



JRC SCIENCE FOR POLICY REPORT

RIO COUNTRY REPORT 2016: Lithuania

*Research and
Innovation Observatory
country reports series*

Paliokaitė, A, González Verdesoto, E

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 prejudge 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

E-mail: JRC-B7-NETWORK@ec.europa.eu

JRC Science Hub

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

JRC105889

EUR 28492 EN

PDF ISBN 978-92-79-66106-8 ISSN 1831-9424 doi:10.2760/50717

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: Paliokaitė, Gonzalez Verdesoto; RIO Country Report 2016: Lithuania; EUR 28492 EN; doi:10.2760/50717

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 Lithuania

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.

Table of Contents

Foreword.....	3
Acknowledgements.....	3
1. Main R&I policy developments in 2016.....	5
1.1 Focus on National and Regional Smart Specialisation Strategies.....	7
2. Economic Context	7
2.1 Structure of the economy.....	8
2.2 Business environment	9
2.3 Supply of human resources	9
3. Main R&I actors	10
4. R&I trends	11
4.1 Public allocation of R&D and R&D expenditure	13
4.2 Private R&D expenditure.....	14
4.3 Public sector innovation and civil society engagement	15
5. Innovation challenges.....	15
5.1 Challenge 1: Improving the coordination of innovation policies	16
Description	16
Policy response	16
Policy Assessment	17
5.2 Challenge 2: Addressing human resources shortages in R&I	17
Description	17
Policy response	17
Policy Assessment	18
5.3 Challenge 3: Encouraging private investment in RDI	18
Description	18
Policy response	19
Policy Assessment	19
5.4 Challenge 4: Exploiting opportunities for commercialisation of public R&D results	20
Description	20
Policy response	20
Policy assessment.....	20
6. Focus on creating and stimulating markets.....	21
References	23
Abbreviations	25
Factsheet	26
List of Figures.....	26

Foreword

This report offers an analysis of the R&I system in Lithuania 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 Lithuanian 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 partially based on the RIO country report 2015 (Paliokaitė, Krūminas, Stamenov, 2016).

Acknowledgements

Comments from DG Research and Innovation, DG Regional and Urban Policy and other DG JRC colleagues, as well as feedback from the Lithuanian Ministry of Education and Science and the Ministry of Economy are gratefully acknowledged.

Authors

Agnė Paliokaitė, Visionary Analytics (Vilnius, Lithuania)

Elena González Verdesoto, European Commission, Directorate-General Joint Research Centre, Unit B.7, Knowledge for Finance, Growth & Innovation (Brussels, Belgium)

HIGHLIGHTS

- Lithuania's real GDP continued increasing in 2015, with positive forecast for 2016 (2.0% according to DG ECFIN's autumn forecast).
- Traditional sectors form the backbone of the economy, and competitiveness still relies on the exploitation of cheaper factors of production and not on innovation-based growth.
- The Lithuanian R&I system is centralised as regards funding allocation and governance.
- R&I policies remain highly dependent on EU funds, which partly replaced national R&D funds at the end of the previous programming period (the share of the EU funds in GOVERD increased to 92.38% by 2013).
- Public investments remained subdued in 2016 given the cycle of the ESIF financing.
- R&I landscape is dominated by the public sector when it comes to both performance and funding.
- BERD/GDP remains well below the EU average. Furthermore, in 2015 BERD dropped by 10.5%.
- The GERD target of 1.9% of GDP spent on R&D in 2020 requires an increase of both BERD and GOVERD annual growth of national budget expenditure on R&D.

MAIN R&I POLICY CHALLENGES

- **Improving the coordination of innovation policies.** The absence of a systemic R&I policy approach has contributed to a fragmented mix of policies and implementation structures, resulting in limited efficiency and missed opportunities
- **Addressing human resources shortages in R&I.** Due to unattractive research careers, insufficient quality of higher education and demographic as well as emigration factors, the lack of human resources for R&I has become a bottleneck for the achievement of most R&I policy objectives.
- **Encouraging private investments in R&I.** A more balanced policy mix is introduced, open for newcomers (start-ups, spin-offs, R&D-based foreign investors), and consisting of venture capital, business R&D grants, vouchers, pre-commercial procurement etc.
- **Exploiting opportunities for commercialisation of public R&D results.** Measures encouraging spin-offs and public-private collaboration are introduced. Still, too much focus is given to further upgrading and development of R&D infrastructure.

MAIN R&I POLICY DEVELOPMENTS IN 2016

- Revisions in [the Law on Higher Education and Research](#) (06/2016).
- The [Science and innovation Policy Reform Guidelines](#) (09/2016).
- The development, approval and initial implementation of the new R&I policy support [measures](#) under the Operational Programme (OP) 2014-2020 thematic objective 1, aimed at implementing the Lithuanian Smart Specialisation Strategy.
- Revisions of [the Law on Legal Situation of Foreigners](#) (07/2016) and the adoption of "Startup Visa" (06/2016).
- The [Law on crowd funding](#) (11/2016).
- 17th [Lithuanian Government Programme](#) (12/2016).
- [Decision on the optimisation of the network of public universities](#) (12/2016).
- [Implementation Action Plan](#) (10/2016) of the [OECD Review of Lithuanian Innovation Policy: Overall Assessment and Recommendations](#) (06/2016).

1. Main R&I policy developments in 2016

<p><u>Law on Higher Education and Research</u> (06/2016)</p>	<p>It introduces contracts with PROs on higher education accessibility and results, research and higher education quality and domestic and international cooperation (more details in section 5.2.).</p> <p>Specific provisions related to the reduction of research policy fragmentation are set up:</p> <ul style="list-style-type: none"> • strengthening of the role of governmental commission on Science, technology and innovation (Strategic Council for RDI); • assignment of the Research and Higher Education Monitoring and Analysis Center MOSTA as a main institution in governmental level for monitoring, analysis and assessment of RDI system and policy.
<p><u>Science and innovation policy reform guidelines</u> (09/2016)</p>	<p>They were proposed by the President in June and approved by the Parliament in September, with a mandate to the Government to prepare an action plan for their implementation by the 1st December. They aim at reforming the institutional R&D assessment and funding system, reforming R&I coordination and strengthening independent monitoring and evaluation of R&I policies (more details in section 5.1.).</p>
<p>Development and approval of the new R&I policy mix for 2014-2020</p>	<p>The new policy mix is mainly funded by the 1st and 9th priorities of the Operational Programme (OP) for 2014-2020. The first priority is about "strengthening research and development and innovation" and has 2 investment priorities: infrastructure and centres of competence; and promoting business investment in R&I as well as commercialisation and technology transfer. The 9th priority is broader but the specific objective 9.3.3. is "strengthen the skills and capacities of public sector researchers for engaging in high level R&D activities". 18 instruments have been approved under the first priority and other 3 under the 9th (more details in section 5).</p>
<p><u>Law on the legal situation of foreigners</u> (07/2016)</p>	<p>The revision is more favourable for the immigration of skilled specialists and start-ups (ie: "start-up visa" – more details in section 4.2).</p>
<p><u>Business Financing Fund given to INVEGA to administer</u> (04/2016)</p>	<p>The new fund is allocated €179.6m from ESIF and is expected to contribute to implementation of RIS3 activities in the private sector, increase entrepreneurship and productivity of SMEs.</p>
<p><u>Draft project for a decision on the optimisation of public universities</u> (10/2016)</p>	<p>The Parliament drafted a project for a decision regarding the optimisation of public universities, proposing the Government to analyse the current situation and prepare recommendations for optimization. The project was amended in November, and the Committee of Science and Education approved it for further considerations.</p>
<p><u>The law on crowd funding</u> (11/2016)</p>	<p>The law sets up the conditions for crowd funding, crowd funding platform operator, the terms and conditions for mandatory disclosure of information provided in crowd funding platform, as well as crowd funding platform operator's maintenance</p>

	procedures.
<u>17th Lithuanian Government Programme</u> (12/2016)	The October 2016 elections led to a change in the Lithuanian Parliament's majority. On 13 December 2016 the Parliament (Seimas) adopted the Programme of the 17 th Government, which had been drawn up by the coalition of the Lithuanian Peasant and Greens Union and the Lithuanian Social Democratic Party. Among other objectives, the Programme highlights quality of higher education and studies, implementing Smart Specialisation, and the implementation of the Science and Innovation policy reform guidelines approved earlier by the Parliament.
<u>Decision on the optimisation of the network of public universities</u> (12/2016)	The decision proposes that the Government or a delegated institution prepares suggestions on how the network of public universities could be optimised.
<u>Implementation Action Plan</u> (10/2016) of the <u>OECD Review of Lithuanian Innovation Policy: Overall Assessment and Recommendations</u> (06/2016)	There are 32 specific recommendations in the OECD Innovation Policy Review of Lithuania, which are divided into 6 blocks. The first one is to provide favourable framework conditions for innovation. The second is related to fostering the quality of human resources for innovation. The third suggests improving public governance of the innovation system. The fourth is about balancing the policy mix and fostering innovation in the wider business sector. The fifth is to enhance the performance of the higher education sector. And the sixth block of recommendations is about supporting international knowledge linkages. The Implementation Action Plan consists of 94 measures that address each of the OECD recommendations.

1.1 Focus on National and Regional Smart Specialisation Strategies

Description and timing: The Lithuanian Government approved the programme on the implementation of the RDI priority (smart specialisation) areas and their priorities (Smart Specialisation Programme) in April 2014 and [Action plans for implementation of the priorities](#) in the first half of 2015. In August 2015 a general Action plan for this programme concerning the measures coordinated by the Ministry of Education and Science was also approved. These documents cover the implementation of six priority areas and their twenty specialisations – specific priorities.

Following the principles of coordination and monitoring provided in the Smart Specialisation Programme, the coordination group consisting of key stakeholders was established (in 2014) to monitor and coordinate the implementation of the priorities. By the end of 2014 the detailed procedures of evaluation and monitoring of Smart Specialisation Programme were adopted. The provisions provide that two institutions will be responsible for monitoring and evaluation of the implementation of the programme on the implementation of the R&I priority areas and their priorities – MOSTA and the Ministry of Economy.

New developments: From 2015 on, implementation of smart specialisation and thus monitoring and evaluation in Lithuania has started. The first calls for the projects were launched by the end of 2015 and beginning of 2016.

As of the second half of 2016, the Ministry of Economy and MOSTA have developed a project for the evaluation and monitoring system of research and innovation priorities covering output indicators, interim evaluation, impact analysis, foresight exercise, etc. The activities of the project are envisaged to start in 2017.

The monitoring and evaluation system will also be used for an interim review of the Lithuanian smart specialisation strategy implementation and to plan R&I policy after 2020.

In November 2016 the Government took the decision to reorganise MOSTA and make it responsible to the Government's Office and to extend its function for carrying out the evaluation and monitoring of the status of research, higher education and innovation in Lithuania.

Outstanding issues: There are plans to carry out a foresight exercise in order to find out whether priority areas and priorities remain relevant by 2018. The Programme itself includes the possibility to modify priorities based on acquired evidence. Overall, the planned monitoring and evaluation mechanism is balanced and the included measures cover the main aspects of smart specialisation strategy (RIS3); however the dialogue among all actors involved in RIS3 design shall be continued in the strategy implementation phase. This task includes dialogue with the teams/institutions that conducted the entrepreneurial discovery process (EDP) exercise, as well as actors involved in the management/implementation of the Operational Programme, down to the very individuals involved in drafting and managing calls for proposals.

The implementation of the Smart Specialisation Programme and its evaluation and monitoring will largely depend on how successfully the related institutions will manage to cooperate and whether there will be enough political will to respond to the changes.

2. Economic Context

Real GDP grew around 2% in the first three quarters of 2016, somewhat below estimation. According to the European Commission's autumn 2016 European Economic Forecast (9 November), despite continued strong private consumption growth, domestic demand was dampened by weak investment, which suffered severely from an

interruption in EU funds flow. In 2017, recovering investment is set to increase GDP growth to 2.7%. However, higher inflation is forecasted to dampen private consumption which will increasingly weigh on growth in 2017 and 2018.

In 2015, the general government's deficit declined from 0.7% to 0.2% of GDP, but is expected to bounce up to 0.6% in 2016 and 0.8% in 2017 according to the Commission's forecast. In 2015, debt was 42.7% of GDP in 2015 and is forecasted to fall to 40.8%. The unemployment rate went from 10.7% in 2014 to 9.1% in 2015 and is forecast to decline further in 2016 and 2017. Despite Lithuania's high growth level, it still lags behind the EU average in terms of GDP per capita. Its fast recovery after the crisis allowed the country to join the euro in 2015.

Lithuania's labour productivity (in per hour terms) has been consistently increasing for the major part since the country's accession to the EU with the exception of 2009 and 2015. According to the Eurostat data, GDP per hour worked increased by 14.7% over 2010-2014. A minor decline was registered in 2015, leading to €15 (in current prices) per hour worked.

In terms of real labour productivity per person employed no decline was registered, even if the growth slowed, according to the Eurostat data. The nominal labour productivity per person employed in Lithuania was 73.2% of the EU average in 2015 (up from 65.1% in 2008), 22nd among the Member States. According to OECD (2016a), higher supply of skilled workers and increased business innovation activities could help further improve Lithuania's productivity.

2.1 Structure of the economy

Lithuania's economy mostly relies on services and the traditional sector (low and medium technology manufacturing industry), which forms the backbone of the economy. The knowledge-intensive services sector accounts for 33.8% of total employment (2015). In 2015, value added from knowledge-intensive services was 24.76% and high and medium high-tech manufacturing amounted to 3.84% of total value added (in 2014). According to Eurostat data, the agriculture sector's importance for the economy is diminishing. By 2014 gross value added in agriculture, forestry and fishing was only 3.6% of total value added. In general the largest share of value added is created in services (66.5% of total value added in 2015), and manufacturing (19.3% in 2015). These sectors also account for 65.9% and 15.2% of employment respectively.

The data from foreign direct investment (FDI) markets shows that in 2015 Lithuania attracted 49 FDI projects in total expected to create 4,187 new jobs. It ranked first in the Central Eastern Europe and 5th in the EU with respect to FDI projects per million population (Invest Lithuania, 2016). However, FDI flow into Lithuania was negative and equal to €-521.9m in the 1st quarter of 2016, while in the 2nd and the 3rd quarters flow was positive even if comparatively small (€33.85m and €17.3m respectively) (Bank of Lithuania, 2016). As of 31st September 2016, cumulative FDI in Lithuania amounted to €12.8b (preliminary data, Statistics Lithuania).

According to the European Commission (2016c), in 2015, only 301 companies had at least 250 employees (0.2% of all companies), while 156,820 were small and medium size enterprises (99.8%). Concerning foreign controlled enterprises, Eurostat indicates that in 2014 there were 3,629 such enterprises in total, of which 2,643 (72,8%) were controlled by entities from the EU¹.

¹ This data does not account for companies in financial and insurance sector.

2.2 Business environment

Business environment in Lithuania is friendly, and the country ranked 21st in the World Bank's doing business index (out of 190 world countries) as of November, 2016. Recent changes (2014-2016) enabled entrepreneurs to start a business online, establish limited liability companies without minimum capital, etc. However, some barriers remain, such as resolving insolvency. The key venture capital funds available for business in Lithuania are dependent on EU investments, but privately owned funds are also emerging.

Business access to venture capital markets has increased dramatically during 2011-2014 in Lithuania. In addition to several past and ongoing initiatives (see expert background report for further details), in 2016, €179.6m has been secured for loans, guarantees and venture capital in the new Business Financing Fund².

The Global Entrepreneurship Monitor (2014 data)³ indicates that Lithuania has a high share of intrapreneurs (i.e. entrepreneurs within a firm). Furthermore, the findings show that entrepreneurship driven by necessity is being replaced by entrepreneurship driven by opportunity. Enterprises' birth rate in 2013 was 23.64 (the highest among those EU Member States for which data is available). Meanwhile, the survival rate was one the lowest with 40.17.

When it comes to digital infrastructures, Lithuania scores above EU average in connectivity, use of Internet, integration of digital technology and digital public services, according to the 2016 Digital Economy and Society Index (DESI) report. However, the country is below EU average with respect to availability of e-services, organisational and managerial innovations, and internal services innovations. Nonetheless, Lithuania is among the nations with the biggest upward shifts in providing public services through the use of information and communication technologies (ICT).

Discussed data indicates that the development of the country is uneven. While it is easy (and consistently it becomes easier) to start a business, regulation of business is not optimal, as Lithuania lags behind other countries in taxation or resolving insolvency. Furthermore, companies lack access to human capital, including in the ICT (see Chapter 2.3).

2.3 Supply of human resources

The deficiency in human capital is one of the main issues hindering growth of Lithuania's economy. According to Reymen et al. (2015), employers in Lithuania increasingly are not able to find employees with needed skills. They refer to this problem in specific sectors such as ICT, manufacturing, transport and logistics and health, which have the potential to generate high value added. Other challenges in this area are: the shrinking of the labour force (due to both birth rates and high emigration); the lack of soft skills as perceived by the employers (MOSTA, 2014), such as critical thinking, teamwork or decision making; the lack of capacity to attract and maintain young researchers, possibly due to low salaries and their high workload (MOSTA, 2016); and finally the fact that tertiary education is not oriented towards quality, innovation and development of entrepreneurial skills (Paliokaitė et. al., 2014).

² The new Business Financing Fund consists of three instruments to be implemented during 2014-2020 from EIF/ESIF: 'Technoinvest' (€17.6m), 'Entrepreneurship fund' (€103.28m), and 'Investment fund' (€58.72m). This funding instrument will provide loans, guarantees, venture capital and interest rate compensation for new and existing businesses. This new 'fund of funds' is managed by INVEGA.

³ <http://www.gemconsortium.org/country-profile/82>

The total number of researchers (full-time equivalent - FTE) was 8,124 in 2015 and has decreased compared to 2014. The majority of researchers work in the higher education sector (4,830 or 59.5%), compared to business enterprise sector which employs 1,845 (22.7%), and the government sector, with 1,449 (17.8%).

Regarding the gender ratio, in 2014, women made 50.3% of researchers (head count), but less in FTE – 46.5%. The share also varied across sectors. In the business sector they represented 30.7% of all researchers (FTE), while in the higher education sector the share was larger (52.6% in FTE) in 2014. Although these indicators show that gender ratio is close to equal, at least on the whole, two key problems remain significant in Lithuania: a) women are not proportionally represented in all fields of science; b) women are considerably under-represented in senior academic positions.

Some policy actions were taken, such as vocational education, training programmes or increase in remuneration for doctoral students. However, the results remain still to be seen.

To increase interest in research careers, the Ministry of Education and Science aims at promoting science, technology, engineering, arts and maths (STEAM) education. In October 2015 it informed that there will be 10 STEAM non-formal education centres (from pre-school to higher education levels) in Lithuania. In April 2016 the description of an open access STEAM centre was adopted and in August the first agreement on establishing centre STEAM education centre was signed. The Smart Specialisation Strategy also includes a measure for establishing open access centres⁴ of research and development in STEAM areas which would be suitable for students at the secondary education level.

3. Main R&I actors

Lithuania's research and innovation (R&I) landscape is dominated by the public sector with respect to both performance and funding (EU funds are included), whereas the private sector still plays a relatively minor role.

Overall, the share of innovative firms is increasing: 40.7% of firms introduced innovations over 2014, compared to 30% in 2010-2012. In the period of 2012-2014, 67.7% of innovative companies were small, while 26.3% were medium. Only 6% of all innovative companies were large (Statistics Lithuania, 2016).

There has been limited change in the structure of the national R&I system and its governance since 2012. The **Ministry of Education and Science** and the **Ministry of Economy** remain the two main bodies responsible for R&I policy, while several agencies distribute funding. The system as a whole is dominated by R&I funded and performed by public agents. The R&I policy remains fragmented also at academia level, leading to duplications of R&I activities and lowering its efficiency (MOSTA, 2015).

The **Strategic Council for Research, Development and Innovation** is responsible for the overall coordination of the R&I policy. It still lacks active involvement in reviewing policy and institutional setup (OECD, 2016b). However, it will be responsible for coordinating the implementation plan for the Science and innovation policy reform guidelines, which will strengthen its role.

The **research and higher education monitoring and analysis centre (MOSTA)** is the main analytical institution, also responsible for the monitoring of the Lithuanian smart specialisation strategy in partnership with the Ministry of Economy. After revisions

⁴ Open access means that infrastructure at these centres can be accessed by external agents (e.g. business companies) following the specific procedure, and for specific cost.

of the Law on Education and Science (approved in June 2016) MOSTA will be directly responsible to the Lithuanian Government's Office.

The formal **Smart Specialisation Coordination Group** has been set by joint order of the Ministry of Education and Science and the Ministry of Economy consisting of the representatives of main ministries, science, business institutions and implementing agencies.

The two key strategic documents covering also research and innovation are **Lithuania 2030** and the **National Progress Programme 2014-2020**, which includes research and innovation. However, regarding the R&I policy specifically, the two above-mentioned ministries issued separate programmes which leads to some overlaps (e.g. both programmes cover R&D&I or education).

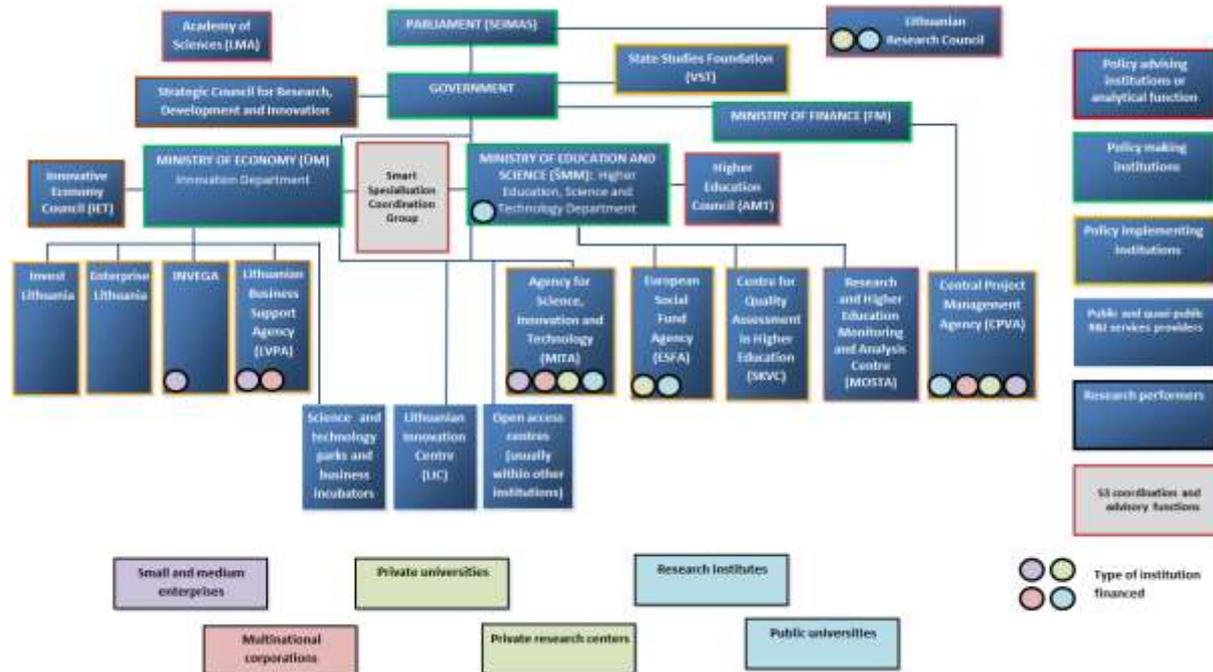


Figure 1: Overview of Lithuania's research and innovation system's governance structure

Source: Paliokaitė et al. (2016).

4. R&I trends

Lithuania ranks 24th in the EU Innovation Scoreboard (European Commission, 2016a) with slow catch up with the EU28 average. The gap between the average and Lithuania remains significant although there is some convergence (in 2008 Lithuania's score was 48.3% of the average, while in 2015 the number increased to 54.1%). The rate of increase in the innovation index (2.4% on average per year) was amongst the highest (although there was a decline in 2015).

The country needs restructuring the economy towards innovation-based growth rather than growth driven by low labour costs. Most of the research and development (R&D) activities are funded and performed by the public sector. However, the public sector suffers from low commercialisation of R&D results and unattractive working conditions for researchers (MOSTA, 2016; Paliokaitė et al., 2016). The private sector has limited capacities to absorb public R&D investments without soft 'capacity building' (scouting, matchmaking, idea development and other innovation promotion services).

Gross expenditure on R&D (GERD) increased from 0.9% to 1.04% of GDP over 2011-2015, whereas R&D performed by business decreased from 0.32% of GDP in 2014 to

0.28% of GDP in 2015. Considering longer time-series there is a sharp increase in funds from the EU, which was 0.09% of GDP in 2009, but by 2014 it was already 0.32% (31% of total GERD). Meanwhile, R&D funded by government decreased since 2009 (0.44% of GDP), but remains fluctuant between 0.33% of GDP in 2013 and 0.37% of GDP in 2015. The decrease which can be seen from 2009 may relate to the increasing role of the EU funds and the economic crisis which forced the government to limit its expenditure. The ratio between GERD funded by government and GERD funded by EC went from 4.75 in 2009 to 1.07 in 2014, by the end of EU programmes for 2007-2013.

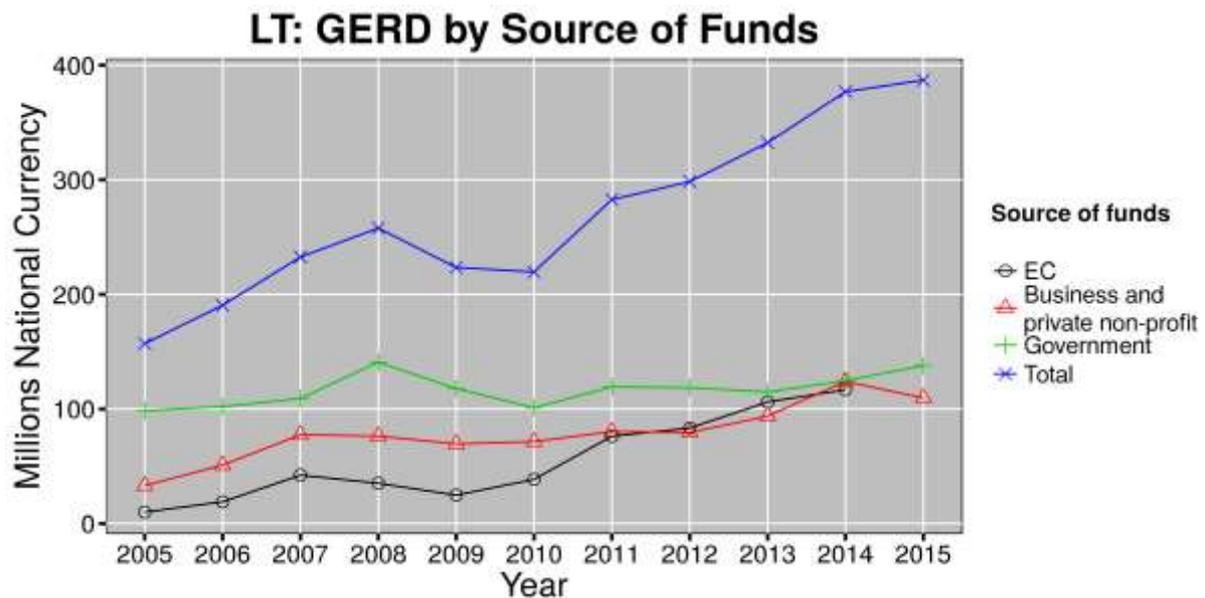


Figure 2: GERD by source of funds

Data source: Eurostat

Although there is some increase in gross domestic expenditure on R&D (GERD) over the recent years, changes are not sufficient to expect that the Europe 2020 target (1.9% of GDP). At the same time, although there was an increase in BERD in 2014, it diminished by 2015 from 0.32% to 0.28% of GDP. This remains significantly behind targets found in national policy documents (0.9% for BERD). It is also important to stress that in addition to domestic actors, increase in funds from the EU was significant (0.18 p.p. as % of GDP from 2010 to 2014). This indicates that most of the increase in GERD was conditioned by investment from the EU.

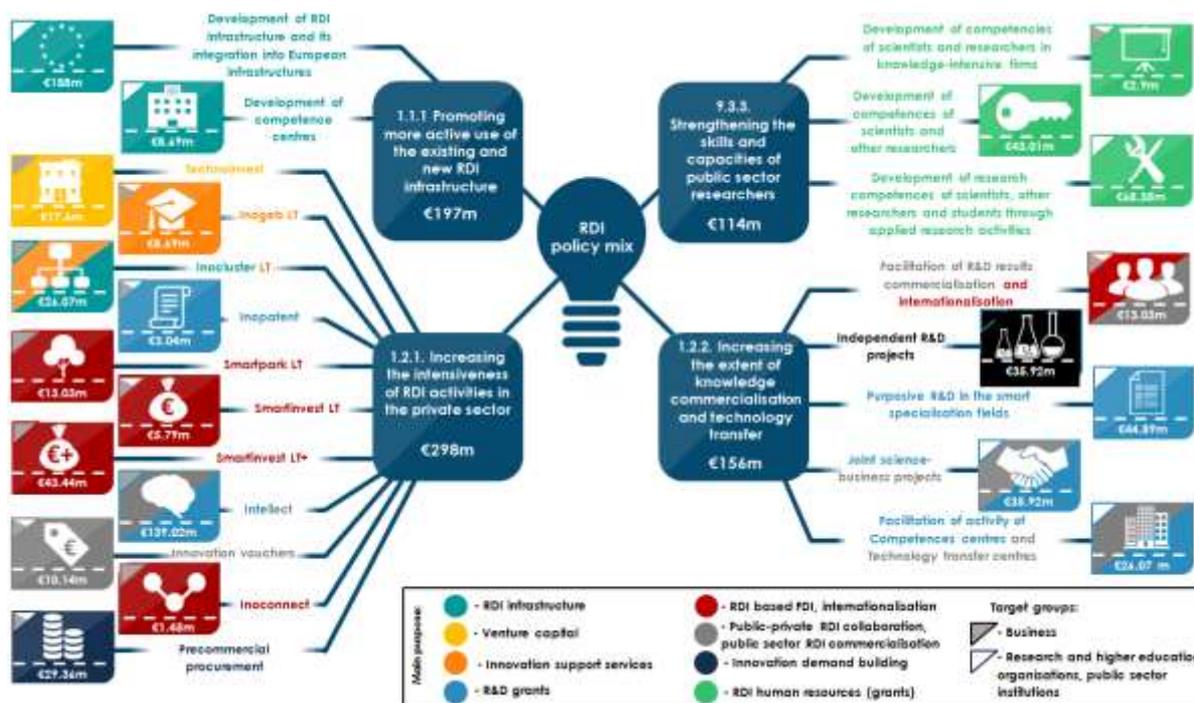


Figure 3: Lithuania's RDI policy mix (2016-2022)

Source: www.esinvesticijos.lt; only approved instruments [31-08-2016]

Note: Independent R&D projects (marked in black) is currently considered cancelled.

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

The Lithuanian government funds approximately one third of all R&D (€1,084m over the period 2007-2015), mostly performed in the higher education sector and with a very low share (1.8%) allocated to business enterprises. The government is also important in distributing EU funds, which accounts for another third of total R&D funds (31% of GERD in 2014). Despite this, the government performed only 17.2% of GERD (in 2015).

On EU funding, data from 2014 show that the EU's 7th research and innovation framework programme (FP7) funding was lower than the EU average. Funding per capita and per million euros of GERD terms the country lagged behind most of the other Member States. Horizon 2020 (EU's framework programme for research and innovation 2014-2020) funding provided to Lithuania in 2014 calls was also lower than the EU28 average in terms of percentage of GERD (2% vs. 2.79%), per researcher (€654 vs. €2,870) and per inhabitant (€2.53 vs. €15.56). Nonetheless, Lithuania had a high success rate (14.3%) in the Excellent Science Pillar (European Commission, 2016b).

It could have been expected that the economic crisis could have reduced public R&D financing. However, there is no strong evidence that fiscal consolidation had significant effect on public R&D spending in Lithuania. Post-crisis fiscal consolidation process had a small negative impact on public support to the Lithuanian R&D expenditures, which is shown by a small decline in Government budget appropriations or outlays on R&D (GBAORD) and government funded R&D relative to GDP. However, since 2014 both indicators are above the 2010 levels. One of the reasons behind being able to maintain similar levels of RDI funding even through the crisis was the mentioned reliance on the EU funds.

Academia does not play a significant role in R&D funding, but is a major performer (55.9% of GERD in 2015). 46.7% of funds to academia come from the government.

Non-governmental sources play an important role for the higher education sector (HES), although not as significant. The main non-governmental source is the EU. Business funding of HES-performed R&D accounts for 11.6% of the total.

4.2 Private R&D expenditure

Research and innovation in the private sector is dominated by business, as the private non-profit sector plays a miniscule role. With respect to business expenditures on R&D (BERD) Lithuania ranked 24th among 27 EU countries in 2015⁵. Most of the innovative companies in Lithuania are SMEs.

Business R&D is a key area of the Lithuanian innovation system where substantial policy efforts are needed. The starting point is rather weak. Despite recent progress in 2014, in 2015 BERD decreased and the BERD/GDP indicator is 4.6 times below the EU average (0.28% in 2015). Analysis of flows of funding indicates that the majority of R&D funds from the business enterprise sector (BES) remain in the same sector (68.8% of all R&D performed by BES in 2015). An important source of funds is the EU, which accounted for 17.3% of all R&D performed by BES in 2014. This shows that business R&D is largely self-sustaining.

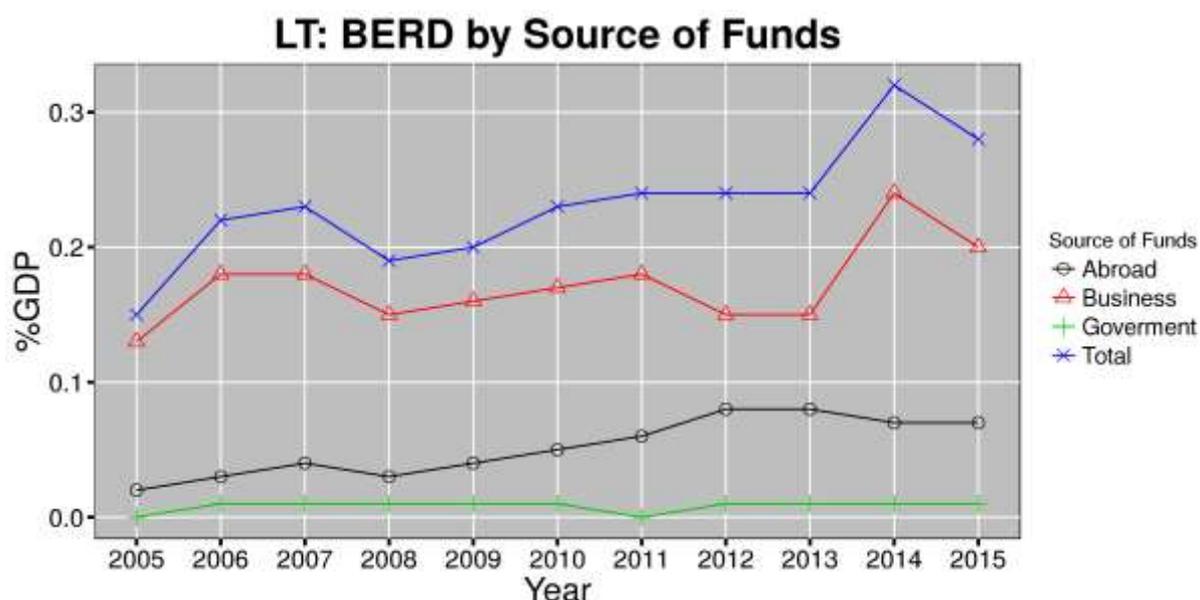


Figure 4: BERD by source of funds

The highest expenditure on R&D in manufacturing is in medium-high (chemicals) and high-technology (computer, electronic and optical products, and pharmaceuticals) sectors. Although data on R&D intensity in individual companies is lacking, it may be asserted that such players as Achema, BIOK and Lifosa (in the chemicals industry) are among the main R&D performers. Other sectors also include strong R&D performers, such as Teva and Valean in pharmaceuticals, or EKSPLA in laser manufacturing, among others. Services also have strengths, e.g. in information and communication technologies (ICT) and biotechnology, with a high number of start-ups in the former and mature innovators in the latter. These include companies such as Moog, Sicor/Teva, Biotechfarma and Thermo Fisher (Paliokaitė et al. 2016).

⁵ Although data for Ireland is not available as of January 2017, it is very likely that its BERD will be higher than Lithuania's.

Funding from abroad for R&D performed in business enterprises remained rather similar of 2011-2015 (change from 0.06% to 0.07% of GDP).

4.3 Public sector innovation and civil society engagement

According to the Public Sector Innovation Scoreboard (European Commission, 2013), Lithuania is below the EU average with respect to more than 10 scoreboard indicators, such as: availability of e-services, organisational and managerial innovations, and internal services innovations. Over the recent decade, Lithuania has put most focus on the availability of e-services and data transparency – the country is among the six nations with the biggest upward shifts in providing public services through the use of ICT in the period of 2003-2012, according to the E-government development index (United Nations, n.d.).

In addition, Lithuania has made substantial progress over 2009-2016 in adopting various initiatives leading to better availability of e-services and higher transparency of policy decisions and opening public sector data.

The OECD published its review of Lithuanian open government initiatives in 2015 and recommended, among other actions, to: develop a common vision of open government; elaborate a common methodology to foster citizens' participation; develop stronger monitoring, impact measurement and communication of digital government initiatives; expand the use of digital technologies to promote openness, transparency & accountability to fight corruption (OECD, 2015).

Compared to transparency, citizen participation and collaboration receive less attention in Government policies. The recent participative process of identifying the national R&I priorities and drafting the Smart Specialisation Strategy for 2014-2020 (2015) and the process of designing the Lithuania's Progress Strategy 'Lithuania 2030' (2012) are two exceptions that mark progress in this area. 'Lithuania 2030' marks one of the first attempts to institutionalise participative and collaborative governance in Lithuania.

Despite above-mentioned initiatives and several successful ICT-based projects, substantial gaps remain. The implementation of open data and e-services initiatives remains fragmented and quality varies. Both supply and demand of citizen participation initiatives are weak (OECD, 2016c).

Although not too abundant, there are some mediating structures as well, such as fab labs: M-Lab in Vilnius or FabLab Kaunas (Kaunas University of Technology). Both have been established very recently (2015-2016) and it is not yet possible to assess their performance. There are also research hubs, and co-working spaces are opened by universities and by private enterprises (e.g. 'Western Union Start-up Space' in the Sunrise Valley technology park). Finally, there are also platforms for start-up cooperation, such as Startup Lithuania or 'bzn start'. The latter also gives annual start-ups' awards. It merged with 'Nextury Ventures' in November 2016.

In addition, the private or semi-private start-up hubs, platforms and co-working platforms scene is booming. Several have been launched over the last five years. For example, one of the largest start-up and game development centres in the Baltic Countries – Vilnius Tech Park opened in autumn 2016, filling 9000+ square metres. Some successful Lithuanian start-ups (for example, Vinted) have already announced their relocation to the park. Among the recent attracted tenants is also Eagle Genomics Ltd. from Cambridge (UK).

5. Innovation challenges

Innovation challenges for Lithuania remain similar to previous years. Although steps were taken to overcome them, they can still hinder innovation effects. Years 2015 and

2016 mark the beginning of the new 'chapter' in implementing innovation policies in Lithuania. The new policy mix⁶ has been planned, and first measures were launched in 2015 and 2016, the remaining measures will be launched in 2017.

5.1 Challenge 1: Improving the coordination of innovation policies

Description

Lithuania's R&I system remains highly fragmented, both in the private (e.g. approx. 50 clusters) and the public sector (e.g. large number of higher education and research institutions, over 20 open access centres, 8 science and technology parks, etc). Fragmentation at the level of research performance creates burden in several ways: a) potential synergies are not achieved due to research being carried out in different institutions with little collaboration; b) overlaps and duplications in research, as well as potential duplications in infrastructures. Fragmentation is also evident at the policy and governance level. Lack of synergies and overlaps in competence areas of ministries responsible for R&I policy, as well as a high number of lower-level agencies, leads to missed opportunities and wasted efforts. Although there are bodies that coordinate policy initiatives (e.g. inter-institutional body for smart specialisation strategy), overall coordination is still lacking (OECD, 2016b; Paliokaitė, 2015). Coordination is a critical issue for implementing the smart specialisation priorities which is funded from multiple sources.

Policy response

In June 2016, the President of the Republic of Lithuania proposed Science and Innovation Policy Guidelines that were approved by the Parliament in September 2016. They also constitute a good example of stakeholders' involvement, as over fifty representatives from the academic and business community, NGOs and other experts contributed to their drafting. The Parliament obliged the Government to prepare a plan for implementation of the Guidelines by the 1st of December. Among the most important action areas set in the Guidelines are:

- Reform in the institutional R&D assessment and funding system (more focus on indicators from international research and an innovation activities monitoring system);
- Consolidation of the potential of research and higher education institutions and optimisation of universities' network, open access centres and technology parks;
- Reform of R&I policy coordination. According to the Guidelines, the Parliament should ensure clear responsibility for innovation policy design. The Strategic R&D and Innovation Council under the Government was appointed responsible for innovation policy coordination.
- Independent monitoring and evaluation of R&I policies should be strengthened by involving society and scientists to a wider extent, and increasing the focus on evidence based policy learning.

The new R&I policy mix is also currently under development and approval. As of November 2016, 18 instruments under priority 1 (promotion of RDI) and 3 instruments under specific objective 9.3.3 (developing capacities of researchers) have been approved. However, 'Independent R&D projects' are likely to be cancelled with funds distributed to other instruments. Its design is closely tied to the Smart specialisation strategy and thanks to this thematic concentration of investment and improvements in

⁶ The term 'new policy mix' in this Report refers to a set of financial R&I policy instruments approved for the period 2014-2020 in the Operational Programme for 2014-2020, which is the main funding source for implementing R&I policy in Lithuania.

the policy mix, the potential of RDI policy to create a breakthrough in prioritised fields of R&D is higher compared to the previous period.

Policy Assessment

The Science and Innovation Policy Reform Guidelines show political will to take steps to counter policy and institutional fragmentation. In addition, several new instruments demonstrate efforts for better coordination (for example, the new measures of 'Joint science-business projects' and 'Intellect LT. Joint science-business projects').

The Lithuanian R&D system could be more concentrated both thematically and institutionally. The research assessment exercise of 30 institutions (MOSTA, 2015) showed that there are duplications of thematic areas between different research units (126 in total), which lead to fragmented funding and more competition than synergies. However, the adoption of the Smart specialisation strategy which identified six priority areas and 20 priorities might help concentrate research efforts thematically.

A positive sign is that consensus and evidence-based policy making is becoming more common, as signified by the process of preparing Lithuania's Smart specialisation strategy.

5.2 Challenge 2: Addressing human resources shortages in R&I

Description

This challenge forms a part of a deeper issue faced by Lithuania's economy – skills supply and demand mismatch. This is caused by two harmful trends. First, due to negative demographic tendencies (ageing society and emigration, which includes brain drain), the labour force in Lithuania is shrinking. Therefore, there is a smaller supply of any workforce irrespective of its skills. Second, the quality of higher education has deteriorated, which means that university graduates are equipped with lower skills than demanded in the market (MOSTA, 2014; OECD, 2016b). Only one of the Lithuanian universities (Vilnius University) has been accepted among the top 500 World Universities (QS World University Rankings 2016–2017) in 2016. On top, these trends are further reinforced by non-attractive working conditions and unattractive career prospects for researchers (MOSTA, 2016).

Skills supply and demand mismatch is also strongly felt in the R&I area. Research indicates that in technology field, the mismatch is increasing. One third of companies in manufacturing industries agree that they lack engineers, technology designers, etc. for their R&I activities (Paliokaitė et al., 2014) Being unable to employ enough R&I personnel, they are forced to limit their R&I activities.

Policy response

In June 2016, the Lithuanian Parliament approved the proposed revisions of the Law on Research and Studies. Some key approved revisions concern these changes, mainly in the higher education sector:

- Contracts with higher education institutions concerning education accessibility and results, research and education quality, and domestic and international cooperation. The contracts will be renewed every three years based on the set of indicators.
- Introduction of minimal acceptance criteria for new students in order to reduce acceptance of low quality students.
- Possibility to implement three year bachelor studies.
- Possibility to implement industrial/professional PhDs in collaboration with business companies.
- MOSTA will be accountable to the Government instead of the Ministry of Education and Science.

- Non-state higher education and research institutions will have the possibility to access to state budget funds for R&D.
- Budget funding for administrative costs, associated to higher education and research institutions will be distributed according to their R&D performance (from 2017).

However, since the Law for the most part enters into force only on January 1st 2017, in 2016 the previous revision is valid. Until then, some of the details (such as the specific role that MOSTA will play) still remain unclear. Furthermore, the article concerning contracts with higher education institutions will only enter into force on January 1st 2018.

In addition, in June 2016, the President of the Republic of Lithuania proposed Science and Innovation Policy Reform Guidelines that were approved by the Parliament in September 2016. The Parliament obliged the Government to prepare a plan for implementation of the Guidelines until the 1st of December, 2016. Among the most important action areas set in the Guidelines is the consolidation of the potential of research and higher education institutions, which is expected to focus investments into higher education and thus enhance its quality. The Guidelines were prepared involving around 50 representatives from the business and science communities.

The Lithuanian Parliament approved proposed revisions of the Law on Legal Situation of Foreigners in July 2016. These revisions are more favourable for immigration of skilled specialists and start-ups. For example, a 'start-up visa' is introduced – start-ups and entrepreneurs from foreign countries will be able to get legal decision to live and work in Lithuania quicker; previously existing requirement to employ at least three Lithuanians has been abandoned; immigration of skilled specialists from non-EU countries becomes easier; foreign students can start working from first year of studies and they will not be required to pass a previously required 'labour market test'.

A number of funding instruments are also in the pipeline for researchers' capacity building (incl. post doc grants, various R&D grants, reintegration of 'brains', facilitation of participation in Horizon 2020, etc.). None have been launched by September 2016. Researchers' placements in companies and Industrial PhD programme are planned.

Policy Assessment

This challenge has a potential to shortly become a bottleneck for achieving any of the midterm and long term R&I goals. A mix of instruments and strategic decisions are needed, from structural reforms in the higher education sector to financial instruments for young researchers and talent from abroad and upgrading of research career indicators, salary system and contracts.

Specifically on the Law on Research and Studies, most of the revisions can be considered rather incremental, except for the introduction of the contracts with science and studies institutions. The contracts can give some control over the quality of research and studies back to the State. However, it remains to be seen whether it will be enough to achieve considerable improvement in the field of education quality considering high fragmentation of institutions and already depreciated value of higher education diploma.

The revised law on legal situation of foreigners will contribute to solving one of the key pressing barriers – shortage of skilled labour force and new innovators – by helping attract talent from abroad.

5.3 Challenge 3: Encouraging private investment in RDI

Description

Indicators related to Lithuanian business R&I remain below EU28 average, and it is not likely that BERD will reach 0.9% of GDP by 2020 as aimed. Recent efforts by responsible institutions to ensure better statistics and accountability of business R&D will have some

effect on future business expenditures on R&D (BERD) indicators, but this effect might be 'cosmetic' rather than a 'game-changer'. Indeed, data from 2015 indicates that BERD fell compared to 2014. The challenge is of the structural character. Traditional sectors form the backbone of the economy and the focus remains on exploitation of relatively cheaper factors of production, with low focus on innovation-based growth. This is problematic due to the decreasing competitiveness with regards to the traditional factors of production, which are more favourable in other countries.

Policy response

Under the new policy mix, the promotion of business investment in R&I is among the priorities to "strengthen research and development and innovation". A vast variety of support instruments were launched in 2015-2016, covering, for example: business R&D grants (covering full innovation cycle); support for cluster development; experimentation using public R&D infrastructure (innovation vouchers); innovation promotion services and 'technology scouts' (in the pipeline); pre-commercial procurement (the call will be launched in the 1st quarter of 2017); grants for R&D-based foreign direct investment (FDI). In total the Ministry of Economy intends to invest €326m, which should attract at least additional €260m of private investments.

Business access to venture capital markets has increased dramatically during 2011-2014 in Lithuania. In addition to several past and ongoing Joint European Resources for Micro to medium Enterprises (JEREMIE) initiatives such as LiCapital and Practica Seed Capital and Venture Capital Funds, in 2016, €179.6m has been secured for loans, guarantees and venture capital in a new 'fund of funds'.

The new Business Financing Fund managed by INVEGA and funded from the European structural and investment funds (ESIF) will consist of three instruments to be implemented during 2016-2022:

- 'Technoinvest' (€17.6m) will provide venture capital (VC) for innovative firms including start-ups, spin-offs, early stage innovating firms.
- 'Entrepreneurship fund' (€103.28m) will provide loans, guarantees, VC and interest rate compensation for any new businesses.
- 'Investment fund' (€58.72m) will focus on loans, guarantees, VC and interest rate compensation for industry investments in the regions (local and international).

The new funds have not been launched by September 2016 as INVEGA was looking for an operator for these funds.

The Lithuanian Parliament has adopted the Law on Crowd Funding on November 2016. It sets up the conditions for crowd funding, crowd funding platform operator, the terms and conditions for mandatory disclosure of information provided in crowd funding platform, as well as crowd funding platform operator's maintenance procedures.

Policy Assessment

The 2014–2020 period may be a 'make or break' one for Lithuania in terms of achieving significant structural change and breaking out of the 'middle-income trap'. The challenge for Lithuania, thus, instead of focusing on the few existing R&D based innovators, is to promote the structural change of the economy by providing a transformation agenda for diversification of existing (incl. traditional) sectors and transition to new knowledge based activities (Paliokaitė et al., 2016).

The new period's business R&D policy mix is more balanced and comprehensive, compared to 2007-2013. It covers a variety of instruments and addresses different innovator types. Its effectiveness, however, will depend on several preconditions (Paliokaitė and Antanavičius, 2015), such as policy additionality (vs substitution), R&I capacity building and the availability of well-functioning start/seed/VC capital.

5.4 Challenge 4: Exploiting opportunities for commercialisation of public R&D results

Description

The majority of the R&D efforts in Lithuania are funded by the public sector and performed by public research institutions. Key PROs have upgraded their research infrastructures from funds available in 2007-2013.

Despite the huge potential, weak capacity to commercialise and exploit public research for economic benefits becomes more evident after heavier investments in research production. Key indicators covering economic R&D results (such as patenting, spin-offs, prototypes, licences) are below the EU average. For example, the indicator of public-private co-publications per million population was only 1.7 in 2014, and has been decreasing over the few previous years. Due to the modest levels of commercialisation of public research results public investment in R&I does not bring expected economic returns. This creates a problem for the economy since public investment does not have lasting effect and the society does not benefit enough to justify resources spent. For example, through support of public research infrastructure the policy mix for 2007-2013 public R&I created a chance to attract firms to use public resources through open access centres. However, studies indicate that open access centres will not be able to sustain themselves and will have to rely on public resources. Furthermore, by 2020 these infrastructures will require additional ~€118m for upgrading of outdated equipment (Technopolis Group, Ernst and Young, 2014). The annual maintenance costs will increase the burden on the public resources. Therefore, instead of further upgrading R&D infrastructure policy could focus on its exploitation, so as to ensure that the investment bears returns.

Policy response

Under the new policy mix for R&I (2014-2020), a few instruments address the challenge. 'Facilitation of activity of Competences centres and Technology transfer centres' (€26m) will focus on the development of technology transfer services. 'Inogeb LT' (€8.7m) will fund services of the science and technology parks (including activities of technology scouts). 'Facilitation of R&D results commercialisation and internationalisation' (€13m) will finance university spin-offs. The innovation vouchers for R&D subcontracts with public research organisations will be continued with larger budget (€10.1m). Furthermore, the instrument 'Joint business-science projects' (from at least €36m to €175m depending on how the instrument will be implemented) will provide grants for public-private R&D collaboration.

In addition, the measure focused on Industrial PhDs (vouchers covering 50% of company costs) is in the pipeline, to be launched in 2017.

There are already some steps towards implementation of these measures (e.g. two contracts signed in 'Inogeb LT' in 2016), but it is too early to assess their effectiveness.

Policy assessment

There is clearly more focus on incentives for public R&D commercialisation and business-science collaboration in the policy mix for 2014-2020. Effects of these instruments remain to be seen. For example, implementation of the 'joint' measures such as 'joint business-science projects' will be dependent on the existence of sufficient demand, which was not the case in the past.

Other issues remain to be tackled, such as the low entrepreneurial culture in the Lithuanian universities (OECD, 2016b), which could benefit from incentive systems, researchers' career criteria, university IPR policies and entrepreneurial training.

When it comes to R&D infrastructures for commercialisation and technology transfer, the existing ones have the potential to be better exploited. A 'soft' approach such as the exploitation of the open access centres, science and technology parks, clusters and their

infrastructures, and creation of related capacities and human resources could work (Paliokaitė et al., 2016).

6. Focus on 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. It also analyses policy measures aimed at internationalisation of companies with the aim of increasing the innovativeness of the economy.

Public procurement and other demand-led policy instruments for innovation have not been very much used so far in Lithuania. In general, public procurement rules have been interpreted in an overly restrictive manner, therefore discriminating against demand-led innovation, especially among SMEs. Lithuania also lacks a developed administrative culture of organising tenders around innovative ideas (Paliokaitė et al., 2016). The Lithuanian innovation system has therefore relied mainly on innovation supply side instruments, and the demand side policies are not used enough (OECD, 2016b).

Since 2012, however, the policy debate shifted towards demand-side oriented measures. In July 2015, the Government approved the procedure of pre-commercial procurement, which allows three types of such process – when only a trial run of the product is ordered, when prototype creation is also ordered, and when in addition to the two mentioned stages, developing of the concept is also ordered by the buying organisation.

The new ESIF measure 'Pre-commercial Procurement LT' will allocate €29.36m. Pre-commercial procurement is also funded from non-ESIF sources with two calls launched. There are 6 key areas (Soloveičik, 2015): development and production of drones; health care; agricultural sector; national defence; waste management; energy consumption.

A survey of potential interest in such measure has been carried out and the Ministry of Economy announced in July 2016 that it has identified about 50 potential pre-commercial procurement projects, and has already received 15 project applications and 80 project ideas. Open call for implementing the first project was launched in August 2016.

When it comes to assessing the impact of regulation on innovation, and according to the OECD (2016c), the requirement of proportionate regulatory impact assessment (RIA) is largely in place, but the RIA is mainly used to justify choices already made, and quality controls are diffuse. There are no clear guidelines on the laws or regulations which should undergo more in-depth RIA, and there are no mentions on assessment of impact on innovation (OECD, 2016c). The only relevant recent RIA concerns ex-ante assessment of the impact of the proposed new Law on Innovation Promotion in 2015. The new Law was not approved.

Changes in regulation in specific fields may also help foster innovation. For example, in October 2016, the Government approved changes regarding remote identification of clients, which makes it easier for financial technology companies to operate. This should lead to increased investment and may also lead companies to innovate.

One of the objectives of Lithuanian Innovation Development Programme 2014-2020 is to promote the cooperation, creation of value networking, development and internationalisation, therefore there is an effort in order to promote cooperation between business and science and transfer of knowledge and technology as well as to promote the development of clusters and integration in the global value chains.

There is a wide range of measures in order to stimulate SMEs internationalisation among others: a) Inoconnect, an instrument supporting participation of companies and representatives of science and technology parks' and clusters' representatives in the events on international RDI initiatives; b) financial instruments (SmartInvest,

SmartInvest+, SmartPark) aiming at R&D-based foreign direct investment attraction, c) the continued implementation of bilateral or multilateral initiatives such as the green industry innovation programme (a bilateral programme implemented with Norway), Baltic Sea Region innovation express (a joint call for projects implemented within the framework of the BSR stars programme), Eureka (support market-oriented R&D and innovation projects by industry, research centres and universities across all technological sectors) and Eurostars (specifically dedicated to research-performing SMEs). In addition, the Ministry of Economy and MITA organise business missions, and constantly invest in new international cooperation agreements such as the one between MITA and MATIMOP, the Israeli industry centre for R&I that resulted in joint Lithuanian-Israeli Eureka projects, or the cooperation agreements with the European Space Agency (since 2010), and the USA (on science and technology) or the student internships with NASA.

References

- European Commission (2013). European Public Sector Innovation Scoreboard 2013. A pilot exercise.
http://bookshop.europa.eu/en/european-public-sector-innovation-scoreboard-2013-pbNBAZ13001/downloads/NB-AZ-13-001-EN-C/NBAZ13001ENC_002.pdf;pgid=Iq1EKni0.1ISR00OK4MycO9B00009MY996PK;sid=ButGjdyOMdVGrIszQZLYKr6rAThAXpHtGJk=?FileName=NBAZ13001ENC_002.pdf&SKU=NBAZ13001ENC_PDF&CatalogueNumber=NB-AZ-13-001-EN-C
- European Commission (2016a). *European Innovation Scoreboard 2016*
<http://ec.europa.eu/DocsRoom/documents/17822/attachments/1/translations/en/renditions/native>
- European Commission (2016b). Horizon 2020 Monitoring Report 2014
http://ec.europa.eu/newsroom/horizon2020/document.cfm?doc_id=15108
- European Commission (2016c). 2016 SBA Fact Sheet Lithuania
<http://ec.europa.eu/DocsRoom/documents/20302/attachments/21/translations/en/renditions/native>
- Invest Lithuania (2016). Tiesioginių užsienio investicijų (TUI) projektų apžvalga 2015 m.
<http://www.investlithuania.com/wp-content/uploads/2016/06/Tiesioginiu-uzsienio-investiciju-projektu-apzvalga-2015.pdf>
- MOSTA (2014). Studijų kokybė Lietuvoje: suinteresuotųjų šalių požiūris
<http://mosta.lt/lt/naujienos/8-naujienos/212-tyrimas-studij-kokybe-lietuvoje-suinteresuot-j-sali-pozuiris-norintiems-matyti-visapusiska-studij-kokybes-vaizda>
- MOSTA (2015). Lithuania: Research Assessment Exercise
http://mosta.lt/images/documents/mokslines_veiklos_palyginamasis_tyrimas/Lithuania_RAE_Process.pdf
- MOSTA (2016). Lietuvos mokslo ir studijų būklės apžvalga 2016
http://mosta.lt/images/leidiniai/Lietuvos_mokslo_ir_studiju_bukle_2016.pdf
- OECD (2015). Lithuania: Fostering Open and Inclusive Policy Making. OECD Public Governance Reviews. OECD Publishing, Paris
<http://www.oecd.org/publications/lithuania-fostering-open-and-inclusive-policy-making-9789264235762-en.htm>
- OECD (2016a), OECD Economic Surveys: Lithuania 2016: Economic Assessment, OECD Publishing, Paris.
<http://www.oecd.org/countries/lithuania/oecd-economic-surveys-lithuania-2016-eco-surveys-ltu-2016-en.htm>
- OECD (2016b), *OECD Reviews of Innovation Policy: Lithuania 2016*, OECD Publishing, Paris.
<http://www.oecd.org/countries/lithuania/oecd-reviews-of-innovation-policy-lithuania-2016-9789264259089-en.htm>
- OECD (2016c). OECD Reviews of regulatory reform. Regulatory policy in Lithuania. Focus on the delivery side. OECD Publishing, Paris
<http://www.oecd.org/publications/regulatory-policy-in-lithuania-9789264239340-en.htm>
- Paliokaitė A. (2015). Stairway to Excellence Report Lithuania. Institute for Prospective Technological Studies, JRC, DG Research and Innovation, Seville
http://s3platform.jrc.ec.europa.eu/documents/20182/117536/S2E_Report_LT.pdf/5f4d1c48-74b1-4b42-b1ae-eee9e6b623ee
- Paliokaitė, A. & Anatavičius, J. (2015). Support to SMEs - Increasing Research and Innovation in SMEs and SME Development: Work Package 2. Lithuania: Case

- Study. European Commission DG REGIO
http://www.visionary.lt/wp-content/uploads/2015/10/Case-study_Lithuania_23-09-15_def1.pdf
- Paliokaitė, A., Angelis, J., Antanavičius, J., Martinaitis, Ž., Mykolaitis, H. & Vilkauskas, A. (2014). Lithuanian high technologies development feasibility study. Ministry of Economy, Vilnius
http://ukmin.lrv.lt/uploads/ukmin/documents/files/AT%20studija_santrauka_EN.pdf
- Paliokaitė, A., Krūminas, P., Stamenov, B. (2016). RIO Country Report 2015: Lithuania. Joint Research Centre
<https://rio.jrc.ec.europa.eu/en/country-analysis/Lithuania/country-report>
- Reymen, D., Gerard, M., De Beer, P., Meierkord, A., Paskov, M., Di Stasio, V., Donlevy, V., Atkinson, I., Makulec, A. Famira-Mühlberger, Lutz, H. (2015). Labour Market Shortages in the European Union. European Parliament
[http://www.europarl.europa.eu/RegData/etudes/STUD/2015/542202/IPOL_STU\(2015\)542202_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/STUD/2015/542202/IPOL_STU(2015)542202_EN.pdf)
- Soloveičik, D. (2015). Pre-Commercial and Innovation Procurement in Lithuania
http://ec.europa.eu/information_society/newsroom/image/document/2015-50/lithuania_12535.pdf
- Statistics Lithuania (2016). Development of Innovation Activity 2012-2014
<http://osp.stat.gov.lt/services-portlet/pub-edition-file?id=22218>
- Technopolis Group, Ernst and Young (2014). Galutinė Slėnių stebėsenos projekto ataskaita
http://www.mosta.lt/images/Sleniai/Sleniu_projektu_pazangos_ir_rezultatu_ivertinimo_ir_galimu_sprendimu_Lietuvos_MTEP_sektorius_issukiams_siulymo_galutine_ataskaita.pdf
- United Nations (n.d.). UN E-Government Survey. Country Profile: Lithuania
<https://publicadministration.un.org/egovkb/en-us/Data/Country-Information/id/99-Lithuania>

Abbreviations

BES	Business enterprise sector
BERD	Business expenditures on research and development
DESI	Digital Economy and Society Index
ESIF	European structural and investment funds
EU	European Union
EU28	European Union including 28 Member States
FP7	EU's 7th research and innovation framework programme (2007-2013)
FDI	Foreign direct investment
GBARD	Government budget allocation for research and development
GBAORD	Government budget appropriations or outlays on R&D
GERD	Gross domestic expenditure on research and development
GDP	Gross domestic product
HEI	High education institution
HES	High education sector
H2020	Horizon 2020 - EU's framework programme for research and innovation (2014-2020)
ICT	Information and Communication technologies
NGO	Non-governmental organisation
OECD	Organisation for Economic Co-operation and Development
PRO	Public research organisation
RIA	regulatory impact assessment
R&D	Research and development
MOSTA	Research and higher education monitoring and analysis centre
R&I	Research and innovation
RIO	Research and innovation observatory
RDI	Research, development and innovation
STEAM	Science, technology, engineering, arts, maths
SME	Small and medium size enterprise
VC	Venture capital

Factsheet

	2009	2010	2011	2012	2013	2014	2015
GDP per capita (euro per capita)	8500	9000	10300	11200	11800	12400	12800
Value added of services as share of the total value added (% of total)	69.42	67.61	65.09	64.8	65.99	65.79	66.52
Value added of manufacturing as share of the total value added (%)	16.73	18.77	20.37	20.67	19.42	19.2	19.34
Employment in manufacturing as share of total employment (%)	15.82	15.37	15.55	15.7	15.43	15.06	15.18
Employment in services as share of total employment (%)	64.21	66.62	66.97	66.14	66.08	66.14	65.89
Share of Foreign controlled enterprises in the total nb of enterprises (%)	2.39	2.39	2.45	2.21	2.19		
Labour productivity per hour worked (Index, 2010=100)	94.2	100	107	109.3	112.6	114.7	113.6
New doctorate graduates (ISCED 6) per 1000 population aged 25-34	0.65	0.66	0.67	0.75	0.83	0.83	
Summary Innovation Index (rank)	31	31	31	30	31	31	30
Innovative enterprises as a share of total number of enterprises (CIS data) (%)				32.9		43.3	
Innovation output indicator (Rank, Intra-EU Comparison)			28	28	28	28	
Turnover from innovation as % of total turnover (Eurostat)		6.6		5.5			
Country position in Doing Business (Ease of doing business index WB)(1=most business-friendly regulations)						21	20
Ease of getting credit (WB GII) (Rank)						22	27
EC Digital Economy & Society Index (DESI) (Rank)						8	11
E-Government Development Index Rank		28				29	
Online availability of public services – Percentage of individuals having interactions with public authorities via Internet (last 12 months)	22	24	29	36	34	41	44
GERD (as % of GDP)	0.83	0.78	0.9	0.89	0.95	1.03	1.04
GBAORD (as % of GDP)	0.52	0.42	0.4	0.36	0.36	0.35	0.33
R&D funded by GOV (% of GDP)	0.44	0.36	0.38	0.36	0.33	0.34	0.37
BERD (% of GDP)	0.2	0.23	0.24	0.24	0.24	0.32	0.28
Research excellence composite indicator (Rank)				27			
Number of scientific publications among the top 10% most cited publications worldwide as % of total scientific publications of the country		5.2	4.54	3.58			
Public-private co-publications per million population	7.54	8.59	9.17	4	2.36	1.7	
World Share of PCT applications	0.02	0.01	0.01	0.01	0.02	0.02	

List of Figures

Figure 1: Overview of Lithuania's research and innovation system's governance structure	11
Figure 2: GERD by source of funds	12
Figure 3: Lithuania's RDI policy mix (2016-2022).....	13
Figure 4: BERD by source of funds	14

***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

