Latvian Roadmap of National Level Research Centres

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Abstract. Latvian national roadmap is a long-term planning instrument that lists research infrastructures on national importance, either new or in need of upgrading. The development of national roadmap, connected to the European Strategy Forum for Research Infrastructures (ESFRI) Roadmap is helping develop the required overall coherent policy by evaluating and prioritising national resources dedicated to the existing research infrastructures (both national and pan-European) as well as by assessing the option of attracting or supporting new pan-European research infrastructures.
Informative Report on Latvia National Level Research Centres (NLRCs) has been approved by the Cabinet of Ministers on 17 August 2010. NLRC is the framework for cooperation among scientific institutions and for concentration of scientific resources to ensure European-level research in the national research priorities. The research aim is to analyse the NLRC scientific excellence, its concentration of research infrastructure (prevention of its fragmentation), and commercialisation of science.
Key words: research infrastructures, scientific excellence.

Introduction

On 17 June 2010 the European Council formally approved the EU 2020 Strategy for smart, sustainable and inclusive growth and the Integrated Guidelines. The aim of the EU-2020 Flagship initiative "Innovative Union" is to improve framework conditions and access to finance for research and innovation to ensure that innovative ideas can be turned into products and services that create growth and jobs. By 2015, the Member States together with the Commission should have completed or launched the construction of 60% of the priority European research infrastructures currently identified by the European Strategy Forum for Research Infrastructures (Annual Report on Research …, 2010). The potential for innovation of these (and ICT and other) infrastructures requires the increase. The Member States are invited to review their Operational Programmes to facilitate the use of cohesion policy money for this purpose.

The Guidelines in Research and Technologies Development for 2009-2013 were approved according to the Cabinet of Minister Decree No. 631 of 16 September 2009 to make closer cooperation between R&D and innovation policy. The main objective of the research and technological development policy is to develop research and technology as a civil society, economic and cultural development long-term basis, thus providing the knowledge economy, its sustainable implementation, and growth. Four integrated actions for the promotion of R&D and innovation are planned in the Guidelines:

- to promote renewal and development of scientific intellectual potential and research infrastructure;
- to ensure relevant increase of the state investment for research and technology also achieving private funding increase;
- to promote competitiveness of scientific activities on international level thus promoting international cooperation in the field of research and technologies;
- to promote transfer of knowledge and technologies thus forming favourable environment for innovative actions, and to promote public and private partnership.

In order to achieve the policy objectives stated in the guidelines it is necessary to upgrade research infrastructure in at least 30 research institutions, concentrating research and applied science in excellent research centres. Ten Latvia National Level Research Centres (NLRCs) have been developed according to the Cabinet Decree No. 243 "For Research and Technology Development Guidelines Implementation Action Plan 2010 to 2011" of May 5, 2010. NLRC is the framework for cooperation among scientific institutions and for concentration of scientific

resources to ensure the European level research in national research priorities. The objective of the NLRC is scientific excellence, concentration of research infrastructure (prevention of its fragmentation), and commercialisation of science and industry-science partnership.

On 17 August 2010, the Cabinet approved the Informative Report on National Level Research Centres (NLRCs). The Ministry of Education and Science (Ministry) of the republic of Latvia has created the system based on scientific institutions operating strategies, which determines the hierarchy of scientific institutions:

- regional level scientific institutions (about 20);
- national level research centres (about 10);
- ESFRI road map level research centres (about 4-5).

Latvian national roadmap is a long-term planning instrument that lists research infrastructures on national importance, either new or in need of upgrading. The development of national roadmaps, connected to the ESFRI Roadmap,

- helps develop the required overall coherent policy by evaluating and prioritising national resources dedicated to the existing research infrastructures (both national and pan-European);
- as well as assesses the option of attracting or supporting new pan-European research infrastructures.

The research hypothesis – the focus on R&D and innovation policy to scientific excellence will improve the framework conditions for research and innovation to ensure that innovative ideas can be turned into products and services creating growth and jobs. The aim of the paper is to analyse the NLRC scientific excellence, its concentration of research infrastructure (prevention of its fragmentation) and commercialisation of science. The following objectives were set in order to achieve the aim:

- to analyse Latvia's government policy of higher education and research in the field of research infrastructure development;
- to analyse Latvia's research focus and centres of excellence;
- to propose Latvia's participation in the potential ESFRI objects.

Development of the national level research centres

According to the law "On Scientific Activity" scientific institutions are scientific institutes, institutions of higher education, commercial companies as well as other institutions in the articles of association, by-law or constitution of which scientific activity and participation in the process of acquiring and improving scientific qualification is provided for and which are registered in the Register of Scientific Institutions. On 1 December 2010 totally 136 scientific institutions were registered on the Register of Scientific Institutions (Table 1).

Table 1

Distribution of scientific institutions by legal status

No.	Scientific institutions	Number	%
1.	**Scientific institutes**	**82**	**60.3**
1.1.	Public agencies (state agencies and municipal agencies), including	16	11.7
	agencies of state institutions of higher education	*14*	*10.3*
1.2.	Derived public persons	13	9.6
1.3.	Structural units of state institutions of higher education	53	39.0
2.	**Institutions of higher education**	**9**	**6.6**
2.1.	State institutions of higher education	7	5.1
2.2.	Private institutions of higher education	2	1.5
3.	**Commercial companies**	**19**	**14.0**
4.	**Other scientific institutions**	**26**	**19.1**
	Total	**136**	**100.0**

The attainment of cost efficiency in the provision of scientific institutes is now a well-established objective of the state government's policy for higher education and research (Glass J.C., McKillop D.G., Hyndman N., 1995).

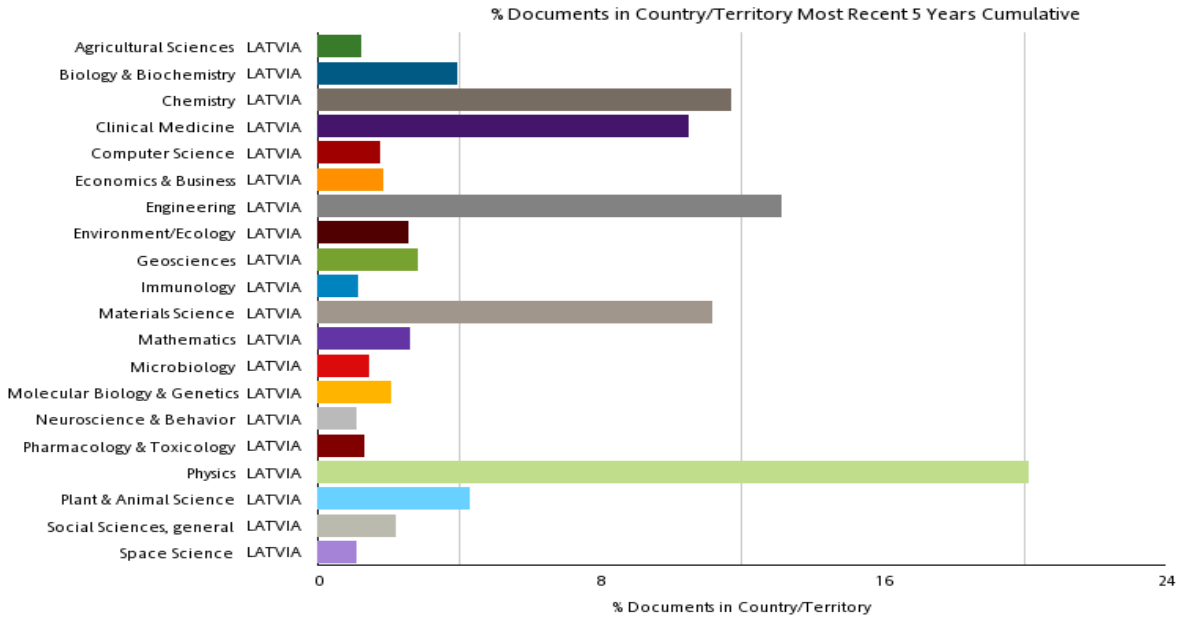
Table 2

Distribution of Latvia National Level Research Centres by the prior research fields

No.	Prior research fields	Latvia National Level Research Centres
1.	Energy and environment (technologies of producing and use of renewal energy resources, technologies reducing climate change, biological multiform)	NLRC on the extraction and sustainable use technologies of Energy and Environmental Resources (including Transport and Mechanical Engineering Centre)
2.	Sustainable use of local resources (entrails of the Earth, forest, food and transport) - new products and technologies	NLRC on the Use of Agricultural Resources and Food Technologies
		NLRC on the Use of Forest and Water Resources
3.	Innovative materials and technologies (IT, information and signal processing technologies, nanostructured multifunctional materials and nanotechnologies)	NLRC on ICT and Signal-Processing Technologies (including Space Data Processing Centre)
		NLRC on Nanotechnologies and Nanomaterials
4.	Social health (prevention, medical, diagnostic means and methods, biomedical technologies)	Pharmacy and Biomedicine NLRC (including Pharmaceutical Technology Study and Research Centre and Biopharmaceutical Centre)
		NLRC on Health and Clinical Medicine
5.	National identity (language, history, culture and social security of Latvia)	NLRC on the Latvian Language, Latvian Cultural Heritage and Creative Technologies
		NLRC on Social Economy and Public Administration

After 2008, a period of retrenchments ensued as a result of intensified budget cutting in Latvia resulted in budget rescissions for public scientific institutions in the fiscal years of 2009 and 2010. A study of internal resource allocation in public research institutions is important as the patterns of expenditures and revenues at public institutions after a period of substantial change (Santos J.L., 2007).

Latvia National Level Research Centres (Table 2) are defined according to the Cabinet Decree No. 594 "On Prior Research Fields for Financing of Fundamental and Applied Research in 2010-2013" of August 31 2009, and according to the priority sectors of the economy, which are



Source: Thomson Reuters. Web of Knowledge. October 10, 2010

Fig.1. **Latvian Research Focus in 2005-2010**

stated in the "Informative Report on the Economic Recovery Policies in the Medium Term" and approved by the Cabinet on 10 November 2009. The scientific institutions, which are involved in NLRC, shall develop the common Cooperation Strategy, including the following information:

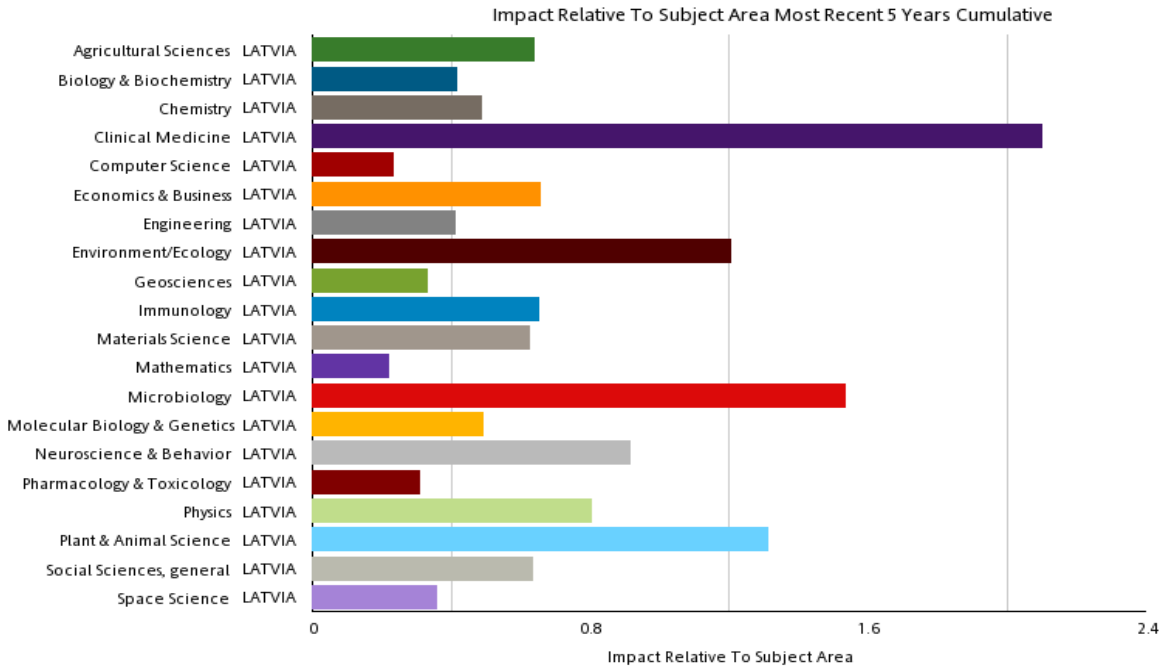
- NLRC mid-term and long-term strategic goals;
- existing and planned scientific and technological cooperation between scientific institutions of NLRC and other R&D organisations;
- information on the leading scientific institution, which will be responsible for the implementation of the NLRC Cooperation Strategy;
- existing and planned cooperation with an industry that justifies the ability of NLRC to commercialise its research results;
- access to the research infrastructure of NLRC for other scientific institutions;
- the European Regional Development Fund (ERDF) funding allocation between research institutions of NLRC;
- maintenance and development of NLRC infrastructure in the mid-term and long-term;
- Territorial Development strategy of each scientific institution of NLRC describing the existing research infrastructure and investment plans under the ERDF.

The evaluation of research institutions' development strategy is based on the following research quality criteria: participation in international and national level research projects, cooperation with industry, scientific publications included in international databases (Figure 1), patented inventions and protected plant varieties, and the number of young scientists, and PhD students employed in the scientific institution.

NLRC shall consist of at least two State scientific institutions with a definite quality of their research activities, their scientific potential, and international competitiveness (quality level is expressed as a coefficient which shall be achieved). NLRC shall be based on a single Cooperation Strategy, which is approved by the Ministry of Education and Science.

Results

According to the initial analysis of internal resource allocation in public research institutions it is expected that Latvia's centres of excellence are concentrated in different fields of natural and engineering sciences as well in social sciences (Figure 2).



Source: Thomson Reuters. Web of Knowledge. October 10, 2010

Fig.2. **Latvian Centres of Excellence**

According to the Ministry's research institutions' development strategy, it is expected that twenty eight research institutions may qualify for the status of NLRC (Table 3).

Table 3

Expected qualified research institutions for the status of NLRC

No.	NLRC	Research institutions
1.	NLRC on the extraction and sustainable use technologies of Energy and Environmental Resources (including *Transport and Mechanical Engineering Centre*)	Institute of Physical Energetic
		Riga Technical University
		University of Latvia
		University of Latvia, Institute of Biology
2.	Pharmacy and Biomedicine NLRC (including *Pharmaceutical Technology Study and Research Centre and Biopharmaceutical Centre)*	Latvian Biomedical Research and Study Centre
		Latvian Institute of Organic Synthesis
		Riga Technical University
		University of Latvia
3.	NLRC on ICT and Signal-Processing Technologies (including *Space Data Processing Centre)*	Institute of Electronics and Computer Science
		Riga Technical University
		University of Latvia
		University of Latvia, Institute of Mathematics and Computer Science
		Ventspils University College, Institute of Engineering "Ventspils International Radio Astronomy Centre"
4.	NLRC on the Latvian Language, Latvian Cultural Heritage and Creative Technologies	University of Latvia
		University of Latvia, Institute of Latvian History
		University of Latvia, Institute of Literature, Folklore and Art
		University of Latvia, Institute of Philosophy and Sociology
5.	NLRC on the Use of Agricultural Resources and Food Technologies	Latvia State Institute of Fruit-Growing
		Latvia University of Agriculture
		Research Institute of Food Safety, Animal Health and Environment "BIOR"
		State Priekuļi Plant Breeding Institute
		State Stende Cereals Breeding Institute
		University of Latvia
6.	NLRC on the Use of Forest and Water Resources	Daugavpils University
		Latvia University of Agriculture
		Latvian Institute of Aquatic Ecology
		Latvian State Forest Research Institute "Silava"
		Latvian State Institute of Wood Chemistry
		University of Latvia
7.	NLRC on Nanotechnologies and Nanomaterials	Riga Technical University
		Riga Technical University, Institute of Inorganic Chemistry
		University of Latvia
		University of Latvia, Institute of Polymer Mechanics
		University of Latvia, Institute of Physics
		University of Latvia, Institute of Solid State Physics
8.	NLRC on Health and Clinical Medicine	Pauls Stradiņš Clinical University Hospital
		Riga Stradiņš University
		University of Latvia
9.	NLRC on Social Economy and Public Administration	Latvian Institute of Agrarian Economics
		University of Latvia

The ESFRI Roadmap identifies new Research Infrastructure (RI) of pan-European interest corresponding to the long term needs of the European research communities, covering all scientific areas, regardless of possible location. The ESFRI roadmap is an ongoing process. First published in 2006, with 35 projects, it was updated in 2008 bringing the number of RIs of

the pan-European relevance to 44. Now the EU Member States have prepared national roadmaps that establish the prioritisation of national and pan-European RIs, using the ESFRI Roadmap as a reference. In Latvia the development of NLRC is the first step in the process of national RI roadmap approval. It is expected that according the NLRC's Cooperation Strategies Latvia National Roadmap will be accepted in 2012. The possible list of investment objects defining Latvia's priorities in the pan-European partnership projects is the following:

- Materials and Analytical Facilities: ESS-European Spallation Source;
- Social Sciences and Humanities: CLARIN - Common LAnguage Resources and Technology Initiative and the European Social Survey ESS;
- e-Infrastructures: PRACE - (ex-EU-HPC) – Partnership for Advanced Computing in Europe;
- Biological and Medical Sciences: ELIXIR – European Life-Science Infrastructure for Biological Information – a Major Upgrade.

The formal approval on the participation in the ESFRI projects will be made by the Government after the conditions of the European Research Infrastructure Consortium (ERIC) agreement.

Conclusions

Latvia's government policy for higher education and research is developed for the research infrastructure concentration, prevention of its fragmentation, and commercialisation of science and industry-science partnership. According to the analysis of research institutions resources, nine NLRCs are developed in five prior research fields, according to the priority sectors of the economy: energy and environment; sustainable use of local resources; innovative materials and technologies; social health; and national identity. It is expected that twenty-eight research institutions may qualify for the status of NLRC for concentration of scientific resources to ensure the European-level research in national research priorities. This helps define national budgets, facilitates political support, and allows long-term financial commitment. Latvia's participation in the ESFRI projects would impact science and technology development on the international level ,and contribute to the enhancement of the European Research Area.

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