Centre for Science and Technology Studies, Latvian Academy of Sciences

Anda Adamsone-Fiskovica, Janis Kristapsons and Aija Lulle
Acknowledgements and further information:

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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.

Latvia is a small country with a population of 2.3m. The country has followed a neo-liberal economic policy since early 1990s when the formerly large industrial sector was not preserved. As a result of the dismantling of the labour-intensive command economy, the emerging national economy has been mainly characterised by the predominance of a low skilled labour force and low value-added production. In 2007, GDP per capita made up 58% of the EU27 average. While the annual growth rate of GDP in 2006 was 12.2% and 10.0% in 2007, in 2008 it fell to minus 4.6%. It has been forecasted that the deepest recession of the Latvian economy is expected in 2009 when GDP could fall by 12%, while in 2010 it might decrease by 2%.

Until 2004, the political elite did not consider science an area to be developed and supported nationally. A key turn in the development of the national R&D system was marked in 2005 by the adoption of the Law on Research Activity stipulating an annual increase in the government R&D funding at least by 0.15% of GDP until it reaches 1%. The figures for GERD (as a % of GDP) have improved with a slight fluctuation since 2004 (2004 – 0.42; 2005 – 0.56; 2006 – 0.7; 2007 – 0.59), yet they are considerably lower than the EU average (1.83% in 2007). In absolute figures GERD was €73m in 2005, €112m in 2006 and €126m in 2007. In its turn, business R&D investment plays a limited role in the national research system of Latvia and there are limited signs of any recent positive developments. Since 2001, changes in BERD have been negligible (0.15% of the GDP in 2001, 0.19% - in 2007) and it is five times lower than the EU average of 1.17%. Under the economic crisis public R&D funding is expected to decrease considerably in 2009 since GBAORD has been reduced at least by 29%.

Achievement of the targets set in the Lisbon strategy has been prioritised in Latvia since 2005. Yet, on the backdrop of the economic crisis it is being less pronounced. Latvia has not submitted a new stand-alone National Reform Programme for 2008-2010, but has instead incorporated its future tasks into the progress report of the previous (2005-2008) document. For the time being it is yet unclear what the particular R&D investment goals for the new period of 2008-2010 are.
The present policy mix of Latvia has a decisive role to play towards reaching the Lisbon goals. In recent years the institutional (block) funding and thematic state research programmes have been the main mechanisms for providing R&D support at HEIs and PROs. On the part of the business enterprise sector one of the key instruments for promoting R&D activities in the private sector is represented by the state aid programmes for development of new products and technologies. There is also a range of measure promoting academia-industry linkages through market-oriented research projects, technology transfer contact points, researcher placements, etc. However, there are no tax incentives aimed at promoting business R&D and also policies for the development of clusters and competence centres are still in an initial stage.

Latvia has been heavily struck by the financial and economic crisis that currently represents the major barrier to R&D investments including ones from the business enterprise sector. Other barriers to private investment are related to the uncompetitive production profile of Latvian companies, weak academia-industry cooperation as well as limited administrative capacities of fund-managing public authorities (see Table below). On the backdrop of the crisis Latvia has an opportunity to maintain the research support and facilitate application of some of the generated knowledge in the national economy by means of immediate promotion of public-private cooperation schemes. At the same time the main risk here is related to the consideration that, provided this opportunity is not taken, Latvia can experience a relapse of public research funding at the level present in 2004 with a high likelihood of a heavy brain drain. The other policy risks and opportunities are summarised in the table below.

<table>
<thead>
<tr>
<th>Barriers to R&amp;D investment</th>
<th>Opportunities and Risks generated by the policy mix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic and financial crisis</td>
<td>Opportunity: Maintenance of research support and application of some of the generated knowledge in the national economy by means of immediate promotion of public-private cooperation schemes</td>
</tr>
<tr>
<td></td>
<td>Risk: A relapse of public research funding at the level present in 2004 with a high likelihood of a heavy brain drain</td>
</tr>
<tr>
<td>Production of goods and services with low R&amp;D intensity and low added value</td>
<td>Opportunity: Stimulation of existing R&amp;D-intensive firms and incentives for creation of new R&amp;D-intensive start-ups</td>
</tr>
<tr>
<td></td>
<td>Risk: Insufficiency of the present policy mix to ensure long-term effects of facilitating companies to carry on with their R&amp;D activities after termination of specific state aid schemes</td>
</tr>
<tr>
<td>Weak cooperation between public research institutes and universities, on the one hand, and business companies, on the other</td>
<td>Opportunity: Implementation of policy measures to stimulate cooperation between firms and research institutions, e.g. via competence centres and clusters</td>
</tr>
<tr>
<td></td>
<td>Risk: The undefined IPR regimes within the current cooperation-promoting measures serving as a hindering factor for their efficient uptake and implementation</td>
</tr>
<tr>
<td>Low administrative capacity of public authorities leading to excessive bureaucratic barriers and complicated procedures to acquire funding from the EU SFs</td>
<td>Opportunity: Optimisation of the administrative apparatus and reduction of the number and scrutiny bureaucratic functions and procedures</td>
</tr>
<tr>
<td></td>
<td>Risk: Excessive paperwork withholding potential beneficiaries from making use of the available schemes and thereby from engaging in R&amp;D activities</td>
</tr>
</tbody>
</table>

Latvia is still a catching-up country in terms of its R&D and innovation performance and both national and global economic crisis may negatively influence the degree and rate of its further progress. Nevertheless, the current policy mix has had and continues to have an important impact on the creation and strengthening of the ERA dimensions and the overall national research development. ERA-related policies are important to the national research policy and strategy and it has been particularly
significant in the overall development of human resources and encouragement of research mobility. Participation of Latvian scientists in the European level research programmes and projects supported by national co-funding contribute to the development of ERA by providing the national input of knowledge and human resources as well as providing means for profiting from access to international knowledge.

There are also various state aid programmes co-funded from the EU SFs, for example, to bring together research and business and to encourage highly skilled personnel (now also including expatriates and foreign researchers) to join business companies in Latvia. Investments from the EU SFs in research infrastructure both in the previous years and in the current programming period 2007-2013 have had a positive impact on the ESFRI initiative and potentially serve as a basis for the attraction of human resources from abroad.

However, there is still a range of serious challenges for further encouragement of ERA-related developments in the current situation present in the country. Firstly, the economic crisis might cause an intensified unbalanced outward mobility of researchers thereby presenting Latvia not only with a challenge to develop means for efficiently attracting foreign researchers but also for retaining its national research potential. Secondly, several important structural changes in the legislation governing both research and higher education are still to be approved to foster the implementation of the ERA (as well as European Higher Education Area) concept in Latvia and facilitate further internationalisation of these sectors.

<table>
<thead>
<tr>
<th>Short assessment of its importance in the ERA policy mix</th>
<th>Key characteristics of policies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labour market for researchers</td>
<td>Growing importance. Increased attention paid to researchers' mobility within the EU.</td>
</tr>
<tr>
<td>Governance of research infrastructures</td>
<td>Growing importance. Increased support for upgrading and governing research infrastructures.</td>
</tr>
<tr>
<td>Autonomy of research institutions</td>
<td>High importance. Legal framework in place allowing for a great level of autonomy of research organisations.</td>
</tr>
<tr>
<td>Opening up of national research programmes</td>
<td>Low importance. Limited incentives for opening up national programmes for foreign participants.</td>
</tr>
</tbody>
</table>

- Predominant focus on outward mobility and repatriation of Latvian researchers with limited pull factors for the attraction of foreign researchers.
- No specific policy for the promotion of gender equality in science (non-existence of formal barriers for academic careers of women).
- Support for the development of the ESFRI roadmap.
- Autonomy of research institutions in setting their research agendas and hiring research personnel stipulated by legal provisions.
- Established national legal framework giving autonomy of research organisations for cooperation with other institutions on a national and international level.
- National (both budget and SF funded) research programmes exclusively limited to national applicants.
- Facilitated cross border cooperation via ERA-NET projects, COST, EUREKA, JTIs.
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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. 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 (see Kristapsons et al., 2009) 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-coordinated 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.

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

2.1 Structure of the national research system and its governance

Latvia is a small and catching-up country with 2.27 million inhabitants, featuring a constant decrease of population since 1990, and constitutes 0.456% of the total EU-27 population (2008). Latvia’s gross domestic product (GDP) per capita in purchasing power standards (PPS) in 2007 was 57.9% of the EU27 average with GDP having grown at an impressive rate of over 10% since 2005. However, the forecasts for 2008 and the coming years indicate a deep recession - a GDP decline by at least 12% in comparative prices and an increase in the registered average annual unemployment to 12.7% of the economically active population is envisaged in 2009 (MoF, 2009). The European Commission (EC) has criticised Latvia for its excessively large budget deficit that made up 6.3% of GDP in 2008 (0.1% in 2007).

Over recent years the gross domestic expenditure on research and development (GERD) had exhibited an overall increase in Latvia reaching 0.7% of GDP in 2006 after stagnating around 0.4% in 1996-2004 (see Table 1). The increase was particularly notable in the light of the high GDP growth rates, nevertheless these figures are still very low compared to the EU27 average of 1.84% (2006). While GERD decreased as a percentage of GDP (0.59%) in 2007, it still demonstrated an increase in absolute figures from €112m to €126m. Yet, as of 2009, a decline in both absolute and relative terms is expected due to the substantial budget cuts under the evolving economic crisis. The shares of GERD by sources of funds in 2007 include government - 55.2%, business enterprise sector - 36.4% and abroad - 7.5%, which imply that the government so far has been the major contributor.

The Summary Innovation Index of the European Innovation Scoreboard also shows a certain stagnation of Latvia in 2008 with the value (0.239) having remained unchanged since 2007 despite the upward trend demonstrated by the majority of other countries and the EU27 average reaching 0.475 (EIS, 2009:58). While Latvia is enlisted among the catching-up countries, its innovation performance is still well below the EU27 average (outweighing only Bulgaria and Turkey) even despite the promising rate of improvement (see also Adamsone-Fiskovica et al, 2008:2-4).

Main actors and institutions in research governance

The main research and development (R&D) policy-making body is the Ministry of Education and Science (see Figure 1), which also coordinates key research programmes, and is the central financing institution of public R&D. An important role is played by the Latvian Council of Science, which provides advice for policy-making, manages research programmes and the evaluation of projects, drafts proposals for the elaboration of science and technology (S&T) policy and the state budget for research financing. Yet, in 2009, a rather profound reorganisation of institutions under the jurisdiction of the Ministry is envisaged whereby changes are expected

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b If not referenced otherwise, all quantitative indicators are based on Eurostat data available at: http://epp.eurostat.ec.europa.eu

c The share of the Private non-profit sector is not provided by the available statistics (included in the business enterprise sector).
also to affect the functions of the Council and the number of public research institutes. However, the details of these structural reforms are not yet clearly laid out.

The Ministry of Economics holds prime responsibility for innovation policy and exerts influence on the research sphere mainly through selected innovation policy measures. Several other ministries allocate funds for research in their respective policy areas. At the operational level, most of the funding for R&D is managed by the Latvian Council of Science with selected policy measures administered by the State Education Development Agency and the Latvian Investment and Development Agency (LIDA). It has to be noted that structural reforms are also planned with regard to the Knowledge and Innovation System department at LIDA. It is being closed down as of 1 July 2009 and its functions are to be primarily taken over by the newly formed Division of industry and innovation at the Ministry of Economics (incorporating also the functions of the formerly separate Innovation division).

Policy advice is provided by the Latvian Academy of Sciences (LAS), the Strategic Analysis Commission under the auspices of the President of Latvia (formed in 2004) and the National Development Council (established in 2007). Task forces and expert groups of these advisory bodies serve as a ground for initiating and discussing the main R&D policy documents and governance issues as well as developing strategic visions for the future development of the country including those related to S&T.

So far the sole body on the political decision making level dealing with R&D issues is the parliamentary Commission on Education, Science and Culture.

**Figure 1: Overview of the governance structure of the Latvia’s research system**

Source: ERAWATCH Research Inventory (2009), updated.
The institutional role of the regions in research governance

Research policy in Latvia is developed, funded and implemented at the national level. The planning regions have neither the level of responsibility nor the funding capacity to develop their own research policies. However, note has to be taken of the current growth in the number of higher education institutions (HEIs) and their related research activities in these regions as well as efforts made by the planning regions to integrate R&D issues in their development strategies (for more see Adamsone-Fiskovica et al, 2007, 2008).

Main research performer groups

Over recent years there have been ongoing changes in the system of research performers, especially with respect to the legal status of university and state research institutes. As of February 2009, the Register of scientific institutions contains 131 entries with the main groups being HEIs (9) and structural units thereof (50), agencies of universities (14), commercial companies (18), derived public persons (mainly state research institutes) (11), foundations (8), and societies (7). In numerical terms HEIs (with their research units/bodies) constitute the largest group of research performers in Latvia.

In 2008, there were 34 accredited HEIs in Latvia, 19 of which are public (MoES, 2009). As stipulated by the Law on Institutions of Higher Education (1995), HEIs are obliged to ensure inseparability of education and research. In 2007, R&D expenditure by the higher education sector (HES) was 0.27% of GDP thereby continuing the gradual increase observed in 2005 (0.23%) and 2006 (0.24%) and having almost doubled since 2004 (0.15%). In absolute figures, in 2007, the total R&D expenditure in HES made up €54m (MoES, 2009). In terms of R&D personnel, in 2007, HES employed 3,744 persons (FTE) or 61% out of the total of 6,378 in the country (ibid).

Table 1: RTD data on Latvia (2005-2007)

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>EU-27 (latest year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GERD (euro million)</td>
<td>73</td>
<td>112</td>
<td>126</td>
<td>226120</td>
</tr>
<tr>
<td>R&amp;D intensity (GERD as % of GDP)</td>
<td>0.56</td>
<td>0.70</td>
<td>0.59</td>
<td>1.83</td>
</tr>
<tr>
<td>GERD financed by government as % of total GERD</td>
<td>46.0</td>
<td>38.2</td>
<td>55.2</td>
<td>34.2</td>
</tr>
<tr>
<td>GERD financed by business enterprise as % of total GERD</td>
<td>34.3</td>
<td>52.7</td>
<td>36.4</td>
<td>54.5</td>
</tr>
<tr>
<td>GERD financed by abroad as % of total GERD</td>
<td>18.5</td>
<td>7.5</td>
<td>7.5</td>
<td>9.0</td>
</tr>
<tr>
<td>GBAORD (euro million)</td>
<td>25</td>
<td>43</td>
<td>68</td>
<td>87639</td>
</tr>
<tr>
<td>GBAORD as % of general government expenditure</td>
<td>0.55</td>
<td>0.70</td>
<td>0.91</td>
<td>1.55</td>
</tr>
<tr>
<td>BERA (euro million)</td>
<td>30</td>
<td>57</td>
<td>41</td>
<td>144089</td>
</tr>
<tr>
<td>Business sector R&amp;D intensity (BERA as % of GDP)</td>
<td>0.23</td>
<td>0.35</td>
<td>0.19</td>
<td>1.17</td>
</tr>
<tr>
<td>BERA financed by government as % of total BERA</td>
<td>12.7</td>
<td>2.8</td>
<td>3.0</td>
<td>7.2</td>
</tr>
</tbody>
</table>

Data Source: Eurostat (Note: Values in italics are estimated or provisional.)

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d Amendments to the Law on Research Activity (2005) passed in 2006 provide that a research institute can be a public agency, a derived public person, a structural unit of a state HEI or a legal entity with private rights or a structural unit thereof.

The second largest R&D expenditure sector as a percentage of GDP is the business enterprise sector that over the last decade has demonstrated a gradual increase. It has climbed from 0.09% in 1997 to 0.19% (€41m) in 2007. Yet, the estimate of the EU27 average for 2007 is six times higher reaching 1.17%. In 2007, the share of GERD financed by business enterprises was 36.4% whereby the respective average percentage in EU27 in 2005 was 54.5%. Unlike Latvia, it positions the business enterprise sector as the major contributor to R&D expenditure in many EU countries. The total number of business companies undertaking R&D activities in Latvia in 2007 was 403 (CSB, 2009). In 2007, a total of 1,128 people were employed as R&D personnel (FTE) in this sector, which constitutes only 18% of the total number. In 2007, only 480 out of 3,603 PhD holders were employed in the business sector.

Finally, in 2007, 0.15% of GDP was spent on R&D by the government sector, below the estimated EU27 average of 0.24%. The government sector in Latvia covers all state-founded research institutions including 11 state research institutes. In 2007, this sector employed 21% (1,371 FTE) of the total R&D personnel (MoES, 2009).

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 specific country can be found in the ERAWATCH web site.

While the majority of strengths and weaknesses of the national research system have remained largely unchanged in 2008/2009 (see Table 2), there have been several developments in the domain of resource mobilisation. In particular, these have affected the former strengths associated with the justification of resource provision for research activities and securing of long-term investment in research. Both of them can be called into question in the light of the developments triggered by the economic crisis. While the previous years witnessed an increasing emphasis on the role of R&D for socio-economic development both in the policy and public discourse, today there are growing concerns over the implementation of some of the provisions (especially regarding the increase in GOVERD) and envisaged policy measures given the governmental plans for reducing budget expenditure in response to the alarming economic recession.

In 2008, several support measures envisaged by strategic policy documents were still managed to be implemented. Those include state aid schemes aimed at increasing the excellence of research output and supply of human resources in S&T

---

f The Law on Research Activity envisages an annual increase in public R&D funding of at least 0.15% of GDP until it reaches 1% of GDP.

g E.g., the National Lisbon Programme of Latvia for 2005-2008, the Programme for Promotion of Business Competitiveness and Innovation for 2007-2013, the National Strategic Reference Framework 2007-2013.
along with ones supporting research-industry co-operation and aiming to boost the innovative capacities of companies. Yet, a persisting problem concerns the involvement and integration of the business sector in the national R&D system. In terms of knowledge circulation the enhancement of the absorptive capacity of knowledge users especially in the enterprise sector remains a systematic weakness requiring particular policy attention.

There are also several deficiencies in the domain of knowledge demand in terms of still limited use made of evaluation tools in the process of policymaking (both for the purpose of identifying and monitoring knowledge demand) as well as public procurement in the field of R&D as an additional means for spurring demand for high-technology products. In its turn, on the supply side the national research system of Latvia requires more determined efforts in facilitating inward mobility of researchers thereby diversifying its competencies and profiting from international knowledge.

Table 2: Summary assessment of strengths and weaknesses of the national research system

<table>
<thead>
<tr>
<th>Domain</th>
<th>Challenge</th>
<th>Assessment of strengths and weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resource mobilisation</td>
<td>Justifying resource provision for research activities</td>
<td>S: Growing emphasis on the role of R&amp;D for socio-economic development in the public discourse</td>
</tr>
<tr>
<td></td>
<td></td>
<td>W: Inconsistent financial prioritisation of R&amp;D under changing economic conditions</td>
</tr>
<tr>
<td></td>
<td>Securing long term investment in research</td>
<td>S: Formal mechanisms in place to ensure a continuous increase in the government R&amp;D funding</td>
</tr>
<tr>
<td></td>
<td>Dealing with barriers to private R&amp;D investment</td>
<td>W: Limited R&amp;D funding of the business sector</td>
</tr>
<tr>
<td></td>
<td>Providing qualified human resources</td>
<td>W: Varying attractiveness of research careers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>W: Insufficient supply of human resources for R&amp;D</td>
</tr>
<tr>
<td></td>
<td></td>
<td>W: Lack of policies for researchers’ mobility</td>
</tr>
<tr>
<td>Knowledge demand</td>
<td>Identifying the drivers of knowledge demand</td>
<td>W: Low private demand for R&amp;D</td>
</tr>
<tr>
<td></td>
<td></td>
<td>W: Limited use made of public procurement in the field of R&amp;D</td>
</tr>
<tr>
<td></td>
<td>Co-ordination and channelling knowledge demands</td>
<td>S: Presence of multi-annual research programmes in the priority research fields</td>
</tr>
<tr>
<td></td>
<td>Monitoring of demand fulfilment</td>
<td>W: Underdeveloped evaluation culture and tools</td>
</tr>
<tr>
<td>Knowledge production</td>
<td>Ensuring quality and excellence of knowledge production</td>
<td>S: Internationally competitive fundamental research in several fields of science</td>
</tr>
<tr>
<td></td>
<td></td>
<td>W: Poor performance in terms of publications, citations and patents</td>
</tr>
<tr>
<td></td>
<td>Ensuring exploitability of knowledge</td>
<td>S: High quality applied research with patentable results in selected fields of science</td>
</tr>
<tr>
<td></td>
<td></td>
<td>W: Limited exploitability of produced knowledge in the framework of the current set-up of national economy</td>
</tr>
<tr>
<td>Knowledge circulation</td>
<td>Facilitating circulation between university, PRO and business sectors</td>
<td>S: A strengthening policy response for promoting knowledge and technology transfer between academia and industry</td>
</tr>
<tr>
<td></td>
<td>Profiting from international knowledge</td>
<td>W: Predominance of brain drain over brain gain</td>
</tr>
<tr>
<td></td>
<td>Enhancing absorptive capacity of knowledge users</td>
<td>S: Increasing support for and intensity of trans-border cooperation in R&amp;D</td>
</tr>
<tr>
<td></td>
<td></td>
<td>W: Limited absorptive capacity of R&amp;D results by the enterprise sector</td>
</tr>
<tr>
<td></td>
<td></td>
<td>W: Shortage of skilled S&amp;E labour force in the business sector</td>
</tr>
</tbody>
</table>
While the domain of knowledge production can be characterised by selected institutes performing high level research and demonstrating excellence in terms of their research output, the overall level of national research capacity is not competitive enough on an international scale. Despite the measures being taken, a remaining weakness of the research system of Latvia is the lack of S&T graduates along with an accompanying insufficient supply of human resources for R&D. The recently improved attractiveness of research careers (introduction of institutional funding, substantial financial resources allocated for a range of state aid schemes supporting doctoral studies, development of research infrastructure, etc.) is being undermined by the unclear future prospects due to funding cuts for R&D. Thereby the strength that the national research system can further build on is the strategic policy orientation towards the development of a knowledge-based economy by underpinning this strategic view with corresponding resources.

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 also to 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

The domain of resource mobilisation is likely to feature the most notable policy changes in the reporting period in Latvia. The economic recession witnessed since early 2008 and having aggravated in the turn of 2008/2009 has served as an essential test for the earlier governmental commitments in providing resources and securing long term investments in research. While the aims and tasks set for the new Lisbon Strategy cycle in Latvia (CoM, 2008) have not diminished the role of R&D in economic growth (see Box 1), the considerable budgetary cuts in 2008/2009 have not left the funding earmarked for science untouched.

Already the initial version of the state budget for 2009 approved by the parliament on 14 November 2008 envisaged a 23.7% reduction in public R&D funding in comparison to 2008 resulting in a cut from €53.0m to €40.5m. Yet, the overall reduction following the amendments to the Law on State budget 2009 made in December 2008 even reached 29%. A corresponding reduction of funding in individual budget lines including those covering base funding of research institutions, fundamental and applied research projects and state research programmes has followed. Moreover, funding of research activities at HEIs that was introduced as part of the state budget for higher education in 2005 as well as state funding for market-oriented research projects have been terminated altogether in 2009. It is argued that the substantial reduction of public R&D expenditures in 2009 is also going to hinder successful implementation of several industrial studies and innovation support measures (MoE, 2008:105). In 2009, a decrease in the inflow of EU SFs is envisaged by the same amendments stipulating a reduction of public co-funding of the SF programmes by 15%. A decision on a thorough reconsideration of a range of SF activities planned to be launched in 2009 was taken by the Cabinet of Ministers on 22 December 2008 (CoM, 2008b). A re-assessment is foreseen with regards to the potential postponement of activities for
the attraction of highly skilled labour force in companies, the establishment of technology transfer centres, the implementation of the cluster programme, the upgrading of IT infrastructure for research activities as well as strengthening the development and administrative capacity of research and innovation policy, etc.

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

Since the initial period of the national reform programme (National Lisbon Programme of Latvia for 2005-2008) has ended, along with an assessment of the measures carried out within this Lisbon Strategy cycle the annual report on progress in implementation of the Programme (CoM, 2008) also outlines the tasks and measures for the new Lisbon Strategy cycle. The main tasks set for further stimulating knowledge and innovation in 2008-2010 have generally remained the same as in 2005-2008 and are as follows:

- to increase public investment and foster private investment in R&D;
- to ensure renewal of intellectual potential in science, improving the system of doctoral grants and modernising scientific infrastructure;
- to promote innovation and new technologies;
- to promote distribution and efficient application of ICT, establish completely integrated information society.

Some of the policy measures envisaged to be launched or continued in the field of R&D and innovation as of 2009 include increased financing of scientific activity, implementation of market-oriented research, development of the project of a Science Communication Centre, raising awareness of IPR issues among entrepreneurs, elaboration and implementation of the Competence centre programme, development of Science and Technology Park of Riga, follow-up of the technology transfer contact point programme, implementation of the state aid programmes for the development, legal protection and introduction into production of new products and technologies, as well as for the attraction of highly qualified labour force.

Latvia has not submitted a new stand-alone NRP 2008-2010 document with its future tasks instead incorporated into the progress report of the previous (2005-2008) document. Some of the tasks outlined in this report cast doubts, namely with regard to the goal for GERD to reach 1.5% of GDP in 2010. In 2007, GERD in Latvia was €125.0m, which constitutes 0.59% of GDP. The earmarked funding of the EU SFs for 2007-2013 for science is €338.9m, which annually adds up around €60m in comparison to the previous years (Arhipova, 2009). This could help to improve the situation, however, taking into account the recent reduction of science funding, it is not plausible for GERD to reach the level of 1.5% of GDP in 2009-2010.

At the turn of 2008/2009, an awareness raising campaign was undertaken by scientists, advocating the vital role of higher education and research in the long term socioeconomic development of the country (e.g., Open letter, 2008; Kalvīņš, 2008; Auziņš, 2009). Serious doubts have been voiced over the feasibility of implementing the legal provision stipulating a fixed annual increase in the government R&D funding in the coming years and over the prospects of reaching the targets initially set in the National Lisbon Programme of Latvia for 2005-2008 (GERD to reach 1.1% of GDP by 2008 and 1.5% by 2010). Securing long term investments is also hindered by the
postponement of the adoption of the Law on Higher Education initially drafted in 2006 and the Guidelines for Development of Science and Technology for 2008-2013

These developments can also be seen as a hindering factor to the challenge of dealing with barriers to private R&D investment as it had been stressed that public R&D funding should serve as a catalyst for the development of research-based activities in the business sector (Bilinskis et al, 2005). So far business R&D investment has played a minor role in the national research system and there are limited signs of any recent positive developments.

There have been recent policy initiatives aimed at providing improved access to seed and venture capital by private companies. In 2008, a pilot project of a new pre-seed support instrument for innovative, knowledge-based business ideas was. Other related measures (co-financed by ERDF) aimed at boosting private R&D investments and innovative capacities of companies include the new round of the state aid programme “Support for development of new products and technologies” (now also covering support for their industrial application and securing IPRs). In 2008, calls under the state aid programmes for operation and establishment of technology transfer contact points at HEIs and for the development of micro and small companies in specially supported territories (including projects envisaging acquisition of modern machinery and production of new products) were launched. Last but not least, in 2008 applications under the first call of the new state aid programme for the attraction of highly qualified workforce in business companies were received.

The challenge of providing qualified human resources in the public sector has been addressed by the EU SF activity „Attraction of human resources to science” (€53m) launched in November 2008. The main aim is to promote the attraction of additional human resources to science by means of forming new research groups and developing cooperation and to facilitate the involvement of young scientists in projects and their management, particularly in interdisciplinary research fields. Given the reduction of the research budget for 2009 this activity is seen as an important resource for the maintenance of research activities in Latvia. Moreover, submission of project proposals under the first call of the SF activity “Support for implementation of doctoral study programmes” under the same OP “Human resources and employment” for invited applicants (18 HEIs) was launched in December 2008.

\[\text{The last postponement of the Guidelines dates back to 9 September 2008 when the issue had been already included in the agenda of the governmental meeting. According to the new action plans the drafted documents had to be re-submitted on 16 March 2009, which was accomplished, yet the date for the revision by the Cabinet of Ministers has not been defined.}\]

\[\text{The number of students participating in second stage of tertiary education in S&T fields of study, as a percentage of the 20-29 year old population, in 2006 was only 0.16% (Eurostat). In 2007/2008, the share of students (out of the total of 127,760) by thematic groups was 4.8% in natural sciences, mathematics and IT and 10.95% in engineering sciences, production and construction while the majority of students (53.6%) were in social sciences, business and law (CSB, 2009).}\]
Table 3: Main policy changes in the resource mobilisation domain

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Main Policy Changes</th>
</tr>
</thead>
</table>
| Justifying resource provision for research activities | • Identification of tasks int. al. in the field of R&D for the new Lisbon Strategy cycle (2008-2010) in Latvia  
• Considerable cuts in budget funding for R&D in 2009                                                                 |
| Securing long term investments in research      | • Postponed adoption of the Guidelines for Development of Science and Technology for 2008-2013                                                                                                                      |
| Dealing with uncertain returns and other barriers | • Diversified support for venture (seed) capital financing  
• Launching of state aid schemes for the development, protection and introduction into production of new products and technologies  
• Launch of new support measures for technology transfer at HEIs and attraction of highly qualified workforce in business companies |
| Providing qualified human resources             | • Launch of a new support measure for the attraction of human resources in science  
• Continued support for implementation of doctoral study programmes                                                                                                                   |

2.3.2 Knowledge demand

While in 2005 a large part of public demand as expressed in GBAORD was non-oriented research (74.6% in comparison to the EU27 average of 15.1%) (Wilen, 2008:5), the prioritisation of various sectors of the economy has emerged as one of the tools for pursuing specific knowledge demand by the Latvian government. Since the current nine programmes in priority research fields launched in 2005 and 2006 are ending in 2008 and 2009, discussions on the potential future developments are intensifying especially with regard to the number of priorities and their fundamental vs. applied focus. The new priorities have to be approved in July 2009, yet it is not clear whether funding for the new programmes will be made available in 2010. It can be noted that in 2008 efforts to launch a debate on the need also to prioritise industrial branches with the purpose of helping the national economy to restructure to more profitable branches of production with higher export capacity have been made (SAC, 2008), yet, so far this initiative has not received any follow-up on a governmental level.

Another tool that is referred to but not yet made systematic use of in Latvia is public procurement in the field of R&D, thereby driving it from the demand side. This instrument has been stressed by the Latvian Chamber of Commerce and Industry in their plan for the stabilisation of the Latvian economy (LCCI, 2008). It envisages establishment of a system of ministerial orders (procurement) for the development of innovative products as one of the means for promoting innovation and reaching higher export volumes based on innovative products with higher value added. The idea of the implementation of offset mechanisms for public procurement of certain type of R&D goods and services in Latvia has also been put forward by the experts of the National Development Council (NDC, 2009).

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1 In total, nine priorities had been set and respective state research programmes have been approved on 20 July 2005 (Information technologies, Organic synthesis and biomedicine, Material science, Forestry and wood processing technology, Latvian studies) and on 30 May 2006 (Agro-biotechnology, Medical science, Energy, Environmental research).

2 Purchase of goods and services that do not yet exist, or need to be improved and hence require research and innovation to meet the specified user need (EC, 2005:5).
These mechanisms also have to do with the development of evaluation culture and tools that serve as a crucial input for policy-making not least in terms of defining knowledge demand in the country. Some recent efforts made to this end in Latvia include monitoring and assessment of state research programmes, evaluation studies being carried out with regards to the EU SFs\(^1\) as well as procedures of wide expert and public deliberations employed during the elaboration of the Sustainable development strategy of Latvia until 2030\(^m\) (LARS, 2008). Yet, there is still considerable room for diversification of evaluation tools and wider use made of evaluation results for further policy-making practices.

### Table 4: Main policy changes in the knowledge demand domain

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Main Policy Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifying the drivers of knowledge demand</td>
<td>• Debate on the new round of research priorities and the need to set industrial priorities</td>
</tr>
<tr>
<td>Co-ordinating and channelling knowledge demands</td>
<td>• Elaboration of the first revised draft of the Sustainable development strategy of Latvia until 2030</td>
</tr>
<tr>
<td>Monitoring demand fulfilment</td>
<td>• Assessment of progress in implementation of state research programmes in 2008</td>
</tr>
</tbody>
</table>

#### 2.3.3 Knowledge production

Over recent years there have been strengthening efforts in improving the quality and excellence of knowledge production in the academic institutions in Latvia. In 2008, the Latvian Council of Science continued to pursue a more thorough evaluation of research grant applications by means of taking stronger account of the previous record of scientific output of applicants and of the expected outcome (novelty) of the project. Likewise, in November/December 2008, a range of public meetings were held with the purpose of assessing the progress achieved in the nine state research programmes ending in 2008/2009. It was concluded that all the programmes fulfilled their defined aims and tasks and the results have been assessed as notable in both theoretical and practical terms (Supervisory board, 2009).

Despite the economic recession and the considerable reduction of public funding for higher education and research in 2009, the largest public university, the University of Latvia (2008), has reinforced its commitment to become a leading research university in the Baltic Sea region. Excellence, innovation and openness have been set as the main three pillars for achieving this strategic aim in the coming decade. Nevertheless, the elimination of budget funding for research activities undertaken by HEIs in 2009 strongly undermines the efforts made to this end so far.

Support for knowledge production has also been implemented by means of upgrading research infrastructure and facilities in order to ensure conditions conducive for high quality and internationally competitive research work. While it is planned to continue this kind of support also in 2007-2013 under the SF activity “Support for research infrastructure”, the programme has not been launched yet.

With regard to the challenge of ensuring exploitability of knowledge production, a share of funding for applied research projects is being allocated annually by the Latvian Council of Science and through the programme “Support for market oriented research” implemented since 1993. Yet, funding for both has been reduced in 2009 with submission of projects planned in March 2009 under the latter terminated

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altogether. One of the planned activities (“Support for science and research”) envisages support for applied research projects potentially facilitating the integration of science and industry along with application of research results in the priority fields defined by the state, but it has not been launched yet.

Since the patenting activity has been rather low both in respect to national (139 in 2007, slightly over 173 in 2008) and international (21 PCT filings in 2007) patent applications (Ramāns, 2008:31), policy measures are also emerging to address the issues of IPR protection (e.g. support for technology transfer, development of new products and technologies). Yet, there are still ongoing discussions on the ownership of intellectual property generated as a result of publicly funded research (Grīnuma, 2008:11). One of the recommendations made by the National Development Council (NDC, 2009) envisages an establishment of a special fund for filing international patents by PROs.

**Table 5: Main policy changes in the knowledge production domain**

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Main Policy Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improving quality and excellence of knowledge production</td>
<td>• Increased requirements for quality assessment of research activities simultaneously undermined by the elimination of budget funding for research activities of HEIs in 2009.</td>
</tr>
<tr>
<td>Ensuring exploitability of knowledge production</td>
<td>• Envisaged support for applied research projects at PROs with a simultaneous reduction of funding for and termination of several support measures for applied research in 2009</td>
</tr>
</tbody>
</table>

**2.3.4 Knowledge circulation**

Facilitation of knowledge sharing and circulation between university, PRO and business sectors has been addressed as one of the major challenges in the national R&D policy. Since 2005, a scheme for the establishment of technology transfer contact points at HEIs has been implemented and the programme has been continued under the new cycle of EU SFs in 2007-2013. A corresponding measure was launched in May 2008 under the OP “Entrepreneurship and innovation” which aims to promote the commercial application of scientific research results, identifying available and required research competencies at HEIs and PROs in a systematic way and pursuing their development. It has also been envisaged to launch an additional activity for the establishment of technology transfer centres. However, this initiative has been put on a waiting list due to the uncertain financial situation.

Another recent development is the launch of the state aid programme “Attraction of highly qualified workforce” (CoM, 2008c) providing support for temporary placements of engineers and scientists in companies for finding solutions to specific technological problems or development of new products. This is an initiative aimed at enhancing the absorptive capacity of knowledge users to mediate limited firm expertise and learning capabilities since the low share of scientists working in the business enterprise sector is seen as one of the major factors hindering the innovative activities of companies. Last but not least, cooperation between research institutions and the enterprise sector is planned to be promoted via competence centres with a corresponding state aid programme envisaged for 2009.

In terms of profiting from access to international knowledge during the reporting period Latvia has continued to take active part in EU FPs (2007-2013) with the success rate after the first two years reaching 17.3% (out of 375 evaluated project applications 65 projects have been retained for financing) (NCP, 2008). Likewise participation in the EU-initiated programmes COST and EUREKA has been
continued - there were around 40 COST actions and 20 EUREKA projects running with involvement of Latvian partners at the beginning of 2009. Since FP6, Latvia has also taken part in seven ERA-net scheme projects and is involved in several European Joint Technology Initiatives (JTIs). In March 2008, a special Centre of European Programmes was formed at the LAS.

Annual funding from the state budget for science is allocated by the Ministry of Education and Science providing support for participation in international S&T cooperation programmes, such as EURATOM, FP7 and COST covering both fundamental and industrial research carried out also in cooperation between companies and research organisations (CoM, 2008d). Yet, in 2009 funding for these activities has been reduced. In the EU SF planning period 2007-2013, a special activity is envisaged for providing support for international collaborative projects in S&T (including FP7, EUREKA, etc.) aiming to ensure the capacity-building of scientific institutions, to facilitate project implementation, elaboration of new collaborative projects and participation in technological platforms. Yet, for the time being drafting of project applications, which is planned to be covered under the eligible costs of this measure, is still left to the research institutions themselves.

Table 6: Main policy changes in the knowledge circulation domain

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Main Policy Changes</th>
</tr>
</thead>
</table>
| Facilitating knowledge circulation between university, PRO and business sectors | • Continued support for technology transfer initiatives  
• Prioritisation of the need to implement competence centre programme       |
| Profiting from access to international knowledge                           | • While funding for participation in international S&T cooperation programmes has been reduced in 2009, a new support measure for international collaborative projects in S&T is envisaged under EU SF activities |
| Absorptive capacity of knowledge users                                    | • State aid programme for the attraction of qualified labour force to companies launched |

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. The new policies introduced and developments having taken place in Latvia during the reporting period in the four domains have opened up or alternatively reinforced a range of policy-related opportunities as well as risks.

With regards to resource mobilisation, the main policy-related opportunity is represented by the economic crisis that has the potential of serving as an accelerator for implementation of the declared policy orientation towards a knowledge-based society and for the reinforcement of national priorities so far having been defined with regards to S&T. In case this scenario is neglected or discarded altogether by the policy-makers there is a risk of a prevalence of short-term measures for cutting budget expenses over long-term (R&D-based) development prospects of the national economy that can eventually lead to a halt of the progress so far achieved in the field of R&D and a further economic recession of the country.

In the domain of knowledge demand the former policy-related opportunity of establishing a research council headed by the Prime Minster has not been yet taken advantage of with the postponement of the respective Guidelines envisaging such a high-level body. In the light of the imminent ending of the four-year period of national
priorities in the field of R&D (2005-2009) an opportunity to revise and streamline their scope and number for the next period (based on the accumulated experience and current economic set-up) has opened up. This, in turn, has the potential of addressing the formerly identified risk of support for too many R&D fields thereby not ensuring a pronounced support for excellent disciplines and researchers. Nevertheless, both in respect to this area and the broader policy-making processes there is a persisting risk of the governing bodies not making qualified use of different evaluation tools and the resulting conclusions and expert recommendations.

As for the domain of knowledge production, the former opportunity of orientation towards high quality research results with increased productivity levels that has been increasingly addressed during the reporting period has been further supplemented by an opportunity of making the utmost use of the newly obtained (through the EU SF co-funded state aid schemes) research equipment and facilities. It can be accomplished by means of a facilitated and open access to these infrastructure objects by both public and private actors thereby enabling the production of internationally competitive research results and facilitating the development of R&D-based entrepreneurship in Latvia. In its turn, a notable policy-related risk is a lack of state incentives for settling the current IPR regimes in respect to the ownership of intellectual property generated as a result of publicly funded research. The current situation considerably hinders the commercialisation efforts of individual and institutional research actors and thereby the exploitability of knowledge production.

Finally, with regard to knowledge circulation, the major potential resource in this domain is still represented by an efficient implementation and active use made of new policy measures aimed at knowledge and technology transfer between research institutions and the business enterprise sector. These have both the potential to enhance the absorptive capacity of companies and promote mobility of human resources between public and private sectors. Another opportunity is related to the facilitated participation in international collaborative S&T projects increasingly promoted by a range of policy measures. Yet, a serious policy-related risk with respect to knowledge circulation is still represented by undetermined policy actions in facilitating a more balanced inward and outward mobility of R&D staff, that could be achieved by gradually opening up both national programmes and institutions for foreigners in the field of higher education and research.

Table 7: Summary of main policy related opportunities and risks

<table>
<thead>
<tr>
<th>Domain</th>
<th>Main policy related opportunities</th>
<th>Main policy-related risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resource mobilisation</td>
<td>• Economic crisis as an accelerator for implementation of declared policy orientation towards a knowledge-based society</td>
<td>• Prevalence of short-term measures for cutting budget expenses over long-term (R&amp;D based) development prospects of the national economy</td>
</tr>
<tr>
<td>Knowledge demand</td>
<td>• Revision and streamlining of national priorities in the field of R&amp;D for the next planning period</td>
<td>• Insufficient and unqualified use made of evaluations and results thereof in the policy-making process</td>
</tr>
<tr>
<td>Knowledge production</td>
<td>• Utmost use made of recently upgraded research infrastructure by both public and private actors</td>
<td>• Uncertain IPR regimes at public research institutions</td>
</tr>
<tr>
<td>Knowledge circulation</td>
<td>• Efficient implementation of new policy measures aimed at knowledge and technology transfer</td>
<td>• Undetermined policy actions in facilitating a balanced inward and outward mobility of R&amp;D staff</td>
</tr>
<tr>
<td></td>
<td>• Facilitated participation in international collaborative S&amp;T projects</td>
<td></td>
</tr>
</tbody>
</table>
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

Similar to other East European countries, a transformation of the economic system took place in Latvia after 1990. But unlike other countries the former large industrial sector that was present prior to this change was not preserved. Furthermore, until 2004, the political elite did not consider science an area to be developed and supported nationally. As a result, the national economy was mainly characterised by the predominance of a low skilled labour force and low value-added production and a weak linkage between research undertaken at state institutes and universities, on the one hand, and entrepreneurship, on the other. Therefore, business R&D investment plays a limited role in the national research system of Latvia. In 2007, GERD financed by the business sector was 0.19% of GDP - five times lower than the EU average of 1.17% (Eurostat). Also GERD as such is rather negligible making up only 0.59% of GDP (2007), considerably lower than the EU average of 1.83%.

The major barriers in the national research system for the achievement of R&D investment objectives can be seen as related to the following four aspects.
Economic and financial crisis

The economic and financial crisis at present represents the major barrier to R&D investments including ones from the business enterprise sector. The crisis conditions exert a direct impact on the national research system of Latvia which is first and foremost represented by the sharp reduction of R&D funding in 2009. The economic and financial crisis and its impact on the field of R&D could be traced back already to the second half of 2007 when discussing R&D funding allocations from the state budget for 2008. Manifestations of the crisis became particularly notable in September-October 2008 when one of the major commercial banks in Latvia (Parex) was taken over by the government. It was accompanied by a sharp increase in the unemployment rate and a drastically declining GDP growth rate (prior to that the Latvian economy featured the most rapid growth rates in the EU).

Production of goods and services with low R&D intensity and low added value

Only 18% of firms operating in Latvia are innovative (CSB, 2006), with this fact to a large extent determining a predominance of the production of goods and services with low R&D intensity and low added value. In 2007, the share of total R&D (GERD) financed by industry was 36.4%, an increase if compared to the respective level of 17.6% in 1996, yet which is still far from the Lisbon objective of a two-thirds business enterprise financed share of GERD. According to the Community Innovation Survey (CIS), 64% of innovation expenditures are invested in the acquisition of machinery and equipment, while only 12% are allocated to R&D (CSB, 2006). More than half of innovative enterprises (53.6%) are large companies with more than 250 employees. According to the 2007 EU Industrial R&D Investment Scoreboard (EC, 2007) the only Latvian company among the top 1,000 EU R&D investors is the pharmaceutical company Grindeks ranked 974th with its €3.48m R&D investment$^\text{a}$.

Weak cooperation between public research institutes and universities, on the one hand, and business companies, on the other

Efforts to establish and strengthen cooperation between academic institutions (PROs and universities) and business companies have been quite active in recent years. This cooperation has been prioritized by the government as one important step in building a knowledge-based economy, which was set as a strategic policy goal to ensure the competitiveness of the national economy, which had so far relied mainly on cheap labour and natural resources.

In recent years, the need to foster private R&D has been widely recognised in government policy documents. Thus, the government has elaborated a number of measures to foster partnerships between research organisations and businesses (e.g. support to technology transfer, establishment of competence centres, market-oriented research projects, researcher placements), to support the development of new technology-based firms (e.g. support to business incubators) as well as to facilitate private R&D activities directly (e.g. funds for development of new products and technologies). While selected measures envisaged for 2007–2013 have already been launched, there are still few left on a hold in 2008/2009.

One of essential weaknesses of the Latvian system of applied research is also the lack of specialised intermediary organisations bringing together researchers and industrial actors (including the provision of quality services for solving IPR-related

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$^\text{a}$ In the 2008 Scoreboard (EC, 2008e) not a single company from Latvia has made it to the list.
issues). Since 2005 concrete aid schemes have been launched including financial support for the establishment of technology transfer offices at universities, yet, the whole newly developing system is only at its initial stage.

**Low administrative capacity of public authorities leading to excessive bureaucratic barriers and complicated procedures to acquire funding from the EU SFs**

While on the whole SFs are increasingly seen as a crucial tool for the revival of the economy and resources are still being sought to ensure the necessary budgetary co-financing⁰, there are many complaints being voiced by different stakeholders on the heavy bureaucratisation of the SF activities both in terms of procedures and the oversized administrative apparatus. In its plan for the stimulation of the Latvian economy the Latvian Chamber of Commerce and Industry (LCCI, 2009) has identified the need to review and improve the EU SF aid programmes to bring those in line with the current economic situation as well as to establish an efficient, unified, simple and cheap system of EU SF management, adoption of legal regulations and supervision over their implementation.

Although the new programming period of the EU SFs is operational since 2007, almost none of the newly available funds have been mastered in 2007-2008. At the same time the number of involved authorities (21 agency) and employees (approximately 700) for the scale of Latvia make a clearly oversized bureaucratic apparatus for the management of these funds. The legal and normative regulations established by public authorities in many areas are assessed as more constraining and rigorous than demanded by the EU legislative acts (NDC, 2008).

### 3.2 Policy objectives addressing R&D investment and barriers

As outlined in the ERAWATCH Country Profile (ERAWATCH Research Inventory, 2009), the aims of research policy in Latvia are still in the process of being specified and elaborated. There is no one major, updated and officially approved national research policy document setting out the main aims of this policy domain. The aims set out in several other related recent documents – the National Lisbon Programme of Latvia for 2005-2008, the National Development Plan of Latvia for 2007-2013 – are still relevant, e.g. in respect to issues such as the development of human resources for S&T, or support for science–industry cooperation. Expert opinion on research policy goals is presented in the Guidelines for Research, Technological Development and Innovation developed by the Strategic Analysis Commission (Grens et al, 2005).

All these documents include references to achieving the strategic Lisbon targets: by 2010 the level of GERD has to reach 1.5% of GDP. For the time being these national goals have not been officially altered, though the EC assessment of progress achieved by the Member States (MSs) in the implementation of the Lisbon Strategy reforms in 2008 rightly states that „the ambitious R&D targets of 1.1% of GDP in 2008 and 1.5% in 2010 are unlikely to be met“ (EC, 2009:56) – a fact that was already obvious in 2008, but has neither been acknowledged nor analysed in the

⁰ The Memorandum of Understanding between the European Community and the Republic of Latvia requires Latvia to commit enough budgetary resources for implementation of the planned SF co-financed programmes within the framework of the 2009 budget law (Memorandum, 2009:10).
According to the Action plan for implementation of the programme for stabilisation of the Latvian economy and growth resumption (CoM, 2009c), the above-mentioned Guidelines had to be reviewed and approved by the government in March-April 2009. Yet, until May 2009 no respective developments have followed and no clear future prospects have been officially stated so far. According to the draft guidelines, the main aim of research policy is to develop S&T as a basis for the long-term well-being of civil society, the economy and for culture in general and in order to guarantee a knowledge-based economy and sustainable growth. In order to implement this aim, the following tasks have been set out:

- to rejuvenate and develop the current human resources and infrastructures;
- to transform universities into internationally competitive R&D centres that regional HEIs and other public and private research organisations co-operate with;
- to ensure a substantial increase in public R&D investment and develop funding mechanisms which encourage co-funding from the private sector;
- to strengthen the international competitiveness of national R&D performers and support international cooperation in S&T;
- to support knowledge and technology transfer and develop an institutional environment and support mechanisms to facilitate innovation.

The annual report on progress in implementation of the National Lisbon Programme of Latvia for 2005–2008 (CoM, 2008) also outlines the main tasks set for further stimulating knowledge and innovation in 2008-2010, which have generally remained the same as in 2005-2008 (see Box 1). A more active analytical work is undertaken within the expert groups of the National Development Council. In 2008, in the Progress Report on Implementation of the National Development Plan, experts have concluded (based on estimated increase in 2007, 2008 and 2009) that the 1% target for public R&D expenditure would only be reached by 2013 and have reset the target year accordingly (Progress Report, 2008). They emphasised the need of providing the envisaged annual increase of 0.15% of GDP from the national budget and relying less on the funding from the EU SFs. A considerable reduction of state budget in December 2009 envisages cuts in public research funding by 29%.

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

Research policy is predominantly developed and implemented by the Ministry of Education and Science, and includes generic as well as thematic R&D policies. While until 2004 public R&D funding was mainly project-based, since 2005 longer term investments have been introduced. There is a range of generic research policy...
instruments: block funding to universities; support for R&D infrastructures; competitive grants. However, there are also thematic research policy instruments. The Law on Research Activity defines the main types of research funding, which include institutional funding for research establishments, funding for multi-annual state research programmes in priority research areas, funding for competitive grants - basic and applied research projects, and funding for market-oriented research projects. The comparative weight of the various mechanisms for the distribution of public R&D funding can be illustrated by the following figures for 2009. While the total public R&D funding makes up €40.5m (100%), the majority of that goes to institutional funding (€19.1m or 47%), with one fourth allocated for state research programmes (€9.8m or 24.2%), and the least share going to project-based funding (€5.9m or 14.5%).

There have been several attempts to introduce medium-term planning in research funding. In 2007, the Cabinet of Ministers adopted the framework for the first medium-term budget for 2008-2010. The development of a knowledge society has been declared to be one of the medium-term budget priorities. However, because of the need to restrict budget expenditures, the implementation of the medium-term budget is uncertain. Difficulties in introducing the medium-term planning are also exemplified by the so far unsuccessful attempts to adopt the Guidelines for Development of Science and Technology for 2008-2013 drafted by the Ministry of Education and Science.

Since 2004, when Latvia joined the EU, the EU SFs have become an important source of R&D funding supporting development and upgrading of research infrastructure, doctoral studies and post-doctoral research, etc. In the new SF programming period 2007-2013, €238m is budgeted for R&D and an additional €202m for innovation. Support is envisaged for applied research, international cooperation in R&D, development of human resources in R&D, academia-business co-operation, etc. Since the 1990s, an important source of funding for excellent research teams has been the EU FPs.

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;
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.

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p www.esfondi.lv
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**

There are two groups of measures relating to this route: policy measures oriented towards the establishment of companies and those aimed at the establishment of business support infrastructure and services (e.g. business incubators) to create favourable conditions for new start-ups.

Under the first category there are measures such as the state aid programme “Investment in development of micro and small companies in specially supported territories” (€36.4m, 2008–2013), a policy measure under the OP “Entrepreneurship and innovation”. This aims at promoting the development of entrepreneurship in the specially assisted territories of Latvia thereby levelling out the disparities between regions and regional territories and facilitating a more balanced development of the country. Eligible activities include initial investments related to the establishment of a new company, diversification of production of an existing company with new products, a considerable change in the production process of an established company as well as purchase of software, licences and patents that are related to the afore-mentioned activities.

Other related measures include the newly launched Pre-seed support for innovative business ideas that is a pilot project by LIDA with support made available to individuals and organisations with innovative, knowledge-based business ideas or projects with a considerable expected growth potential. The measure is aimed at the promotion of innovative entrepreneurship in Latvia, as well as the creation of a sufficient pool of potential demand for the services of the existing venture capital funds. Within the framework of the project the authors of business ideas have an opportunity to establish co-operation with mentors and potential investors, partners willing to co-operate within the idea implementation process. A somewhat similar incentive in the form of an annual competition is represented by the “Venture cup”.

The other category of measures can be illustrated by the programme “Support for development of innovation centres and business incubators” (€25.8m, 2007-2013) promoting the upgrading of innovation infrastructures by strengthening the capacity of local governments, HEIs and national research institutes. It also supports initiatives by HEIs and national research institutes to establish new innovation centres and helps regional or local governments to develop new business incubators. The provision of services to start-ups by innovation centres and business incubators is also supported, thereby facilitating the establishment and development of new innovative companies.

Additionally, there are several more policy measures pertaining to this route, for instance, Consulting support for start-ups, Support for market-oriented research, Support to SME venture capital, loans provided by the Mortgage Bank of Latvia and the Latvian Guarantee Agency. However, it should be noted that not all new companies established as a direct or indirect result of these measures perform R&D. At present there are no measures that provide tax incentives for stimulating R&D.

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q An initial study on R&D policy mix routes in Latvia was carried out by Rammer et al (2007) yet with a limited set of measures used for the analysis.
activities in the enterprise sector and thereby facilitate the establishment of new technology-based companies.

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

Policy measures under this route are best illustrated by the state aid programme "Support for development of new products and technologies" (€15.4m, 2004-2006; €125m, 2007-2013). Its main tasks are to promote private sector investments in R&D activities, direct the national economy towards modern, knowledge-intensive production, promote the development of new competitive high value added products, promote the production of new technologies and products, as well as promote mutual cooperation between science and industry. In the current programming period (2007-2013) the programme has been divided into three sub-activities – one supporting development of new or significantly improved products and technologies, including goods, services and technological processes, another supporting industrial application of new products and technologies, and the third one providing support for securing industrial property rights of successfully developed new products and technologies. Financial allocations earmarked for implementation of these activities are considerable in the national context if compared to the overall funding of €440m budgeted for R&D and innovation in the SF programming period 2007-2013.

Other measures under this route include the support for international R&D cooperation (EUREKA) as well as the planned measure for the promotion of high value added investments in companies.

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

In the case of Latvia there are no special measures that would explicitly target firms that do not perform R&D. Nevertheless, implicitly the following measures could be attributed to this route: Support to modernisation of business infrastructure, Support for market-oriented research, Support to technology transfer, as well as the newly launched state aid programme for the Attraction of highly qualified workforce. The latter programme (€6.9m with an equal amount expected from private co-funding, from 2008) implemented under the OP “Human resources and employment” aims at boosting the competitiveness of companies and encouraging their research activities by attracting highly skilled labour to provide solutions to particular technological problems or developing new products. The target group of the measure is commercial companies and individual persons, namely, PhD students, research staff of academic institutions and highly skilled specialists. Last but not least, certain contribution to this route is also provided by different awareness rising measures implemented by LIDA (e.g. regional innovation days, informative seminars, etc.).

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

There have been no explicit policies for attracting R&D-performing firms from abroad (new R&D results from abroad are instead taken up through subsidiaries of foreign companies operating in Latvia).

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

There are several policy measures that can be attributed to this route: Support for market-oriented research, Support to joint research projects, Support to technology transfer, Support to international R&D collaboration (EUREKA), and Development and upgrading of applied research infrastructure. While this route has a
comparatively small budgetary weight, its importance would substantially increase upon launching the state aid programme “Competence centres” that is being delayed year by year. The programme dates back to 2006 with an ex-ante evaluation of the programme resulting in its temporary postponement, as it was in need of further refinement. It is planned to support five to six competence centres in 2009-2013 with the estimated budget of €51.68m. The programme aims to boost important R&D and innovation activities in demand by entrepreneurs, attract industrial investments to these activities, and to promote partnership of various public and private parties.

Another example under this route is represented by the policy measure providing Support to market-oriented research (€0.5m in 2009) launched in 1993. This is a special programme for applied research aiming to promote integration of science and industry, development of technologically oriented sectors, promotion of industrial research and job creation. Its goal is to encourage researchers from universities, research institutes and SMEs to develop new competitive products and facilitate the development of new start-ups. Every year the Ministry of Education and Science supports 70-90 projects, mainly carried out in PROs and universities and partly in innovative SMEs. Projects are funded if 50% of the total project costs are covered by an industrial or another partner.

**Route 6: Increasing R&D in the public sector**

Given the low business R&D expenditure in Latvia, this route is of crucial importance in both generally increasing R&D activities as well as indirectly boosting those in the business sector. Pertaining to this route are such programmes as Support for implementation of doctoral study programmes and postdoctoral research, Support to development or research infrastructure, Development and upgrading of applied research infrastructure, etc. It should be noted that in 2000-2002 around 6 centres of excellence were operational in Latvia that have retained their names but are no longer given any special status in the distribution of national funding.

The major programme eligible under this route is that for the Promotion of science competitiveness that actually comprises nine state research programmes that are being implemented in line with the research priorities approved by the government for a four-year period. These programmes are basically aimed at the needs of the national economy. The total annual funding for these nine programmes amounted to €14m in 2008 but in 2009 has already been reduced by 29%.

From the newly launched measures one should also mention the new state aid programme “Attraction of human resources to science” launched at the end of 2008. The programme provides funding from the European Social Fund for supporting the work of young scientists at research institutes and promoting the remigration process of Latvian scientists with the total allocations over €53m.

**The importance of education and innovation policies**

At the governance level, the Ministry of Education and Science is responsible for education policy, while the Ministry of Economics supervises innovation policy. Innovation policy mainly concentrates on the development of technology centres, business incubators and technology transfer points located both in Riga and in regional centres. Meantime, it should be noted that innovation policy is also within the competency of the Ministry of Education and Science, since its programme “Support to market-oriented research” was established in 1993, a long time before the Ministry of Economics was chosen as the main governing body for innovation policy. In sum,
planning and implementation of innovation policy mostly exerts impact on routes 1, 2 and 4.

Since the early 1990s, the Ministry of Education and Science has had responsibility for both higher education and science; previously higher education and science were treated separately. It could be presumed that these structural changes and, more recently, rising awareness of the role of universities in the development of science, has served as a basis for a closer integration of both sectors.

Education, research and innovation policies are in a way being brought together in the framework of the EU SF programming documents and individual activities as well as such strategic policy documents as the National Reform Programme and the draft Guidelines for Development of Science and Technology for 2008-2013. Yet, it is deemed that policy coordination in the area of R&D - also with regard to the integration of research and innovation policies – still has to be strengthened in Latvia (MoES, 2008).

Assessment of the importance of policy mix routes and their balance

A summarised assessment of the importance of the six policy mix routes in the national policy of Latvia is provided in Table 8.

Table 8: Importance of routes in the national policy and recent changes

<table>
<thead>
<tr>
<th>Route</th>
<th>Importance of the route in the national policy</th>
<th>Main policy changes since 2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Medium importance</td>
<td>• New policy measures - “Pre-seed support for innovative business ideas” and “Support for development of innovation centres and business incubators” - launched.</td>
</tr>
<tr>
<td>2</td>
<td>Medium importance</td>
<td>• New policy measures - “Attraction of highly qualified workforce” and “Support to development of new products and technologies” - launched.</td>
</tr>
<tr>
<td>3</td>
<td>Medium importance</td>
<td>• New policy measures - “Attraction of highly qualified workforce” and “Support to development of new products and technologies” - launched.</td>
</tr>
<tr>
<td>4</td>
<td>Very low importance</td>
<td>• No changes</td>
</tr>
<tr>
<td>5</td>
<td>Low-medium importance</td>
<td>• State aid programme “Competence centres” postponed; • New measure “Support to technology transfer” launched.</td>
</tr>
<tr>
<td>6</td>
<td>The highest importance</td>
<td>• Sharp decline of the state budget funding in 2009. • Elimination of the budgetary position “Development of research activities and provision of infrastructure at HEIs”. • New state said programme “Attraction of human resources to science” launched.</td>
</tr>
</tbody>
</table>

3.4 Progress towards national R&D investment targets

For three years (2005-2007) Latvia witnessed a rather adequate increase in the public R&D funding due to the Law stipulating an annual increase in public R&D funding by 0.15% of GDP until the Lisbon goal of 1% of GDP is reached. That was the national R&D investment objective. Simultaneously a range of policy measures aimed at increasing BERD, though quite limited in their number and scope, were being elaborated and implemented.

The above-mentioned target for public R&D funding was adhered to for two subsequent years following the adoption of the law in 2005: the annual increase of GERD in both 2005 and 2006 was 0.14% thereby reaching 0.7% of GDP in 2006 (2004 – 0.42%) mainly at the expense of GBAORD. Nevertheless, in 2007, publicly
funded GERD was 0.33% of GDP, which is well below the EU average of 0.63% (Eurostat). Already the statistical data for 2007 demonstrated a decrease of GERD to 0.59% of GDP. This drop was mainly due to the GDP growth rate outpacing the respective growth of GERD since in 2007 GBAORD continued to grow in absolute figures. Yet, in 2008 this increase was rather negligible and already a substantial decline is planned for 2009. According to the state budget data, over the course of the last five years GBAORD has witnessed the following development trend: 2004 – €20.1m; 2005 – €25.4m; 2006 – €42.8m; 2007 – €68.4m; 2008 – €59.7m; 2009 (initially approved) – €53.0m; 2009 (following the amendments to the budget in December 2008) – €40.4m.

Latvia has been heavily struck by the financial and economic crisis and has substantially (by approximately 29%) reduced its public R&D funding against the backdrop of this crisis. It was already obvious in 2008 that the ambitious R&D targets are unlikely to be met, but it has neither been acknowledged nor analysed in any of the policy documents including the Report on Progress in Implementation of the National Lisbon Programme of Latvia (CoM, 2008a). It is known that upon redrafting the Guidelines for Development of Science and Technology for 2008-2013 for submission to the government in March 2009, the Ministry of Education and Science has amended those with a statement that 1% of GDP as public R&D expenditure is to be reached in 2013. Given the funding from the EU SFs earmarked for research the this target could probably be reached, yet one can hardly expect a considerable increase in the business expenditure for R&D (ibid: 8). A radical change of approach is needed in this respect yet the available information for the time being does not provide any indication of such a change.

Table 9: Main barriers to R&D investments and respective policy opportunities and risks

<table>
<thead>
<tr>
<th>Barriers to R&amp;D investment</th>
<th>Opportunities and Risks generated by the policy mix</th>
</tr>
</thead>
</table>
| Economic and financial crisis | **Opportunity**: Maintenance of research support and application of some of the generated knowledge in the national economy by means of immediate promotion of public-private cooperation schemes  
**Risk**: A relapse of public research funding at the level present in 2004 with a high likelihood of a heavy brain drain |
| Production of goods and services with low R&D intensity and low added value | **Opportunity**: Stimulation of existing R&D-intensive firms and incentives for creation of new R&D-intensive start-ups  
**Risk**: Insufficiency of the present policy mix to ensure long-term effects of facilitating companies to carry on with their R&D activities after termination of specific state aid schemes |
| Weak cooperation between public research institutes and universities, on the one hand, and business companies, on the other | **Opportunity**: Implementation of policy measures to stimulate cooperation between firms and research institutions, e.g. via competence centres and clusters  
**Risk**: The undefined IPR regimes within the current cooperation-promoting measures serving as a hindering factor for their efficient uptake and implementation |
| Low administrative capacity of public authorities leading to excessive bureaucratic barriers and complicated procedures to acquire funding from the EU SFs | **Opportunity**: Optimisation of the administrative apparatus and reduction of the number and scrutiny bureaucratic functions and procedures  
**Risk**: Excessive paperwork withholding potential beneficiaries from making use of the available schemes and thereby from engaging in R&D activities |
4 Contributions of national policies to the European Research Area

ERAWATCH country reports 2008 provided 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 ERA 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.

4.1 Towards a European labour market for researchers

Latvia has experienced turbulent changes in the labour market over several past years: joining the EU in 2004 marked the beginning of an impressive GDP growth of 10% on average for three consecutive years, salaries grew by 33.4% on average in 2007 (CSB, 2009). The evolving demand for workers, which was evident in practically all sectors, including a higher demand for research personnel in publicly and privately funded HEIs, ended when the sharp economic slowdown in the second half of 2008 and early 2009 led to the shrinkage of the labour market and the lay-off of employees. Consequently, unemployment rose from about 5% at the beginning of 2008 to 10.4% in March 2009 (SEA, 2009). It should be noted that unemployment grows proportionally not only among people with basic and secondary education, but also in the group with higher education (ibid.). In January 2009, 11.7% from all officially registered unemployed were with higher education, while those holding a diploma in vocational education made up 38.1% and those with general secondary education - 28.1%. According to the Law on State budget 2009 and its subsequent amendments, general funding and salary cuts are envisaged for all sectors, including higher education, science and research (with a reduction of the general funding by 29% including a 15% reduction of salaries).

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The main reasons for the insufficient and declining number of researchers in Latvia prior to these changes were related to low salaries, obsolete research infrastructure and limited work opportunities outside academia. In 2006, the average yearly salary of researchers in Latvia was €10,488, which made Latvia among the least attractive countries in terms of remuneration and put the country well below the EU average of €37,947. In addition, Latvia made only half of the EU average remuneration of researchers when calculated by PPS (EC, 2008:22). At the same time it should be noted that researchers’ remuneration in 2006 was above the average yearly salary in Latvia, which was €6,540 in all sectors and €8,367 in the public sector (CSB, 2009).

By 2008 the remuneration level and research infrastructure in Latvia had improved considerably and this largely contributed to the increase in the number of researchers (FTE) from 3,282 in 2005 to 4,223 in 2007 (CSB, 2009). Improvements in career opportunities in academia also accounted for an increased number of PhDs awarded. While in 2001 only 37 PhDs were awarded in Latvia, since then the situation has gradually improved with 139 PhD theses defended in 2008 (MoES, 2009:64). However, according to the estimates of the Ministry of Education and Science, the number of PhDs awarded is still insufficient and should be increased to at least 500 new PhDs awarded annually (MoES, 2008:13). The number of defended PhD theses is also low when compared to the number of PhD students, with the latter totalling 2,025 in 2008 (MoES, 2009:5). In comparison, in 2007/2008 there were 6,561 students in graduate (academic Master) programmes and 2,602 Masters’ degrees were awarded (ibid.).

During the period of economic growth, research organisations were beginning to provide work places for qualified research staff from abroad on both short and long-term basis, although this is not yet a common practice, particularly due to the rather uncompetitive remuneration level and underdeveloped infrastructure. There is a general brain-drain with many Latvian researchers moving to work permanently in different research facilities abroad or going for study visits or short-term placements in other countries. It has been estimated that around one third of Latvian scientists work abroad (MoF, 2007b). The increased R&D funding in 2005-2007 served as an incentive for the return of those researchers who left the Latvian R&D sector during the 1990s and went to other sectors or to research institutions abroad. The current combination of an insufficient supply of human resources for R&D in the light of the economic crisis in 2009 and the ensuing wage cut has alarmed the research community about a possible new wave of researcher emigration (Auziņš et al, 2008).

4.1.1 Policies for opening up the national labour market for researchers

There are several supranational and national level policies for opening up the national labour market for researchers and for stimulating both inward and outward mobility. The most comprehensive covers the fundamental rights of free movement of people across the EU. Since its accession to the EU in 2004, Latvia does not put any restrictions for the free movement of labour to citizens from the EU and European Economic Zone. At the same time inward mobility of third country nationals is more restricted and thereby much more limited in numbers.

Official migration data show that the total number of foreigners (persons with permanent and temporary residence permits) compared to the number of inhabitants in Latvia is small – approximately 2% of the whole population, and this also includes non-citizens or long term residents, who have lived in Latvia for several decades (OCMA, 2008). Accordingly, outward migration has been more pronounced,
especially after the country joined the EU and it has been estimated that around 50,000 of Latvia’s inhabitants were working abroad in 2006 (MoE, 2006).

Latvia’s immigration system is vacancy-based, a regulation that also applies to foreign researchers. Third country nationals can be recruited for a vacancy if the position has been registered with SEA and has not been filled by a local or an EU citizen within a month since the time of its registration. All documents should be submitted by the employer, not the employee except in cases an employee wants to launch his/her own business in Latvia. A work permit is issued for a specific position in a specific company which means that an incoming worker cannot change his employer or profession under the same permit.

However, there are certain privileges granted to researchers, academic personnel and highly skilled workforce. For example, the Minister of the Interior may grant permanent residence if it is in the interest of the state – a condition usually attributed to scientists, experts and doctors. Also, apart from the two types of residence permits – temporary and permanent, after a person has resided in Latvia for at least five years, the national legislation envisages the status of long-term EU residents that are entitled to almost the same free movement rights as EU citizens. It might also be a potentially favourable option for those researchers, highly skilled third country nationals, who would like to receive a long term residence status and work freely in different EU countries.

After obtaining a permanent residence permit and/or the status of a long term EU resident, an EU researcher and a third country national may apply for any research position in Latvia. However, a major obstacle is a lack of command of the Latvian language, which represents both a legal and an informal barrier. The Official Language Law (1999), the Immigration Law (2002) and other accompanying regulations stipulate that a foreigner should prove a sufficient level of state language proficiency. The official list of various professions in both public and private sectors sets standards of the Latvian language proficiency, which has to be at the highest level for highly qualified workers (CoM, 2000).

In 2006, the share of non-national human resources in S&T in Latvia was only 1.2% in comparison to the EU average of 5.7% (Andersons, 2008). Likewise, in 2005-2008, 80% of enquiries received by the Latvian Researcher’s Mobility Centre, which provides informative support on both inward and outward mobility issues, came from young Latvian researchers interested in finding funding (scholarships, internships, etc.) abroad, while only a few requests for information came from foreign researchers (Kokorevičs, 2008). A study on foreign researchers in Latvia (Kalniņa, Šūmane, 2008), found that research institutions and companies mainly use their direct contacts with foreign counterparts to invite researchers to Latvia and do not use more formal channels to search for human resources. The same also applies to foreign researchers themselves, since they have also mainly employed personal ties to get a research position in Latvia.

Despite the rather limited attractiveness of Latvia as a destination country for researchers, there are several specific policies or policy initiatives to encourage the inward mobility of researchers. While the Law on Research Activity does not stipulate any specific advantages for researchers or easing of the bureaucratic entry procedure, related legal regulations provide some exceptions:

- The national legislation of Latvia stipulates exceptions to facilitate the entry of researchers and academic personnel for the period of work of 14 days without work permission and if longer stay expected, with facilitated application for visa
and a work permit (CoM, 2004). The regulations specifically set an annual quota for a facilitated entry of up to 100 IT specialists. However, this quota has never been filled and the interest of highly skilled IT professionals from third countries in finding a work place in Latvia has been negligible.

- Since resources of the EU SFs in 2007-2013 are made available to promote the mobility of highly skilled professionals, in 2008 a new state aid programme (CoM, 2008c) has been launched for the attraction of highly qualified workforce to companies. The programme is open also for foreign specialists being attracted by Latvian companies, with eligible costs covering also those associated with their moving to Latvia.

The internationalisation policy in the academic field in Latvia mainly comprises the following elements: participation of Latvian researchers in international research projects and individual and institutional membership in international associations, attraction of foreign guest lecturers to the Latvian HEIs, short and long term visits of the Latvian academic personnel to HEIs and research institutions abroad, participation in the EU level mobility programmes for researchers (e.g. Marie Curie) and students (e.g. ERASMUS), as well as implementation of doctoral study programmes in collaboration with foreign universities and ones provided in English.

The Law on Institutions of Higher Education (1995) envisages that all higher education programmes in public HEIs must be given in the state language (Latvian), while those in other languages can be provided if a HEI has an agreement or it has formed a franchise with another foreign HEI. Apart from the majority of study programmes given in Latvian, Latvia’s public and private HEIs also provide selected programmes or separate courses with English as the main language of instruction at bachelors’, masters’ and doctorate level. Some private HEIs provide also higher education in Russian. The present restrictions have spurred a debate in 2008 on the necessary changes in the legislation to allow universities to become more open for international students and programmes.

The draft Law (2008) on Higher education envisages the introduction of new regulations with regards to situations when higher education can be provided in foreign languages: (1) if it is needed to achieve specific goals of the programme (culture, language studies), (2) if a programme is established under the framework of the EU or international cooperation agreements, (3) if a programme is part of a common programme with another foreign HEI or is based on franchise agreement between a Latvian and a foreign HEI, (4) programmes for foreigners, if they are held in any of the official EU languages, (5) specific courses, if they are taught by foreign guest-lecturers, and (6) if a student has studied in a foreign accredited HEI, he/she can submit Master or doctorate theses in any of the EU official languages, providing its annotation is in Latvian. The draft law was not approved as it received various suggestions by different stakeholders and by the beginning of 2009 it had not yet resulted in any specific changes in the legislation.

So far the number of foreign students in Latvia has been generally very small – those coming from abroad make up less than one percent of all students (in absolute numbers 1,492 students in the academic year 2007/2008 (including 633 studying in public and 859 in private HEIs)). These figures are well below the EU average where about seven percent of tertiary students were foreigners in 2004 (Meri, 2007:4). In 2007/2008, foreign students in Latvia represented 56 countries and were studying in more than ten public and private HEIs (MoES, 2009). The majority of these students are mainly from Russia and Lithuania where some Latvian private HEIs have branch
offices. Hence some of the students mentioned in the statistics do not actually physically come to pursue their degrees in Latvia.

The trend of the inflow of full time international students at the tertiary level shows that it is rather stable (around 1,500 students) and does not indicate any substantial increase over recent years. This can be mainly explained by the rather unfavourable legislative framework, namely, difficult entry rules for third country nationals and limited programmes in English or other EU languages. Besides, according to formal regulations, citizens of EU countries should be allowed to take a state funded PhD place in Latvia, yet it is almost impossible to do in reality due to the language barrier while programmes available in English, in their turn, require personal funding.

The Bologna process is one of the main driving forces for Latvia to make changes in its national legislation with regards to the internationalisation of higher education. However, as explained above, the new draft law on higher education that would serve as a basis for a series of new regulations has not yet been approved. At the same time, joining the EU and implementation of the Bologna process have opened up more opportunities for students from Latvia to study in exchange programmes. In 2007/2008, 1,239 students from 35 Latvian HEIs were participating in exchange programmes in 42 EU HEIs (MoES, 2008). The numbers of outgoing students are higher than incoming exchange students and there is growing a trend of interest to study in exchange programmes among Latvian students.

A study on “Scientists Careers” conducted by the Central statistical bureau of Latvia (CSB, 2008) covering 2,000 PhD holders (out of the total of 3,600 degree holders in Latvia in 2007) revealed that 72% of them have obtained their degree in Latvia, while 28% did so abroad, mainly in Russia, Lithuania, the Ukraine, Estonia, Sweden and Germany. These degrees have been awarded since Soviet times, when Russian universities often were chosen for better academic prospects and also during independence since the early 1990s, when more opportunities appeared to study in Western countries.

**Researcher-friendly social security and supplementary pension systems, health insurance, scientific visa for third countries**

Social security rights for the EU nationals in Latvia are the same as for its citizens with no special tax incentives for research personnel. If a person stays in Latvia for less than five years, he/she can choose where to pay the social tax (either in Latvia or in their home country), but after the five-year period it can be paid only in Latvia as a place of permanent residence (Law on Personal income tax, 1993). The pension system in Latvia is based on so-called three pillars, where the third level implies voluntary payments in private pension funds whereby a person can choose any private fund regardless of the place of residence and can annually claim a 25% tax refund for the amount paid in these funds. Otherwise there are no special tax incentives for researchers (Euraxess Latvia, 2008).

**4.1.2 Policies enhancing the attractiveness of research careers in Europe**

The Eurostat study (Meri, 2007:3) on the mobility of human resources in S&T (HRST) shows that the share of foreign-born HRST, aged 25-64 years in Latvia, was 15.6%, above the EU-27 average of 9.7%. However, these figures should be treated with caution due to the historic situation: the majority of researchers born abroad were actually born in other republics of the former USSR. Thus, Latvia also stands out in
its relative proportion of third country nationals and those from other European countries. A breakdown by the EU and third country nationals shows that nine out of ten foreign researchers in Latvia come from third countries.

Regarding the inward mobility of researchers, a study based on 20 semi-structured interviews with foreign researchers in Latvia (Kalniņa, Šūmane, 2008) revealed that the mobility channels used are mainly based on previous contacts with researchers, institutions or companies in Latvia or alternatively a job in Latvia has been chosen due to family reasons (a spouse living in Latvia, etc.).

**Uptake of the Charter of Researchers**

One of the ways to enhance the attractiveness of research careers in Europe has been the Charter for Researchers (EC, 2008c), which has been signed by around 300 institutions in Europe. According to Euraxess, no institution in Latvia has signed the Charter as of February 2009.

**Remuneration policies**

The report of the ERA Expert Group “Realising a single labour market for researchers” (EC, 2008a) suggests that countries should not only try to avoid the barriers to the mobility of researchers, but should also try to establish competitive practices for remuneration to attract researchers from abroad (ibid: 21). The Law on Research Activity regulates the remuneration for employees of PROs, public HEIs and research institutes of public HEIs only to the extent that it defines that it is formed by (1) salary, which is granted to employees and calculated in accordance with regulatory enactments regarding the procedures for granting of institutional funding; and (2) salary, which is paid from financial resources acquired for the implementation of contracts entered into by the State or research institutes of public HEIs and the amount of which is determined in conformity with the internal work remuneration policy of the research institute, as well as on the basis of contracts entered into by the institute.

Universities and research institutions generally have a rather high degree of flexibility in setting the level of salaries for their academic staff and individual income can vary significantly according to the research projects in which they are involved, the funding source, etc. There are examples of academic institutions and individual HEIs (e.g. the University of Latvia) negotiating for increased funding to attract back talented researchers who have left the country in 1990s. Mainly it is realised by fixed salaries plus additional funding from national or international research programmes.

**Promotion of women**

The Labour law (2002) of Latvia covers equal opportunities legislation in Latvia and restricts discrimination against women in employment. Latvia has a relatively high share of women in science and this is probably one of the reasons why there is no special unit for women in science at the Latvian Council of Science or at the Ministry of Education and Science. Namely, gender equality in the field of science is not singled out as a specific challenge for the country, though generally gender equality as such is seen as an important issue with several non-governmental organisations focusing on women’s rights in Latvia.
According to Eurostat, in 2007, 46.66% of human resources in S&T in Latvia were women, which is above the EU27 average of 40.82%. At the same time, in 2006, the percentage of females among the doctorate students in S&T fields (as a percentage of the 20-29 year old population) made up 0.13%, while the respective share of males was 0.19%. The largest percentage of women holding a doctorate degree in 2007 were in natural sciences (29.6% from all women with a doctorate degree), medical and health sciences (15.7%), social sciences (27.0%), and humanities (14.9%) (CSB, 2009).

The relative gender distribution in a typical academic career in Latvia shows that there are more women at graduate level (ISCED, 1997:85-86; grades 5, 6), but it decreases at professors’ grades B and A (EC, 2008a:85). While 57.5% grades A-C were women (2004), a breakdown shows that women made up a higher proportion (65%) in grade C but only 37% in grade B and 26.5% in grade A (EC, 2008b:19). Data also indicate that 72% of awarded degrees (bachelor, master and doctorate) went to women in 2008/2009. Considerably more women chose humanities, programmes related to medicine and health care and social sciences. Counting all personnel, at HEIs, the ratio of women is 54%. However, as noted above, the ratio gradually decreases at the top level, with 44% of associate professor positions being occupied by women and 30% of full professorships (MoES, 2009). Nevertheless, compared to other countries, the representation of women in science in Latvia is still among the highest in Europe.

In a retrospective comparison, there was a high share of women in science also in the Soviet period. In the 1980s, women made up around 47% and the share has not diminished substantially since then. Thus, it is argued, women in science in Latvia generally do not perceive themselves as discriminated against nowadays (Küle, 2003:131-137). According to Küle, the rather low remuneration in science and accordingly its prestige (unlike the Western countries) in both the Soviet and transition periods have served as one of the reasons for the non-presence of a direct discrimination of women in this field. Yet, while science in Latvia as a structural player so far has been incapable of participating in power and financial structures (that generally are more masculine) in the country, internal power within academia (posts of rector, vice-rectors, presidents of the Latvian Academy of Science, vice-presidents, etc.), similarly to other European countries, is mainly held by males. In 2003, one in eight academicians at the Latvian Academy of Sciences were women. Furthermore, latent discrimination can be traced to the language level: for example, the Statutes and the Charter of LAS use only masculine pronouns. Küle (2003) concludes that full integration into the ERA with increases in remuneration and higher prestige of scientific work would also shape the ratios of women and men, in favour of the latter.

In general terms Latvia currently provides rather strong guarantees for women with permanent labour contracts after maternity leave. The Law on Social insurance (2001) stipulates that a workplace must be provided after up to three years following the leave. Besides, both women and men can apply for one year off after a child is born; the person who chooses to take care of the baby can receive both social

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5 In the age group between 15-74 years.
6 According to the ISCED standard classification of education, level 5 is the first stage of tertiary education, and 6 - the second stage. Grades: A - top position, the single highest grade, B - Researchers working in less senior positions, but more senior than newly qualified PhD holders, C - The first grade/post into which a newly qualified PhD (ISCED6) graduate would normally be recruited within the institutional system.
security payments, based on previous income (70% of gross income), and can also continue working and receiving full salary. However, these regulations could be changed and payments to new parents can decrease due to the measures taken under the economic crisis and in that way influence also level of income and social security of those researchers with small children. At the same time, it should be mentioned that HEIs like the University of Latvia provide support for families with small children, granting special scholarships and providing short term day care centres for small children at the university.

4.2 Governing research infrastructures

One of the medium-term tasks of Latvian research policy is to foster integration in the ERA, in particular by supporting participation in technological platforms and other international initiatives as well as developing research infrastructures of interest for the European and international research communities (MoES, 2008a:22). Policy documents state that Latvia can participate in the ERA with its unique research infrastructure objects such as the Ventspils International Radio Astronomy Centre and the Liquid Metal Laboratory of the Institute of Physics of the University of Latvia, including the pilot equipment for studies of the Earth’s magnetic field (MoF, 2007b).

An important facility is provided by the Laser Centre (established in 2005), the largest laser resource in Latvia and a unique experimental facility in the Baltic States. Its researchers participate in various exchange programmes on a regular basis, also inviting foreign researchers to undertake projects in Latvia. This and other facilities are currently being identified and listed under the framework of the European Strategy Forum on Research Infrastructures initiative (ESFRI, 2008). This is coordinated nationally by the Latvian Academy of Sciences to explore common and integrated initiatives for the use of research infrastructures of European relevance. Similarly, the Innovation centre of the University of Latvia provides a database on the research equipment made available with the help of EU SF co-funded programmes.

Development and upgrading of research infrastructure has been stated as one of the priorities of the EU SF programmes in both 2004-2006 and 2007-2013 (CoM, 2009a). In the first programming period, there was a special emphasis on the development of infrastructure and the importance of investing in high quality facilities needed as a basis for research development and opening up Latvian research institutions for foreign researchers. However, certain access restrictions for firms to the facilities purchased by SF money create unfavourable conditions for science and business cooperation. The experts of the National Development Council have made a recommendation with regard to the formation of an association of PROs facilitating their operation within a unified system and ensuring exploitation of the material and technical basis for research (without applying the VAT for the usage of scientific and technical equipment purchased by the EU SFs) in the promotion of entrepreneurship (NDC, 2009). The need for a publicly accessible database on the respective scientific and technical supply of research institutions has also been stressed.

The emphasis on infrastructure is also strong in the period 2007-2013. Yet, given the economic crisis, it is not clear if all planned programmes can be launched on time and at full scope. Current planned investments from the SF 2007-2013 for the entire science and education sector are almost €338m out of which €168m are budgeted to science infrastructure (MoES, 2009). In addition, a major Latvian academic

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See: http://www.lu.lv/petnieciba/iekartas/
information systems project has been planned with the total EU SF funding of €47m, while €143m have been allocated for the modernisation of research infrastructure in HEIs in priority research areas from the ERDF (ibid). However, this programme has been listed among those that could be temporarily postponed in 2009.

4.3 Research organisations

The Law on Research Activity (2005) states that all scientists can freely choose directions of scientific research according to their research interests, competency and principles of humanity without any censorship and can participate in research projects either as individuals or perform collective research in Latvia or abroad. Public research organisations and HEIs have their autonomously designed research agendas and topics of research specialisation, which often comprise both the interests and capacities of a specific institution and state research priorities. Research organisations also have autonomy in hiring research personnel and providing fixed or permanent contracts according to specific circumstances of a research project. In practice, research organisations are often involved in drafting regulations on research activities, so they are also enabled to set priorities and influence the national research agenda at the policy decision making level. For instance, representatives of the Latvian Council of Science and major universities are often invited to provide expertise upon drafting new regulations regarding science, allocation of EU funds for research activities, setting research priorities, etc.

Research organisations in Latvia are increasingly engaging themselves in various partnerships with both public and private actors becoming more profoundly embedded in the social and economic life of the country. Universities and PROs are striving to ensure their responsiveness to various social and socio-economic priorities defined both nationally and internationally. This is accomplished by means of developing their ‘third mission’ or outreach activities going beyond the mere tasks of teaching and research - promoting cooperation with the business sector, developing incentives for commercialisation of research results and ensuring public accountability and engagement (Adamsone-Fiskovica et al., 2009). Yet, many of these elements are still in an initial process of development not least due to the lack of human resources available for the accomplishment of these tasks and limited incentive structures (e.g. underdeveloped policy for the protection of IPRs; lack of formal appreciation of individual initiatives in public engagement, etc.) (ibid.).

Funding of public HEIs and PROs in Latvia is split between block grants from the state budget and competitive funding, when institutions compete for the various EU funds, funding from the Latvian Council of Science and other sources. The distribution of block grants (institutional funding) is based on the calculations of salary payments for the research personnel (depending on the number of staff members, defined level of basic salary, scientific quality) and expenses related to the maintenance of the scientific institution (rent and utilities of real estate). A special coefficient is applied to specific sectors of science with higher funding provided for natural sciences, engineering and technologies, health sciences, agriculture, environmental, earth and forestry sciences (CoM, 2008e). In comparison to the previous regulations (2005), the current ones define a smaller number of sectors, where a higher coefficient of the block funding is applied. The quality of scientific work is assessed based on such indicators as the profile of executed projects, scientific publications (including citation), cooperation with commercial companies and other clients (contract research, licences, patents), participation in the
improvement of professional skills in higher education and research (newly awarded scientific degrees). At the same time it should be mentioned that with regard to public HEIs there is a trend towards attraction of more students with private funding, since public funded study places are gradually decreasing.

When it comes to the involvement of external stakeholders in the university governance, there is an ongoing discussion about the need of establishing advisory committees to bridge the gap between universities and the rest of society (Adamsone-Fiskovica et al., 2009:136-137). The idea of such bodies has been addressed by the draft law on higher education envisaging the establishment of a Council consisting of representatives of the HEI, its founders and employers. The role of such a Council would be to serve as a decision making body on strategic governance issues of HEI and to coordinate interests of HEI, its founders and society. However, universities have some reservations with regard to their openness in cooperation with social partners, since individual partners might have certain personal or political motives that could threaten their present autonomy.

The dominant trend is that the top management of HEIs (e.g. rectors or deans) are elected among peers. Nonetheless, the recruitment occurs also through tenders that are open to external stakeholders including not only HEI staff and research personnel from other national institutions, but also foreign candidates. For example, there are at least two known cases when rectors of HEIs in Latvia are foreigners (Stockholm School of Economics in Riga, Riga Graduate School of Law). Namely, the current legislation operates under conditions of free movement of labour within the EU and formally citizens of other EU countries could apply for different vacancies in Latvia. However, there are no specific statistical data on the nationality of the staff of research institutions and HEIs available probably due to the so far comparatively limited numbers of foreigners employed as well as the sensitivity status granted to this kind of a variable by the national statistical authorities. In practice most universities run their programmes in Latvian, therefore the language barrier could become the main obstacle to foreigners for entering this labour market niche.

4.4 Opening up national research programmes

There are limited mechanisms contributing to the openness of research organisations and national programmes to European and international researchers. National programmes are predominantly designed for local researchers and research teams with a common condition set in the terms of reference for beneficiaries to be registered in the national register of scientific institutions. This automatically excludes foreign institutional and individual participants not residing in Latvia. The Law on Research Activity also specifies that state budget funding for research activities can be allocated only to those institutions listed in the register. While the participation of individual researchers from EU countries in the scientific research projects executed by national research institutions is governed by the common framework of free movement of labour force within the EU, recent amendments (2007) include a new article on the participation of foreign researchers coming from non-EU countries. Yet, this does not imply opening up the programmes for foreign institutional participation. Considerable efforts still have to be made in respect to the openness of national research organisations and programmes to foreign researchers as an incentive for providing an additional input in terms of human resources for advancing research activities in Latvia. The main barriers for foreign researchers and HEIs staff remain to
be both economic and cultural factors: low salaries, relatively underdeveloped research infrastructure and the language barrier.

4.5 National ERA-related policies - a summary

In recent years Latvia has implemented several important initiatives towards ERA-related policies. This has been mainly possible due to the greater integration into the EU and the economic growth the country has enjoyed in recent years. This has resulted in a more extensive international cooperation between researchers, increased investments in research infrastructures, intensified exchange of students, opening of more study programmes in English or other European languages. This has also contributed to internationalisation at home whereby Latvian HEIs establish common degrees with foreign universities\(^v\). However, the country still has serious challenges in sustaining and widening those policies that are important for the ERA. These challenges could become further pronounced in the light of the economic recession. At greatest risk would be the funding of programmes and initiatives to improve researchers' remuneration and mobility and the continuation of steady investments in research infrastructure.

The attraction of foreign researchers is still rather low and pull factors are too weak in Latvia due to the reasons discussed above. Personal contacts dominate over formal opportunities to disseminate information about research positions and the opportunities offered by the researchers' mobility portal (Euraxess) are not fully used. At the same time there are locally specific barriers, such as the policy on language in study programmes and the language requirements for specific professions that diminish options for foreign HEI stuff and researchers to participate in this labour market segment on equal terms with nationals due to the language proficiency requirements stipulated by national laws.

**Table 10: Importance of the ERA pillars in the ERA policy mix and key characteristics**

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<thead>
<tr>
<th>Labour market for researchers</th>
<th>Growing importance. Increased attention paid to researchers' mobility within the EU.</th>
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<tr>
<td>Governance of research infrastructures</td>
<td>Growing importance. Increased support for upgrading and governing research infrastructures.</td>
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<tr>
<th>Key characteristics of policies</th>
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<tbody>
<tr>
<td>• Predominant focus on outward mobility and repatriation of Latvian researchers with limited pull factors for the attraction of foreign researchers.</td>
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<tr>
<td>• No specific policy for the promotion of gender equality in science (non-existence of formal barriers for academic careers of women).</td>
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<tr>
<td>• Prioritisation of investments in research infrastructure in the EU SF programming periods of 2004-2006 and 2007-2013.</td>
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<tr>
<td>• Support for the development of the ESFRI roadmap.</td>
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\(^v\) For instance, it is possible to study in Masters’ programmes at the Riga International School of Economics and Business Administration (RISEBA) and, while physically residing and studying in Latvia, to receive diplomas of both RISEBA and the University of Salford. Similarly, while studying in specific programmes at the Riga Business School, one is allowed to obtain also a diploma from the Buffalo University or University of Ottawa. The University of Latvia has signed special agreements with HEIs in the other Baltic States allowing to choose PhD supervisors in humanities or social sciences not only from Latvia, but also from Estonia or Lithuania.
### 5 Conclusions and open questions

#### 5.1 Policy mix towards national R&D investment goals

Over the course of three years (2005-2007) the research community in Latvia experienced a period of uplift. A number of talented young scientists chose to return to Latvia from their advantageous positions in the field of research abroad. These developments were not least triggered by the adoption of the Law stipulating an annual increase in public R&D funding by 0.15% of GDP until the Lisbon goal of 1% of GDP is reached. That was the national R&D investment objective and it was nearly adhered to for two subsequent years following the adoption of the law in 2005: the annual increase of GERD in both 2005 and 2006 was 0.14% thereby reaching 0.7% of GDP in 2006 (2004 – 0.42%), which was achieved mainly at the expense of GBAORD. However, already the statistical data for 2007 demonstrated a decrease of GERD to 0.59% of GDP. This drop was mainly due to the GDP growth rate outpacing the respective growth of GERD since in 2007 GBAORD continued to grow in absolute figures. Yet, in 2008 this increase was rather negligible and already a substantial decline is planned for 2009.

Latvia has been heavily struck by the financial and economic crisis and under the given conditions has substantially (by approximately 29%) reduced its public R&D funding. Based on the above-mentioned facts and considerations one can conclude that the economic and financial crisis at present represents the major barrier to R&D investments including ones from the business enterprise sector. The other main barriers faced by Latvia, as set out in Section 3, include the production of goods and services with low R&D intensity and low added value; the weak cooperation between public research institutes and universities, on the one hand, and business companies, on the other; and the low administrative capacity of public authorities leading to excessive bureaucratic barriers and complicated procedures to acquire funding from the EU SFs.

The present policy mix of Latvia has a decisive role to play towards reaching the Lisbon goals. In recent years the institutional (block) funding and thematic state research programmes have been and still are the main mechanisms for providing R&D support at HEIs and PROs. On the part of the business enterprise sector one of the key instruments for promoting R&D activities in the private sector is represented by the state aid programmes for development of new products and technologies.

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<tr>
<th>Autonomy of research institutions</th>
<th>High importance. Legal framework in place allowing for a great level of autonomy of research organisations.</th>
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<tr>
<td>Opening up of national research programmes</td>
<td>Low importance. Limited incentives for opening up national programmes for foreign participants.</td>
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<tr>
<td></td>
<td>• Autonomy of research institutions in setting their research agendas and hiring research personnel stipulated by legal provisions.</td>
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<td></td>
<td>• Established national legal framework giving autonomy of research organisations for cooperation with other institutions on a national and international level.</td>
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<tr>
<td></td>
<td>• National (both budget and SF funded) research programmes exclusively limited to national applicants.</td>
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<td></td>
<td>• Facilitated cross border cooperation via ERA-NET projects, COST, EUREKA, JTIs.</td>
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There is also a range of measures promoting academia-industry linkages through market-oriented research projects, technology transfer contact points, researcher placements, etc. However, there are no tax incentives aimed at promoting business R&D and also policies for development of clusters and competence centres are still in an initial stage.

Latvia does not yet possess its own White Paper on R&D policy, namely, a long- or medium-term R&D policy document approved by the parliament or the government. One can, though, make references to the National Development Plan (2007-2013) or the National Reform Plan (2005-2008) comprising fragmented elements of R&D policy by means of repeating the legal provision on the annual increase of public R&D funding. As far back as 2005 the task force of the Strategic Analysis Commission elaborated the first draft of the Guidelines for Development of Science and Technology for 2008-2013. Since 2006-2007, this document has been passed on to the governmental bodies but has not yet made its way to the final approval by the Cabinet of Ministers. This should take place in the near future since adoption of the Guidelines is stipulated by the Action plan of the Programme for economic stabilisation of Latvia, implementation of which, in its turn, is directly linked with the subsequent allocations from the negotiated loan of the International Monetary Fund to the State of Latvia for managing the crisis.

Revision of the above-mentioned guidelines is becoming a sort of a ‘litmus paper’ in order to understand the particular governmental policy with regard to science under the current crisis conditions and in the following post-crisis period. Since 13 March 2009, a new government is in office in Latvia, yet it is being argued by the representatives of the research community (in media and internal communications) that the declaration of the new government (CoM, 2009b) does not provide for a clearly defined policy with regard to science.

It can be presumed that the government is affected by three conditions. Firstly, the disbelief in the potential contribution of science to the national economy that no longer has its own industrial production – an attitude having originated already from the government of the early 1990ties. Secondly, an appearance that the increase in public R&D funding over the course of the last five years has not yielded clearly identifiable returns to the national economy (though scientists are of the opposite view). And, thirdly, there is an uncertainty in regard to the future fate of Latvia under the conditions of the economic crisis.

Thereby at this point one can only state that on the backdrop of crisis Latvia has an opportunity to maintain the research support and facilitate application of some of the generated knowledge in the national economy by means of immediate promotion of public-private cooperation schemes. And the main risk here is related to the consideration that provided this opportunity is not taken, Latvia can experience a relapse of public research funding at the level present in 2004 with a high likelihood of a heavy brain drain.

With regard to the other main policy risks, they are as follows:

- Insufficiency of the present policy mix to ensure long-term effects of facilitating companies to carry on with their R&D activities after termination of specific state aid schemes;
- The undefined IPR regimes within the current cooperation-promoting measures serving as a hindering factor for their efficient uptake and implementation;
• Excessive paperwork withholding potential beneficiaries from making use of the available schemes and thereby from engaging in R&D activities.

5.2 ERA-related policies

Latvia is still a catching-up country in terms of its R&D and innovation performance and both national and global economic crisis may negatively influence the degree and rate of its further progress. Nevertheless, the current policy mix has had and continues to have an important impact on the creation and strengthening of the ERA dimensions and the overall national research development. ERA-related policies are important to the national research policy and strategy and it has been particularly significant in the overall development of human resources and encouragement of research mobility. This has been promoted by means of implementing various exchange programmes for academic staff and students, opening up opportunities to obtain higher education in English in Latvia and providing informative support to both national and foreign researchers.

Participation of Latvian scientists in the European level research programmes and projects (such as FPs, EUREKA, COST, ERA-NET and JTIs) supported by national co-funding contribute to the development of ERA by providing the national input of knowledge and human resources as well as offering means for profiting from access to international knowledge.

There are also various state aid programmes co-funded from the EU SFs, for example, to bring together research and business and to encourage highly skilled personnel (now also including expatriates and foreign researchers) to join business companies in Latvia. Investments from the EU SFs in research infrastructure both in the previous years and in the current programming period 2007-2013 have had a positive impact on the ESFRI initiative and potentially serve as a basis for the attraction of human resources from abroad.

However, there is still a range of serious challenges for further encouragement of ERA-related developments in the current situation present in the country. Firstly, the economic crisis might cause an intensified unbalanced outward mobility of researchers thereby presenting Latvia not only with a challenge to develop means for efficiently attracting foreign researchers but also for retaining its national research potential. Secondly, several important structural changes in the legislation governing both research and higher education are still to be approved to foster the implementation of the ERA (as well as European Higher Education Area) concept in Latvia and facilitate further internationalisation these sectors.
References

Legal documents:


Cabinet of Ministers (2008b): Decision on the EU SF activities to be prioritized and those requiring reassessment on their implementation in 2009 (in Latvian: “ES fondu apguves statuss”). Available at: http://www.esfondi.lv/page.php?id=909

Cabinet of Ministers (2008c): Regulations No 130 on 1.3.1.9. activity “Attraction of highly skilled personnel” of the Operational programme “Human resources and employment” supplement” (in Latvian: “Noteikumi par darbības programmas “Cilvēkresursi un nodarbinātība” papildinājuma 1.3.1.9.aktivitāti “Augstas kvalifikācijas darbinieku piesaiste””). Available at: http://www.liaa.gov.lv/?module=explorer&object_id=49372


Cabinet of Ministers (2009a): Draft regulations on 2.1.1.3.1. sub-activity “Development of science infrastructure” of the Operational programme “Entrepreneurship and innovations” supplement” (in Latvian: Noteikumi par darbības programmas “Uzņēmējdarbība un inovācijas” papildinājuma 2.1.1.3.1.apakšaktivitāti "Zinātnes infrastruktūras attīstība"). Available at: http://www.mk.gov.lv/lv/mk/tap/?pid=40087529


Cabinet of Ministers (2009c) Action plan for implementation of the programme for stabilisation of the Latvian economy and growth resumption (approved on 3 February 2009) (in Latvian: Latvijas ekonomikas stabilizācijas un izaugsmes


Literature:


European Commission (2008b): Mapping maze: getting more women to the top research. Study commissioned by the DG Research. Available at: http://ec.europa.eu/research/science-


List of Abbreviations

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<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>CIS</td>
<td>Community Innovation Survey</td>
</tr>
<tr>
<td>CoM</td>
<td>Cabinet of Ministers of the Republic of Latvia</td>
</tr>
<tr>
<td>CSB</td>
<td>Central Statistical Bureau of the Republic of Latvia (LR Centrālā statistikas pārvalde)</td>
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<tr>
<td>CSTS</td>
<td>Centre for Science and Technology Studies, Latvian Academy of Sciences (LZA Zinātne un tehnoloģijas pētniecības centrs)</td>
</tr>
<tr>
<td>EIS</td>
<td>European Innovation Scoreboard</td>
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<tr>
<td>ERDF</td>
<td>European Regional Development Fund</td>
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<tr>
<td>ESF</td>
<td>European Social Fund</td>
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<tr>
<td>ESFRI</td>
<td>European Strategy Forum on Research Infrastructures</td>
</tr>
<tr>
<td>Acronym</td>
<td>Full Form</td>
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<tr>
<td>---------</td>
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<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>FP</td>
<td>European Framework Programme for Research and Technology Development</td>
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<tr>
<td>FTE</td>
<td>Full time equivalent</td>
</tr>
<tr>
<td>GBAORD</td>
<td>Government budget appropriations or outlays on R&amp;D</td>
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<tr>
<td>HEI</td>
<td>Higher education institutions</td>
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<tr>
<td>HES</td>
<td>Higher education sector</td>
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<tr>
<td>IPR</td>
<td>Intellectual property rights</td>
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<tr>
<td>LARS</td>
<td>Laboratory of Analytical Research and Strategies (Analītisko pētījumu un stratēģiju laboratorija)</td>
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<tr>
<td>LAS</td>
<td>Latvian Academy of Sciences (Latvijas Zinātņu akadēmija)</td>
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<tr>
<td>LCCI</td>
<td>Latvian Chamber of Commerce and Industry (Latvijas Tirdzniecības un rūpniecības kamera)</td>
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<tr>
<td>LIDA</td>
<td>Latvian Investment and Development Agency (Latvijas Investīciju un attīstības aģentūra)</td>
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<tr>
<td>MoE</td>
<td>Ministry of Economics (Ekonomikas ministrija)</td>
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<td>MoES</td>
<td>Ministry of Education and Science (Izglītības un zinātnes ministrija)</td>
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<tr>
<td>MoF</td>
<td>Ministry of Finance (Finanšu ministrija)</td>
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<tr>
<td>MS</td>
<td>Member State</td>
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<tr>
<td>NCP</td>
<td>National Contact Point (Latvijas Nacionālais kontaktpunkts)</td>
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<tr>
<td>NDC</td>
<td>National Development Council (Nacionālā Attīstības padome)</td>
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<tr>
<td>OCMA</td>
<td>Office of Citizenship and Migration Affairs (Pilsonības un migrāciju lietu pārvalde)</td>
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<tr>
<td>OP</td>
<td>Operational Programme</td>
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<tr>
<td>PCT</td>
<td>Patent Cooperation Treaty</td>
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<tr>
<td>PRO</td>
<td>Public Research Organisations</td>
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<tr>
<td>R&amp;D</td>
<td>Research and development</td>
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<tr>
<td>SAC</td>
<td>Strategic Analysis Commission (Stratēģiskās analīzes komisija)</td>
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<tr>
<td>SEA</td>
<td>State Employment agency (Nodarbinātības Valsts aģentūra)</td>
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<tr>
<td>SF</td>
<td>Structural Funds</td>
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<tr>
<td>SMEs</td>
<td>Small and medium-sized enterprises</td>
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<tr>
<td>S&amp;T</td>
<td>Science and technology</td>
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</table>