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# Latvian Research Funding System Background Report

## Horizon 2020 Policy Support Facility

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## *Horizon 2020 Policy Support Facility*

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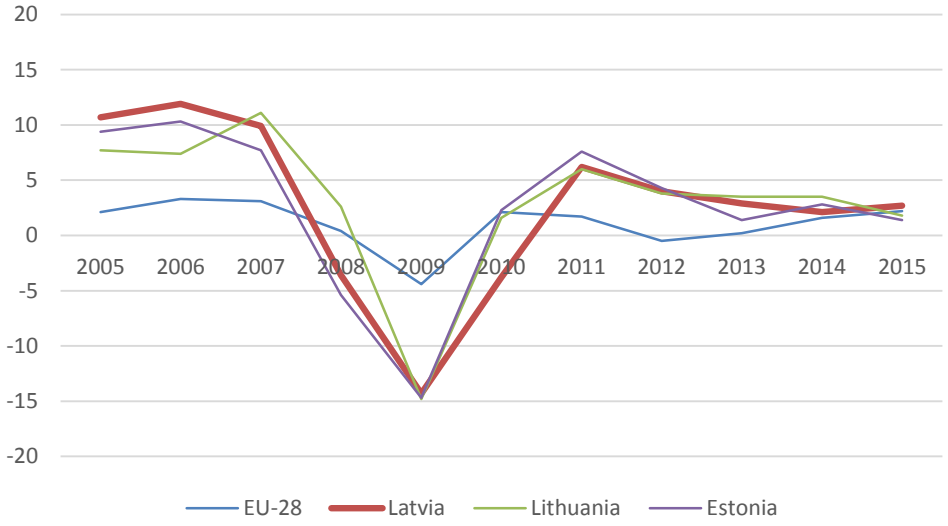
# 1 INTRODUCTION: SOCIO-ECONOMIC CONTEXT OF LATVIA

In 2008, after years of booming economic activity driven predominantly by consumer demand and easy access to credits, the Latvian economy took one of the sharpest downturns in the world. While there had been an almost 90 % increase in GDP from 2000-2007, in a mere two-year period (2007-2009) the economy contracted by a staggering 25 % (The Bank of Latvia). A mirror image was observed in unemployment, which skyrocketed from a rate of 6.1 % in 2007 to 19.5 % in 2010 (Central Statistical Bureau of Latvia - CSB). In February 2009, the Latvian government asked the International Monetary Fund (IMF) and the European Union (EU) for an emergency bail-out loan of EUR 7.5 billion. Latvia was under extreme pressure to pursue fiscal austerity measures. In the period 2010-2012, significant cuts in public spending were implemented across the board in all sectors, including research and development (R&D).

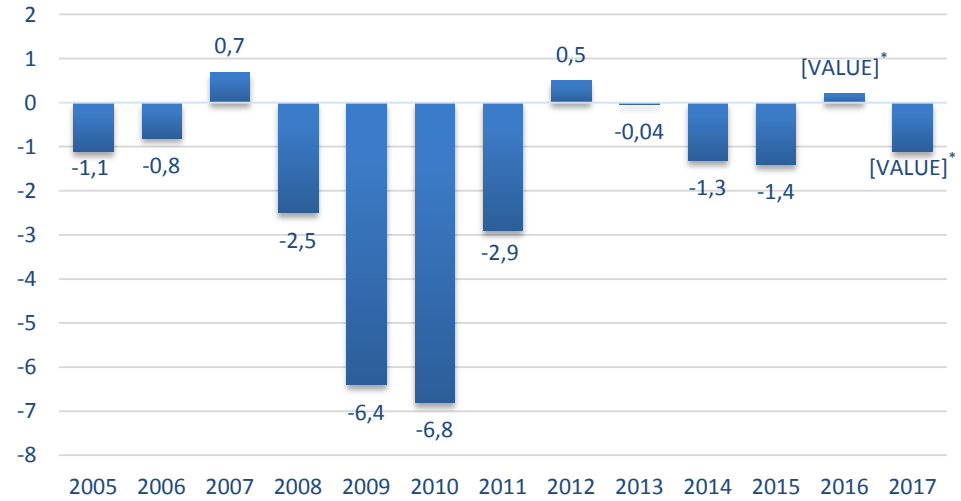
Caught up in the economic crisis, Latvia embarked on a rigorous reform programme supported by the EU-IMF financial assistance. Taking such decisive measures led to a swift rebalancing of the economy and a return to economic growth in 2011. In 2011 and 2012, GDP increased by close to 5 %, and since 2013 the annual growth rate has been between 2 % to 3 %. By adhering to stringent fiscal policy, Latvia has managed to gradually repay international loans. The total government debt fell from 40.7 % of GDP in 2014 to 36.3 % by the end of 2015 (CSB). Currently, the government's budgetary position is under control with a fiscal deficit of 1.1 % of GDP projected for 2017 (Ministry of Finance).

**Figure 1: Real GDP growth trend in %, Baltic countries and EU-28**




Source: Eurostat

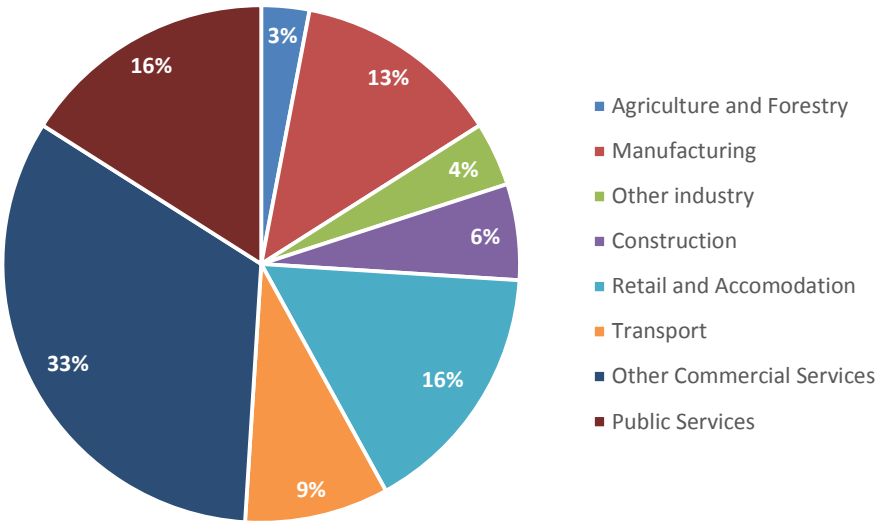
**Figure 2: Balance of Latvian national budget, % of GDP**




Source: Ministry of Finance (*projected values)

Within Latvia's economic structure, the service sector remains the largest contributor to the national GDP, while manufacturing and other industry comprise only 17 % (see Figure 3: Economic sector contribution to GDP). The goal is to transform the economy towards a sustainable development model underpinned by strong export-led growth and increasing attractiveness for foreign direct investment. Export of goods constitutes around two-thirds of the overall income from export. It is dominated by five major product groups that constitute more than 70 % of the total export of goods. These are: 1) wood and wood products (17.5 % in 2016); 2) agricultural and food products (19.2 %); 3) machinery and electric equipment (17.3 %); 4) products of the chemical and allied industries (11.1 %); and 5) metals and metal articles (8.3 %) (Ministry of Economics, 2016). While these five product groups stand out in the overall export structure, there are only two distinct industry clusters – forestry and woodworking and agriculture and food – that show more relatedness in the product space and a more concerted knowledge and skills base between science and industry (MoE, 2013). Around 15 % of the total income from export comes from transport services, of which one-third is connected to transit.

**Figure 3: Economic sector contribution to GDP**

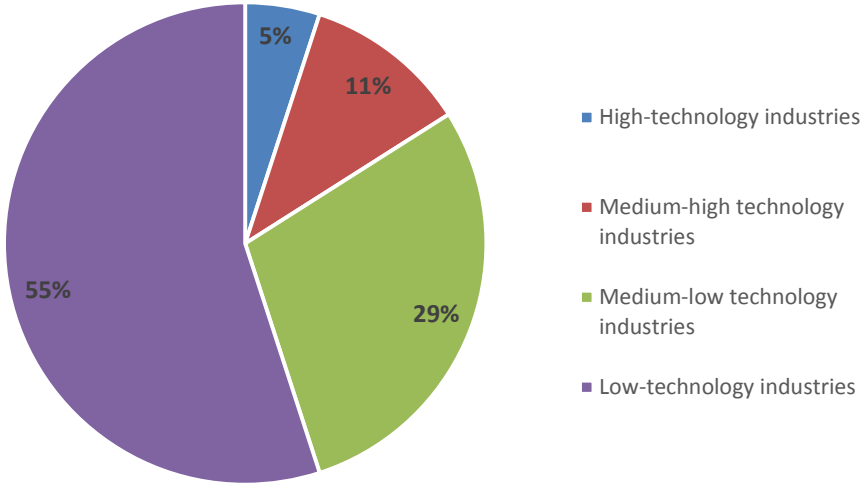



Source: MoE, 2016

So far, the global competitiveness of indigenous firms has been achieved mainly as the result of low labour costs. Under the conditions of the free movement of the labour force, the potential to further exploit this advantage is limited. Further increases in competitiveness will have to depend on productivity improvements and business readiness for technology absorption. While productivity levels in manufacturing have been gradually increasing (MoE, 2013), this indicator is still among the lowest in the EU-28 (Eurostat). Businesses in Latvia rely heavily on the acquisition of machinery as one of the most important mechanisms for technology transfer. There is a low share of medium-high and high-tech companies in the overall structure of the manufacturing sector (see Figure 4). While it is very hard to measure the move towards more technologically advanced industries, it appears that in the last decade there has been an increase in medium-low technologies at the cost of low technologies (MoE, 2013). Also, anecdotal evidence from Latvian industries suggests that Latvian companies are slowly climbing the value-added ladder (Swedbank, 2014). Yet overall, Latvia's economy is predominantly in an efficiency-based rather than knowledge-based growth mode.

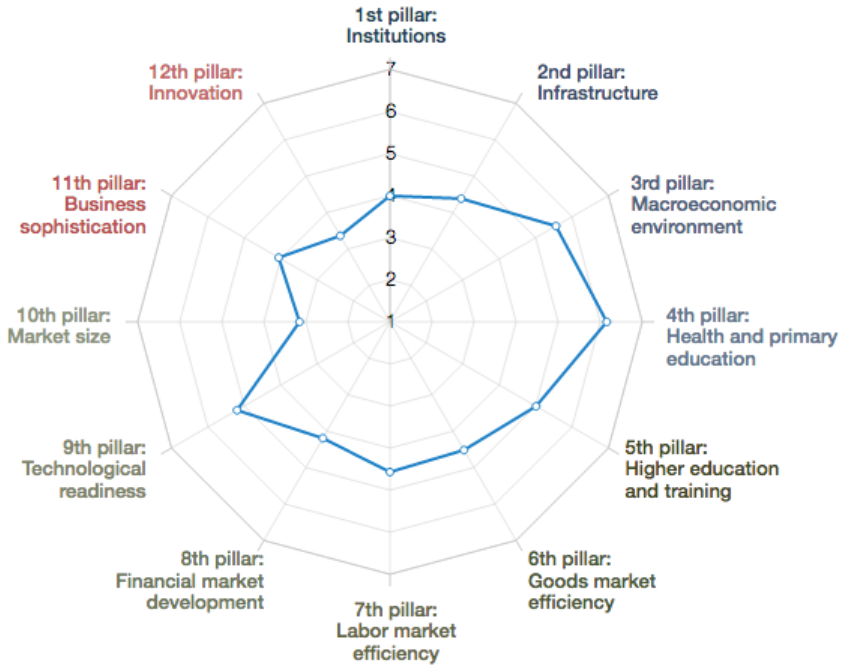
The World Economic Forum's Global Competitiveness Report 2016-2017 ranks Latvia in 49$^{th}$ place out of 140, which is lower than its neighbouring countries Estonia and Lithuania (30$^{th}$ and 35$^{th}$ respectively). Macroeconomic stability has been the aspect evaluated most positively by the international ranking (24$^{th}$ place). Innovation and business sophistication are still among the weakest points in Latvia's performance, underlining its weak knowledge-transfer mechanisms. However, compared to previous years, these scores have marginally improved. The country also has a low ranking in aspects related to administrative bureaucracy, infrastructure development, market size and labour market efficiency. See Figure 5 for more details.

**Figure 4: Structure of the Latvian manufacturing sector by technology level, 2013**




Source: MoE, 2015

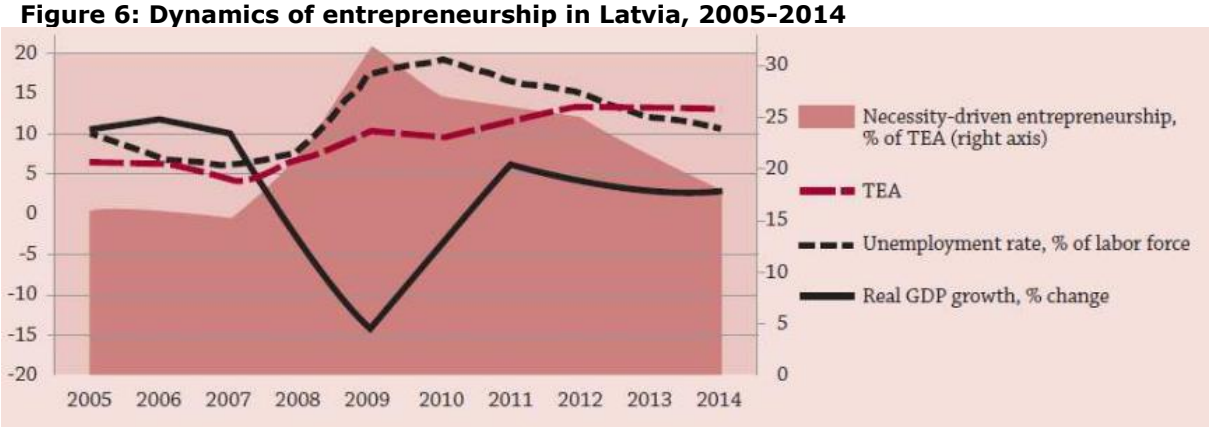
**Figure 5: Latvia's position in the Global Competitiveness Index 2016-2017**




Source: World Economic Forum, 2016

The Global Entrepreneurship Monitor (GEM) 2015 shows that Latvia has a very high rate of new companies being set up compared to other European countries or its neighbours. In the GEM Adult Population Survey 2014, Latvia was ranked 1st with 12.2 % of its adult population (aged 18-64) involved in early-stage entrepreneurial activity. While this trend has certainly been more necessity-driven during the crisis years (see Figure 6), the total entrepreneurial activity (TEA) also continued on an upward trend during the years of recovery. In 2014, around 18 % of early-stage entrepreneurs in Latvia cited more needs-driven considerations among their reasons for starting a business, which is below the EU average rate of 22.6 %. Improvement-driven opportunities have been an important impetus for 45 % of early-stage entrepreneurs (Krumina and Paalzow, 2015).

**Figure 6: Dynamics of entrepreneurship in Latvia, 2005-2014**

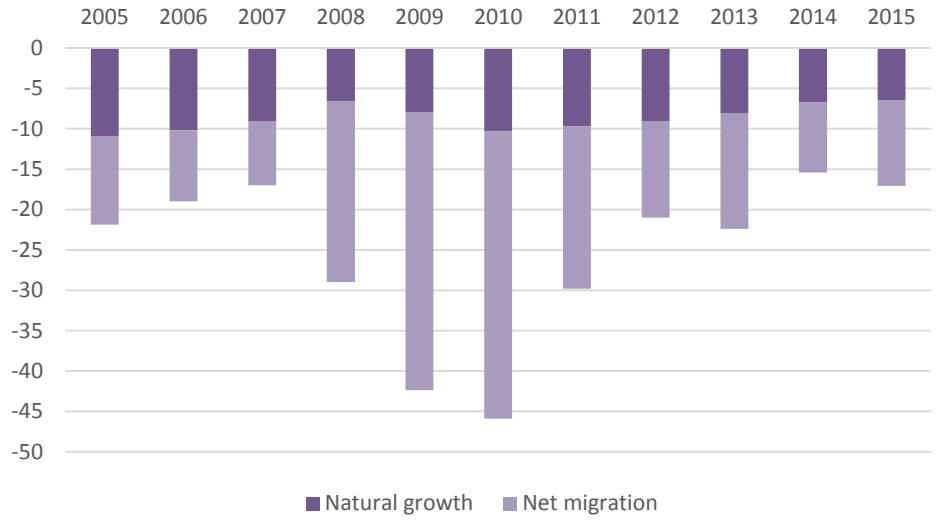



Source: GEM Adult Population Surveys and Eurostat, adapted by Krumina and Paalzow, 2015

While the knowledge-intensive start-up scene in Latvia is young compared to other countries, it is rapidly expanding and has set ambitious goals. Most technology-oriented start-ups are internationally orientated from their inception, as would be expected in a small country. Recognising this emerging community, in November 2016, the MoE prepared, and the Parliament passed a new law to create a tax regime – not matched anywhere else in Europe – that will effectively double venture capital investors' money in young Latvian start-ups. Further initiatives, such as a start-up visa to ease the process of hiring talented employees from outside the region, are also in the pipeline. These activities can be regarded as the first step in a wider push to make Latvia an attractive base for creating start-ups. The Latvian government has also made no secret of its plan to compete for the status of the main start-up hub in the Baltic region and beyond[1].

The major challenge regarding the economic transformation goals relates to the demographic situation. The labour market is tightening due to persistently negative natural growth and negative migration balance. Since 2016, the total number of inhabitants in Latvia dropped below 2 million for the first time. As Figure 7 indicates, there were very significant flows of emigration during the crisis years and migration has remained negative in each of the following years. Emigration significantly affects the labour market as it is mainly the working-age population that is experiencing a dramatic fall and is shrinking faster than in any other OECD country (Organisation for Economic Co-operation and Development, 2016). It is estimated that compared to its 2014 level, the working-age population (15-64) could drop by 20 % by 2030 and decline by almost 40 % by 2060 (European Commission, 2015). These trends exacerbate the shortage of a skilled workforce to match industry's needs. Hence, businesses are raising concerns about unfilled vacancies, especially in the ICT sector, construction, metalworking and other industrial sectors.

**Figure 7: Population changes in Latvia, 2005-2015 (thousands)**




Source: CSB, 2016

## 2 Overview of the Research and Innovation Environment in Latvia

[1] https://blog.techhub.com/latvia-passes-innovative-startup-law/

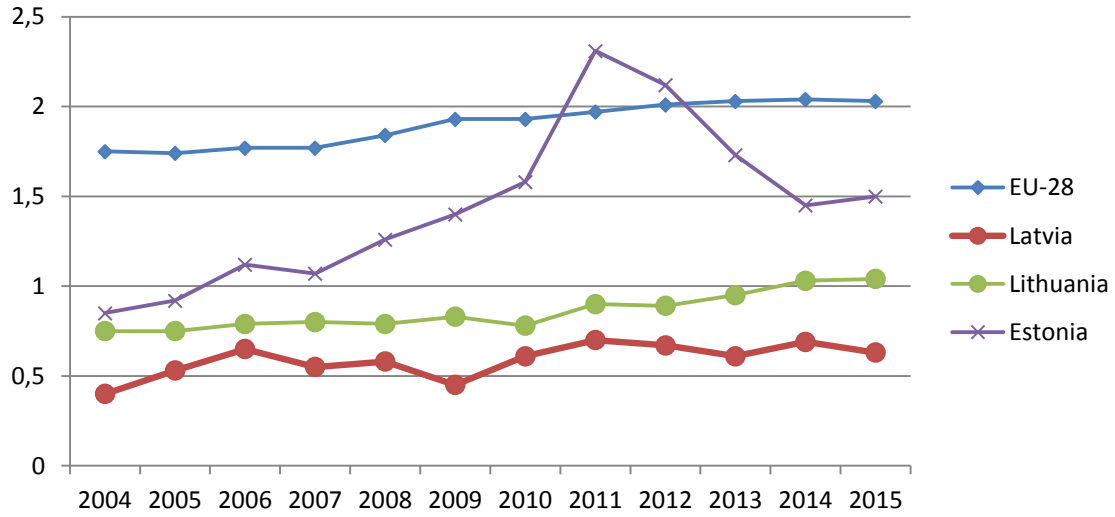
In recent decades, the Latvian industrial landscape has experienced a profound restructuring. During the years of transition to a market economy the business sector had to seek more integration into Western industrial value chains. Heavy industries shrank dramatically as the Soviet Union's 'safe' markets disappeared and they were exposed to international competition. This called for a shift toward a more service-based economy and a search for potential areas of competitive advantage. Currently, small and medium-sized enterprises (SMEs) comprise 99.6 % of all business organisations (CSB, 2013). This implies that higher-value-added production and services in niche areas are the main ways to increase the overall competitiveness of Latvia's industrial base.

Similar destructive and reorganising effects were seen in the science sector. The rapid switch to grants as the sole funding mechanism, coupled with the bare-minimum provision of state financing not only hampered productivity but also led to some unintended outcomes in the science system reform. First, the constant funding proportions between science fields have been maintained for nearly two decades, ensuring minimum funding for most projects. Secondly, the distribution of funding based on merit (largely determined by publications in international peer-reviewed journals) has not materialised, as the standard was been lowered to also include national and regional publications. Hence, the science system reform largely failed to achieve its original objectives, leading to the institutionalisation of mechanisms that promoted the status quo. While this system has been essential for safeguarding the existence of the research base, it has failed to provide the necessary incentives to improve the productivity and excellence of Latvian science (Rambaka, 2011). The failures of this legacy are being tackled by a comprehensive reform of the science system.

## 2.1 Latvia's current performance in research and innovation

The country's research and innovation (R&I) system is characterised by a very low R&D intensity. While the gross domestic expenditure on R&D (GERD) as a percentage of GDP marginally increased from 0.56 % in 2007 to 0.62 % in 2015, it remains well below the EU average of 2.03 % and also lags behind expenditure rates in Estonia and Lithuania (see Figure 8). During the crisis years, the significant reduction in national public R&D budgets due to fiscal austerity measures was compensated for by a substantial use of EU Structural Funds (SF), resulting in a dependency on foreign funding for research system development.

**Figure 8: R&D expenditure as % of GDP**




Source: Eurostat, 2017

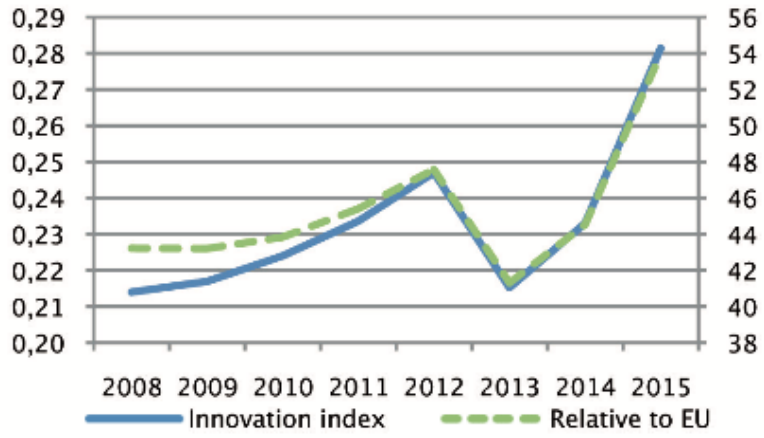
Overall, the capacity of the Latvian research system has been characterised by a low proportion of publications in 'indexed' databases (Web of Science, Scopus, etc.) in the total research output. This indicator is lower than in Estonia and Lithuania and suggests that much of the research is primarily of local interest. In many cases, indexed articles are not often cited, indicating issues of quality and relevance. Only a small number of research institutions seem to perform well and to be visible in the international scientific literature (Arnold, 2014b). Low levels of patenting and insufficiently developed international cooperation networks are also highlighted as weak points in research system performance (Ministry of Education and Science, 2013). In order to get a more precise understanding of the performance of Latvia's research system vis-à-vis the global research landscape, in 2011 (two decades after the collapse of the Soviet Union) the MoES launched an international Research Assessment Exercise (RAE). All research-performing units were assessed in terms of scientific quality, relevance, socio-economic impact, research environment and

development potential. More detailed information on the results of the RAE are presented in Section 4. For detailed information on the characteristics of the research system, see Arnold, 2014a and 2014b.

Since 2008, Latvia has belonged to the group of 'modest innovators', according to the European Innovation Scoreboard (EIS) classification. As Figure 9 shows, Latvia's overall innovation performance continued to rise until 2012, but dropped sharply in 2013. Since 2014, its performance has recovered, increasing sharply again in 2015. For the first time, the EIS 2016 has reclassified Latvia as belonging to the group of 'moderate innovators', with a similar overall performance score as that of Lithuania and Croatia. The trends indicate that the performance of Latvia's R&I system is improving in about two-thirds of the indicators. The innovation dimensions where Latvia's scores are close to the EU average are *human resources* (growth in the indicator - *new doctorate graduates*) and *investments of enterprises* (growth in *non-R&D innovation expenditures* and *venture capital investments*). However, in other innovation domains Latvia performs well below the EU average. Particular attention should be paid to areas like *linkages and entrepreneurship (*worst score on the indicator - *public-private co-publications)*, *open, excellent and attractive research systems (*although there was significant growth in *non-EU doctorate students*), and *innovators* (see

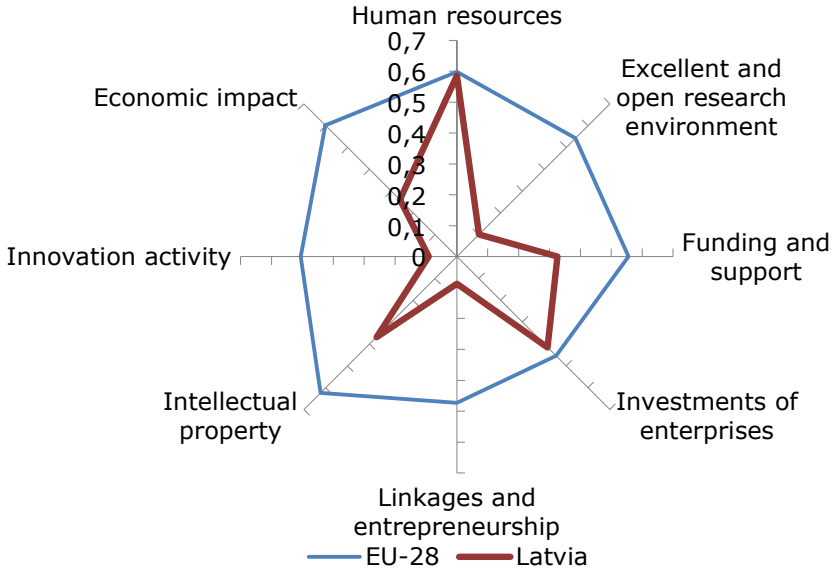
Figure 10).

**Figure 9: Latvia's performance in EIS 2008-2015**




Source: EIS, 2016

**Figure 10: Latvia's performance in EIS 2016 per innovation dimension**



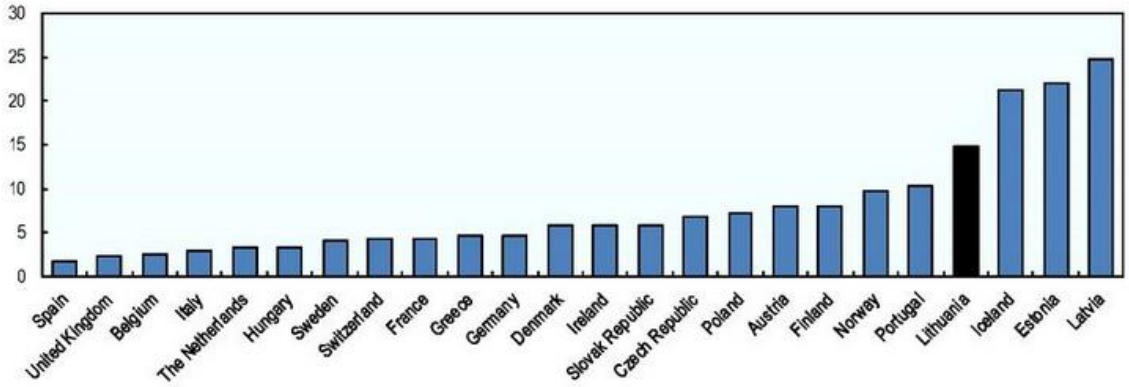

Source: EIS, 2016

## 2.2 Key challenges for R&I system development

- **Challenge 1:** Continuing to reform the public research and education system by reducing fragmentation, strengthening R&I capacity, and internationalisation

One of the core structural issues facing Latvia is the high degree of fragmentation in the R&D and higher education (HE) systems. In 2016, there were around 78 scientific institutions and 58 higher education institutions (HEIs) (MoES), which equates to around 39 scientific institutions and 29 HEIs per million inhabitants. Due to the targeted reforms for consolidation, this number is gradually falling, although it is a long-term process which faces periods of fierce opposition. The striking issue remains that Latvia and its Baltic neighbours all have a significantly higher number of HEIs per million of inhabitants than larger and more research-intensive countries, such as Sweden, Switzerland and Denmark (see Figure 11). This excessive number of institutions leads to an inefficient use of financial and administrative resources, and causes problems for knowledge management, while low levels of internationalisation make the situation worse. More rapid internationalisation is hampered by the Official Language Law which requires that most teaching and research must be done in Latvian.

**Figure 11: Number of HEIs per million of inhabitants in selected European countries**

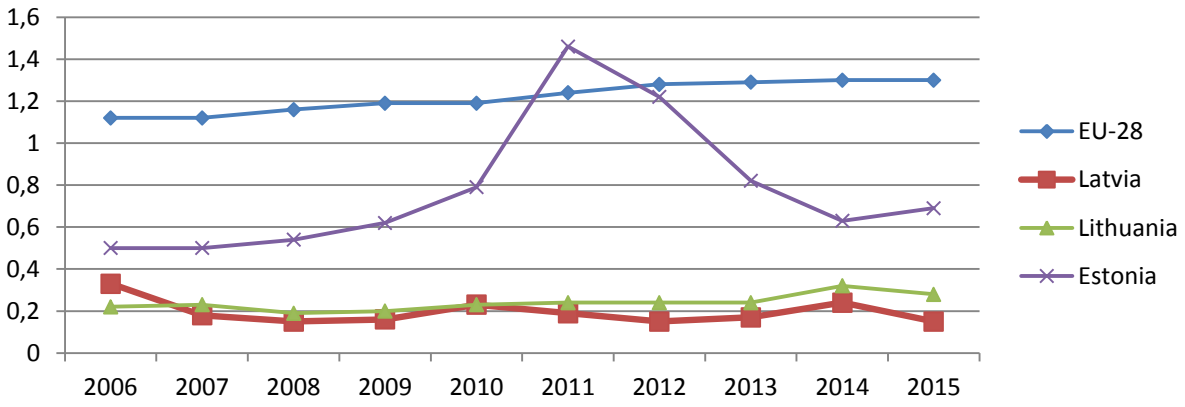



Source: OECD, 2016

- **Challenge 2:** Encouraging private-sector innovation capacity, investment in R&D and collaboration with science

A low level of science-industry cooperation and insufficient private investment in R&D represent other long-standing challenges Latvia's R&I system is facing. The country's business expenditure on R&D (BERD) is one of the lowest in the EU, accounting for around 0.24 % of GDP in 2014 and dropping to 0.13 % in 2015 (CSB). The level of public-private co-publications is more than eight times lower than the EU-28 average (EIS, 2016), while the number of researchers employed in business is also near the bottom of the list of EU-28 countries (Eurostat, 2015). There has been a plethora of support measures implemented to tackle these gaps, yet many of them have been too scattered and small-scale to effectively address the challenge. To overcome these shortcomings, more targeted state interventions are needed to provide sufficient incentives for private investment in R&D (particularly in smart specialisation priority areas) and help to restructure traditional sectors by supporting new innovative companies in their efforts to become mature innovators.

**Figure 12: BERD as % of GDP, Baltic states and EU-28**



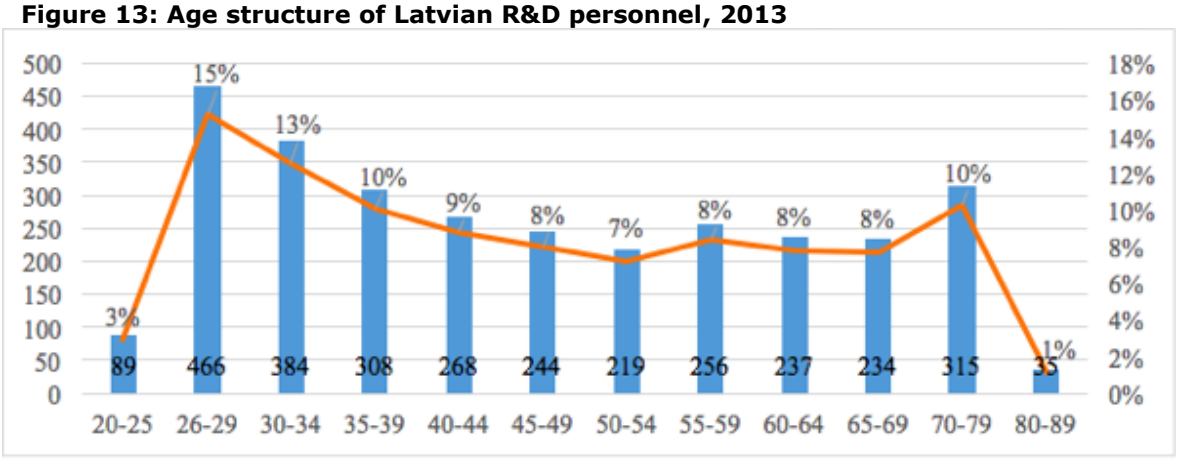

Source: Eurostat, 2017

- **Challenge 3:** Addressing human capital shortage and imbalances in R&I

The challenge of an insufficient supply of human resources applies to both the business and the public sector. The number of R&D personnel in Latvia is below 0.6 % of the total labour force, while the EU-28 average stands at 1.2 % (Eurostat, 2015). The human capital capacity relates not only to the number of people, but also to the relevance of their knowledge. Due to the severe economic crisis, Latvia experienced a very significant wave of economic emigration. This applied to both low-skilled and highly-skilled knowledge workers, making it harder for employers in research and industry to retain and substitute employees with the necessary skill sets. Moreover, the education system has not unable to ensure an appropriate balance between labour market supply and demand (MoES, 2013). In 2011, only around one-fifth of all students were enrolled in engineering and natural science programmes, although this indicator has since improved to 28 % (CSB, 2017).

Another worrying trend is the overall age structure of scientific personnel –an overview of the age distribution among Latvian R&D personnel is presented in Figure 13. At the beginning of 2013, around 27 % of scientific and academic personnel were aged 60 or over. In total, some 42 % of scientific personnel in Latvia are aged 50 or over (FIDEA, 2013). The ageing of R&D personnel is influenced not only by 'brain-drain' trends, but also by issues related to recruitment, promotion and employment conditions. Until now, the main emphasis in policy-making has been placed on R&D expenditure in monetary terms, whereas the focus ought to be on R&D activity volume as measured by the number of R&D jobs created and filled.

**Figure 13: Age structure of Latvian R&D personnel, 2013**




Source: Fidea, 2013

- **Challenge 4:** Improving the governance of the R&I system

Governance of the research, development and innovation (RDI) system has been characterised by a fragmented institutional structure leading to an unnecessarily complex division of functions (funding, evaluation, reporting). Due to the limited availability of state funding, the institutions involved have frequently been driven by competing institutional interests that have not supported an overarching system development (MoES, 2013). Overall, there has been limited capacity to design, implement and coordinate R&I policy and the effectiveness of policy measures has been undermined by a lack of systematic evaluations that would provide a timely evidence base for new interventions or corrective actions.

Currently, there is no single implementation agency dedicated solely to support for innovation. In addition, the function of promoting science and innovation in society has yet to be realised. It must be noted that there is still insufficient public awareness and recognition in policy-making circles of the importance of R&I as drivers for economic and social development. The lack of strong political support for RDI matters is reflected in the budgetary negotiations. A step towards more focused and collaborative high-level decision-making on R&I policy was achieved in 2014 by establishing the Research and Innovation Strategic Council as a platform for inter-agency cooperation, chaired by the prime minister (see Section 3 for more details). Nevertheless, more clarity on the functional structure of the RDI governance system is necessary to increase its capacity, efficiency and transparency.

## 2.3 National objectives and priorities for R&I system development

The National Development Plan 2014-2020 (NDP2020), adopted in December 2012, is the highest level medium-term planning document. The NDP2020 leitmotiv is 'Economic Breakthrough', aiming to encourage growth and competitiveness of the national economy and to improve the population's well-being. The overall objective is to provide targeted and prudent investment of resources in areas that ensure smart specialisation, employment and cohesion. This overarching policy

document puts forward a national strategic objective 'Advanced Research, Innovation and Higher Education' which outlines concrete targets, key performance indicators and expected results (see Figure 14) that are set in accordance with the National Reform Programme for the implementation of the Europe 2020 strategy. Over a 10-year period, NDP2020 quantitative targets for R&I foresee a significant increase in overall R&D investment to reach the goal of 1.5 % of GDP in 2020. Private R&D investment is expected to increase by 11 % and the targeted increase in the number of researchers employed in the private sector is around 6.8 %. The aim is also to more than double the 2011 level for European patents granted to researchers residing in Latvia. With respect to human resources, the goal is to maintain the current number of students graduating from universities and colleges and to slightly increase the share of the population (aged 30-34) holding a higher education degree.

- The overall national science and technology policy framework is set out in the Guidelines for Science and Technology Development, and Innovation, 2014-2020. This policy document, which has been developed by the MoES, summarises the key national RDI objectives as follows:
- Develop human resources in research, technological development and innovation by increasing the total number of researchers to at least 7000 by 2020, focusing on the identified smart specialisation areas;
- Promote the international competitiveness of Latvian science, concentrating research in a smaller number and stronger scientific institutions, while ensuring the principle of polycentric development; promote an annual increase in peer-reviewed articles published in journals listed in Scopus, WoS by 1500 articles and an annual increase of IPR by 50 units;
- Modernise and integrate the research and education sector, increasing the capacity to react to future challenges in research, technological development and innovation and increasing the mobility of the eduation sector;
- Establish a more effective technology transfer environment by strengthening the capacity of enterprises to absorb and create innovation, developing demand for new knowledge and increasing research institutions' ability to respond to an increasing demand;
- Optimise the governance of research, technological development and innovation, ensuring effective coordination and an increase in R&D investments;
- Create demand for research and innovation, informing society about scientific discoveries and popularising innovative activities and technology development.

**Figure 14: NDP2020 quantitative targets for R&I**

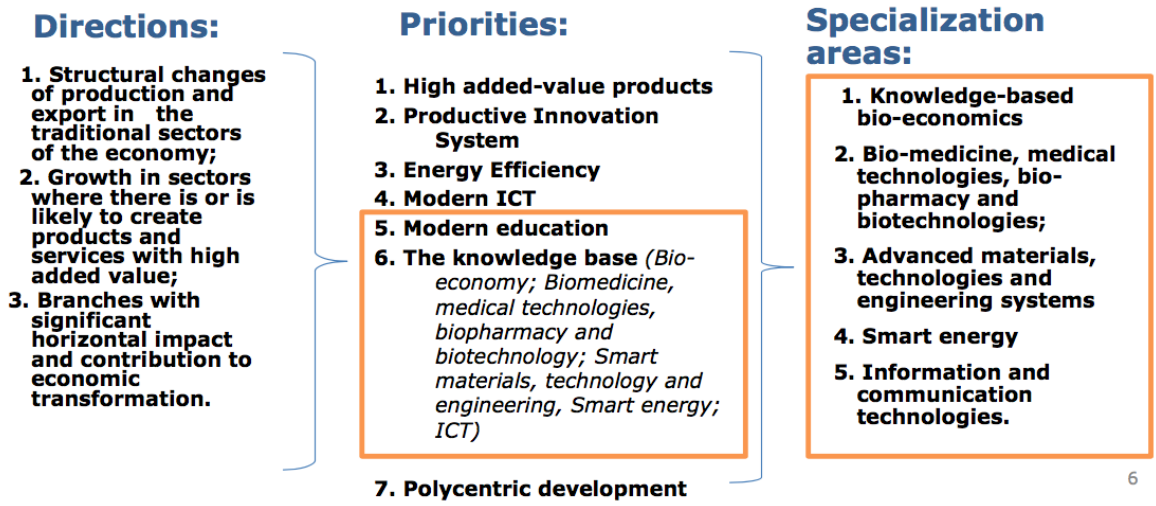
| Targets | Base value (year) | 2014 | 2015* | 2017 | 2020 | 2030 |
|---|---|---|---|---|---|---|
| • Private-sector investment in research and development in 2020 reaches at least 48 % of the total investment in research and development (private-sector investment in research and development, as percentage of the total investment) | 37 (2010) | 42 | 20 (CSB) | 46 | 48 | 51 |
| • Number of researchers employed in the private sector, as a percentage of the total, full-time equivalent | 16.2 (2010) | 18 | 17 (CSB) | 21 | 23 | 27 |
| • Number of students obtaining degrees or qualifications at universities and colleges (in thousands) | 24.8 (2011) | 23.9 | 17.0 (CSB) | 24.1 | 24.6 | 28.9 |
| • Higher education (percentage of the population aged 30 to 34 with higher education) | 36 (2012) | 37 | 41.3 (Eurostat) | 38 | 40 | >40 |
| • European patents granted, applied for by researchers residing in Latvia | 11 (2011) | 13 | 8 (EPO) | 18 | 26 | 35 |
| • Turnover of innovative products (as a percentage of total turnover) | 5.9 (2008) | 8 | tbd | 9 | 11 | >14 |
| • Proportion of innovative businesses (as a percentage of all companies) | 20.1 (2008) | 22 | 28.2% (CSB 2012-2014) | 25 | 30 | >40 |

Source: NDP2020

*In red are the actual values achieved in 2015

By the end of 2013, Latvia had adopted the Smart Specialisation Strategy (RIS3). The strategy identified seven priority areas for R&I support activities (target areas for improving the functioning of the innovation system) and defined five smart specialisation areas (see Figure 15). The definitions of the specialisation areas are still relatively broad, but the continuation of the entrepreneurial discovery process should help to narrow down the areas of Latvia's competitive advantages. The implementation of these strategic goals is supported by the whole policy mix detailed in Figure 24-26.

**Figure 15: Strategic directions of Latvian smart specialisation**




Source: MoES, 2013

Total SF funding for support to increase R&D and innovation capacity in the defined RIS3 priority areas is EUR 467.5 million over the period 2014-2020, which constitutes 11 % of the overall EU Structural Funding for Latvia. Implementation of RIS3 has only just started, hence there is no assessment yet on progress on the economic transformation. Latvia adopted its RIS3 monitoring framework in September 2015. The first RIS3 analytical report is scheduled for the first half of 2017, measuring the progress towards the overarching national policy objectives.

## 2.4 Main developments regarding the reform of the research and higher education system

To address the prevailing challenges and move towards the national strategic priorities for R&I, large-scale reforms have been initiated in the HE and research systems. In 2014, the World Bank issued its evaluation of Latvia's HE funding model. In the same year, results of the research assessment exercise were published. These inputs served as a basis for initiating the consolidation of research structures, the work on a quality-driven financing model, and incentivising the development of research-based higher education. The broad aim of the initiated reforms is to promote the development of a stable human capital capacity in R&D until 2030, and to consolidate the science system in 20 strong national research centres. It is envisioned that these national research centres are reliable partners for other foreign research organisations, are competitive and well represented in European research programmes, and undertake research activities in the defined national priority areas for socio-economic development.

Since the beginning of 2014, the following measures have been undertaken:

- In cooperation with the Latvian scientific community, an **increase in the science-base funding** has been achieved in the national budget negotiations;
- The **mechanism for allocating science-base funding has been changed**. State funding is now awarded only to competitive scientific institutions with specific minimum criteria for research staff in full-time equivalent (FTE) (for universities and research institutions the minimum research staff totals 25 FTE, for other higher education institutions it is 10 FTE, and for higher education institutions specialising in arts, 5 FTE). The introduction of performance criteria allows more funding to be awarded to more research-intensive institutions that show better results. For example, since 2014, the government has awarded 10 % of the additional science-base funding to those scientific

institutions that performed best in the RAE. Social sciences and humanities have tailored criteria and are evaluated separately for natural sciences, life sciences and engineering;

- The assessment criteria for proposals to competitive research programmes have been changed, introducing **foreign peers** in the evaluation committees;
- Incentives have been introduced for **closer integration of research and higher education**. A performance component in HE funding has been introduced. A share of HEI staff is financed from science-base funding. Research project rules now allow for students to be employed in scientific activities;
- In 2015, **additional funding of EUR 11 million was granted to the best-performing scientific institutions** (RAE scores of 5 and 4) for the development of strategic plans to increase their research excellence and relevance, and to foster the concentration of resources. This funding has enabled the fragmentation of Latvia's research sector to be reduced and has helped to cut the overall number of state-funded research institutions from 40 in 2014 to 22 in 2017;
- **The second round of research system consolidation has been prepared** which foresees the integration of research units evaluated by RAE as poor or adequate (scores 1 and 2) into the research centres of national significance;
- **The monitoring system** for evaluating the return from state R&D investment has been established.

It should be noted that the changes and policy initiatives aimed at addressing the structural challenges outlined in this report started in 2013. The MoES, as the main policy-making body for RDI in Latvia, is constantly facing strong opposition to most of its proposed changes. Therefore, the progress being made towards solving the challenges and overcoming the weaknesses is slow and rather complicated. This tendency is likely to persist in the future. The current pace of structural changes might best be characterised as a compromise between the necessity to react and the policy possibilities (Kulikovskis, 2016). Given the complexity of the structural challenges, the fact that the respective policy actions were only initiated recently and that the last independent assessments of the R&I and HE systems were carried out in 2014, it is still too early to assess the overall effectiveness of the actions that have been undertaken.

## 3 GOVERNANCE OF THE LATVIAN RESEARCH AND INNOVATION SYSTEM

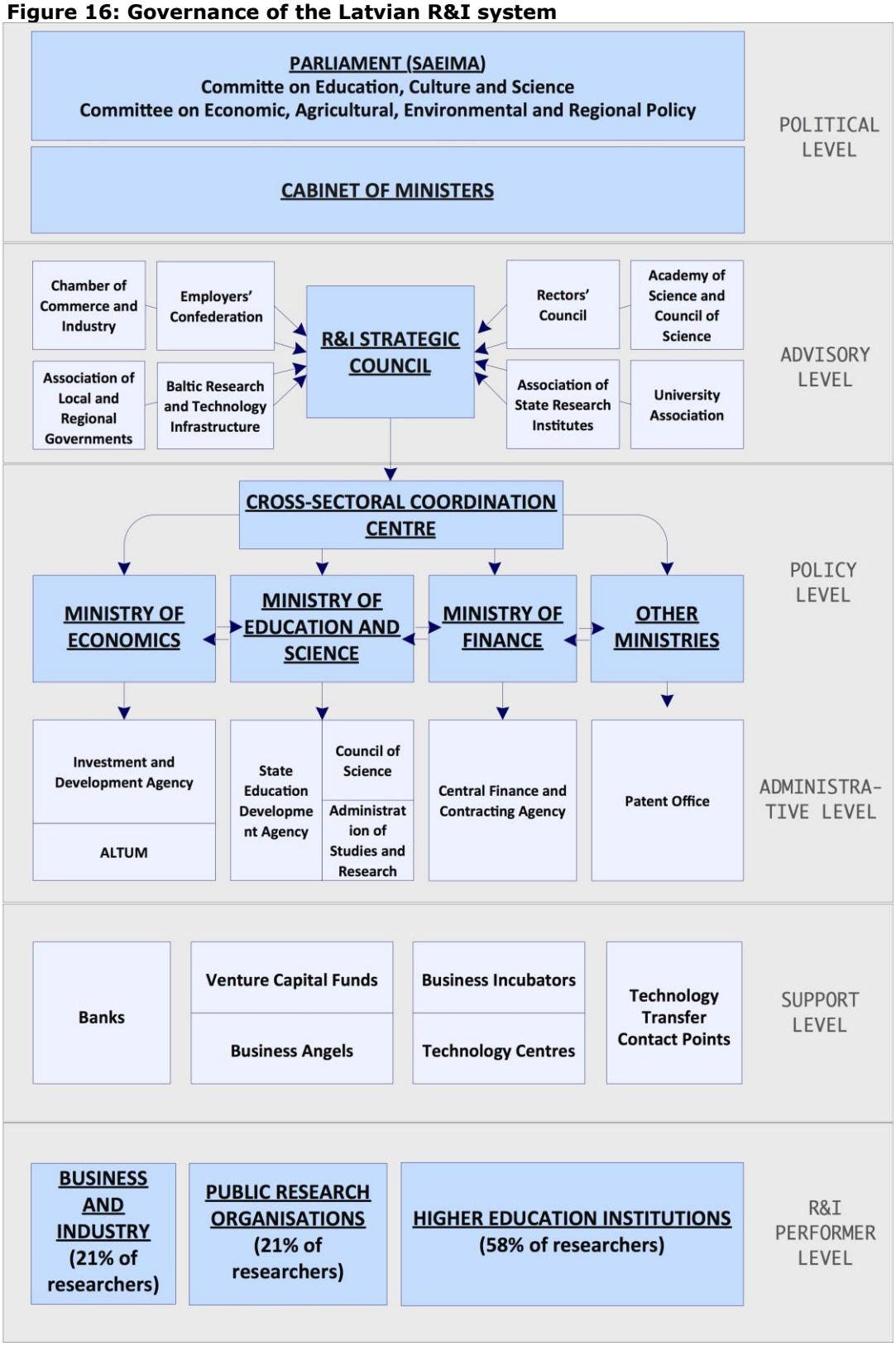
R&I policy in Latvia is predominantly developed, funded and implemented at the national level. The role of the regions in R&I governance is very limited. In recent decades, there have been incremental changes in the governance of the RDI system. The main policy-making function has always been divided between the MoES and the MoE, which has hampered a comprehensive and systemic approach to RDI policy interventions. While R&I still do not feature in the Latvian political debate as centrally as perhaps in other EU Member States, in recent years there has been greater emphasis on the need for more concerted activities and a more inclusive decision-making process to shape the Latvian R&I system. Figure 16 presents the current governance structure of the Latvian RDI system.

At the political level, **the Parliament (Saeima)** and **the Cabinet of Ministers** set the broad directions of national R&I policy. They are responsible for allocating the budget for R&I policy, setting the evaluation criteria for assessing the efficiency of research institutions, and approving the prioritised research directions and State Research Programmes for financing fundamental and applied research every four years (Law on Scientific Activity). In practice, R&I policy has had a rather low priority in comparison to other policy areas, and its budget has not enjoyed the privileged status it has in other EU countries. While the Law on Scientific Activity prescribes that "the Cabinet shall provide for an annual increase of financing for scientific activity of not less than 0.15 per cent of the gross domestic product until the State-allocated financing for scientific activity reaches at least one per cent of the gross domestic product", this commitment has not always been met.

**The Research and Innovation Strategic Council** is a new advisory body that was established in 2014. It is a collegial and coordinating body set up to ensure coordinated inter-agency cooperation for successful R&I policy implementation, as well as the implementation and monitoring of the smart specialisation strategy. The main aim is to ensure innovation capacity building and to increase public awareness of the social value of RDI activities to promote Latvia's development and competitiveness. The Council is chaired by the prime minister and comprises ministers, representatives of HEIs, public research organisations, the chamber of commerce, the Confederation of Employers, the Association of Local and Regional Governments, the Baltic Innovative Research and Technology Infrastructure (BIRTI - an NGO), the Academy of Science, and the Cross-Sectoral Coordination Centre. Its task is to advise the Cabinet of Ministers on important

matters concerning investments in RDI, evaluate their implementation and provide input to the formulation of policy proposals. Since its establishment, the Council has become a platform through which different stakeholders can communicate and reach a consensus regarding potential decisions to be made by the Cabinet, thereby making the R&I policy decision-making process more inclusive.

**Figure 16: Governance of the Latvian R&I system**




Source: Kulikovskis et al. (2015), adapted by the authors

**The Cross-Sectoral Coordination Centre (CSCC)** is the body in charge of the development and coordination of overarching policy planning documents at the national level, ensuring their alignment with the available national and EU funding lines and overseeing the implementation and monitoring of the strategic national policy objectives. The CSCC has been in operation since 2011 and is directly subordinated to the prime minister's office. Upon its establishment, the Centre was tasked with preparing the National Development Plan of Latvia for 2014-2020 which, among other

things, also includes an outline of the national strategic objectives related to research, technological development and innovation. The GSCC ensures that policy initiatives proposed by sectoral ministries are in alignment and consistent with the objectives set out in the National Development Plan. The Centre's positioning gives it the power to coordinate the priorities of various ministries, at least in the medium-term. It also undertakes analytical assignments tasked either by the Cabinet of Ministers or the prime minister.

**The Ministry of Education and Science (MoES)** has a pivotal role to play in the development of policies for research and technological development. It elaborates key policy documents in research, technological development and education, and coordinates the design and implementation of respective support measures (for more details see Figure 16: Governance of the Latvian R&I system**Error! Reference source not found.**). The general RDI policy framework is described in the Guidelines for Research, Technological Development and Innovation 2014-2020. MoES is also in charge of developing the policy framework and ensuring the monitoring of the Smart Specialisation Strategy (RIS3). Two departments within the MoES work on R&I policy planning:

- The Department of Higher Education, Science and Innovation – responsible for policy design and monitoring in the fields of higher education, science, research, and innovation;
- The Department of Structural Funds – together with the State Education Development Agency (SEDA) it is responsible for implementing the Structural Fund (SF) programmes.

**The Ministry of Economics (MoE)** is responsible for developing policies related to business support and innovation, as well as the design and monitoring of the implementation of Structural Fund programmes that address issues of business competitiveness and strengthening the capacity for innovation (for more details see Figure 25-26). While the MoES has overseen all main business support and innovation programmes funded by the SF in the last programming periods, there are indications that the human resources allocated to innovation within MoE might currently be insufficient and unsustainable in the future. This is based on the relatively limited involvement of the MoE in R&I activities when compared to the MoES' involvement. This may be a sign that in future the MoES will take a leading role in the design of innovation policies (Kulikovskis et al., 2015).

**Other sectoral ministries** may have input in R&I policy development in their respective fields of competence. The Ministry of Finance (MF) is in charge of the development and coordination of financial policy and budget allocation, as well as the administration of EU Structural Funds and the Cohesion Fund. As in the EU programming period 2014-2020, more emphasis has been put on support to RDI, and RIS3 has been set as an *ex-ante* criterion for receiving SF funds, and the MF has become more involved in R&I policy development. While the MoES is responsible for most research-performing organisations, the Ministry of Agriculture (MA) is the principal of the University of Agriculture and its institutes, as well as of the Institute of Food Safety, Animal Health and Environment 'BIOR' and the State Forest Research Institute 'Silava'. The MA also oversees the implementation of the programmes 'Cooperation between research and agricultural and forestry sectors' and 'Knowledge transfer to farmers and people responsible for the management of forests', financed by the European Agricultural Fund for Rural Development.

**The Central Finance and Contracting Agency (CFCA)** is a state agency directly subordinated to the MF. Since the start of the new EU programming period 2014-2020, the CFCA has had a more influential role with respect to the implementation and oversight of R&D funding flows. According to the Research and Innovation Observatory (RIO) Country Report, the Agency had to replace some of the functions of two government funding agencies – Latvia's State Education Development Agency and its Investment and Development Agency. Operating with the aim of improving funding absorption, minimising costs and bureaucracy, the MF initiated the concentration of EU fund allocation and oversight in the hands of one institution. The CFCA has set out rather ambitious plans to increase its capacity and adjust its structure to fulfil its mission (Kulikovskis et al., 2015).

**The State Education Development Agency (SEDA)** is the largest agency under the MoES. SEDA is the main body for the implementation of RDI and education policy. The Agency also implements and monitors projects financed by EU SF, along with other international funding programmes and initiatives, such as the joint Baltic Sea research and development programme BONUS, EUREKA, COST, ERASMUS+, etc. In the period 2007-2013, SEDA played a very central role in the implementation of SF-funded programmes related to research and education, along with some of the programmes targeting innovation. There is a possibility that this role will be reduced in future due to the planned consolidation of the SF management system. However, as the RIO Country Report 2016 points out, this agency still plays an essential role in RDI policy implementation as it is recognised as an efficient organisation with a 'business-like' internal culture and result-oriented approach to management (Kulikovskis et al., 2015).

**The Latvian Council of Science** was created in 1990 with the task of formulating and coordinating science policy and acting as a research council, assessing applications for research funding and allocating money according to the competition. In the early days, ministers were Council members but over time representatives from the MoES replaced them. Today, the role of the Council of Science has been reduced since its policy-making function was transferred to the ministries. However, the Council continues to advise on R&D and higher education policy formulation and implementation, representing the voice of the academic research community, for instance, by providing input to the formulation of State Research Programmes. The Council is a collegial body of scientists comprising representatives from 14 institutions. It operates through five expert commissions which act as assessment panels for proposals for scientific research projects and programmes. It is in charge of the formulation and continual improvement of evaluation criteria for assessing research projects and research-performing institutions. In practice, it tends to function as a funding agency of the MoES, evaluating fundamental or applied research projects and distributing financing in accordance with the procedures specified by the Cabinet of Ministers.

**The Administration of Study and Research (ASR)** is another institution involved in the implementation of R&I policy and directly subordinated to MoES. Its main task for science involves administrative and financial oversight of the implementation of state-funded fundamental and applied research projects, interacting with and supporting the Latvian Council of Science. Each year, the ASR submits a report to the MoES on the utilisation of state-budget resources allocated to state-funded research programmes and projects.

**Latvia's Investment and Development Agency (LIDA)** is an administrative agency under the responsibility of the MoE. Its main objectives are to facilitate foreign investment and increase the competitiveness of Latvian entrepreneurs, thereby promoting business development. In 2004, LIDA became one of the main funding agencies responsible for administering EU funds and implementing state support programmes in entrepreneurship and innovation. Currently, it is focusing predominantly on the implementation of national programmes regarding export promotion. In addition, the Latvian Tourism Agency has been merged with LIDA. There appears to be less of a focus on innovation, while the Agency continues to implement some strategic SF co-financed programmes like Innovation Vouchers, Business Incubators, and others (for more details see Figure 25-26). Oversight of the Competence Centres programme has been reallocated to the CFCA. While LIDA has been responsible for the implementation of several innovation instruments for more than a decade, it appears it has not developed the necessary skills base found in innovation agencies in other EU countries (Arnold et al, 2014).

**The JSC Development Finance Institution Altum (ALTUM)** is a financing institution that is fully owned by the state and has three ministries as its shareholders (the MF, MoE and MA). This new institution was created in April 2015 when the Latvian Guarantee Agency (LGA) merged with the State Joint Stock Company Latvian Development Financial Institution Altum (ALTUM) and the State JSC Rural Development Fund (RDF) (Kulikovskis et al., 2015). ALTUM provides alternative risk capital funding for businesses in the event of insufficient collateral. Its objective is to provide efficient and professional support to certain business target groups using various financial instruments (loans, guarantees, investments in risk capital funds, etc.) that are supplemented by non-financial support (consultations, training, monitoring, etc.). The aim of this financing institution is to incentivise entrepreneurial activities and promote the growth and expansion of business operations.

## 4 LANDSCAPE OF RESEARCH PERFORMERS

The Law on Scientific Activity differentiates between scientific institutes in Latvia, dividing them into four categories:

- **Public agency** – established by a decision of the relevant public person decision-taking institution and operating with the transferred property and financial resources at its disposal; it can launch competitions, enter into contracts, and determine payment for the services provided in the fields of research and the improvement of scientific qualifications;
- **Derived public person** – established by a decision of the Cabinet of Ministers that determines the movable and immovable property to be transferred into the possession or use of the institute; the institute's Council of Science is the decision-making body that approves the by-laws and budget of the scientific institute; it may also establish,

reorganise and liquidate institutions, found, reorganise and liquidate capital companies, and make decisions regarding participation in associations, foundations and capital companies. All main state scientific institutes are derived public persons;

- **Structural unit of a higher education institution**
- **Private law legal person** or its structural unit – may also be founded as a state or local government capital company.

All scientific institutions are listed in the Register of Scientific Institutions. According to the Law on Scientific Activity, a scientific institution shall comprise at least five persons with PhD degrees in the corresponding field of science. Since the 1990s, this low barrier for establishing a scientific institution has led to a proliferation of small (and even micro) research units, thereby complicating overseeing the research-performer landscape.

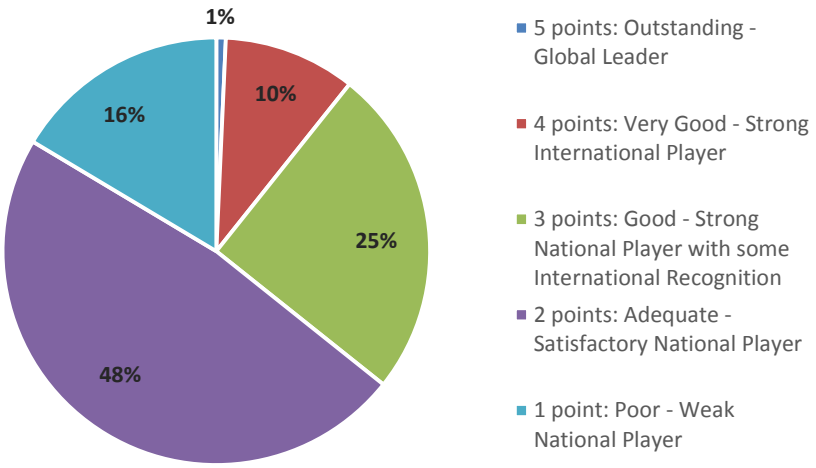
To acquire a more precise understanding and reduce the excessive fragmentation of the research system, in 2011, the MoES launched an international Research Assessment Exercise (RAE). The assessment comprised an evaluation of scientific activities in 150 research units listed in the Register of Scientific Institutions (status in 2011). The performance of each unit was assessed in five dimensions: scientific quality, impact on science, economic and social impact, research environment and infrastructure, and development potential[2]. The RAE's aims were to provide detailed reasoning and recommendations for the consolidation of scientific institutions and better science-industry collaboration to serve as a basis for reforming the research system. The exercise also included an overall assessment of the Latvian innovation system and recommendations for improving its governance mechanisms[3].

The overall scores awarded by the peer-review panels (see Figure 17) showed that the performance of 15 Latvian research institutions was assessed as excellent and good, and 33 institutions were evaluated as strong national players. More than half – or 77 research units – were judged to be satisfactory local players, and the performance of 22 research units was assessed as weak. Around 10 research units listed in the Scientific Activity Registry did not perform research activities, and thus were not evaluated. While this was the first time such an assessment exercise had been carried out[4], and scientific institutions had to follow an important learning curve on how best to present their organisation, a decision has been made to withdraw base funding from those units that received an overall score of 1 and 2, thereby incentivising them to undertake consolidation and restructuring decisions. The best-performing scientific institutions (those receiving 5 and 4) have been allocated additional funding totalling EUR 11 million in 2015 to prepare their development strategies which set the base for further reforms aimed at increasing scientific capacity and excellence.

Figure 18 shows the RAE scoring per assessment dimension and scientific discipline. The exercise concluded that in mathematics and natural sciences there are comparatively strong and well-established research institutions, although there are both low and comparatively high performers. This strength represents an important economic opportunity. Engineering and computer science is surprisingly fragmented, with a great deal of activity at levels below international norms, but with important high spots, too. Given the importance of these disciplines for the economy, strengthening their performance should be given a high priority. Research units in life sciences are mainly national players, but there are also high performers with a handful of units that can perform at international levels for quality and relevance. Agricultural research was assessed as being overly inward and focusing on national needs, and would benefit from a more international perspective. Social sciences are highly fragmented and not very mature in Latvia as many of the sub-disciplines have only been developed during the post-Soviet period. Research groups in humanities, however, represent a slightly higher quality and scientific relevance due to more established research traditions and organisations (Arnold et al., 2014b).

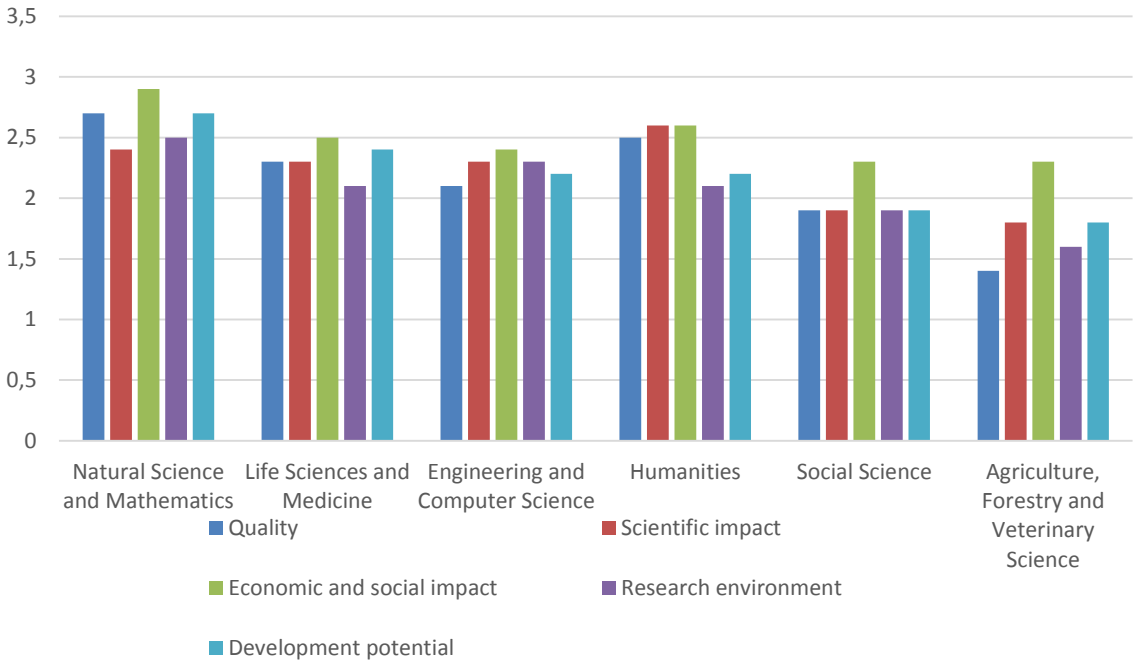
[2] For more details on the assessment methodology see Arnold et al., 2014b
[3] For more details on Latvian innovation system performance see Arnold et al., 2014a
[4] Since 1992, when the Danish Research Council evaluated Latvia's science system after the collapse of the USSR

**Figure 17: Overall results of the Latvian Research Assessment Exercise (RAE) 2013**




Source: Arnold, et al., 2014b

**Figure 18: RAE scores per assessment dimension and scientific discipline**




Source: Arnold, et al., 2014b

There are currently 78 scientific institutions listed in the MoES Scientific Institute Register. This represents a reduction from 150 institutions listed back in 2011. This has been achieved mainly through the amendment in 2013 of the Law of Scientific Activity which stipulated that universities can register as research performers, either for the whole university or its structural unit. Due to this amendment, the number of universities' structural units included in the Register has fallen by 65 %. In addition, further mergers, closures and clarifications concerning institutions' actual engagement in research activities has shrunk the initial list of scientific institutions by half. Currently, the Register lists 13 scientific institutions as derived public persons. These represent all the main state research institutes. HEIs and their structural units comprise 20 listed scientific institutions and 21 are listed as commercial companies or their structural units. Other institutions are operating as associations, establishments, public agencies or under another tailored legal status[5].

[5] Register of Scientific Institutions, representing data as of 25 May 2016: http://www.ikvd.gov.lv/zinatnisko-instituciju-registrs.html

HEIs play an important role in the Latvian R&I system with around 58 % of researchers concentrated in this sector. The HE system also demonstrates problems relating to excessive fragmentation. According to MoES data, there were 51 HEIs and two branches of foreign universities operating in Latvia in 2016. This number includes 17 state HEIs and 12 state colleges, and 13 HEIs and nine colleges established by legal persons[6]. However, the two main universities – the University of Latvia (UL) and Riga Technical University (RTU) – account for more than 40 % of researchers and academic staff working within the HEI sector. The research activities of smaller and private HEIs are yet to become very developed. HEIs located in the regions are seen as an important way of stopping the regional population from leaving. However, such an approach is expensive as it disrupts the integrity of the higher education system and disperses it. As has been pointed out in various assessments of Latvia's higher education system, this might also contribute to lowering the quality of education (WB, 2014).

As regards the private sector, the Register of Scientific Institutions currently lists 21 research units founded as commercial companies. Data from the CSB shows that, in 2014, a total of 411 business sector enterprises performed R&D activities. Since companies tend to employ few researchers, the overall share of research staff working in the private sector is around 21 %. The relatively small figures might be explained by the fact that it is mainly SMEs that are engaged in R&D (Kulikovskis et al, 2016), as 99.6 % of economically active enterprises in Latvia are classified as SMEs (CSB, 2013). Moreover, the accounting principles and under-reporting of R&D activities by enterprises could also explain the seemingly low expenditure on R&D as up until now the business sector has paid less attention to the classification of R&D activities (Kulikovskis et al, 2016). This situation is starting to change with the introduction of R&D tax incentives in 2014. It is expected that this incentive might lead to at least a partial correction of the under-reporting of R&D activities, although a comprehensive evaluation of the support measure's success has yet to be initiated.

With respect to the geographical concentration of scientific activities in Latvia, Figure 19 shows that the vast majority of research is performed in Riga and its vicinity, with few scientific institutions located in the rest of Latvia's territory. Research activities are concentrated in the main cities and are closely aligned with the operations of the largest HEIs. Scientific institutions located outside the main cities mainly perform research in agriculture, forestry and food science. This uneven distribution of research activities has instigated a discussion about the urgency of R&I system consolidation vs. the need for polycentric development.

The number of R&D staff in Latvia measured in full-time equivalents (FTE) fell significantly during the crisis years. In 2008, there were 6533 FTE researchers, dropping to 5570 FTE in 2015 to around 15 % to (see Figure 20). The aim of the research system reform by 2020 is to increase this number to 7000 FTE and concentrate the human capital in 20 strong national research centres. The analysis of the available human resources per scientific discipline shows that the highest concentration of researchers is in natural sciences (44 %). Engineering and IT account for 21 % and social sciences for 12 % of all researchers. Agriculture, humanities and life sciences and medicine comprise smaller shares of the total human resources in science, at 6 %, 8 % and 9 % respectively (see Figure 21).

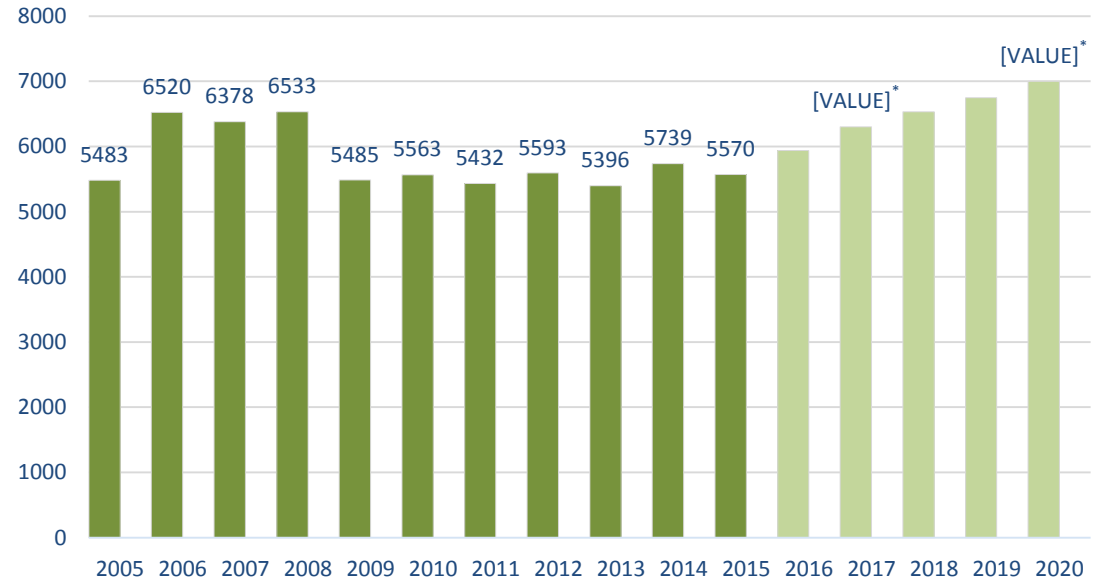
**Figure 19: Mapping of institutions listed in the Scientific Activity Registry**

- 


Red dots: state research institutions, HEIs or their structural units
Blue dots: organisations established by private law legal persons
Source: MoES, 2015

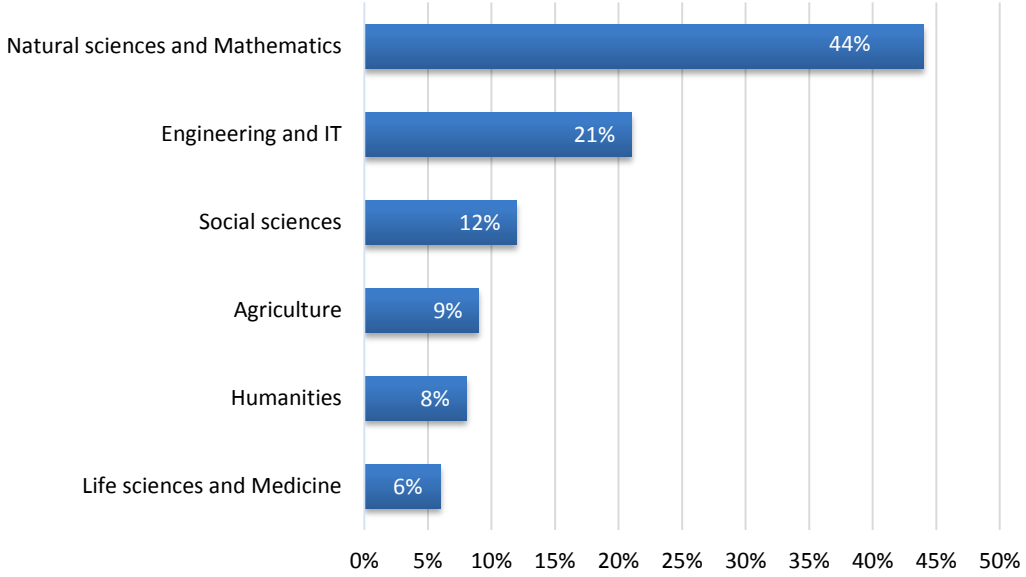
[6] List available at: http://www.izm.gov.lv/lv/izglitiba/augstaka-izglitiba/augstakas-izglitibas-iestades

**Figure 20: Number of R&D staff in FTE, actual and planned**




Source: MoES (*planned RIS3 target indicators)

**Figure 21: Distribution of human resources in science per scientific discipline**

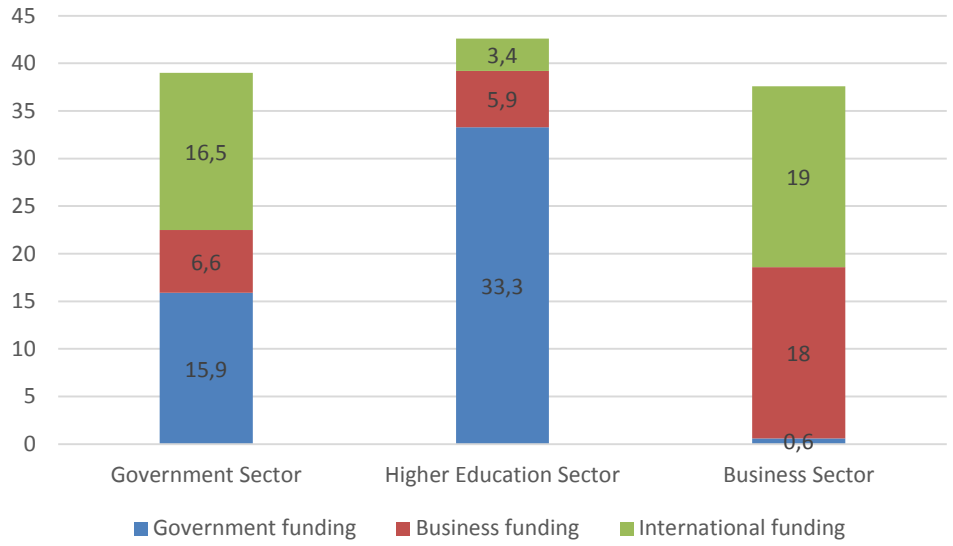



Source: FIDEA, 2013

## 5 FUNDING FLOWS IN THE RESEARCH AND INNOVATION SYSTEM

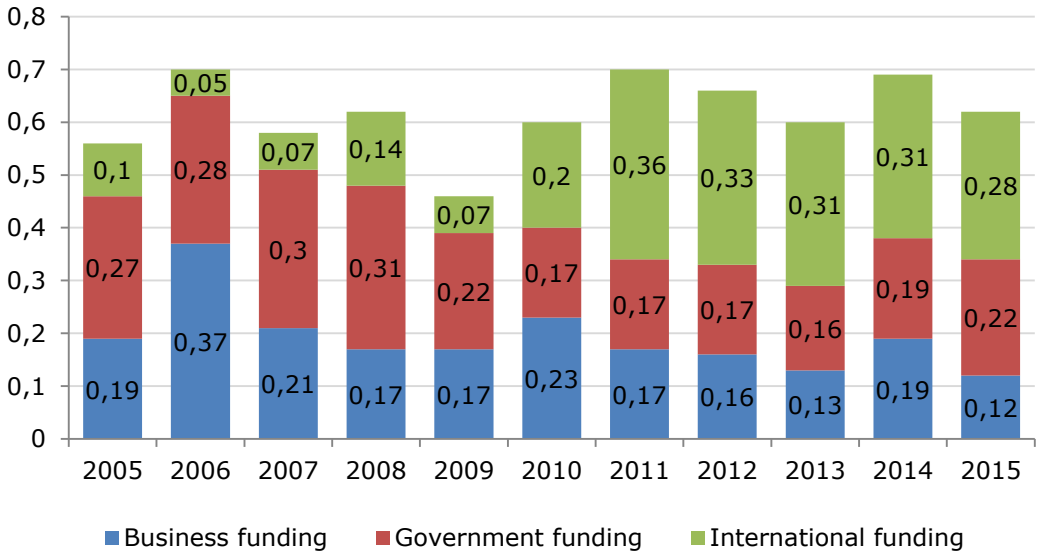
The Latvian R&I system is characterised by a very low gross domestic expenditure on R&D (GERD) as a percentage of GDP. This basic indicator shows only a marginal growth over the last eight years, increasing from 0.56 % of GDP in 2007 to 0.62 % of GDP in 2015 (or EUR 162.8 million in absolute figures). These indicators are well below the EU average and lower than R&D expenditure in Estonia and Lithuania (see Figure 8). Public funding on R&D in 2015 represented around 0.5 % of GDP, of which 0.28 % came from international funding sources. Private-sector R&D expenditure (BERD) constituted around 0.12 % of GDP (CSB, 2017). Breaking down R&D expenditure per sector of activity shows that the largest share of state funding goes to the HE sector. State-funding allocations to the business sector are negligible. While there is a stable funding stream from industry to state research and the HE sectors, the share of this funding is relatively small. International research funding is channelled mainly to the research and business sector.

**Figure 22: R&D expenditure per sector of activity, 2015 (EUR million)**




Source: CSB, 2017

**Figure 23: Structure of R&D funding, 2005-2015 (% of GDP)**




Source: CSB, 2016

The severe cuts in the national public R&D budget (by almost half) during the economic crisis in 2009-2011 have been compensated for by the substantial use of EU Structural Funds for R&D, leading to a strong dependence on European funding for the development of research and innovation capacity. Figure 23 shows the evolution of funding streams from 2005-2015. The share of foreign funding for R&D in Latvia increased significantly in 2010 to reach around half of GERD between 2011 and 2013. In 2015, the share of foreign R&D funding remained substantial, amounting to around 45 % of the total expenditure on R&D. This means that the current R&I policy mix in Latvia is mainly funded by the European Regional Development Fund (ERDF) and the European Social Fund (ESF). An overview of the main instruments currently in the RDI policy mix is outlined in Figure 24-26. This overview specifies the average annual funding allocation per measure[7] and indicates the funding source[8], aim of the intervention, funding allocation method and criteria, main operators for allocating the funding, and recipients.

[7] The averages have been calculated arithmetically dividing the earmarked funding per programme by seven (the years of the SF financial period) and rounding up the figures. The goal is to provide a better sense of the weight of funding between various instruments. This does not indicate the amount of funding actually allocated per year as each programme has a different intensity of funding distribution across the whole period.
[8] Indication of the ERDF funding source means total funding, including national co-financing (in most cases 15 %)

**Figure 24: Instruments targeted for increasing scientific competitiveness**

| Funding instrument and source | Average annual allocations (EUR) | Aim of the intervention | Funding allocation method and periodicity | Criteria and conditions | Operator(s) | Recipients |
|---|---|---|---|---|---|---|
| **Science-base funding**<br>National budget | 27m | Ensure institutional stability and continuity of research activity | Formula based on input and output indicators<br>Annual allocation | Allocated to scientific institutions with min. research staff 25 FTE, to other HEIs with 10 FTE, and to HEIs specialising in arts with 5 FTE<br>Minimum RAE score 3<br>+ 10 % for RAE scores 4-5 | Central planning by MoF<br>Direct administration for calculation and allocation to performers by MoES | State-established scientific institutes and HEIs registered in the Register of Scientific Activity |
| **State Research Programmes**<br>National budget | 4-5m | High-impact, industry-relevant research in priority areas of national development | Open call and selection every 4 years<br>Annual allocation per programme<br>14 programmes in 2014-2017 | Corresponds to national priorities<br>Scientific and practical relevance<br>Scientific novelty | Central planning by MoF<br>Selection and supervision by MoES<br>Expertise by LCS<br>Administration by SRA | State-established scientific institutes and HEIs |
| **Fundamental and applied research grants**<br>National budget | 4m | Scientific and technological advances, solutions in topical research areas | Competitive, project-based<br>Open call and selection every 4 years<br>Annual allocation per project | Scientific potential and quality<br>Impact and international competitiveness<br>Scientific novelty | Central planning by MoF<br>Appropriation by MoES<br>Selection and supervision by LCS<br>Administration by SRA | State-established scientific institutes, HEIs, individual scientists and groups of scientists |

| Funding instrument and source | Average annual allocations (EUR) | Aim of the intervention | Funding allocation method and periodicity | Criteria and conditions | Operator(s) | Recipients |
|---|---|---|---|---|---|---|
| **Practically oriented research grants**<br>ERDF | 11m | Innovative solutions for practical socio-economic challenges, improving intersectoral collaboration and knowledge transfer in RIS3 areas, focus on high commercialisation potential | Open call and selection every year<br>Max 600k, min 30k per project<br>Public funding intensity for non-commercial entities – 92.5 %, for commercial entities 25-85 % | Project scientific quality and correspondence with RIS3 goals<br>Economic and social impact<br>Quality and efficiency of implementation | Central planning by MoF<br>Supervision by MoES<br>Administration by CFCA | Scientific institutions and enterprises |
| **Grants for postdoctoral research**<br>ERDF | 9m | Postdoc research projects in RIS3 areas, competence building, international mobility and networking, tech-transfer activities | Open call and selection every year<br>The max amount of the grant is EUR 133 806 for three years | Project scientific quality and correspondence with RIS3 goals<br>Economic and social impact<br>Quality and efficiency of implementation | Central planning by MoF<br>Supervision by MoES<br>Administration by SEDA | Scientific institutions and enterprises employing PhD holders |
| **Innovation grants for students***<br>ERDF | 5m | Student research and innovation projects, particularly in STEM areas, life sciences and creative industries | tbd | tbd | Central planning by MoF<br>Supervision by MoES<br>Administration – tbd | HEIs and scientific institutes of HEIs |
| **Support for international cooperation projects in R&I***<br>ERDF | 4m | ERA bilateral and multilateral research cooperation project development, networking, strengthening capacity of H2020 national contact points | tbd | tbd | Central planning by MoF<br>Supervision by MoES<br>Administration by SEDA | Scientific institutions and HEIs registered in the Register of Scientific Activity, enterprises, researchers, H2020 national contact points |

| Funding instrument and source | Average annual allocations (EUR) | Aim of the intervention | Funding allocation method and periodicity | Criteria and conditions | Operator(s) | Recipients |
|---|---|---|---|---|---|---|
| **Strengthening the institutional capacity of scientific institutions**<br>ERDF | 11m in 2015 | Elaboration of institutional development strategies, research programmes and human resource plans for implementing RAE recommendations to increase scientific excellence | One-off restricted call for a targeted purpose | Allocated to 13 scientific institutions that received RAE scores 4 and 5 | Central planning by MoF<br>Supervised and administered by MoES | Scientific institutions and HEIs |
| **Support for the development of R&I in RIS3 areas and capacity building of research institutions (including HEIs)****<br>ERDF | 16-17m | RDI infrastructure development that is required by developing RDI activities in RIS3 areas, implementation of measures for research system consolidation and increase in scientific excellence and competitiveness | Restricted call – tbd | Project scientific quality and correspondence with RIS3 goals<br>Economic and social impact<br>Quality and efficiency of implementation | Central planning by MoF<br>Supervision by MoES<br>Administered – tbd | Scientific institutions registered in the Registry of Scientific Institutions |
| **Support for RIS3 governance***<br>ERDF | <0.5m | tbd | tbd | tbd | Central planning by MoF<br>Supervision by MoES<br>Administered – tbd | tbd |

* Measures in planning
** Measures in preparation
NB: Indication of the ERDF funding source means the total funding also includes national co-financing (in most cases 15 %)

**Figure 25: Instruments targeted for increasing capacity for innovation***

| Funding instrument | Average annual allocations (EUR) | Aim of the intervention | Funding allocation method and periodicity | Criteria and conditions | Operator(s) | Recipients |
|---|---|---|---|---|---|---|
| **Tax allowances for R&D**<br><br>Horizontal measure, national budget | - | Promote new product and technology development in local enterprises and attracting FDI in research-intensive sectors | The applied value coefficient for eligible expenses is 3 | The eligible costs include:<br>• R&D personnel<br>• Services from scientific institutions<br>• Services of accredited certification, testing and calibrating institutions | Budgetary oversight by MoF<br><br>Operational oversight by MoE<br><br>Administration by State Revenue Service | Enterprises that invest in R&D |
| **Support to development of new products and technologies within competence centres**<br><br>ERDF | 10m | Individual and cooperative research projects, including industrial research, experimental development, technical and economic feasibility studies for research projects | Funding allocated in four stages:<br><br>1st stage – MoES organises governance, monitoring and dissemination activities<br><br>2nd and 4th stage – calls for competence centre project implementation<br><br>3rd stage – tbd | Development of a competence centre in RIS3 sub-specialisation areas<br><br>Competence centre must comprise at least five unrelated commercial entities in the sector | Central planning by MoF<br><br>Supervision by MoE<br><br>Administered by CFCA | Science and business cooperation platforms – competence centres |
| **Support to implementation of new products into production**<br><br>ERDF | 24-25m | Implementation of new products into production to increase business productivity and foster business R&D | Open calls | Alignment with RIS3 goals<br><br>Experience with R&D projects and product development<br><br>New R&D jobs created<br><br>Project sustainability | Central planning by MoF<br><br>Supervision by MoE<br><br>Administered by CFCA | Enterprises that invest in R&D |

| Funding instrument | Average annual allocations (EUR) | Aim of the intervention | Funding allocation method and periodicity | Criteria and conditions | Operator(s) | Recipients |
|---|---|---|---|---|---|---|
| **Technology-transfer system and innovation vouchers**<br>ERDF | 6m | Establish a common technology-transfer centre to foster interest and develop cooperation between research institutions and potential IPR commercialisation entities, ensure the functions of research commercialisation and patenting fund, manage innovation voucher support to SMEs | Restricted call to a consortium of scientific institutions | Contribution of the common technology-transfer centre in reaching RIS3 goals | Central planning by MoF<br>Supervision by MoE<br>Administered by LIDA and CFCA | Latvian Investment and Development Agency<br>Consortiums of HEIs and scientific institutions |
| **Innovation motivation programme**<br>ERDF | <1m | Informative and consultative support to students, business idea authors, potential start-ups on innovation-related issues to raise awareness and improve related business skills | Restricted call to LIDA | Experience and technical support<br>Clear strategy for proposed activities<br>Coherence with RIS3 goals | Central planning by MoF<br>Supervision by MoE<br>Administered by LIDA and CFCA | Latvian Investment and Development Agency<br>Final beneficiary enterprises, start-ups, self-employed, NGOs, students |
| **Support for employee training to increase business competitiveness and innovation**<br>ERDF | 3m | Employee training to improve skills in enterprises to promote introduction of new or improved products or technology development and increase in labour productivity | Open calls | Experience with implementation of similar projects<br>Evaluation of skills needs in the sector has been performed<br>Training supply-and-demand analysis | Central planning by MoF<br>Supervision by MoE<br>Administered by CFCA | Sectoral associations |

| Funding instrument | Average annual allocations (EUR) | Aim of the intervention | Funding allocation method and periodicity | Criteria and conditions | Operator(s) | Recipients |
|---|---|---|---|---|---|---|
| **Support for training to improve ICT skills, capacities for non-technological innovation and attracting foreign investment**<br>ERDF | >1m | Employee training to improve ICT skills, capacities for non-technological innovation and attracting foreign investment | Restricted call to Latvian Information and Communication Technology Association, Chamber of Commerce and LIDA | Competence in ensuring training in ICT, non-technological innovation and attracting investment | Central planning by MoF<br>Supervision by MoE<br>Administered by LIDA and CFCA | LICT, Chamber of Commerce, LIDA<br>Final beneficiary enterprises and self-employed |
| **Support to technology-oriented start-ups***<br>National budget | tbd | Support the creation and growth of technology-oriented start-ups through adjustments in social security payment rules, tax breaks and support for attracting highly qualified labour force | tbd | tbd | Central planning by MoF<br>Supervision by MoE<br>Administered – tbd | Technology- and innovation-oriented start-ups |

*Include only main support instruments by MoE; other ministries, such as the Ministry of Agriculture, also have measures associated with the goal of increasing capacity for innovation

**Figure 26: Other instruments for increasing overall business competitiveness***

| Funding instrument | Average annual allocations (EUR) | Operator(s) | Recipients | Funding instrument | Average annual allocations (EUR) | Operator(s) | Recipients |
|---|---|---|---|---|---|---|---|
| **Support to improvement of production infrastructure and equipment**<br>ERDF | 11-12m | Central planning by MoF<br>Supervision by MoE<br>Administered by CFCA | Enterprises, associations and port authorities | **Loan guarantees and mezzanine loans**<br>ERDF | 8m | Central planning by MoF<br>Supervision by MoE<br>Administered by ALTUM | All enterprises (SMEs for loan guarantees) |
| **Business incubator support programme**<br>ERDF | 4-5m | Central planning by MoF<br>Supervision by MoE<br>Administered by LIDA and CFCA | LIDA<br>Final beneficiary regional incubators and creative industry incubators | **Seed capital funds**<br>ERDF | 4-5m | Central planning by MoF<br>Supervision by MoE<br>Administered by ALTUM | Start-ups, micro enterprises and SMEs |
| **Cluster programme**<br>ERDF | 1m | Central planning by MoF<br>Supervision by MoE<br>Administered by CFCA | Consortiums, associations<br>Final beneficiary enterprises | **Business angel co-investment**<br>ERDF | 1-2m | Central planning by MoF<br>Supervision by MoE<br>Administered by ALTUM | SMEs |
| **Support to international competitiveness**<br>ERDF | 8-9m | Central planning by MoF<br>Supervision by MoE<br>Administered by LIDA and CFCA | LIDA<br>Final beneficiary enterprises | **Technology accelerator**<br>ERDF | 2-3m | Central planning by MoF<br>Supervision by MoE<br>Administered by ALTUM | SMEs, including start-ups |

*Include only main support instruments by MoE; other sectoral ministries such as the Ministry of Welfare and Ministry of Environment and Regional Development also have measures associated with the goal of increasing business competitiveness.

## 5.1 Structure of scientific institution funding

The main funding lines for the research system include:

- **Base-science funding**: funds for ensuring scientific activity and resources for maintenance of the scientific institution;
- **Council of Science grants**: academically orientated competitive research funding;
- **National Research Programmes**: competitive funding for more applied research in the national priority areas;
- **International funding**:
  - EU Structural Funds, allocated nationally
  - EU Framework Programme, allocated at the EU level
  - Other international funding (e.g. bilateral cooperation programmes, Baltic Sea Region programmes, etc.).

The base-science funding is allocated to those state research institutions, HEIs, their structural units, and institutes founded by HEIs that are listed in the Register of Scientific Activity. In the framework of science system reform, the procedure of allocating base funding has been amended – it is only allocated to competitive scientific institutions with scientific staff with specific minimum criteria for research staff in FTE (for universities and research institutions the minimum research staff is 25 FTE, for other higher education institutions, 10 FTE, and for higher education institutions specialising in arts, 5 FTE). In 2017, MoES listed 22 scientific institutions which receive the base financing. According to the research reform plans, the number of institutions receiving base financing will be reduced to 20 by 2020. The state will only allocate base financing to those institutions that have received high scores in the research assessment which, according to the Law on Scientific Activity, will be carried out every six years.

The base funding is distributed according to the following formula:

$$B_{inst} = (I + P) \times A_t, \text{ where}$$

I – funding resources for maintenance of the scientific institution

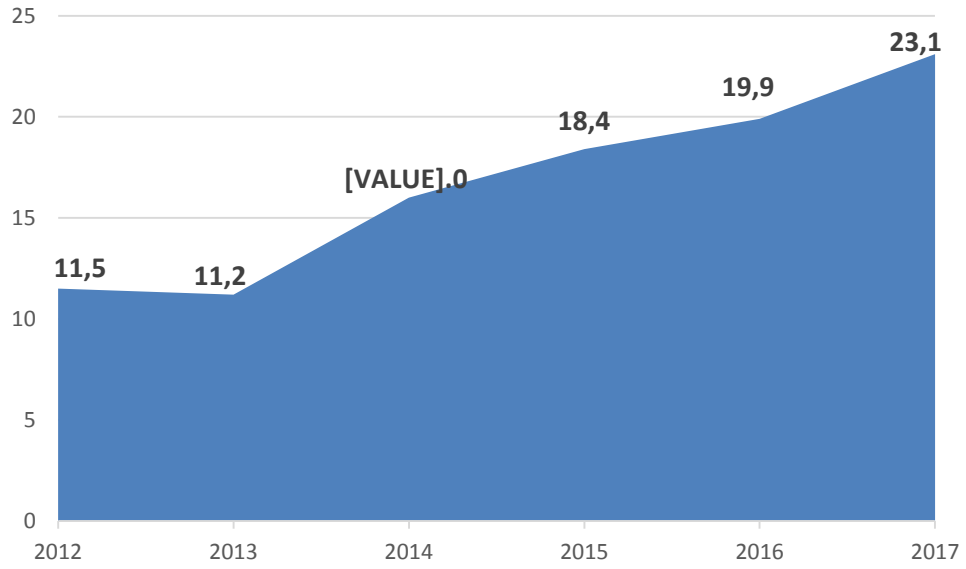
P – funding resources for remuneration of the scientific personnel employed by the scientific institution

$A_t$ – development factor of the scientific institution

I – funding resources for maintenance of the scientific institution are calculated by taking into account the ratio of working premises to be used for the scientific activity, operating costs for one square metre of premises and the branch factor. P – funding resources for the remuneration of scientific personnel is calculated by taking into account the number of scientific personnel and the figure for the base remuneration of labour of one scientific personnel unit. $A_t$ – the development factor of the scientific institution is calculated by using a formula that accounts for scientific activity quality indicators, such as R&D projects, publications, patents and doctorates produced (for more details on base-funding allocation see Cabinet of Ministers, 2013).

Figure 27 shows the total amount of base funding allocated to Latvian scientific institutions in the period 2012-2017. As can be seen, base funding stood at an absolute minimum during the post-crisis years 2012-2013, but has almost doubled by 2017. Notwithstanding this increase, it can be calculated that only around 19 % of public research funding is institutional, making Latvia's system one of the most highly 'contested' in the world. While there is no clear international benchmark for what the proportion of institutional funding should be, there is some consensus that 50 % is the minimal viable level. It is often argued that low relative levels of institutional funding undermine continuity, the ability to invest in facilities and equipment and ultimately, therefore, quality. A degree of institutional funding stability is also required for establishing good links with industry. Without this, it is hard to be a credible long-term research partner (Arnold et al., 2014).

**Figure 27: Base funding to scientific institutions, 2012-2017 (EUR million)**




Source: Based on data from MoES

The Council of Science grants for basic and applied research are distributed through five disciplinary expert committees in response to calls for proposals. The success rate of the calls is about 15 % (Arnold et al., 2014a) and in both 2014 and 2015 the distributed financing was approximately EUR 4.4 million, of which around EUR 3.2 million went to thematic research projects and EUR 1.2 million to research cooperation projects (Kulikovskis, 2016). Each project proposal is evaluated by at least three experts. In the case of proposals for research cooperation projects, evaluations include at least four experts (for more details on award principles see Cabinet of Ministers, 2011). Since 2013, evaluation of the Council of Science proposal also involves international peers in order to incorporate European standard practices in assessment procedures.

The state-funded National Research Programmes aim to boost research activities in the priority areas defined by the state. In the period 2014-2017, the funding has been allocated to 14 National Research Programmes covering areas such as the environment, climate and energy, materials, photonics and nanotechnology, next-generation ICT systems, biomedicine, forests and natural resources, agriculture for sustainable production, education for inclusive development, economic transformation and smart growth, and the sustainability of Latvia's cultural traditions (for more information see Cabinet of Ministers, 2014). Applications to the Programmes are peer-reviewed by the Council of Science but final spending decisions are taken by the MoES. On average, the annual funding distributed via National Research Programmes amounts to around EUR 4.5 million.

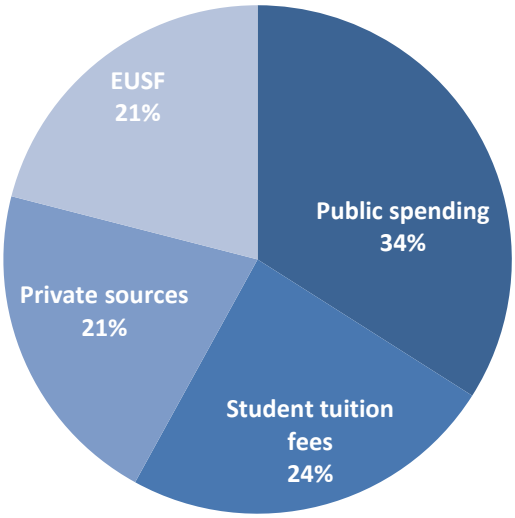
As already highlighted, EU SF is the core funding source for all support measures in R&D. The highest funding is allocated through programmes like 'practically oriented research' (EUR 76.5 million for the total SF funding period) and 'development of R&D infrastructure' (around EUR 115 million). As to funding from the EU Framework Programme, Latvia's participation in these competitive calls has not been very proactive. In total, 120 participants in H2020 are from Latvia, which represents 0.4 % of the total number of participants. They received approximately EUR 19.42 million which represented the third lowest sum across all EU countries (EC, 2016b). The most important institutions in attracting international project funding are the University of Latvia, Riga Technical University, and the Institute of Organic Synthesis. Together, these three scientific institutions have attracted 67 % of the overall international funding (MoES, 2016). To date, one researcher from Latvia – Prof. A. Ambainis from the University of Latvia, Faculty of Computing – has been awarded the prestigious 'Advanced Grant' by the European Research Council.

## 5.2 Structure of higher education institution funding

From a national policy perspective, in Latvia, R&D and HE are two different activities with two separate laws regulating them: the Law on Scientific Activity and the Law on Higher Education Establishments. The first of these states that HEIs have a duty to perform research activities. HEIs are major players in the Latvian R&I system, comprising 58 % of all researchers. HEIs and other public research institutions 'share' a common pool of annual allocations to fund research and compete with other R&D institutions for funds under National Research Programmes and Council of Science grants.

The Latvian HE sector is funded through both public and private sources. In 2013, total public expenditure on HE was 0.66 % of GDP (around EUR 153.2 million). The allocations are made as a lump sum and in cases where HEIs do not spend all the allocations for the year in question, they are not required to return these funds to the state budget. Figure 28 shows the funding distribution to HEIs in 2014 per source of funding.

**Figure 28: Funding distribution to HE sector per source of funding**




Source: World Bank, 2014

Prior to 2014, HE funding was allocated primarily through direct grants in addition to the government-guaranteed student loan system. Basic public funding for HEIs was calculated using a formula which used students as indicators in a price-per-student approach. Therefore, the previous funding model was primarily oriented towards the 'money-follows-the-student' principle. The number of study places per field and HEI was determined by a planning process that enabled the promotion of national priorities, affecting fields relevant to the Latvian economy. Because of the use of planned parameters, this was not a fully demand-driven model.

The funding model was designed to facilitate stable basic funding, and to a large extent the funding volume resulting from study places for each HEI remains the same. This was based on a three-year contract which received yearly updates (called an annual protocol) concerning adjustments to the number of state-funded study places. The contracts stipulated some of the metrics that HEIs must achieve (number of graduates, number of graduates from a specific field), introducing the most prevalent (if not the only) element of performance indicators to the funding model.

Public funds did not go directly to the faculties. Instead, they were initially centralised at the rectorate level and then allocated to faculties which were granted unrestricted internal autonomy for resource allocation (Saeima, 1995). Based on the three-year contracts, HEIs could reallocate up to 10 % of their funds from one programme to another, provided these reallocations did not impede the ability of the HEIs to graduate an agreed number of specialists from any of the study programmes.

EU SF allocations to HEIs (around 21 % of total HEI funding in Latvia) were used primarily to fund research. From 2009 to 2013, EU SF were the main source of funding for HEI R&D activities (World Bank, 2014b). The European Social Fund was also used to fund R&D in Latvian HEIs, in particular to increase human resource capacity. In Latvian HEIs, the ESF has been used to support 23 Master degree scholarship projects (EUR 11.7 million) and 28 doctoral degree scholarship projects (EUR 53 million). Around EUR 75 million of ESF funding has also been used to support young researchers (World Bank, 2014a).

In the wake of the World Bank's comprehensive assessment of the HEI funding model in 2014, substantial reforms have been initiated in HE financing mechanisms. Initially, according to the existing legislation, the HEI funding comprised the following components: 1) base funding that is calculated taking into account the number of study places; 2) contracts to prepare a certain number of specialists; and 3) competitive research funding. Assessing the regulatory framework, the World Bank found that while some performance-based elements were identified in the existing

funding model, such mechanisms did not operate efficiently. The competitive research funding was not aligned with HEI development strategy and HEIs were stripped of base-science funding (MoE, 2014).

The World Bank's recommendations suggested that Latvia should adopt a three-pillar model which would combine:

- Stable financing or basic funding (this element was already present in the Latvian system);
- Performance-based funding using a formula with performance indicators;
- An innovation component based on third mission target agreements with the MoES (World Bank, 2014b).

By the end of 2015, Latvia had adopted the three-pillar model which accounted for basic funding, performance-oriented funding, and innovation funding tied to the universities' third mission (see the concept in Figure 29). The first pillar comprises base funding to HEIs for ensuring their study and research activities as well as system stability. Base funding is set according to the number of study places, the award of which mirrors the strategic national development priorities. The HEIs are now granted access to science-base funding, thereby ending the practice that this funding stream can only be awarded to those scientific institutes integrated in HEIs. HEIs receive funding for research activities according to the number of research personnel and cost of studies in the respective research field (MoES, 2014).

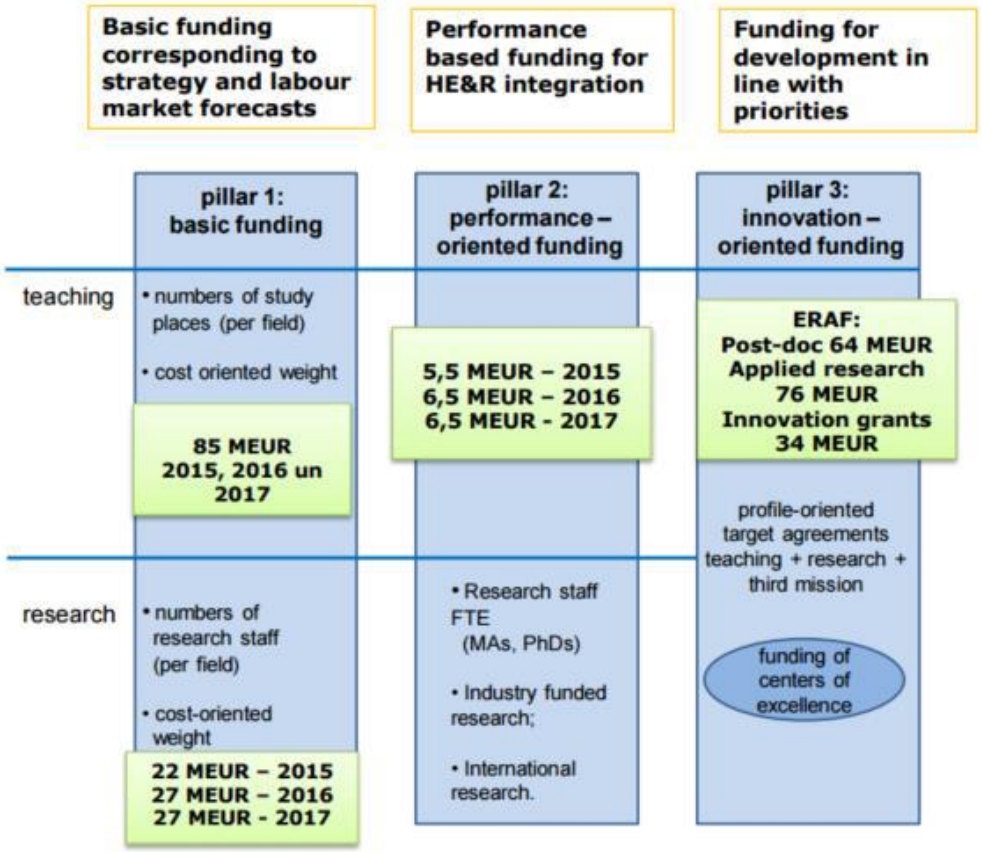
The second pillar is performance- and growth-oriented funding that promotes mutual competition. Funding is awarded after an *ex-post* assessment of results achieved, as against the planned performance criteria that the HEI and MoES have agreed upon in a target contract. The funding level is set by the MoES and the performance criteria are established during the negotiation procedure with the HEIs and, where appropriate, sectoral ministries. Core performance indicators are included in the funding mechanism as a constant component in the financing award formula. Specific indicators are included as a variable component in the formula (MoES, 2014). In November 2015, the Latvian government introduced performance-based funding which took into account the results the HEIs achieved in 2014. These indicators revolve around the ability of an HEI to attract young researchers, research projects, local government research funding, and implemented and realised art and creative projects. Criteria have also been developed for the performance-based funding of R&D activities. To implement the new performance-based funding, a budget sub-programme allocated EUR 5.5 million in 2015 and EUR 6.5 million in both 2016 and 2017 (Kulikovskis, 2016).

The third pillar aims to foster certain innovation-oriented activities that correspond to the HEIs' strategic development plans. For instance, the funding can be allocated to the development of centres of excellence, the realisation of specific research initiatives, technology transfer and cooperation with industry. Funding is awarded on a competitive basis and takes into account the alignment of the initiatives with national priorities (MoES, 2014). Using this funding stream, the government expects to stimulate R&D activities in the HEIs by signalling the importance of connecting R&D to education and pursuing universities' third mission. Changes to the funding are also expected to encourage HEIs to seek additional financial resources from the private sector, especially in light of the weak private contributions to HEI R&D. The current plans appear to be to use EU SF to support innovation funding. Emphasis has been placed on the fact that support to innovation should also feature when planning the HE budget. Of all the changes to HEI funding in the last two years, innovation funding is the least documented (Kulikovskis, 2016).

To summarise, the three-pillar model envisions that base funding should ensure system sustainability, performance-oriented funding fosters the attainment of targets, and innovation-oriented funding supports the planning of long-term development. Target contracts between HEIs and the MoES are concluded for a three- to five-year period, taking into account national priorities, developments in the labour market, and specific sectors of the economy (MoES, 2014). The contract is reviewed annually, adjusting the number of study places and performance targets, if necessary. Performance funding is awarded in the same ratio as target fulfilment. The new model is expected to provide a balance between funding for past achievements and funding for the attainment of future goals, national priorities and institutional missions, and financial autonomy and responsibility for the effective and efficient use of resources.

Although the European Commission has welcomed the plan to introduce the model, it has highlighted the fact that the allocated funding is lower than is required for optimal development of the model, as suggested by the World Bank. It also points out that the new model's international dimension is limited. In 2016, no additional national funding was allocated to the third pillar due to budget restrictions (EC, 2016a).

**Figure 29: Concept of the new HE funding model**




Source: MoES

## 5.3 Funding companies

The manner in which the government encourages private enterprise participation in R&D has also shifted in the last few years. Until 2014, "indirect government R&D incentives promoting RDI in Latvia, such as R&D tax credits, R&D allowances, reductions in R&D workers' wage taxes and others, were either insignificant or absent" (Kulikovskis, 2016). Latvian enterprises mainly targeted the acquisition of technology from outside the country and/or foreign investors and entrepreneurs. While the government has been addressing issues to the public R&D funding model, small steps are also being taken to encourage private-sector investments in R&D.

As of July 2014, private enterprises investing in R&D can deduct the costs associated with their R&D activities from the taxable amount by applying a coefficient of 300 %. The eligible R&D costs include:

- Scientific and technical personnel costs in relation to R&D work;
- Costs of research services received from scientific institutions;
- Costs of certification, testing, and calibration services when receiving the services from accredited certification, testing, and calibration institutions.

Eligibility for these tax cuts is strongly associated with novel R&D activities, so much so that more mainstream R&D activities receive tax cuts if the private enterprise can prove it was not aware of similar research already being performed. For the company to apply the tax break, it must evaluate the eligibility of the planned R&D. The exception is further extended when the R&D activities are especially beneficial for the national economy, or if the private enterprise has a patent for the product or its research. The uptake of this incentive is increasing and more companies are reporting their innovative activities, which were previously accounted for in operational expenditure (EC, 2016a). A comprehensive evaluation of the success of the support measure has yet to be initiated.

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## ABBREVIATIONS

ASR – Administration of Study and Research

BERD – Business expenditure on R&D

BIRTI – Baltic Innovative Research and Technology Infrastructure

CFCA – Central Finance and Contracting Agency

CSB – Central Statistical Bureau

CSCC – Cross-Sectoral Coordination Centre

EAFRD – European Agricultural Fund of Rural Development

EC – European Commission

EIS – European Innovation Scoreboard

ERDF – European Regional Development Fund

ESF – European Social Fund

EU – European Union

EU SF – European Union Structural Funds

FTE – Full-time equivalent

GDP – Gross Domestic Product

GEM – The Global Entrepreneurship Monitor

GERD – Gross domestic expenditure on research and development

HE – Higher education

HEI – Higher education institution

ICT – Information and communication technologies

IMF – International Monetary Fund

IT – Information technologies

JSC – Joint-stock company

LIDA – Investment and Development Agency of Latvia

LGA – Latvian Guarantee Agency

MA – Ministry of Agriculture

MF – Ministry of Finance

MoE – Ministry of Economics

MoES – Ministry of Education and Science

NDP2020 – National Development Plan 2014-2020

PhD – Doctor of Philosophy

RAE – Research assessment exercise

R&I – Research and innovation

R&D – Research and development

RDI – Research, development and innovation

RDF – Rural Development Fund

RIO – Research and Innovation Observatory

RIS3 – Smart specialisation strategy

RTU – Riga Technical University

SEDA - State Education Development Agency

SME – Small and medium-sized enterprise

TEA – Total entrepreneurial activity

UL – University of Latvia

WB – World Bank

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The report is providing background information on the Latvian research and innovation system and its funding mechanisms. It includes a concise overview of Latvia's current performance in research and innovation, the main challenges and the defined national priorities and targets for research and innovation system development, as well as the recent achievements in fulfilling the set of objectives. The report summarises information on the governance of the Latvian research and innovation system and the landscape of research performers. Details on the current funding system are provided by outlining the financing structure for scientific institution, higher education institution and companies.

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