

JRC SCIENCE FOR POLICY REPORT

RIO Country Report 2016: Latvia

*Research and Innovation
Observatory country
report series*

Kujikovskis, G, Petraitytė, D,
Stamenov, B

2017

This publication is a Science for Policy report by the Joint Research Centre (JRC), the European Commission's science and knowledge service. It aims to provide evidence-based scientific support to the European policymaking process. The scientific output expressed does not imply nor prejudice policy positions of the European Commission. Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use that might be made of this publication.

Contact information

Email: JRC-B7-NETWORK@ec.europa.eu

JRC Science Hub

<https://ec.europa.eu/jrc>

JRC105892

EUR 28489 EN

PDF	ISBN 978-92-79-66100-6	ISSN 1831-9424	doi:10.2760/026894
Print	ISBN 978-92-79-69865-1	ISSN 1018-5593	doi:10.2760/87217

Luxembourg: Publications Office of the European Union, 2017
© European Union, 2017

The reuse of the document is authorised, provided the source is acknowledged and the original meaning or message of the texts are not distorted. The European Commission shall not be held liable for any consequences stemming from the reuse.

How to cite this report: Gundars Kujikovskis, Diana Petraitytė, Blagoy Stamenov; RIO Country Report 2016: Latvia; EUR 28489 EN; doi:10.2760/026894

All images © European Union 2017, except for the ERA Dashboard image on the first page by Niels Meyer licensed under CC BY 2.0

Research and Innovation Observatory Country Report 2016 Latvia

The 2016 series of the RIO Country Report analyses and assesses the development and performance of the national research and innovation system of the EU-28 Member States and related policies. It aims at monitoring and evaluating the EU policy implementation as well as facilitating policy learning in the Member States.

Contents

Foreword.....	3
Acknowledgements.....	4
1. Main R&I Policy Developments in 2016	6
1.1 Focus on National and Regional Smart Specialisation Strategies.....	6
2. Economic Context	7
2.1 Structure of the economy.....	8
2.2 Business environment	8
2.3 Supply of human resources	9
3. Main R&I actors	9
3.1 Government.....	9
3.2 Academia.....	10
3.3 Business	11
3.4 Networks, clusters, platforms, linkages.....	12
4. R&I trends	12
4.1 Public allocation of R&D and R&D expenditure	12
4.2 Private R&D expenditure.....	13
4.3 Public sector innovation and civil society engagement	14
5. Innovation challenges.....	16
5.1 Challenge 1: Development of human capital for innovation	16
Description	16
Policy response	16
Policy Assessment	17
5.2 Challenge 2: Fragmentation of the public research and education system and low quality of the science base.....	18
Description	18
Policy response	18
Policy Assessment	18
5.3 Challenge 4: Sub-optimal framework conditions for entrepreneurship and access to finance to (innovative) enterprises.....	19
Description	19
Policy response	20
Policy Assessment	21
6. Creating and stimulating markets	22
References	23
List of abbreviations and definitions.....	24
Factsheet	25

Foreword

This report offers an analysis of the R&I system in Latvia for 2016, including relevant policies and funding, with a particular focus on topics of critical importance for EU policies. The report identifies the main challenges of the Latvian research and innovation system and assesses the policy responses implemented. It was prepared according to a set of guidelines for collecting and analysing a range of materials, including policy documents, statistics, evaluation reports and online publications. The quantitative data are, whenever possible, comparable across all EU Member State reports. Unless specifically referenced, all data used in this report are based on Eurostat statistics available in January 2017. The report contents are partly based on the RIO Country Report 2015 (Kujikovskis, Petraitytė and Stamenov, 2016).

Acknowledgements

Comments from DG Research and Innovation, DG Regional and Urban Policy and the Secretariat-General of the European Commission are gratefully acknowledged. The report has also benefited from comments from Nida Ozbolat from DG JRC unit B.3.

Authors

Gundars Kujikovskis, FIDEA (Financial and Management Consulting Company), Riga, Latvia

Diana Petraitytė, FIDEA (Financial and Management Consulting Company), Riga, Latvia

Blagoy Stamenov, Policy Analyst at the European Commission, Directorate-General Joint Research Centre, Unit B.7, Knowledge for Finance, Innovation & Growth (Brussels, Belgium)

HIGHLIGHTS

- Economic growth in Latvia slowed down significantly in the first half of 2016 as the use of EU funding for investment was much lower than expected. The general fiscal situation remains stable.
- In 2014, Latvian SMEs generated around 69% of the non-financial business economy's value added which is much higher than the European average (58%). However, Latvian SMEs are concentrated in sectors with low and medium-low research intensity.
- BERD intensity in Latvia has been stagnating in the recent years. In 2015, it decreased to as low as 0.15% of GDP.
- Government support to R&D in Latvia is still very modest. Latvian GBAORD (0.19% of GDP in 2015) is very low, 3 times lower than the EU average. The country is extremely reliant on EU funding for its R&D expenditure.
- Some public sector innovation initiatives in terms of new electronic services and open data projects were rolled out recently but in general the public sector and the civil society are not actively engaged in co-creation of services and in procurement of innovative solutions.

MAIN R&I POLICY CHALLENGES

- **Development of human capital for innovation.** Insufficient supply of human resources is an issue for both the business and the public sector, and human capital capacity in both cases relates not only to the number of people, but also to the relevance of their knowledge.
- **Fragmentation of the public research and education system and low quality of the science base.** Despite consolidation efforts, fragmentation in the educational system did not change significantly. With respect to geographical dispersion not much progress is observable - no physical locations are consolidated, and no researchers or infrastructure was relocated.
- **Sub-optimal framework conditions for entrepreneurship and access to finance to (innovative) enterprises.** The risk of abuse of the insolvency process and the shadow economy are particularly acute problems hindering entrepreneurship.

MAIN R&I POLICY DEVELOPMENTS IN 2016

- In May 2016, the Cabinet of Ministers confirmed the accompanying documents of the government action plan "[Cabinet of Ministers priority lines of action for the development of the economy](#)".
- The Ministry of Economics, in cooperation with other responsible ministries, began the development of the innovation system governance model.
- In November, 2016, the Latvian Parliament approved the [Innovative Start-up Law](#) to create a tax regime that will stimulate the growth of innovative Latvian start-ups.
- The Ministry of Economics has approved the [acceleration fund, seed and growth fund](#) programmes executed by ALTUM making extra €60 million available to the market from the second quarter of 2017.

1. Main R&I Policy Developments in 2016

Government action plan "Cabinet of Ministers priority lines of action for the development of the economy" (05/2016)

The Ministry of Economics was assigned the leading ministry for the implementation of the third task of the action plan, namely "innovation as a necessary precondition for economic transformation, private sector motivation for 47% of total investment in research and development in 2018".

Ministry of Economics began the development of the innovation system governance model

The development of this model is undertaken in order to create a permanent multilevel discussion format, that will allow all involved parties (government sector, private sector, research and education sector) to participate in the discussions of questions related to the national innovation system and policy development.

Latvian Parliament approved the Innovative Start-up Law (11/2016)

This law sets two tax regimes for innovative start-ups: a flat tax regime (€252 per month per employee regardless of their salary) ensuring minimal social benefits, and a tax plan where all the social and personal taxes of highly qualified employees are covered by the state and the employees receive full social benefits.

Ministry of Economics approved the acceleration fund, seed and growth fund programmes

Executed by ALTUM, the programmes will make extra €60 million available to the market from the second quarter of 2017. Half of it will be dedicated to pre-seed and seed investments to accelerate 120-150 start-ups in 3 years.

1.1 Focus on National and Regional Smart Specialisation Strategies

Description and timing: The Smart Specialisation Strategy of Latvia puts an emphasis on supporting economic transformation and was developed by taking into account the structural challenges to enable the transformation and sustainable development of the Latvian national economy. The RIS3 of Latvia is laid out in one of the central RD&I documents, the "Guidelines for Science, Technology Development and Innovation for 2014-2020" (STDIG). The chosen specialisation fields are: (1) knowledge-based bio-economy; (2) biomedicine, medical appliances, bio-pharmacy and bio-technology; (3) advanced materials, technologies and engineering systems; (4) smart energy; and (5) the Information and Communication Technologies (ICT).

According to the "Smart Specialisation Strategy Monitoring System"¹ report (2014), the RIS3 monitoring system in Latvia revolves around three monitoring levels: the overall goals of the specialisation strategy, macro- and micro-level indicators. It was designed in such a way so that it would be more likely to capture the broad scope of the potential impact of public investment in science, technology development and innovation. The overall goals include an increase in investment in R&D as a percentage of GDP, a better position in the European Innovation Scoreboard and greater efficiency in the processing industries. The macroeconomic level indicators, among others, include private sector investments in R&D as a percentage of total investments, proportion of innovative companies, the number of R&D personnel and graduates in R&D related fields. The many micro-level indicators are the indicators contributing to the achievement of the macro-level indicators.

¹ Report by the Ministry of Education and Science of the Republic of Latvia; accessible at: <http://tap.mk.gov.lv/lv/mk/tap/?pid=40334802&mode=mk&date=2014-10-21>

In 2015 analysis of the ecosystems of each specialisation area were developed to introduce policy makers, the R&D sector, entrepreneurs and the general public to the main actors who create and use knowledge and, by doing so, to increase the quality of investments. Descriptions of the ecosystems provide a snapshot of the current context in which knowledge is created, including the scale of each knowledge area, core challenges, public funds and regulations.

The implementation of RIS3 is monitored by the Strategic Innovation Council, the highest decision-making body on innovation policy in Latvia, chaired by the Prime Minister.

New developments: The responsible ministries - the Ministry of Research and Education and the Ministry of Economics - are gathering the necessary information for launching the RIS3 monitoring system and some extra funds will be allocated for the Central Statistical Bureau to gather some missing statistics. The first monitoring report is envisaged for June 2017.

Outstanding issues: A few problems associated with the Smart Specialisation Strategy monitoring system are apparent in the Latvian RD&I context. Firstly, the monitoring system hasn't been properly launched yet and no extra funds have been allocated for monitoring. Secondly, the focus of the monitoring and evaluation system is still on R&D spending in monetary terms rather than on an increase in the volume of R&D activity, which does not account for the possibility of inefficient fund usage. Finally, the results of the policies regarding human capital development will only become apparent in the long term and the monitoring system lacks scope to define and track any progress in the short term that would indicate a gradual improvement.

2. Economic Context

Economic growth in Latvia slowed down significantly in the first half of 2016 (in 2015 it was 2.7%) as the use of EU funding for investment was much lower than expected. However, under the revised government plan for the use of EU funds, investment is expected to increase over the next two years.² Economic growth is expected to improve from 1.9% in 2016 to 2.8% in 2017 and 3.0% in 2018.³ This outlook is also supported by a fading negative impact from the Russian trade embargo and a robust household consumption.

The unemployment rate dropped from 10.8% in 2014 to 9.9% in 2015. However, it is forecast to decline less rapidly than previously envisaged to 9.6% in 2016 and 9.2% in 2017, as job creation is facing significant structural constraints - a decline in the working-age population and the increasing shortages of skilled workers in some sectors.⁴

The general fiscal situation remains stable in Latvia. The general government deficit stood at 1.3% of GDP in 2015. In 2016, the government deficit is projected to improve to 0.8% of GDP due to expected tax revenue growth underpinned by the pick-up in private consumption and the strong wage growth, as well as a one-off receipt from anti-money laundering investigations.⁵

The general government debt declined to 36.3% of GDP at the end of 2015 and is expected to stay low in the next few years.

² ECFIN Autumn 2016 Economic Forecast, http://ec.europa.eu/economy_finance/eu/forecasts/2016_autumn/lv_en.pdf

³ Ibid.

⁴ ECFIN Spring 2016 Economic Forecast.

⁵ ECFIN Autumn 2016 Economic Forecast.

Latvia shows steady labour productivity growth from 2000 to 2015 driven in part by high levels of foreign investment (mostly in the banking and real estate sectors). However, foreign direct investment (FDI) is declining⁶ in 2016 according to the Latvian Investment and Development Agency (LIDA). The wage growth is starting to outpace the increase in productivity, raising concerns about cost competitiveness of the Latvian economy in the medium term. To maintain the growth of productivity in the same pace the business model of Latvian enterprises should change towards more knowledge intensive products and services.

2.1 Structure of the economy

As reported by the Central Statistical Bureau, in 2014, 93.2% of economically active enterprises in Latvia were micro enterprises and 99.9% were classified as small- and medium-sized enterprises (SMEs). In 2014, Latvian SMEs generated around 69% of the non-financial business economy's value added (Central Statistical Bureau of Latvia, 2016). This is a significant proportion, as the European average is around 58%. The Latvian SMEs are, to a large extent, concentrated in sectors with low and medium-low research intensity, such as metal processing and machinery, wood products and food processing.

Data provided by the Central Statistical Bureau of Latvia indicates that the service sector accounted for 73.8% of Latvia's value added in 2015. Two other sectors that have been steadily losing their relative weights are the industrial and the agricultural sectors, accounting for 23% and 3.3% of GDP in 2015, respectively. The country's medium-low and low-tech industries, however, still account for around 82% (in 2014) of the entire manufacturing industry.

The service sector export structure is changing rapidly. Traditionally, Latvia was on a transit route for goods from Russia to Europe. However, 2016 is the first year when ICT exports are exceeding railroad transit services exports.

2.2 Business environment

In 2016, the World Bank's "Doing Business Index" (DB) ranked Latvia 22nd (out of 189 countries) when it comes to the ease of doing business there. Latvia occupied the same position in 2015. With regard to the four aspects of starting a business, Latvia was outperforming the European and OECD averages. Among the DB indicators, Latvia receives its highest ranking in terms of getting credit. The evaluation of Latvia's business environment is also quite positive when it comes to registering property, enforcing contracts and trading across borders, with the latter being explained by the country's lower import and export costs when compared to the benchmarked groups. Getting electricity has the worst ranking among the indicators (65th place in 2016). In 2015, Latvia was the 39th most favourable economy for resolving insolvency, in 2016 – 43rd. Most Latvian indicators under this aspect are close to the OECD average. A notable exception is the rate of recovery – while in the OECD member states the creditors could recover on average around 72.3% of their investment from the insolvent firm at the end of insolvency proceedings, in Latvia this number was 48.1%. Latvia has recently modified its Insolvency Law, which was changed to benefit the enterprises. However, these changes are not expected to produce a significant overhaul.

The insolvency process in Latvia receives a lot of criticism from industry groups and international investors. Abuse of the insolvency process is harmful for the Latvian

⁶ From €37m in 2015 to €11.5m in the first half of 2016.

economy in several ways. First, it makes it more difficult for businesses to receive financing as creditors are not sure to recover their investment. Second, it is mentioned as one of the deal breakers when investors are considering Latvia as their investment target. For example, in research for the Foreign Investors Council in Latvia (FICIL), Deloitte estimates that in the next 10 years the Latvian economy can lose up to €850 million if the insolvency process is not significantly improved. The rate of recovery DB indicator mentioned in the previous paragraph illustrates the problem.

Latvia has a very strong Small business act (SBA) profile (European Commission, 2015). It performs above the EU average in all but two areas: on skills & innovation it is below the average, and on business environment it is in line with it. Latvia scores particularly high marks on entrepreneurship, 'responsive administration', state aid & public procurement and the single market. Over the past seven years Latvia improved significantly in a number of SBA areas, mostly thanks to several successful policies adopted in the wake of the crisis and to action by the business community. One of the main achievements was the increase of the private sector's involvement in R&D.

2.3 Supply of human resources

In general, Latvia faces a shortage of human resources employed in R&D&I activities. Around 70% of employers regularly face lack of qualified workforce, according to the Latvian Employers' Confederation. According to external assessments, some of the main problems include an ageing researcher base, non-competitive remuneration of employees in science and a potential shortage of professionals in Information and Communication Technologies (ICT) and engineering in the near future (Technopolis Group 2014). The factors that have caused a reduction in the number of qualified human resources are rooted in the demographical and economic crises that have reduced the ability of the population to pay for higher education and have caused a high number of young people to emigrate to other countries.

To illustrate the problem, the number of new graduates in science, maths, computing, engineering, manufacturing, construction per 1000 population has slightly decreased in the recent years and remains below the EU average (1.76 per 1000 in 2014 vs 2.3 per 1000 for EU-28). The number of new doctoral graduates is increasing but is still much below the EU average (0.5 per thousand population vs 1.07 for EU-28 in 2013). Last but not least, the share of the population with digital skills is among the lowest in the EU (European Commission, 2016b).

3. Main R&I actors

3.1 Government

The Parliament of Latvia and the Cabinet of Ministers of the Republic of Latvia set the state's policy on the development of science and technology in broad terms.

The **Ministry of Education and Science (MoES)** has a pivotal role to play in developing R&I policy. MoES designs and coordinates public policies when it comes to research and education and supports project financing instruments and the Smart Specialisation Strategy (RIS3). Its subordinate institution, the **State Education Development Agency (SEDA)**, often implements the programmes designed by the MoES. The role of SEDA in the governance of EU funds for R&D is expected to decrease in the period 2014-2020 due to the planned consolidation of the system. However, this agency will still play an essential role in policy planning.

The **Ministry of Economics (MoE)** is responsible for developing policies related to business support and innovation as well as the design, introduction and supervision of Structural Funds programmes and projects pertaining to enterprise support and innovation. In the previous EU programming period (2007-2013), the **Latvian**

Investment and Development Agency (LIDA), which is one of the institutions overseen by the MoE, implemented these policies and programmes. The involvement of the Ministry of Economics in R&I activities is relatively low when compared to the involvement of the Ministry of Education and Science.

However, there are proposed changes concerning the governance of R&I in 2016. There are signs that MoE might be taking the lead with respect to innovation system governance as opposed to the current lead of the MoES. In March of 2016 the Innovation Department was established within the Ministry of Economics to ensure enhanced synergy between the policy planning functions and the EU support instruments as well as to assure more effective implementation of the state administration functions. In addition, the Ministry of Economics, in cooperation with other responsible ministries, began the development of an innovation system governance model. The development of this model is undertaken in order to create a permanent multilevel discussion format that will allow all involved stakeholders to participate in the discussions of issues related to the national innovation system and policy development.

The **Central Finance and Contracting Agency (CFCA)** has had a more influential role with respect to the governance of R&D funds since the start of the new EU programming period of 2014-2020. CFCA had to replace some of the functions of two main government funding agencies – SEDA and LIDA. CFCA is a state agency that is subordinate to the Ministry of Finance. With the aim of improving funding absorption, minimising costs and bureaucracy, the Ministry of Finance initiated concentration of EU fund allocation and oversight in the hands of one institution.

The JSC **Development Finance Institution Altum** is a financing institution that is fully owned by the state and has three ministries as its shareholders. The new unified 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 Joint Stock Company Rural Development Fund (RDF). The objective of Altum is to use state support financial instruments in order to provide efficient and professional support to growing businesses in the form of financial instruments.

The **Administration of Study and Research (ASR)** is another institution responsible for the implementation of R&I policy under the Law on Research Activity. Subordinate to the Minister of Education and Science, the ASR is, among other things, tasked to supervise the use of financial resources in research and administer the state budget resources allocated to fundamental and applied research projects.

On the advisory level, two institutions exist: The **Council of Higher Education (HEC)** of Latvia helps to develop the national strategy on higher education, to encourage cooperation between HEIs, state institutions and the general public, and to oversee the quality of higher education. The **Research and Innovation Council (RIC)** is a relatively new advisory body that was established at the end of 2013. RIC is chaired by the Prime Minister and its task is to advise the Cabinet of Ministers on important matters concerning research and technology investments and the evaluation of policy proposals. Ever since its establishment, the RIC has become a platform through which different stakeholders can communicate and reach consensus regarding potential decisions to be made by the Cabinet, thus making the R&I decision-making process more inclusive.

3.2 Academia

As reported by the Ministry of Education and Science of Latvia, 56 institutions of higher education and two branches of foreign universities were operational in Latvia in 2016. This number includes 17 state HEIs and 17 state colleges, and 13 HEIs and 9 colleges

established by juridical persons.⁷ HEIs play an important role in the Latvian R&I system with more than 60% of researchers being concentrated in this sector. Three Latvian universities, namely the University of Latvia, Riga Technical University and Riga Stradins University, are internationally recognised for their research institutes and scientific groups. The research activities of smaller and private HEIs, on the other hand, are not well developed. The main research performers at the universities are research institutes with various degrees of autonomy and legal statuses. As of beginning of 2016, of a total of 77 scientific institutions listed in the Scientific Institute Register of the Ministry of Education and Science, 37 could be classified as public research organisations (PROs)⁸.

An assessment of the Latvian research and innovation system points to the excessive fragmentation of the public research organisation system (Technopolis Group, 2014). Based on this assessment, consolidation of the scientific institutes with regard to base financing has already been undertaken. The number of state research institutes that receive the base financing is planned to be reduced from 29 in 2015 to 20 by 2020. According to the consolidation plans, the state will only allocate the base financing to the institutes that have received high scores in international evaluations. Already for the year 2016, the base financing will only be given to 21 state scientific institutions.⁹

Recently, the first entrepreneurial university was established – the Riga High Tech University (RHTU).¹⁰

3.3 Business

During 2014, a rapid increase in R&D activities in the Latvian business sector was observed. BERD increased by 13% to €57.8m in 2014. Growth was also experienced in the number of full-time employees (FTE) in research and development in the business sector, which went from 981 in 2013 to 1,382 in 2014.

However, the impressive increase in business R&D experienced in 2014 seems to have been only a temporary improvement. In 2015, Latvian business R&D indicators reversed to similar levels as in 2013 – BERD in 2015 stood at €37.6m and the full-time (FTE) R&D personnel count in the business sector was 1,145 (Central Statistical Bureau of Latvia, 2016). The predominant source of funding for the business enterprise sector in 2015 was foreign (mostly EU) funds - €19m.

Most of the innovative companies in Latvia are SMEs. The accounting principles and underreporting of R&D activities by enterprises could partially explain the low expenditure on R&D. Latvian enterprises (especially if they are SMEs) rarely pay much attention to the classification of R&D activities. Such a culture might be due to the lack of R&D tax incentives until recently as well as to the lack of recognition of R&D in the expense reports of the enterprises that actually perform a great deal of R&D. However, these circumstances are starting to change and they might lead to at least a partial correction of the underreporting.

The private sector investment in R&D, according to the National Development Plan of Latvia for 2014-2020,¹¹ is set to reach at least 48% of the total investment in R&D by

⁷ List available at: <http://www.izm.gov.lv/lv/izglitiba/augstaka-izglitiba/augstakas-izglibas-iestades>

⁸ Research organisations associated with state HEIs are also considered to be PROs <http://www.ikvd.gov.lv/zinatnisko-instituciju-registrs.html>

⁹ List available at: http://www.izm.gov.lv/images/zinatne/BF2016/BF_ZI_gala_rik_2016.pdf

¹⁰ <http://rhtu.edu.lv/about-us/>

¹¹ http://www.pkc.gov.lv/images/NAP2020%20dokumenti/NDP2020_English_Final_.pdf

2020. This corresponds to BERD/GDP target of 0.72% by 2020 which at this stage seems quite ambitious.

3.4 Networks, clusters, platforms, linkages

Latvia has 8 Technology transfer contact points¹² and 4 Science and Technology Parks (Latvian Technological Centre, Latvia Technology Park, Ventspils High Technology Park, Latgale Machinery and Technology Centre)¹³ which also offer business incubation services.

There are currently many incubators, hubs, working spaces and initiatives appearing that aim at facilitating innovation, entrepreneurship and start-up creation in Latvia: Turiba business hub,¹⁴ RISEBA business incubator (for creative industries),¹⁵ the Design Factory¹⁶ of RTU which aims to become the largest fab lab in Latvia and join the Design Factory Global Network, a business incubator in Madona¹⁷ (a relatively small city in Latvia), etc.

4. R&I trends

The National Reform Programme and the National Development Plan of Latvia have set the national target for GERD at 1.5% of GDP for the year 2020. Even though this target is half of the European R&D intensity goal, it is still ambitious. With 0.63% of GDP in 2015 Latvian GERD is among the lowest in the EU.

4.1 Public allocation of R&D and R&D expenditure

The economic crisis of 2009 hit Latvia very hard and the country experienced a negative GDP growth rate of -17.7%. At the backdrop of rapidly increasing foreign debt and outflow of foreign private capital the country was faced with very strong fiscal consolidation pressure and pursued pro-cyclical austerity measures across the board. This led to a drastic decrease of R&D spending and appropriations both in absolute and relative terms (Figure 1). The public R&D expenditure started recovering after 2010 but in 2015 it still hasn't reached the pre-crisis level of 2008.

¹² Full list here: <http://www.liaa.gov.lv/lv/tehnologiju-parneses-kontaktpunkti>

¹³ <http://www.spica-directory.net/associations/?id=40>

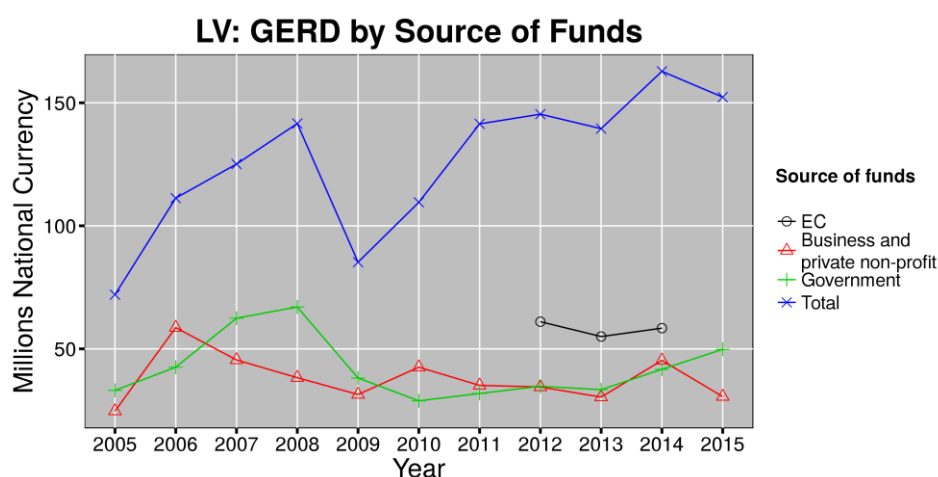
¹⁴ <http://www.turiba.lv/lv/dzive-augstskola/biznesa-inkubators/116/>

¹⁵ <http://www.riseba.lv/lv/par-riseba/par-riseba-radoso-biznesa-inkubatoru>

¹⁶ <http://www.rtudesignfactory.com/>

¹⁷ <http://businessmadona.lv/madona-var-labak/>

Figure 1. Latvia: GERD by source of funds



The Latvian government budget appropriations or outlays for R&D (GBAORD) increased from nearly €30m in 2011 to about €47m in 2015. However, the EU average GBAORD as % of GDP is 3 times higher than the one in Latvia (0.19% in 2015). The government's support to R&D in the country is still very modest.

Publicly funded R&D is almost entirely performed by the public sector. In the recent years, R&D performed by the governmental sector has shown increasing volumes, accounting for 28.3% of the total GERD in 2013 but decreasing to 24% of the total GERD in 2014. In 2015, the absolute expenditure on R&D by the government sector was the same as in 2014 (€39m), and as a percentage of the total it picked up to 25.6% due to the lower total expenditure in 2015. The share of R&D performed by the higher education sector is still the most significant contributor to the R&D activity in Latvia, spending a half of the total R&D funds (49.7% in 2015).

Latvia is extremely reliant on EU funding for its R&D expenditure. Since 2009 the external funding accounts for around 45 - 50% of the total GERD. In 2013, 51.6% and in 2015, 44.4% of Latvian total GERD was funded from abroad. Thus, it is largely thanks to the EU Structural funds that Latvia continues to fund its R&I policy mix. The use of EU SFs in Latvia in the period 2007-2013 was directed mostly towards investments in infrastructure, production equipment purchases or replacement, construction and other capital goods. Less tangible R&D&I investments, such as RD&I activity, education, human resources, social investments and the like, were not as significant. In the 2014-2020 period €482.6m (8.8% of total structural funds allocation) is allocated to thematic objective 1. Strengthening research, technological development and innovation (European Commission, 2014).

As regards indirect funding, a new tax incentive (enhanced allowance scheme) was introduced in July 2014. The new scheme offers a 300% super deduction of a range of R&D expenditures.

4.2 Private R&D expenditure

BERD intensity in Latvia has been stagnating during the recent years and is one of the lowest in the EU. It peaked in 2006 but then went back down to values of around and below 0.2% of GDP. The value for 2014 (0.24% of GDP) marked a notable increase from 2013 but in 2015 it decreased to as low as 0.15% of GDP. The business sector performed 24.7% of total GERD in 2015 which is way below the EU average of 64%.

The highest BERD spenders have been the manufacturing and business services sectors. In 2011 business services R&D intensity dropped and manufacturing became the most important sector in this respect. In the manufacturing top sectors (in terms of BERD) the manufacture of wood products, the pharmaceutical industry and the manufacture of computer, electronic and optical products are responsible for the increase in manufacturing BERD since 2011. Thanks to long-standing traditions, Latvia has a strong manufacturing base in fine chemicals and pharmaceuticals. The country was the principal location for these sectors in the former Soviet Union, with 25% of new Soviet-era drug technology designed there. But by far the most R&D intensive sector in Latvia in 2014 is the wood sector (mostly plywood for different commercial transport and housing applications) (Figure 2, sector C16).

Figure 2. Latvia: Most R&D intensive manufacturing sectors



In the business services sector professional, scientific and technical activities, ICT, as well as the financial and insurance activities sector are the top BERD spenders. The Latvian ICT sector is less developed than in the neighbouring Baltic countries and for a while its R&D spending was quite small but since 2013 an increase is observable and the sector is developing fast, especially in the field of gaming services.

4.3 Public sector innovation and civil society engagement

The United Nations (UN) E-Government Survey 2016 showed that in 2016 the E-Government Development Index (EGDI) in Latvia was 0.681 (out of 1) and ranked 45th out of the evaluated economies. Latvia is behind both its Baltic neighbours in terms of its score. The index is a weighted average of normalised scores on the three most important dimensions of e-government: scope and quality of online services, status of the development of telecommunication infrastructure and human capital development in the country.

Some public sector innovation initiatives in terms of new services rolled out recently could be mentioned such as a mobile application to collect and report education and medical expense receipts for annual tax declarations which was introduced at the end of 2015.¹⁸ In addition, in order to enhance the activity of citizens to combat the shadow economy, to encourage the development of civil awareness and to improve communication between citizens and the State Revenue Service (SRS), a mobile application "Suspicious transactions"¹⁹ has been developed, which allows citizens to easily inform the SRS about suspicious transactions/receipts.

¹⁸ <https://www.vid.gov.lv/en/eligible-expenditure>

¹⁹ <https://www.vid.gov.lv/en/suspicious-transactions>

In the field of open data several good practice examples have been observed over the recent years. One example is the Open data pilot project commissioned by the Riga municipality in January 2016, where several of the existing data sets were made available in a machine-readable format. The Latvian Open Technology Association (LOTA)²⁰ has even been awarded by the Riga City Council representatives for the contribution to the open information and communication technology development, use and promotion. It is planned that in 2017 a national level open data portal will be established, which will make data used for innovative product and service development publicly available.

In 2014 the local mobile operator Lattelecom and the Ministry of Environmental Protection and Regional Development together with partners launched the "Latvian e-index" partnership initiative²¹. It assesses the state and local governments' administrative e-environment. It aims to inform on how the authorities and municipalities use the available assets and the modern ICT solutions to enhance the quality of services provided and the availability to the citizens and economic operators.

Civil society in Latvia is in general not actively engaged but there are some initiatives worth mentioning. A private portal "Mana Balss"²² (My Voice) financially supported by EU funds and EEA grants, collects public support for potential legal changes. The portal has received acceptance from the Parliament of Latvia and is open from 2011. With the help of the portal, as soon as 10 000 people support an initiative, it is passed on to the Parliament for a review and has to be considered in the Parliament sessions. This procedure has been included in the legislation of Latvia since 2012 and the Parliament and the municipalities have received approximately 30 initiatives with sufficient number of supporters ever since. Overall, since the establishment of the portal, over 1,000 initiatives have been seeking public support.

Another example of cooperation-encouraging initiatives is the conversation festival "Lampa".²³ Brought forward by the Foundation for an Open Society DOTS, Swedbank and the sustainable change agency SPARK from Denmark, this festival of democracy aims to create a platform for citizen engagement in social and civic processes, bolstering Latvia's democratic development. The festival offers conversations in all kinds of topics, and invites the public to engage in debates with the politicians and other participants on issues important to Latvia's democratic development. The festival was first organised in 2015. In 2016, the "Lampa" festival was already attended by three times as many people as in 2015 – almost 9,000 festival visitors. The public sector was represented there as well, to discuss issues with NGOs directly.

Since 2010, the British Embassy and The Ministry of Culture in Latvia are organising the Design week "radi!".²⁴ Every year this event brings innovative ways to cooperate - social enterprises, entrepreneurs and designers, public sector - can all find events for them to boost design thinking and other activities. The concept of "radi!" is to create public interest and understanding about the development of the creative and cultural industry sectors and their interplay with other sectors (e.g. education) that promote creativity and innovative business management. In 2016 more than 40 events were organised in various locations in Latvia.

²⁰ <http://lata.org.lv/open-data/>

²¹ <http://www.eindekss.lv/en>

²² <https://manabalss.lv/>

²³ <http://www.festivalslampa.lv/gb/>

²⁴ www.radilatvija.lv

5. Innovation challenges

5.1 Challenge 1: Development of human capital for innovation

Description

In the context of the RD&I system in Latvia insufficient supply of human resources is one of the biggest issues. This is true for both the business and the public sector, and human capital capacity in both cases relates not only to the number of people²⁵, but also to the relevance of their knowledge.

In its summary of the structural challenges of the Latvian R&D system, the National Guidelines for Science, Technology Development, and Innovation 2014-2020 (STDIG) point to the low number of people employed in science and the insufficient renewal of scientists. While it explicitly refers to the issues in higher education, it is important to also take into account the problems existing at an earlier stage in the education system. The quality of the provision of education in natural sciences is insufficient in high schools, which results in low numbers of students taking the state exams in biology, chemistry and physics as compared to other subjects. The differences indicate that schools are not doing enough to generate their students' interest in the natural sciences. Moreover, for a long time, it was not mandatory to take the state exams in any of the natural sciences, and there was a lack of initiative to make them mandatory.

Moreover, too much emphasis in policy making is placed on R&D expenditures in monetary terms, whereas it might be better to focus on R&D activity volume as measured by the number of R&D jobs available and filled. The human resource problems in the Latvian RD&I system are due to several factors: lack of mechanisms to attract or maintain industry scientists, e.g. lack of accessible financial support for post-doctoral and young researchers; non-competitive remuneration of researchers; heavy workload of scientists which potentially harms the quality of the research conducted and an ageing scientist base.

Policy response

Considering the ongoing large scale reforms related to education, two notable ones were introduced in 2015: a new approach to higher education financing (i.e. introducing performance-related components) and the new high school, college and study program licensing and accreditation procedure.

The accreditation reform will foster quality evaluation of the professional study courses and programs, as well as promote awareness of Latvian higher education, while also increasing its reliability. A new financing scheme²⁶ is expected to stimulate external financing of research and will signal to HEIs that research is an important part of the education process.

²⁵ The number of new doctoral graduates per thousand population aged 25-34 in Latvia is among the lowest in the EU: 0.5 in 2013, EU28 average: 1.07. Same is true for the number of researchers per thousand population (3.68 in Latvia vs. 5.36 in EU28).

²⁶ A new quality-targeting financing model has been developed, based on the recommendations from a recent World Bank study, and some performance-oriented funding was piloted in 2015-2016 (Kulikovskis and Stamenov 2016).

Positive signals are also being sent by industry associations (IT industry, Electronics industry etc.) that are organizing Public Relations (PR) events for the young generation to attract them to study STEM subjects.²⁷

The State has increased subsidies for universities to recruit more students in STEM studies. Being able to study free-of-charge attracts more applications. However, a significant number of students fail to graduate from their bachelor's studies, as their secondary education has not provided them with sufficient knowledge of mathematics and other STEM subjects.

Recently, an improvement was made in this sphere as the introduction of mandatory state exams (at the end of upper secondary education) in at least one of the three natural sciences was approved in 2014. It is expected that this reform could focus the attention of school principals on the quality of teaching in these subjects. Also, a new teacher remuneration model is in place since 2016, which introduces more stringent criteria for minimum student numbers per class and per school. This may reduce the number of small schools in which students of different ages are taught together in one classroom and may help increase the quality of teaching in basic education.

Moreover, within the framework of the Smart Specialisation Strategy of Latvia, the focus of the upcoming efforts is on the human resource capital needs (including support for doctorates) in the natural sciences (physics, chemistry, biology), engineering (computer science, materials science, biotechnology), medicine (int. al. pharmacy), agricultural science (int. al. forestry), social sciences in the areas which study human development and its challenges, and the humanities and arts.

Policy Assessment

When it comes to the labour market, the dependence of the National Employment Agency ("Valsts nodarbinātības aģentūra") on the Ministry of Welfare might be a drawback for skills promotion policies. The agency has objectives that cover mainly the support for the least protected and least capable labour force segments, which means that there are few policy measures for promoting the supply of highly skilled labour from their side. However, recently, cooperation between the Employment Agency and the educational system has significantly improved due to assistance from EU-funded programmes for young people (e.g. an ESF-financed "Youth guarantee" project²⁸). Several activities are also carried out by the Ministry of Economics with assistance from the EU structural funds - education of highly skilled labour upon demand of the employer is a special programme that allows industries to improve the skills of their staff.

There is scope to strengthen work-based learning. In July 2016, the government adopted the regulations for an ESF project to support work-based learning and practical training, but the implementation has not started yet.

When it comes to education in the STEM fields, it is important to take into account the problems existing not only in higher education, but also at an earlier stage in the education system. The quality of the provision of education in natural sciences is insufficient in high schools, which results in low student numbers and poor student performance in STEM studies later on. For instance, almost one third of the accepted students fail to graduate from Riga Technical University (at present the largest university of Latvia). It is expected that over the coming years STEM will continue to attract more students if the basic education manages to provide pupils with the necessary background

²⁷ <http://www.lettera.lv/lv/aktualitates/sagatavots-dvd-skoleniem-par-elektronikas-un-elektrotehnikas-nozari>; <http://kursors.lv/2016/01/25/programmesanas-konkursa-aicina-skolenus-aplicinat-savas-prasmes/>

²⁸ <http://www.nva.gov.lv/index.php?cid=2&mid=491>

knowledge, considering that a significant amount of funds are being invested in the STEM education.

5.2 Challenge 2: Fragmentation of the public research and education system and low quality of the science base

Description

One of the main structural challenges that Latvia is facing and has received multiple CSRs about is the high level of fragmentation in the higher education system. In 2016, Latvia was home to 77 scientific institutions and 58 higher education institutions. That makes 38 institutions engaged in R&D and 29 HEIs per million population. These numbers are lower in some of the more highly developed EU Member States and in Latvia's neighbouring countries. For instance, in 2014, Lithuania had 15.7 higher education institutions per million population, while Estonia had 19.

The excessive number of institutions leads to the inefficient use of financial and administrative resources, and causes problems for knowledge management. Inadequate public funding in a fragmented research and innovation system (fragmentation makes an increase in public financing ineffective) is also naturally leading to a lack of scientific excellence (for example, the share of scientific publications in the top 10% of the most cited worldwide as % of total scientific publications of the country was 3.3% in 2012).

The Latvian RD&I and education systems are not only fragmented with regard to their large number of institutions, but also from a geographic standpoint. A well-developed research infrastructure should enable more efficient cooperation between the stakeholders in the system and attract new competitive talent and capital. In the case of Latvia, centring the infrastructure around Riga could be an efficient option. As the capital city, Riga is the region where the majority of the population live and the country's economic activity is concentrated. Other regions do not have the ability to attract a critical mass of people and capital to further sustain their development. Thus, trying to artificially induce growth in the regions by building scientific facilities and higher education institutions and allocating more funding to them might instead further increase the dispersion and fragmentation of the RD&I system.

Policy response

Efforts to consolidate research institutions are being made by the Ministry of Education and Science. One of the tools to consolidate research institutions is base financing. In 2015 the Ministry of education and science decreased the number of research institutions that receive basic funding to 21²⁹. Furthermore, public funding, obtained from European Structural Funds for development of research infrastructure, was provided to only 14 scientific organisations which had received higher scores in the international research assessment exercise performed in 2014³⁰.

In order to stimulate consolidation several changes were made in the law.³¹ The most significant change is additional financing for every consolidated functional entity (PRO) and additional partial financing for researchers whose main job is teaching but who participate in research activities as well.

Policy Assessment

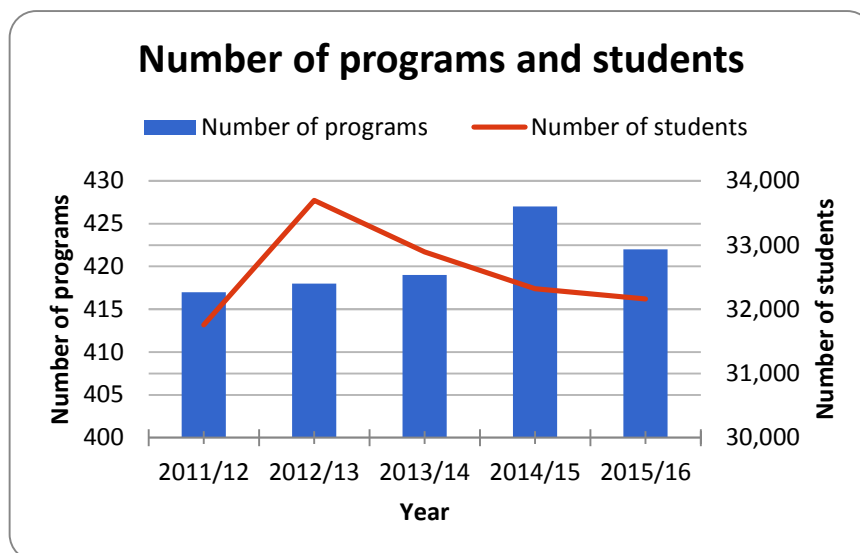
²⁹ <http://www.izm.gov.lv/lv/zinatne/zinatniskas-darbibas-bazes-finansejums/2016-gada-zinatnes-bazes-finansejums>

³⁰ Technopolis (2014), Latvia Innovation System Review and Research Assessment Exercise

³¹ <http://likumi.lv/doc.php?id=262508>

Despite efforts of consolidation, fragmentation in the educational system did not change significantly. **Error! Reference source not found.** shows the number of programs in higher education institutions, and illustrates that the decline in the number of programmes in 2016 was not very notable.

Figure 3. Number of programmes and students in the Latvian HEIs



Some progress can already be observed with respect to the consolidation of the R&D system – from 44 institutions receiving the institutional base financing before the start of the consolidation process, the number decreased to 40 institutions in 2014, 29 in 2015 and 21 in 2016. The goal of the consolidation is to have only 20 research institutions that receive the base financing by 2020.

With respect to the geographical dispersion not much progress is observable. No physical locations are consolidated, and no researchers or infrastructure was relocated. Administrative consolidation still does little to create clusters of researchers and to bring institutions critical mass. There are attempts to slow down the financing and the consolidation reform processes by vested interests – a reluctant big part of the research community whose funding would be cut as a result of the reforms. However, more intensive consolidation is necessary and is expected to follow.

5.3 Challenge 4: Sub-optimal framework conditions for entrepreneurship and access to finance to (innovative) enterprises

Description

Several factors in the Latvian business environment are important obstacles for entrepreneurship and access to finance to (innovative) enterprises. In particular, there is very limited progress regarding the accountability of insolvency administrators (which is part of the problem of deficiencies in investment protection), tax evasion (which remains high and is limiting government finance possibilities) and weak minority shareholder protection (European Commission, 2016a). According to the Commercial Law's requirements (under Art. 226), minority shareholders are guaranteed non-discrimination, access to information, and access to voting in shareholder meetings. However, there are cases of abuse of the insolvency process which includes hostile takeover of company assets by minority shareholders, the management or a third party acting in bad faith (Deloitte, 2016).

The risk of abuse of the insolvency process is a particularly acute problem hindering entrepreneurship according to research conducted by Deloitte together with the Foreign Investors Council in Latvia (Deloitte, 2016). According to the report, 60% of insolvency reports do not contain information required by the law. Moreover, in at least 15% of the insolvency processes there is at least one indication of abuse. The risk of abuse increases with the value of the enterprise in question. The study also showed that small and young companies in Latvia are more likely to engage in illicit activities and contribute to the shadow economy. This further amplifies the negative effect on the entrepreneurial environment, as it is more difficult for newly established companies to compete with their peers that are gaining advantage due to illegal practices.

In 2015, there was a modest decrease by 2.2% of the size of the shadow economy, continuing the long-term downward trend (Sauka & Putniņš, 2016). However, the shadow economy in Latvia remains significantly larger than in the other Baltic countries, estimated by the report "SSE Riga Shadow Economy Index" at approximately 21.3% of GDP. The shadow economy in Estonia and Lithuania in 2015 account for around 14.9% and 15.0% of GDP (Sauka & Putniņš, 2016).

The shadow economy is still an important problem for the entrepreneurial environment in Latvia. When a large number of enterprises, especially of small and medium size, participate in the shadow economy they limit their ability to access public and private finance and have lower incentives to innovate or to report innovation. The biggest components of the shadow economy in Latvia are misreported business income, unregistered employees and "envelope" wages.

Public support for access to finance is still at an early stage. Government support is primarily through SME guarantees and loans for growth, largely supported by EU Structural and Investment Funds. A "one-stop shop" for development financing (ALTUM) was established in 2015 but the roll out of the new support schemes (seed and growth fund programs) has been delayed to 2017.

Policy response

The Ministry of Justice of the Republic of Latvia submitted for review an "Insolvency policy development framework 2016-2020" and an Action plan. Four groups of activities were identified: enterprises should regain solvency during the insolvency process, valuable assets should return into the economic cycle, honest debtors should have a second chance, insolvency administrators should take care about the reputation of the whole profession³². In 2016, the reform of the insolvency administration entered into force and as of 1 September insolvency practitioners became public officials.

During the meeting of the shadow economy containment council under the Prime Minister the participants approved a plan for containing the shadow economy in Latvia. The plan includes sector specific activities targeting sectors with the highest shadow economy proportion, namely construction, services, transport, retail. Some of the activities are related to the improvement in control of income, employment and taxes. Other set of activities target improvements in the legal process. In 2015, the Ministry of Finance published the taxes paid in 2014 by all companies in Latvia.

Some promising initiatives in the start-up community were brought forward in 2016. The newly established (in spring 2016) Latvian Start-up Association has raised an ambitious goal to make the country "the perfect launch pad for start-ups to go global"³³, and is uniting former policy makers, start-up community activists and other start-up ecosystem players. The Start-up Association has explored the reasons behind the untapped

³² <http://www.lvportals.lv/visi/viedokli/281309-par-jaunajam-maksatnespejas-politikas-attistibas-pamatnostadnem-un-to-istenosanas-planu/>

³³ <http://startin.lv/>

potential of the start-up activity in Latvia and proposed first actionable steps towards the goal, including an ambitious employment tax policy treating start-ups differently from SMEs and support programs for attracting highly skilled workers. In November 2016 the Latvian Parliament approved the Innovative Start-up Law which sets two tax regimes for innovative start-ups: a flat tax regime (€252 per month per employee regardless of their salary) ensuring minimal social benefits, and a tax plan where all the social and personal taxes of highly qualified employees (i.e. having a doctoral or master's degree, or more than five years of experience) are covered by the state and the employees receive full social benefits. More initiatives to support start-ups in Latvia are planned for the near future, for instance a start-up visa to ease the process of attracting talent from outside (TechHub Riga, 2016).

Policy Assessment

Regarding the insolvency policy improvement, the adopted plans and measures still seem relatively weak compared to the impact and the size of the problem. The possibilities to detect conflict of interest remain limited as the introduced control measures concentrate on punishing for formal incompliance. However, efficient tools for detecting and preventing malpractices by insolvent companies, individuals and creditors acting in bad faith are not used, resulting in many cases where recovery of funds is negligible.

Regarding containment of the shadow economy, the recent decrease of its size (while it slightly increased in the neighbouring countries) is an indication that the developed plan might be working. However, frequent changes of the management of the State Revenue Service, as well as a lenient attitude of the tax administration towards wrongdoers hinder the fight against tax fraud and evasion.

Finally, as far as start-up support and small business ecosystems are concerned, the new start-up support law will come into force on 1 January 2017 and it looks very promising. Other possible tools such as a start-up visa, if adopted, could also be very helpful in promoting the entrepreneurial ecosystem in the country.

6. Creating and stimulating markets

This section aims at describing and assessing national level efforts to introduce demand-side innovation policies to stimulate the uptake of innovation or act on their diffusion, including public procurement and regulations supporting innovation.

Demand-side innovation promotion instruments such as public procurement for innovation and pre-commercial procurement are largely absent in Latvia, which significantly influences innovation performance of both the public and the private sector. The main support measures providing incentives for businesses to invest in R&D are direct support schemes and tax incentives, which are also very recent.

The Corporate Income Tax incentive provides a tax break to companies for their R&D costs. The government approved this measure in 2014 and it has led to two changes in the Latvian environment: (1) businesses now have greater incentives to reinvest their profits in R&D as opposed to investing in extending their existing production capacity; (2) businesses have the incentive to report all their R&D activities. Discussions on a potential revision of this tax incentive are planned for 2017, after the data for the period of 2014-2016 and corresponding mid-term evaluation of the incentive are available.

The law on public procurement was reformed by several changes regarding innovation and research projects: a) to make it easier to purchase the services of external experts for an evaluation of the research projects; b) to decrease the level of bureaucratic costs of R&I performers by simplifying the procurement procedure where possible. The expected changes in the law represent an important step towards a peer-review based evaluation of the innovation projects that is expected to decrease the level of bureaucracy while increasing the quality of the projects selected for financing.

However, using e-procurement platforms is still not obligatory. E-procurement reduces the administrative burden and helps achieving greater transparency for both the administration and the economic actors participating in tender procedures.

One of the main problems when it comes to the Latvian government approach to creating and stimulating markets is the lack of smart procurement. Currently the biggest public procurement drawback is the law emphasising price as the main, and essentially the only, criteria for selection. This decreases innovation and information flow from the private to the public sector. When a government agency starts procurement procedures, in order to secure the quality of the service, it traditionally builds technological barriers to prevent companies providing older or inferior technological approaches from participating. However, every technological choice made at the time of the procurement procedure limits the possibility for the private sector to compete by offering innovative solutions. Moreover, such an approach allows the suppliers to "lock in" the government to a particular technology.

Some legal barriers the removal of which can help stimulate markets can also be mentioned. For example, rules that limit the usage of cloud services to process personal and public data limit innovation. Many cloud services are new and some are available only outside the EU. Allowing the storage and processing EU data outside the EU might facilitate a roll-out of completely new state-of-the-art public services and platforms.

References

- Central Statistical Bureau of Latvia. (2016). Latvijas statistika. Retrieved 28 August 2016, from <http://www.csb.gov.lv/en>
- Deloitte Legal. (2016, April). *Ļaunprātīga maksātnespējas procesa riski Latvijā*. Riga. Retrieved from http://www.ficil.lv/f/Deloitte_presentation.PDF
- European Commission. (2016a). *Country Report Latvia 2016* (No. SWD(2016) 82 final). Retrieved from https://rio.jrc.ec.europa.eu/en/library?field_external_document_type_tid=1185
- European Commission. (2016b). *Digital Economy and Society Index 2016 Country Profile Latvia*. Retrieved from <https://ec.europa.eu/digital-single-market/en/scoreboard/latvia>
- European Commission. (2015). SBA Factsheet 2015 Latvia. Retrieved from <http://ec.europa.eu/DocsRoom/documents/16344/>
- European Commission. (2014). Summary of the Partnership Agreement for Latvia, 2014-2020
- Gundars Kulikovskis, Diana Petraityte, & Blagoy Stamenov. (2016). *RIO Country Report Latvia 2015* (No. LF-NA-27867-EN-N). Seville: Joint Research Centre, European Commission.
- Latvian Electrical Engineering and Electronics Industry Association. (2016). Latvijas Elektrotehnikas un elektronikas rūpniecības asociācija / Aktualitātes. Retrieved 11 October 2016, from <http://www.letera.lv/lv/aktualitates/sagatavots-dvd-skoleniem-par-elektronikas-un-elektrotehnikas-nozari>
- Sauka, A., & Putniņš, T. (2016). *Shadow Economy Index for the Baltic countries 2009 - 2015*. Riga: Stockholm School of Economics, Riga.
- TechHub Riga. (2016). Latvia Passes Innovative Startup Law. Retrieved 25 November 2016, from <https://blog.techhub.com/latvia-passes-innovative-startup-law/>
- Technopolis Group. (2014). Latvia. Innovation System Review and Research Assessment Exercise.
- United Nations. (2016b). United Nations E-Government Survey 2016. Retrieved 11 October 2016, from <http://workspace.unpan.org/sites/Internet/Documents/UNPAN96407.pdf>

List of abbreviations and definitions

BERD	Business Expenditure on Research and Development
CFCA	Central Finance and Contracting Agency (Latvian - Centrālā finanšu un līgumu aģentūra [CFLA])
EU	European Union
ESF	European Social Fund
FDI	Foreign Direct Investment
FPs	Framework Programmes for research and technology development
FTE	Full Time Equivalent
GDP	Gross Domestic Product
GERD	Gross Expenditure on Research and Development
HEI	Higher Education Institution
JSC	Joint Stock Company
ICT	Information and Communications Technology
LIDA	Latvian Investment and Development Agency (Latvian - Latvijas Investīciju un Attīstības Aģentūra [LIAA])
MoE	Ministry of Economics (Latvian – Ekonomikas Ministrija [EM])
MoES	Ministry of Education and Science (Izglītības un Zinātnes Ministrija [IZM])
PRO	Public Research Organisation
RIC	Research and Innovation Council
RIS3	Research and Innovation Strategies for Smart Specialisation
RD&I	Research, Development and Innovation
SBA	Small Business Act
SEDA	State Education Development Agency. Agency under the Ministry of Education and Science (Latvian - Valsts Izglītības Attīstības Aģentūra [VIAA])
SF	Structural Funds
SME	Small and Medium Enterprise
STDIG	Science, Technology Development, and Innovation Guidelines 2014-2020
STEM	Science, Technology, Engineering and Mathematics - curriculum based on the idea of educating students in the four disciplines in an interdisciplinary and applied approach.

Factsheet

	2009	2010	2011	2012	2013	2014	2015	2016
GDP per capita (euro per capita)	8700	8500	9800	10800	11300	11800	12300	
Value added of services as share of the total value added (% of total)	72.63	71.74	72.16	72.25	72.83	73.28	73.72	
Value added of manufacturing as share of the total value added (%)	10.89	13.44	13.06	12.96	12.57	12.48	12.51	
Employment in manufacturing as share of total employment (%)	13.03	13.84	14.08	14.53	14.22	13.69	13.35	
Employment in services as share of total employment (%)	67.82	68.82	68.18	68.14	68.35	68.82	68.34	
Share of Foreign controlled enterprises in the total nb of enterprises (%)	5.15	5.1	5.23	5.56	6.68			
Labour productivity (Index, 2010=100)	96.2	100	103.7	107.3	108.3	111.5	114.8	
New doctorate graduates (ISCED 6) per 1000 population aged 25-34	0.28	0.2	0.43	0.49	0.5	0.46	0.47	
Summary Innovation Index (rank)	33	34	33	33	33	33	31	
Innovative enterprises as a share of total number of enterprises (CIS data) (%)				30.4		25.5		
Innovation output indicator (Rank, Intra-EU Comparison)			23	25	25	25		
Turnover from innovation as % of total turnover (Eurostat)		3.1		5				
Country position in Doing Business (Ease of doing business index WB)(1=most business-friendly regulations)						22	22	14
Ease of getting credit (WB GII) (Rank)						22	18	
EC Digital Economy & Society Index (DESI) (Rank)						17	19	19
E-Government Development Index Rank		37				31		45
Online availability of public services – Percentage of individuals having interactions with public authorities via Internet (last 12 months)	30	40	41	47	35	54	52	69
GERD (as % of GDP)	0.45	0.61	0.7	0.67	0.61	0.69	0.63	
GBAORD (as % of GDP)	0.2	0.16	0.15	0.15	0.14	0.16	0.19	
R&D funded by GOV (% of GDP)	0.2	0.16	0.16	0.16	0.15	0.18	0.2	
BERD (% of GDP)	0.16	0.23	0.19	0.15	0.17	0.24	0.15	
Research excellence composite indicator (Rank)				25				
Percentage of scientific publications among the top 10% most cited publications worldwide as % of total scientific publications of the country		3.97	4.39	4.11	6.28			
Public-private co-publications per million population	3.24	1.89	1.93	0.98	0.49	0		
World Share of PCT applications	0.02	0.02	0.01	0.02	0.01	0.01		

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

Freephone number (*):

00 800 6 7 8 9 10 11

(*) The information given is free, as are most calls (though some operators, phone boxes or hotels may charge you).

More information on the European Union is available on the internet (<http://europa.eu>).

HOW TO OBTAIN EU PUBLICATIONS

Free publications:

- one copy:
via EU Bookshop (<http://bookshop.europa.eu>);
- more than one copy or posters/maps:
from the European Union's representations (http://ec.europa.eu/represent_en.htm);
from the delegations in non-EU countries (http://eeas.europa.eu/delegations/index_en.htm);
by contacting the Europe Direct service (http://europa.eu/europedirect/index_en.htm) or
calling 00 800 6 7 8 9 10 11 (freephone number from anywhere in the EU) (*).

(*) The information given is free, as are most calls (though some operators, phone boxes or hotels may charge you).

Priced publications:

- via EU Bookshop (<http://bookshop.europa.eu>).

JRC Mission

As the science and knowledge service of the European Commission, the Joint Research Centre's mission is to support EU policies with independent evidence throughout the whole policy cycle.



EU Science Hub
ec.europa.eu/jrc



@EU_ScienceHub



EU Science Hub - Joint Research Centre



Joint Research Centre



EU Science Hub

