

# Innovation and Research Strategy for Smart Specialization

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THE INITIAL POSITION OF LATVIA

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MINISTRY OF EDUCATION AND SCIENCE OF THE REPUBLIC OF LATVIA  
MINISTRY OF ECONOMY OF THE REPUBLIC OF LATVIA

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## 2. Summary

This report aims to demonstrate the current progress and the planned activities regarding development of Research and Innovation Strategy for Smart Specialisation. This document presents the current status and position of Latvia as regards to the possible themes for specialization, their impact on the economy and general development, as well as the policies necessary to implement the Smart Specialization Strategy and future steps for preparation of the final document.

At this stage, the document on the Smart Specialization Strategy is based upon planning documents approved at a National level, as well as industry studies and reports on economic development.



**Illustration 1. The documents and studies currently incorporated in the Research and Innovation Strategy for Smart Specialization.**

Of all the planning documents mentioned above, only the National Development Plan 2014 – 2020 (further - NDP2020) and Latvian National Reform programme for implementation of Europe 2020 strategy (NRP) strategy have been completed and approved. At the moment, two additional documents that will have an impact on the content of the Smart Specialization Strategy are being developed - National Industrial Policy Guidelines for 2014-2020 (NIP) and Information society development guidelines for 2014 -2020.

One of the cornerstones of the Smart Specialization Strategy is NIP, that, among other things, defines clear objectives for economic development as regards to its structural changes towards knowledge intensive, innovative and profitable goods and services and more productive and innovation oriented companies. Therefore, the Research and Innovation Strategy for Smart Specialization and NIP are interrelated and mutually dependent documents.

Considering that NIP is currently being negotiated by entrepreneurs, social partners and the appropriate ministries, the Smart Specialization Strategy will be discussed with stakeholders as a part of an integrated system together with NIP.

The initial position of Latvia as regards to the Smart Specialization Strategy is currently based on empirical research and the objectives defined in the NDP2020. Currently the Ministry of Education and Science has analysed the proposed themes, in order to identify the ones with the highest potential and necessary existing capacity for achieving excellence in knowledge. In addition, the Ministry of

Economy has created NIP, in which the potential sectors for development and challenges for economic development have been identified.

In the documents mentioned above, Latvian government has identified knowledge and innovation driven productivity growth as a crucial prerequisite for sustainable long-term economic development. Latvian economy is relatively highly specialized, typically for small countries, which makes the technological diversification of the embedded sectors and shift to knowledge intensive production with higher profitability a matter of economic stability, demography and long term growth. Due to the limited human capital, scarce natural resources and limited capital successful implementation of the Smart Specialization Strategy is a key issue for ensuring welfare and prosperity of the country.

Latvian policy for the Smart Specialization Strategy:

- Effective coordination between knowledge specialization and capabilities of industry to leverage on such specialization, ensuring that building of excellence in research and development is partly led by and followed by “entrepreneurial discovery”, taking into account existing capacity of embedded sectors and their potential for growth,
- Increasing the knowledge pool in the areas of specialization through focusing, international cooperation and knowledge acquisition via foreign direct investment,
- Economic policy, that promotes the absorption of knowledge in companies and stimulates private R&D&I investments,
- Promoting knowledge transfer and closer cooperation between universities, research institutions and enterprises,
- Promoting social innovation at all levels of government and society in general.

Next steps in developing the Smart Specialization Strategy:

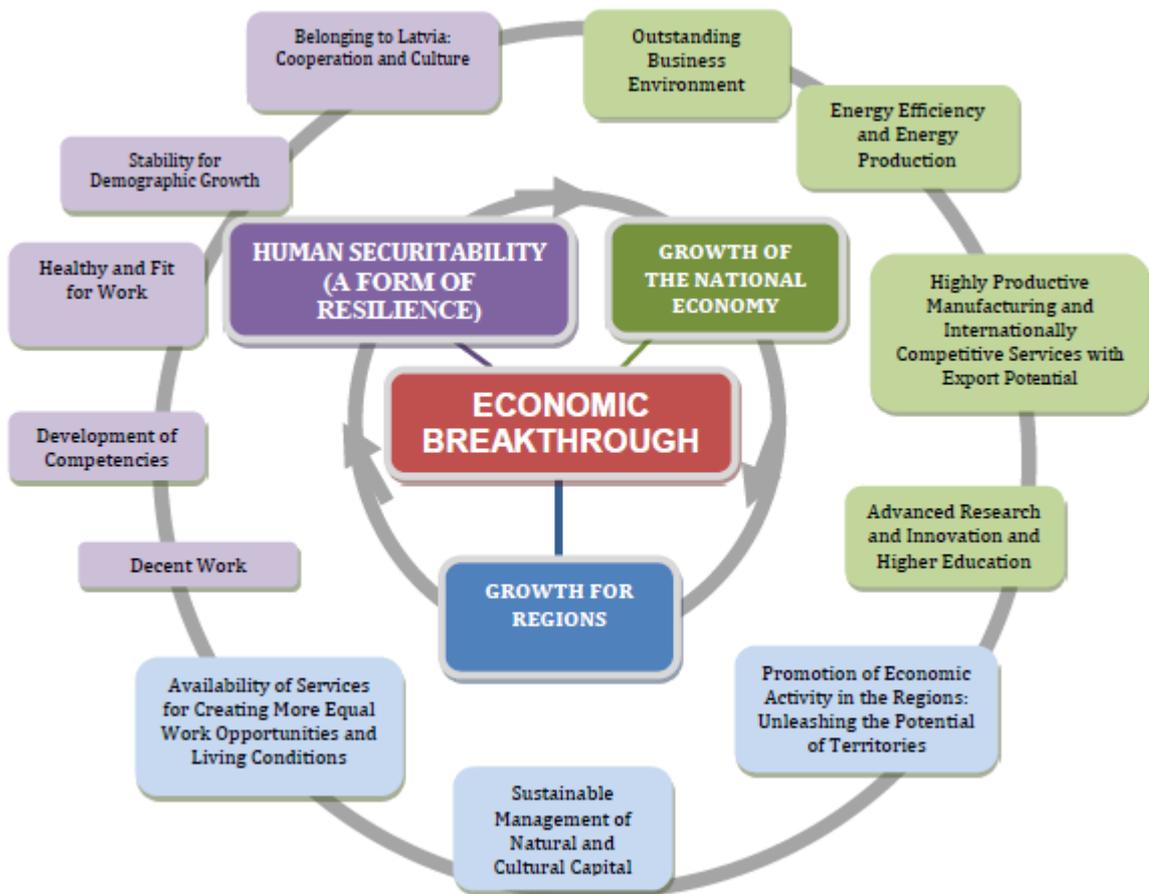
- Assessment of the knowledge specialization themes proposed by the Ministry of Education and Science as regards to the capacity of the economy to use this knowledge and expertise with the aim to increase productivity,
- Ensure the participation of all the relevant stakeholders in further development of the Smart Specialization Strategy and picking knowledge specialization themes. Discussions should focus on direct involvement of all stakeholders through the intensive cooperation with:
  - Organisations, that represent enterprises,
  - Organisations, that represent universities and research institutions,
  - Municipalities.

### 3. National development vision

On 20 December, Latvian Parliament approved NDP2020 - the highest ranked medium term planning document at a national level. It is closely linked with “Sustainable development strategy of Latvia 2030” (Latvia2030) and NRP. The aim of NDP2020 is to identify medium term priorities, courses of action, objectives and evaluation measures.

The development of planning documents (for implementation of the EU funding of 2014-2020 and other foreign financial instruments) including Research and Innovation Strategy for Smart Specialization, is based on the priorities and objectives identified in the NDP2020.

**Illustration 2. National development vision defined in the NDP2020**



Structural changes in the economy towards higher added value and higher productivity play a crucial role in achieving the objectives defined in NDP2020. Considering the negative demographic trends in the short and medium term, the only way to ensure further economic improvement is to increase focus on innovation and research - new technology and products, improved social structures and higher skilled workforce.

#### 3.1. Development objectives

According to NDP2020 vision Latvian science in 2020 will be concentrated to internationally competitive research institutes. A significant part of research will be co-financed by private companies. Academia and the private sector will work hand in hand to create new globally

competitive products. Innovative and creative goods and services will be created by the collaborative effort of scientists and entrepreneurs, that will be able to compete in the global markets. In order to realize this vision, one of the priorities defined in NDP2020 – „National Economy growth” offers a course of action – „Developed research, innovation and higher education”, as well as realistic objectives, tasks and expected outcomes. NDP2020 identifies these objectives for research and innovation fields:

- Investment in research and development (R&D) will reach 1,5% of GDP in 2020, facilitating attraction of human capital, creation of innovative ideas, development of research infrastructure, collaboration between higher education, science and private sectors and the transfer of research and innovation in entrepreneurship.
- Increase the share of high value added product manufacturing in the economy, by commercialization of knowledge and facilitating the production of such products.

The goals and performance indicators included in Latvian NDP2020 are in accordance with the NRP, approved by the Cabinet on 16 November 2010 (prot.Nr.64, 57.§). This document describes a desirable medium-term macroeconomic scenario and reflects the main macro-structural challenges (bottlenecks) and courses of action for Latvian economy. Furthermore, NRP defines quantitative goals for Latvia in 2020 as regards to the EU strategies for smart, sustainable and inclusive growth described in Europa 2020 strategy, as well as the key policies to achieve these goals and a list of the main activities to be conducted from 2011 until 2013.

As regards to the objective defined in Europa 2020 strategy to invest 3% of EU GDP in R&D, Latvia has set an objective to increase its R&D funding to 1.5% of its GDP. (see table)

Year	2008	2009	2010	2015	2020
<b>Total R&amp;D funding (in millions of lats)</b>	99,5	59,9	76,3	169,2	331,1
<b>% of GDP</b>	0,61%	0,45%	0,5%	1,0%	1,5%

**Table 1. R&D expenditure forecast**

### 3.2. National industrial policy objectives

NIP aims to promote structural economic change in favour of production of goods and services with higher added value, including increase of the role of manufacturing, industrial and service modernization and development of more sophisticated exports.

In order to achieve the goals defined, these policy performance indicators have been set:

- Increase of the share of manufacturing in GDP to 20% in 2020 (2011 - 14.1% 2015 - 16.7%);
- Manufacturing productivity growth reaches 40% in 2020 relative to 2011 (2015- 18%);
- Manufacturing growth reaches 60% in 2020 relative to 2011 (2015 - 29%);
- Investment in R&D reaches 1,5% of GDP in 2020 (2011 - 0,6%, 2015 - 1,0%).

## 4. Assessment of the situation in the economy, science and society

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### 4.1. Global challenges

Global challenges alter the traditional business model and the main effects are:

- Increased mobility of production and human and financial capital. This, in turn, leads to an increase in competition for skilled labour and capital;
- Production fragmentation:
  - more sophisticated supply and production chains. As a result of the transport infrastructure development and increasing role of ICT, previously highly concentrated production become geographically fragmented in order to utilize the comparative advantages of different countries and regions;
  - increased specialization of regions in certain fields or focus on a specific part in the value creation chain;
  - enhanced sectorial (production) inner specialization (division of labour). Excellence on every production level is crucial. Also, the competence of suppliers and partners and the innovations in other regions and sectors can play an important role.
- Rapidly growing newly industrialized countries with significant advantages of inexpensive labour;
- Technological development raise new requirements for the creation of competitive advantage. There are higher demand on institutional infrastructure. This is particularly important for promotion of key enabling technologies;
- Disruptive technologies and new business models rapidly changes business landscape increasing demand for rapid application of knowledge and technology;
- Technological advances pushes knowledge frontier further ahead, thus requiring more efforts and focus to reach the frontier of knowledge in order to make next advances in general technologies as well as in specialized applications of such technologies;
- Ubiquity and accessibility of technological information increases pressure on knowledge absorption capacity of businesses into new products and services. Local demand conditions becomes significant driver for creation and adoption of new products.

The impact of globalization and technological process on various sectors is not homogeneous.

*Measuring and Benchmarking the Structural Adjustment Performance of EU Industry<sup>1</sup>*, a study by the European Commission, shows that the globalization has the least impact on such important sectors for Latvian export as food production, woodworking and hardware production. In turn, globalization has a strong effect on light industry and metal producers. Such sectors as chemical industry and production of machinery, electrical and electronic equipment will be affected by both the pressure of globalization and technological advances.

The challenges of globalization lead to changes in industrial policy, which cannot be based on traditional view that sees the manufacturing sector as homogeneous, national and independent. Furthermore, the geopolitical position has great importance, as Latvia is a member state of the EU and

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<sup>1</sup> [http://ec.europa.eu/enterprise/policies/industrial-competitiveness/industrial-policy/future-of-manufacturing/files/key\\_findings\\_measuring\\_and\\_benchmarking\\_en.pdf](http://ec.europa.eu/enterprise/policies/industrial-competitiveness/industrial-policy/future-of-manufacturing/files/key_findings_measuring_and_benchmarking_en.pdf)

borders Commonwealth of Independent States (hereinafter - CIS). Latvia bases its Smart Specialization Strategy on the four main pillars defined<sup>2</sup> in a report by the European Commission. These are:

- Promoting investment in innovation and new technologies;
- Improving demand conditions;
- Facilitating access to funding;
- Increasing investment in human capital and skills.

## 4.2. Comparative advantages of Latvian companies

The comparative advantages of Latvian companies, identified by studies carried out when developing NIP:

- Cost advantage;
- Quality advantage;
- Niche specialization and high customization of products;
- Flexibility in quantities and products;
- Secure and short time of delivery of products and services;
- Qualified experts in selected areas;
- “Made in European Union” label.

**Cost advantage.** The main advantage of Latvian companies is the ability to offer goods and services at competitive price corresponding to relatively high quality of products and services.

**Quality advantage.** Products of Latvian companies have equal or higher quality compared to competitors' at the same price level. It has to be noted, that several other EU countries have similar advantages, while such regions as Asia or the CIS are lagging behind in terms of quality. That creates space for differentiation and compensating advantage of lower labour costs in Asia.

**Specialization in product niches and high product customization.** Latvian manufacturers increasingly specializes in manufacturing niches and highly customized products and services.

**Flexibility in scope and range.** Established production capacity and great flexibility means that companies are flexible in both the range of products offered and the scope of an order thus allowing to attract customers, whose orders volumes are below minimum volume requirements for ordering such products from companies in Asia

**Secure and short order delivery time.** This advantage has been underlined as especially important by the representatives of companies from various sectors. Companies exploit geographical advantage being relatively close to the EU market providing shorter order times. In order to compete with geographically close neighbour countries with cheaper labour force, such as Belorussia and other CIS countries companies focuses on reliability as regards order times. When placing an order with a

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<sup>2</sup> Industrial Policy Communication Update “A Stronger European Industry for Growth and Economic Recovery”, Brussels, 10.10.2012 <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2012:0582:FIN:LV:PDF>

manufacturer from Latvia, the customers is secure to receive the good or service on time with package of other advantages - cost, quality, and flexibility.

**Highly qualified personnel.** Several sectors still have relatively highly qualified personnel, who can ensure product customization according to the needs of the customer as well as constant and systematic product improvement, taking into account trends in commodity markets or increasing demands for more sophisticated products.

**Label „Made in European Union”** Finally, interviews with companies indicate, that more emphasis is being placed by the customers on the geographical location of the manufacturer or on the brand “Made in European Union”. This trend is especially strong for “final goods” and tips the scale towards goods manufactured in EU and subsequently Latvia, when competing with products of similar and even slightly better quality from Asia or CIS countries.

The price paid for cost advantage is increased emigration and general negative demographic trend. Therefore, such advantage is not sustainable. Significant increase in productivity and wages is required to stop the emigration. Thus also implementation of the Smart Specialization Strategy should result in companies decreasing their reliance on cost advantages, shifting focus on those advantages that come from production of more complex goods and services with higher added value. Such transformation process should outpace the loss of competitiveness in low cost sectors due to wage increase.

#### 4.2.1. Productivity

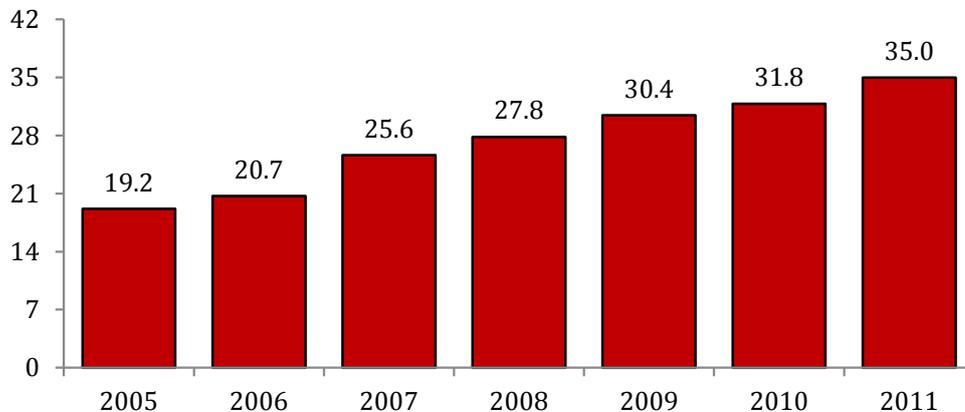


Illustration 3. Manufacturing productivity as a % of EU average level

Latvian labour unit productivity is still far from the EU average, which reinforces the need for priority investments in skills and knowledge, which businesses can use in high-performance work-places with competitive compensation, which should provide a further positive feedback and reinforcement of specialization.

### 4.3. Barriers for economic development

#### 4.3.1. Institutional and Sector-specific structural transformation barriers

NIP development is based on scientific concepts that have been developed by modern and contemporary economic theorists. A new industrial policy has been recognized as one of the most

modern economic concepts in economic literature (few of the most renowned theorists are Harvard professors D.Rodric, R.Hausmann) with one of the basic principles to avoid from "picking winners", but ensure the process including public and private sector dialogue with an aim to discover hindering restrictions for new economic activity and to propose solutions to avoid or overcome them.

The institutional and sector-specific structural transformation barriers were identified in the NIP. In order to identify embedded sectors with capacity to utilise knowledge and generate high-performance work-places the list of most profitable and globally competitive products was determined by using Hausmann-Klinger (H-K) methodology<sup>3</sup>. During research a group of entrepreneurs was identified, that can lead the shift to production of more profitable and productive products.

Afterwards, as a result of dialogue with the largest associations that represents industry sectors, the outcome (lists of products and companies) of the H-K analysis were assessed, thus gathering opinions on the relation between the products and Latvian economy. This was especially important, when taking into account how huge role transit of goods plays in Latvian export structure. In subsequent interviews with entrepreneurs further information was gained on various aspects of entrepreneurship that are important for ensuring competitiveness. The questions were based on M.Porters economic concept of five forces and on economic concept of critical success factors. The analysis of the results yielded valuable information on barriers that impede the expansion of production of existing goods and services or starting a production of goods and services located higher on the added value chain.

During the study a number of comparative advantages and disadvantages were identified, that were practically equivalent for all companies interviewed, regardless of their size, number of employees, the industry they represented or the type of product (intermediate or final product) <sup>4</sup>.

According to the identified competitive advantages through interviews and analysis, the following institutional barriers and market failures have been identified:

- Constraints on capacity and opportunities:
  - labour availability and expertise. Especially, the lack of highly qualified experts;
  - management skills and knowledge. Companies lack managers with general management knowledge and skills. There is a lack of skills in sales, risk and quality management, financial planning and management, and in production process management and optimization. All of these are essential in further development of companies and acquisition of such knowledge and skills would contribute to growth and strengthening of the position in niche markets;
  - limited access to funding;
  - limited supply of industrial areas and office space;
  - barriers to entry in new markets;
- Regulatory restrictions:

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<sup>3</sup> "Structural Transformation and Patterns of Comparative Advantage in the Product Space." Ricardo Hausmann and Bailey Klinger. Center for International Development at Harvard University. 2008

<sup>4</sup> A distinction between systemic or functional market barriers and product segment specific barriers has been used in National industrial policy Source: SMITH, K. (2000). Innovation as a systemic phenomenon: rethinking the role of policy. Enterprise and Innovation Management Studies, 1(1), pp. 73-102.

- the burden of regulation on export markets;
- cost increase, especially energy costs;
- Cooperation restrictions:
  - weak cooperation with science in product development. As studies suggest that companies prefer significant «in-house» investments as regards product development, it can be concluded, that the collaboration with scientific institutions and organisations in the midst of respondents is underdeveloped, irregular and opportunistic.<sup>5</sup>

#### 4.4. Current status of institutional systems in science and technology

Although the country's institutional system of science, technology and innovation provides good overall management and division of responsibilities between the areas, it does not ensure effective co-operation on inter-agency level. At the collegiate level the functions of advisory and consultative bodies are too broad to focus on facilitating closer mutual cooperation and creation of synergies in research and innovation.

Coherent and coordinated innovation process requires the development of a joint research and innovation policy. Existing policy documents on scientific and technological development and innovation policy do not ensure it.

The problems mentioned above, as well as other issues regarding research and innovation have already been identified in a report on Latvia prepared by European Commission in May 2010 *Policy Mix Peer Review. Latvia. Peer Review Outcome Report* (ERAC 2010)<sup>6</sup>. This study was carried out by the Scientific and Technical Research Committee of the EU (CREST) and is focused on the efficiency of scientific policies in Latvia and provided recommendations.

Taking into account the information included in the above mentioned report on government administration, responsibility and the main planning documents in the field of science, technology and innovation, it can be concluded, that in Latvia:

- There is an established institutional system, that provides good overall administration and division of responsibilities between the fields of science, technologies and innovation;
- There are policy documents, that have been created and applied by 2013, and reflect the existing situation, identify problems, define possible solutions and the appropriate financial instruments;
- There is a noticeable lack of management and coordination to implement a successful innovation policy;
- The existing policy documents do not ensure a coherent and coordinated activities for implementing coordinated innovation policy.

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<sup>5</sup> This indicates, that the actual R&D expenditures are significantly larger, as these „in-house” R&D&I costs are not separated from other costs in the accounting logs and therefore do not show up on any statistics.

<sup>6</sup> [http://ec.europa.eu/research/era/pdf/policy-mix-peerreview\\_latvia\\_en.pdf](http://ec.europa.eu/research/era/pdf/policy-mix-peerreview_latvia_en.pdf)

#### 4.4.1. National research centres

One of the first steps in developing the Smart Specialization Strategy is the idea and rules developed by the Ministry of Education and Science in collaboration with other ministries and social partners to create National research centres.

National research centre (NRC) is a form of cooperation between scientific institutions with the aim of concentrating scientific resources in order to undertake research at EU level in a prioritised direction, thus facilitating the growth of prioritised sectors in Latvia and the development of society. This, in turn, stimulates close cooperation between the NRC research institutions involved in prioritized research areas as regards use of available infrastructure, providing concentration of resources and investment, creation of new infrastructure for the needs of NRC and consolidation of scientific institutions.

The objectives of NRC are:

- Scientific excellence;
- Concentration of scientific infrastructure in order to avoid fragmentation;
- Science/production – commercialization in partnership with science.

Overall, by 2013, nine NRCs have been developed:

- Information, Communications and Signal Processing Technology NRC (including Cosmic Data Processing Centre);
- Nanostructured and multifunctional materials, design and technology NRC
- Pharmaceutical and Biomedical NRC (including pharmaceutical technology studies and research centres and biopharmaceutical Centre);
- Public Health and Clinical Medicine, NRC;
- Energy and the extraction and use of environmental resources NRC (including transport and engineering centre development);
- Forest and water resources, NRC;
- Agricultural resources and food NRC;
- Latvian language, cultural heritage and creative technology NRC;
- NRC Socioeconomics and Public Administration.

## 5. Potential for achieving the objectives

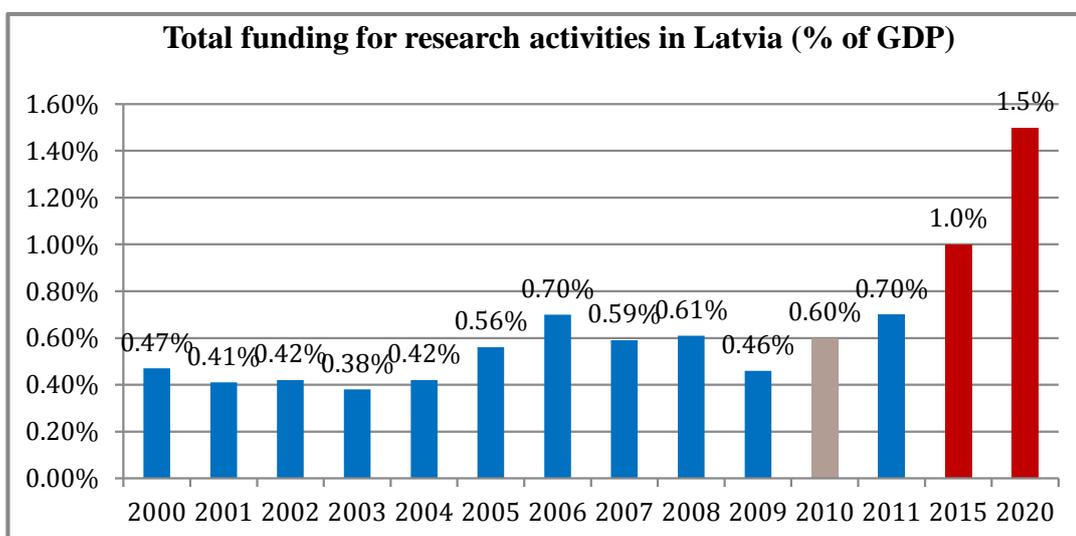
### 5.1. Potential for increasing the R&D&I investments

Latvian business sector R&D spending in 2010 was 0.22% of GDP, which, behind Poland (0.20%) and Romania (0.18%) was the third lowest performance in EU. EU 27 country average business spending on R&D as proportion from GDP is 1.23%. The achievements of Latvia's neighbour countries are as follows: Finland - 2.69%, Sweden - 2.35%, Estonia - 0.81%, Lithuania - 0.23%.

Public expenditure on R&D in 2010 ranks Latvia and Lithuania in 21<sup>st</sup> and 22<sup>nd</sup> place, respectively, among the EU-27 with the index of 0.14% of GDP. Smaller public sector investment in R&D of GDP is in Denmark - 0.06%, Ireland - 0.06%, Cyprus - 0.1%, Malta - 0.02%, and Portugal - 0.11%. If compared to the Finnish public sector investments in R&D it reaches 0.36%, Sweden - 0.17%, Poland - 0.26%, Estonia - 0.17% of GDP.

In order to achieve the objectives set in the NDP2020, it is expected that public sector investments in R&D will reach 0.58% of GDP, while in case of private sector - 0.42% by 2014. However, until 2020, the public and private investment in R&D will reach 0.78% and 0.72% of GDP, respectively. Consequently, the national commitment to increase R&D funding compared to what was invested so far, represents an ambitious, but realistic long-term goal (see Illustration 4).

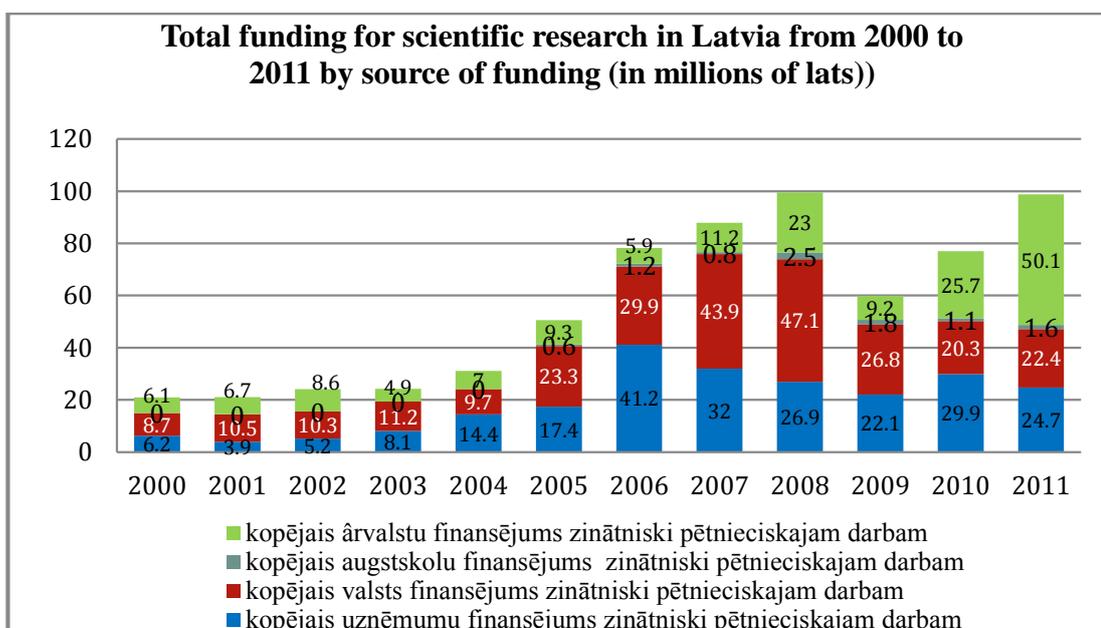
**Illustration 4. Total funding for research activities in Latvia (% of GDP)** Source: Central Statistical Bureau (SCP) data



Analysis of R&D expenditure in 2011 by financing source shows that state budget provided 22.5%, the private sector - 24.8%, university funding - 1.6%, but more than half of the total funding available for research in 2011, or 50.4% has been provided by foreign funding (see illustration 5).

**Illustration 5. Latvian funding for scientific research in the years 2000 to 2011 by source of funding (in millions of U.S. \$).** Source: CSP data<sup>7</sup>

<sup>7</sup> Tax code of Republic of Latvia does not require and do not provide benefit for separating R&D costs from other business costs such as production and materials. Separation of R&D costs on the other hand often is extra burden for enterprises, thus actual



Comparative data with other EU countries shows that private sector has the greatest potential as regards significant increase of funding in R&D&I. The Smart Specialization Strategy should contribute to the public sector investments in R&D&I that supports significant increase in private R&D&I co-investment along the public one.

## 5.2. Potential for economic growth

NIP strategic framework states that in order to implement national industrial policy two types of activities will be undertaken:

- the activities that should remove barriers that hinder innovation. It includes activities related to the identification of functional economic barriers and development of policies to remove them;
- the activities that are related to increasing the economic profitability and increase of tradable sector productivity. Policies that facilitates shift to higher added value products and services will be developed.

Profitability of Latvian exports and possibilities of increasing it was analysed in in-depth study *Product space analysis and structural transformation capabilities in Latvia*<sup>8</sup> applied when developing NIP.

The most substantial contribution in the growth of productivity can be created by innovations -both technology and practice-based (non-technological). Latvia has one of the lowest levels of investment in R&D along other EU member states which points to serious deficiencies in innovation policy and funding. To ensure that this funding significantly increases, one should assume that the increase of public R&D funding will result in co-investment by private sector. Given that in the EU Latvia has one

R&D spending and level of activities may be underreported by Latvian enterprises. However, the difference between actual level of R&D activities and reported one is difficult to estimate.

<sup>8</sup>[http://www.mk.gov.lv/file/files/ESfondi/2012/padzilinata\\_izpete\\_precu\\_telpas\\_analize\\_un\\_strukturalas\\_transformacijas\\_ie\\_spejas\\_latvija\\_lv.pdf](http://www.mk.gov.lv/file/files/ESfondi/2012/padzilinata_izpete_precu_telpas_analize_un_strukturalas_transformacijas_ie_spejas_latvija_lv.pdf)

Innovation and Research Strategy for Smart Specialization | Potential for achieving the objectives of the lowest private R&D investments, the increase of share of private investment in the R&D activities is crucial.

## 6. Smart Specialization Strategy

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At this point all the preliminary work has been carried out to initiate productive discussions with all the stakeholders regarding the themes for specialization, as well as the impact of specialization and implementation of the activities:

- Ministry of Education and Science has identified the themes where knowledge specialization is most likely to reach critical mass and excellence;
- Ministry of Economy has carried out an in-depth studies of the economy, in order to evaluate the existing industrial base to identify those areas and directions for specialization that have the highest possibility to create significant growth in innovation, profitability and productivity.

### 6.1. Themes for knowledge specialization

The ministry of Education and Science has identified the following priorities for smart specialization by evaluating scientific activities, analysing the amount and significance of scientific publications, as well as excellence in research groups, involving scientific institutions, by taking into account scientific priorities and the experience in establishing NRC and analysing technological transfers:

- Bio pharmacy and organic chemistry:
  - human and veterinary drug design;
  - individualized diagnostic and treatment methods;
  - functional food and medicinal cosmetics;
  - pharmaceutical technology and fermentation technology;
  - Novel diagnostic technologies;
- Nanostructured materials and high-energy radiation:
  - functional materials for electronics and photonics;
  - nano-composites and ceramics;
  - thin layer and coating technologies;
  - radiation chemistry and nuclear medicine;
  - agneto hydrodynamics;
- Smart engineering technologies and ICT:
  - mechatronics;
  - cyber physical systems;
  - functional materials;
  - smart energy and water technologies;
  - aeronautics and space technology.

Typically for a small country, the economy of Latvia is relatively specialized. On one hand, it leaves the economy dependant on few sectors, on the other hand, it allows to focus on technological diversification within these sectors and creation of synergies with other sectors. In order to prevent such sectorial specialization enhancing effect, Latvia aims to define knowledge specialization themes, by taking into account the following aspects:

- The highest potential of creation of opportunities for embedded industries of technological diversification of production towards higher profitability products;
- Clear coordination between education, research and innovation;

- Potential to create new industries or new domains of products for existing industries as a result of knowledge and skills spill-over from research institution and existing industries;
- Industry demonstrate readiness to co-finance public sector R&D&I investments with private funding;
- It is possible to reach critical mass in every stage: R&D, innovation and commercialization/production including areas where Latvia has an existing capacity and natural advantages to achieve excellence;
- Biggest social value identified;
- Latvia can coordinate its activities with neighbouring countries, primarily in the Baltic region, in order to avoid duplication and fragmentation at the Baltic region level;
- It is possible to facilitate the acquisition and usage of key enabling technologies, including the ones with the biggest social impact improve access and quality of

When using the term 'industry', we also mean the service sector.

## 6.2. Coordination

One of the tasks of the Smart Specialization Strategy is to provide coordination between investments in human capital and skills and the ability of the economy or society to utilize human capital in creation of higher productivity and high-performance work-places.

The aim of such coordination is to ensure that local economy benefits from the investments in human capital and knowledge first. Without appropriate coordination there is a risk that such investments can become counter-productive, thus worsening the chances of local economic development.

### 6.2.1. Competence Centres

One of the coordination mechanisms that has been established and can serve as a tool for implementing the Smart Specialization Strategy is Competences Centres. At the moment six Competence Centres have been established by the Ministry of Economy that unify companies and research organisations among various industries and collaborate on research projects with the aim to create innovative products.

Competence centres have been established in six key areas of Latvian economy:

- pharmaceutical and chemical industries;
- information and communication technologies;
- forests;
- electrical and optical equipment;
- environment, bioenergy, and biotechnology;
- Transport engineering sector.

The objectives of Competence Centres are:

- to promote private sector investment in R&D and R & D-related infrastructure;
- to improve research sectors understanding of the industry;
- to improve labour mobility between industry and research;
- to promote research and development internationalization through greater foreign enterprises and research institutes, as well as participation in joint research and product development projects in Latvia;

Research and development activities related to Competence Centres are carried out in companies and research institutions cooperating in the Centres. Competence Centres can be used as vehicle for mutually beneficial research coordination, research funding and knowledge transfer, providing open access to innovation infrastructure and improving sustainability of operation.

## 7. Further activities

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Summary:

- SWOT analysis to facilitate evaluation of potential options for the Smart Specialization strategy;
- Clarification of specialization themes for discussion from the side of research, including:
  - in-depth analysis and proposal development of goals and objectives in each proposed theme;
  - required investment size and expected impact to economy and society from researchers' perspective;
  - offer to industry/society<sup>9</sup>;
  - expected human capital as a result of strategy in terms of number of researchers and high-performance work-places, as well as research infrastructure;
- Coordination and alignment of the proposed themes with industry capacity, development possibilities and market (existing and expected) needs. This is expected to be two way road, where industry assessment induces changes in themes as well as proposed themes creates for industry new ways for innovation and productivity;
- Further expert analysis of proposed themes regarding social value and economic impact;
- Assessment of proposed themes between stakeholders, including industry<sup>10</sup>;
- Assessment of opportunities for synergy between Horizon 2020 and the Smart Specialization Strategy and the necessary change;
- Assessment of possibilities of synergy and coordination between ERA and Horizon 2020 with the Smart Specialization Strategy and the necessary change;
- Coordination between the Smart Specialization Strategy themes and BIRTI initiative;
- Spatial and geographical assessment of the Smart Specialization Strategy;
- Assessment of the Smart Specialization Strategy as a facilitator in shifting toward low carbon economy and resource friendly industry;
- Development of action plan to facilitate implementation of the Smart Specialization Strategy based on selected themes and identified necessities for stimulus, funding and policies (action plan should include possibilities for trial and error);
- Development of monitoring and evaluation system to ensure that the Smart Specialization Strategy will be re-evaluated regularly and adapted to the results and identified failures (risk assessment and risk management plan to ensure timely response to inevitable failures in part of policies).

Development of action plan, that would create the largest synergy and accepted by all stakeholders. During the stage of consultation and further analysis of areas and directions, alterations in themes is expected.

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<sup>9</sup> There can be themes with high social value, but without potential to directly create opportunities for business.

<sup>10</sup> Criteria of assessment given below in this chapter.

## 7.1. Principles for selecting knowledge specialization themes

In order to get necessary support and monitoring from stakeholders, when the activities are being undertaken, in-depth discussion between stakeholders should occur with the goal to set common goals.

Taking into account the concept of “entrepreneurial innovation” and emphasizing a bottom-up type of communication, each theme and its supported activities needs to be evaluated by the following criteria, in order to ensure precision when choosing specialization themes:

- Potential for creation of critical mass:
  - is it possible to reach critical mass within this theme, in order to ensure private investment in R&D&I that at least matches the investment from the public sector? Is it possible to achieve a constant increase in private investment without a further increase in public funding?
  - will the supported activities be sufficient and focus on reaching the critical mass?
- Impact on the economy:
  - does this knowledge have the potential to facilitate technological diversification of existing industries?
  - does this knowledge have support in the industry?
  - is the ability of the economy sufficient in this theme to create profitability and high-performance work-places? When the country reaches excellence in this theme? Will it be able to keep highly qualified experts by providing them work and competitive wage level?
  - is the knowledge being created for expanding markets, future products or the existing demand?
- Social value:
  - does specialization theme create social value for society,
  - does specialization theme respond to the most pressing social challenges: aging of society, inequality in opportunities, youth unemployment, and digital division?
  - what is the likelihood that investment into theme with high social value will reach critical mass to deliver significant impact? Can we attract and evaluate critical market value to the outputs, does the output value justify investment?
- Size of the investment:
  - is the necessary amount of investment available covering the difference between existing capacity and desirable capacity?
- Competition:
  - is the concentration of infrastructure sufficient; is it possible to reach sufficiently high number of labour, to reach critical mass on the industrial side?
- Internationalisation:
  - will this theme be interesting enough for the global markets? Does this theme have the potential to concentrate regional competence? Is there another regional centre with strong enough pull to attract experts from Latvia?
  - does this theme has the potential to create a regional centre with a gravity of its own?
- Knowledge attraction through investment:
  - will excellence in this theme attract foreign direct investment in sectors, hence enhancing use of this type of knowledge?
- Advantages in factors of production:

- does Latvia have any factors of production, whose existence provides a natural regional advantage (natural resources – water, wood, land, climate)?
- Production chains:
  - do these specialization themes allow to move up the production chain or become an integral part of it?
- Time:
  - is the time horizon, when excellence could be achieved, comparable to the time horizon for the possible demand for this knowledge?

Answers to these questions should be found in polls, interviews and analysis by experts, as well as stakeholders – entrepreneurs, societies, scientists.