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Feedback Paper Document on the Implementation of EmpInno Activities: PP 09 Riga Planning Region, Latvia

Table of Contents

1. Introduction

This feedback document was elaborated by the EmpInno partner - Riga Planning Region - in cooperation with its local stakeholders and external consultants. The paper contains a description of the implementation of EmpInno activities in Latvia, outlines the current situation in the Region as well as provides recommendations for the implementation of RIS3 strategy on a regional level. The conclusions and suggested solutions for the most part originate from the research and communication activities held in the territory of the region, however, the feedback document also includes the findings that stem from the international exchange activities, benchmarking and discussions with international experts during the implementation of the EmpInno project.

The Smart Specialization Strategy of Latvia and National Industrial Policy Guidelines 2014-2020 are two mutually coordinated parts of the national economic development plan – these documents aim to facilitate achievement of the common goal – structural change of the national economy to increase the proportion of high added value products and services in export[1]. The Strategy is oriented towards promotion of knowledge intensive economics by investments in research, innovation and similar facilitating activities.

There are five smart specialization priority areas in Latvia: (1) knowledge intensive bioeconomy, (2) biomedicine, medical technologies, bio-pharmacy and biotechnologies, (3) smart materials, technology and engineering systems; (4) information and communication technologies and (5) smart energy, the ecosystems of which incorporate all industry, science and education representatives who create knowledge necessary for the successful implementation of the set strategic tasks for each smart specialization area.

[1]Smart Specialization strategy. Retrieved from: http://www.izm.gov.lv/en/Science/smart-specialisation-strategy

Since the beginning of the implementation of the Strategy, it has become clear that there are a number of industries in Latvia that are highly specialized in relative terms, therefore specialization as such is not a problem. The main obstacles hindering economic development could rather be attributed to other aspects, such as the lack of a qualified labour force or underdeveloped mechanisms that ensure smooth cooperation. There is a huge potential for the improvement of collaboration among research institutes and enterprises, especially in more remotely located urban settlements.

The feedback paper attempts to describe the experiences acquired by the EmpInno project Riga team during the implementation of the project, as well as summarizes and documents the results of analytic reviews and a range of meetings and workshops organised.

2. Background information

According to the "*Law on Regional Development*" of Latvia, the planning regions function as derived public authorities responsible for development planning and monitoring on regional level. There are five planning regions in Latvia that can also be viewed as platforms for cooperation of local municipalities. The most important responsibilities of the regions include elaboration and monitoring of regional development planning documents, cooperation with local municipalities located in the region and the promotion of entrepreneurship. Riga planning region is by far the largest planning region in Latvia both in terms of population and the amount of economic activity – there are 30 local municipalities located in the territory of Riga Planning Region, including the capital city Riga, and the region produces about a half of the national Gross domestic product.

Despite the huge economic importance of the region, it lacks the political or the executive power to administer the EU operative programmes and therefore its role is somewhat limited. There is a single nation-wide Smart specialization strategy in Latvia that was elaborated by the national Ministry of Education and Science and its stakeholders - other state ministries, agencies, associations / chambers of commerce and research institutes. It is the national strategy owner that has ensured the public participation process and held consultations with major stakeholders before the RIS3 strategy was approved. The monitoring is also being done by the Ministry and it does not include a clear regional dimension, which necessitates that the regional and local actors elaborate their own tools and mechanisms that could possibly assist planners and economic analysts on a regional and local level and also help to achieve one of the most important goals of EmpInno to deliver the RIS3 approach to medium-sized cities and regions.

The fact that the national Smart Specialization Strategy does not include a particular regional or local component, imposes significant restrictions for both regional and local RIS3 specialists, however, there is still a wide range of instruments available that help to establish the much needed linkage among different levels of administrative and spatial hierarchies.

Using the EmpInno terminology, Riga Planning region, as a regional authority, can be named a smart specialization strategy implementer and its target group for the organizational coaching tool thus consists of the "*internal members of the organization*", however, given the fact that Riga Planning Region is a regional municipality whose primary task is to co-ordinate regional development processes through cooperation with local municipalities and support to entrepreneurship, there is also a strong external dimension and the Region can actually play a certain role in transferring knowledge to other stakeholders, especially on a lower spatial level.

All development centres (cities or towns) in Latvia are classified by their size and functional scope by the Spatial Development Perspective of the Sustainable Development Strategy of Latvia until 2030 and other related regulatory acts. There are: *National development centres* (for instance, Riga, the capital city – a centre of international relations, entrepreneurship, higher education, research and development); *regional development centres* (e.g. Limbaži, Ogre, Sigulda, Tukums) with similar functions but on a more localized scale; and local development centres (smaller municipalities). As part of EmpInno, all research and communication activities were aimed at target groups on all three levels of urban hierarchy in order to help increase the capacities of local RIS3 specialists (usually development planners and entrepreneurship specialists) by involving them in the EmpInno activities that were implemented by project partner Riga Planning Region.

Given the responsibilities and functions delegated to the planning regions by the State, the most important target group to be addressed as part of the EmpInno activities in Riga Planning Region were *public institutions* that deal with the implementation of the RIS3 strategy - central, regional and local authorities, especially municipal entrepreneurship development divisions or individual officers. Hence, the challenge was to raise their awareness of the significant role of smart specialisation in the development of the region and its municipalities.

Entrepreneurs are the ones that bring the RIS3 strategies to economically viable contexts and therefore they constituted another important target group. Most local activities focused on companies that operate within the framework of priority sectors of the Smart specialization.

Non-governmental business support institutions that are directly or indirectly related to innovation activity and stimulate the emergence and growth of companies who are able to produce innovative products or services. This target group included technology and industrial parks, business incubators, chambers of economy and commerce, business associations, and other institutions that have been founded to favour the development of entrepreneurship.

Regional research and academic institutions that offer research and development, education, technology transfer and knowledge services for enterprises operating in the region.

3. Objectives, communication and results

At the time Riga Planning Region made the decision to become a part of the EmpInno project consortium, the region played a relatively modest role in the promotion of innovation on a regional scale and its practical activities in relation to the implementation of the national RIS3 strategy were of irregular nature and *ad hoc*. When joining EmpInno, a decision was made to assume a role of a regional leader in championing the RIS3 approach in Latvia. The most important challenge was to find the unique role and the specific added value of the region in the broader RIS3 environment.

The logics of the EmpInno activities in Riga Planning Region can be easily described by associating the implemented activities with partner budget or deriving local activities from overall project implementation plan.

A closer look at the budget would reveal the pattern that clearly indicates three local targets on regional level that focused on a certain territorial unit but also simultaneously respected the overall EmpInno vision. First, as part of activities that were implemented in Work Package 2 “Enhancing RIS3 Capacity and Delivery via Specialists” included such

budget positions as “Data collection and analysis on RIS3 implementation in Riga Planning Region” and “Maintenance and updating of information platform for RIS3 implementation in Riga Planning Region”, which implied accumulation of detailed information and both explicit and tacit knowledge to be later used when developing recommendations and suggestions.

Secondly, there were funds allocated for the local meetings, workshops and wrap-up seminars focusing on small and medium sized enterprises in local municipalities (“Empowering SMEs – Organisation of Local Seminars in Latvia – ICT, Health&Biotech, Materials and Food”) These budget positions and local activities associated with them fell into Work Package 3 “Empowering + exploiting transnational RIS3 priorities”.

The third group of activities on local level related to EmpInno WP4 Macro-regional solutions for local needs and for the most part implied learning and exchange of experiences.

The implementation of EmpInno activities in Riga was based on a simple three-phase model that is graphically shown on Table 1 (refer to page 8) and describes both the process and reckoning of how EmpInno activities were implemented in Riga Planning Region. This model can also be attributed to the basis of the partner Feedback document.

The whole process was split into three mutually intervened phases that contained certain activities sequenced in a logical order given the existing role, responsibilities and capacity of Riga Planning Region in the implementation or adaptation of the national RIS3 strategy to regional and local needs. In addition, it was deliberatively subordinated to the EmpInno timeline so that the learning process and knowledge gained from project partners and stakeholders during formal project meetings became available. This acquisition of knowledge consisted of a) information on existing experiences or regional processes of growth and innovation that targeted S3 in other partner regions, b) good practices of regional innovation policy instruments or approaches, c) experiences in cluster development, d) regional RIS3 presentations, e) practical initiatives that foster innovation, especially in locations outside larger urban areas, f) the role of leadership and g) methods of matchmaking and other types of networking.

In practice it resulted in the transfer of these experiences to local stakeholders via meetings and workshops, the results of which were later converted to a comprehensive research study of the existing situation, description of major ecosystems, stakeholder maps, recommendations for the regional S3 monitoring process and solutions for the integration of the key findings in the development documents of Riga Planning Region, such as the long-term Regional Growth Strategy and the medium-term Regional Growth Programme. As well, inspired by other partners’ achievements and best practices, the Riga team elaborated the so called “Organisational coaching tool” – an online analytical platform that helps to better understand the process of innovation in Riga Planning Region by mapping the added value produced by all relevant enterprises represent the core branches within the five priority sectors on the national and regional RIS3 strategy.

The first stage provided for the elaboration of detailed agenda or the road map for local outputs to be delivered and events to be organized. This task was completed by, first, elaboration of the stakeholder map, i.e. selecting the most relevant stakeholders – research institutes, associations and clusters, municipal developments departments, state agencies – that must be approached during the implementation of EmpInno and included in the “circle of supporters” that helped to create the core network of the project, reach stakeholders beyond the scope of EmpInno and can be attributed to other projects or activities related to smart specialisation or regional innovation processes.

Secondly, the project experts elaborated an initial proposal for the research studies or data collection and processing to allow for the in-depth understanding of the existing situation and to search for ways how to introduce meaningful changes or improvements to the pattern of interaction among relevant involved parties.

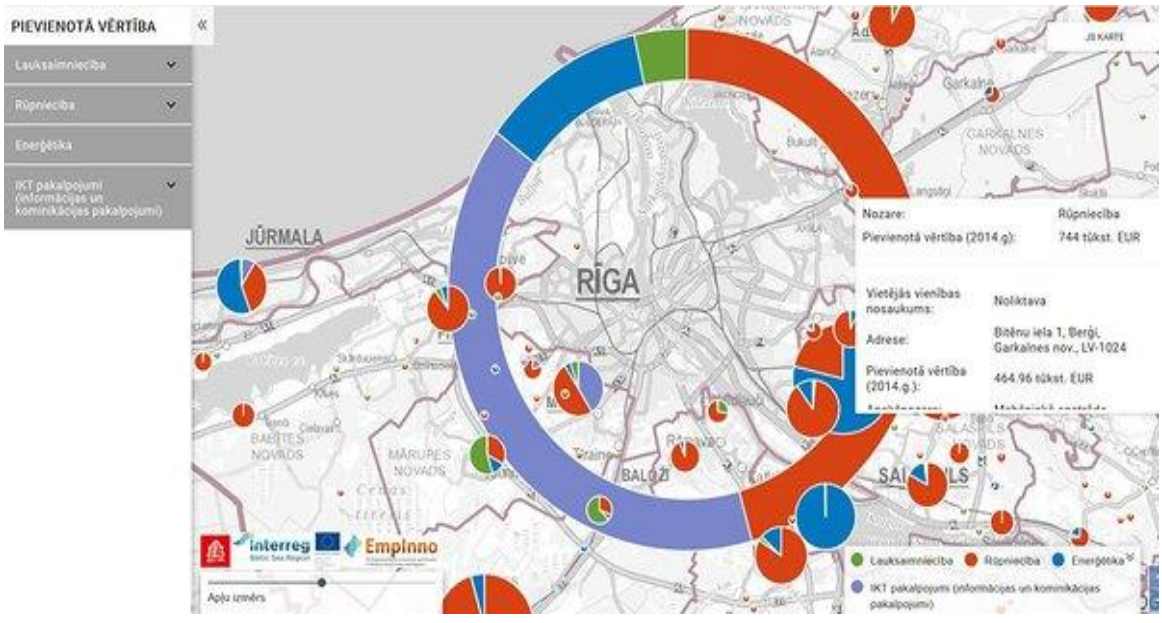
The third set of activities of Phase 1 focused on how to increase awareness of what kind of expertise available from other project partners were the most crucial to Riga Planning Region and what methods were should be used to take over that experience and knowledge.

Summed up, all three steps to be taken during the initial phase, made it possible to create a firm foundation and targeted action list for the later stages.

The second or the maturity stage of the implementation of EmpInno activities in Riga Planning region started around the beginning of 2017 and resulted in an established framework for regional consultation with the purposes to identify common needs and preferences of involved stakeholders and elaboration of mechanisms for ongoing cooperation. The road map that had been outlined during Phase 1 was completed and selected practical activities accomplished.

Among certain activities implemented in Riga planning Region the elaboration of the Interactive RIS3 Analytical On-line Platform of Riga Planning Region. This platform was developed as part of the EmpInno project activities in Riga Planning region after a range of consultations with local stakeholders and international partners. It demonstrates socio-economic data and other information and helps to understand the implementation of the Smart specialization strategy, provides for better understanding of the existing ecosystems and allows for further analysis of the RIS3 processes in the region. The platform provides an informative basis and some in-built analytical mechanisms that allows spatial mapping of various socio-economic phenomena. Mapping of the added value of all companies whose products or services are produced within the branches that constitute the priority sectors of the Latvian Smart specialisation strategy was chosen as a pilot activity. See Figure 1 for a screenshot of the interactive platform.

Figure 1. Screenshot of the Interactive RIS3 Analytical On-line Platform of Riga Planning Region



It should be noted that the analysis of the value added by the companies that work within the priority sectors of the national RIS3 provides just for the initial information. Given the uniform cartographic base, it becomes possible to develop, map and mutually compare various socio-economic phenomena on different layers or mix them, if required. From the organisations' perspective, the strategic goal is to develop this platform as a spatial basis for the development of a comprehensive database that contains various layers of information.

In addition, although the development of a comprehensive data platform would require larger funds and more in-depth analysis, it can be upgraded over time as new amounts of financing are available and as demand for other types of spatial-economic analysis emerge.

All five priority branches of the Smart specialization strategy of Latvia have been mapped and analysed and all enterprises classified in accordance with the European NACE codes. The respective branches were selected and bunched so that they comply and fit into the broader notion of the five priority sectors of the Smart specialization strategy of Latvia.

The newly developed tool served as an assistant to regional and municipal staff members working in the RIS3 field, for instance, development planning and entrepreneurship officers. The integration of the tool into the organisation's daily routine enables regional and local RIS3 specialists get better equipped with more practice-related knowledge about the RIS3 and its implementation possibilities on the local level. The platform also helps them obtain, improve, and retain the skills and knowledge needed to execute their duties properly and competently. This tool was popularised at most EmpInno events in Latvia and it is placed on the internet page of Riga planning region for public access.

The third and the final phase, for the most part associated with year 2018, stands for finalisation of the EmpInno activities in Riga Planning Region and preparing to maintain and further develop project outcomes and ensure integration of these outcomes in the regional strategic development documents, which would give them strategic significance and take the issues related to the implementation and monitoring of the Smart Specialisation Strategy to the political agenda by presenting project outputs to the Development Council of Riga Planning Region.

Certain activities within Phase 3 included the elaboration of analytical review on the implementation of smart specialization strategy in Riga Planning Region, which was done in cooperation with a local consulting company (FIDEA Ltd) based on the terms of reference prepared by the project team and its stakeholders during Phases 1 and 2. The review consists of an extended yet focused description of all priority ecosystems, lists major participants, describes available human resources and financial assistance instruments to align the RIS3 strategic documents with funding initiatives, outlines best practices, provides a comparative analysis between regional and local centres, as well as summarises the most important conclusions of both the analytical work and cooperation with local or foreign partners. A more detailed description of these efforts is given in the next section of this document.

The maps were developed in close cooperation between the project team of Riga planning Region and the consulting company SIA Fidea (Fidea, Ltd) and they represent the results of the series of discussions that were held with the aim to list all relevant stakeholders who comprise the ecosystems of the priority sectors of Smart Specialization Strategy of Latvia (elaborate the so-called stakeholder maps).

It was a quite straightforward process from the very beginning – the initial decision was on how to group these stakeholders and on identifying the attributes that could be used to assist the grouping procedures. We opted for quite a simple technical solution and decided that *Google maps* web mapping service should be used as a platform for smart specialisation maps as it allows grouping various types of data (assign different icons to different types of activity by locations).

Hence, the decision was made to group the stakeholders by 1) Smart specialisation area (for instance, ICT, Smart materials, etc.), then 2) the role of smart specialisation (for instance, excellence driver, infrastructure, innovation centre, etc.) and finally 3) by exact specialisation or the type of economic activity.

The other part of the work was to search / filter the public databases (the Enterprise register) for the addresses of all relevant companies and classify them by the above mentioned parameters, thus creating an MS Access database / spreadsheets. Once it was finished, the data were exported from MS Access database to Google maps. However, some information was entered manually, for instance, links to the stakeholders' webpages.

In summation, it was a mixture of the expert discussions and technical work but we are quite satisfied with the results as they allow to identify the clusters of economic activity and the degree of concentration. In general, they represent the location of our RIS3 industries.

In autumn, 2018, as most of local product outputs and the series of consultations with local stakeholders were completed, Riga planning region organised the project wrap-up seminars at various local municipalities both to popularise and promote the RIS3 approach as such, and demonstrate the practical outputs and continue the debate on how to proceed after the implementation of EmpInno is over.

Four regional wrap-up seminars were held from October to December, each of them consisting of two parts – a) the general part that focused on the implementation and monitoring of RIS3 in the region and included best practice examples from Latvia and other project partners and b) the specific part where issues related to certain priority sectors - ICT, Health&Biotech, Materials and Food were discussed. These wrap-up seminars can be considered as important elements to ensure feedback on a regional / local level and their results were also reported to the partners responsible for the respective GoA's within WP3.

Another very important activity started by the project team to capitalise on the project results as the closure of EmpInno was approaching included the integration of major project conclusions in the regional development documents and regional monitoring system to ensure continuity and sustainability as well as establish a framework for regional monitoring.

The activities mentioned before have allowed the following tangible and intangible project results to be achieved:

a) Network or regional RIS3 specialists, including contributors from other regions around the Baltic Sea, as well as on-going discussion;
b) better understanding of S3 processes in Latvia and partner regions
c) On-line analytical platform that provides for a cartographic base and some analytical tools that demonstrate the spatial patterns of RIS3 and can be updated or upgraded by adding new data layers (the Organisational coaching tool);
d) Detailed descriptions of existing ecosystems and solutions for monitoring of innovation on regional and local level;

e) Integration of project findings and other proposals into strategic development documents of Riga Planning Region;
f) Clear vision of how to further develop project achievements as part of new international cooperation projects in the field of innovation and smart specialisation strategy.

Table 1. Process of the elaboration of the EmpInno Feedback Document for Project Partner Riga Planning Region

Timeline	2016				2017				2018				2019	
PHASE AND ACTIVITY	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Phase 1. Detailed Agenda for Local Outputs and Events														
Step 1.1 Stakeholder analysis and mapping that includes meetings and workshops with local stakeholders – preliminary phase, getting to know each other														
Step 1.2 Data collection and analysis on RIS3 implementation in Riga Planning Region – preliminary stage and general understanding														
Step 1.3 External input via learning from project partners and other foreign institutions through EmpInno events														
Phase 2. Consultation and preparing deliverables														
Step 2.2. Early maturity - identifying common needs, preferences and solutions in cooperation with stakeholders														
Step 2.1 Data collection and analysis on RIS3 implementation in Riga Planning Region, elaboration of analytical on-line platform and terms of reference for external contractors														
Step 2.3 External input via learning from project partners and other foreign institutions through EmpInno events														
Phase 3. Finalisation and Outputs														
Step 3.1 Elaboration of Analytical review on the implementation of smart specialization strategy in Riga Planning Region (external contract based on results of Phase 1 and Phase 2)														
Step 3.2 Wrap-up RIS3 implementation seminars in local municipalities – ICT, Health&Biotech, Materials and Food (based on results of meetings held during Phase 1 and Phase 2)														
Contribution of explicit and tacit knowledge accumulated from EmpInno partners during the implementation of the project to analytical review and wrap-up seminars														
Integration of project outputs in regional development documents, elaboration of regional monitoring system for the implementation of RIS3 on regional level														
Elaboration of EmpInno output documents														

4. Description of current situation – identified problems, SWOT analysis and best practice

During the implementation of the EmpInno project, the project team both examined the existing scientific and applied literature on the Smart Specialization strategy of Latvia and conducted a series of certain practical activities – did a research study on the implementation of the national RIS3 in the region, elaborated an on-line analytical tool to improve understanding of the current processes of change, held a series of discussions or consultations with the relevant stakeholders from public and private sectors and organised local publicity campaigns.

Overall, although significant progress has been achieved in recent years, the productivity level of the national economy of Latvia remain among the lowest in the EU and a relatively cheap labour is still cited as one of the competitive advantages. The interaction among all subjects of the innovation system is still in the intermediary development phase and therefore special attention should be paid to strengthening the innovation ecosystems that ensure natural and fluent co-operation among businesses, academia, various layers of government and other important partners.

During the implementation of EmpInno, we have identified several problems related to the implementation of the Smart Specialization strategy in Riga Planning Region that require proper attention:

1) There is no clear linkage between the different levels of administrative hierarchy as there is a single nation-wide Smart specialization strategy. It is the national strategy owner that has ensured the public participation process and held consultations with major stakeholders before the RIS3 strategy was approved. The monitoring is also being done by the State and it does not include a clear regional dimension, This necessitates that the regional and local actors elaborate their own tools and mechanisms that could possibly assist planners and economic analysts on a regional and local level and also help to achieve one of the most important goals of EmpInno to deliver the RIS3 approach to medium-sized cities and regions.
2) The existing business model is slowly changing towards innovation as a major driving force in most areas of smart specialization. The economic competitiveness is still based on the exploitation of cheap labour and natural resources, the export structure mostly contains products of low or medium-low technology industries, the proportion of manufacturing industry in the national economy is insignificant and industrial productivity is behind the EU average.
3) Insufficient cooperation between groups of important stakeholders (for instance, businesses and science on a local level). Some successful examples show that the situation could be possibly improved through the existing infrastructure of Competence / Excellence Centres.
4) There is a lack of qualified human resources in peripheral areas, especially engineers, study placement opportunities for students, and cooperation with entrepreneurs and local governments in ensuring study placement opportunities for students. Academic and scientific personnel get an incomplete picture of the needs of enterprises.
5) Institutions of higher education and research centres need to support the use of their infrastructure so that applied research commissioned by enterprises is given a high priority.
6) Current mono-centric economic and demographic trends in Latvia negatively affect balanced development. The capital Riga is by far larger than other development centres and is the location of a disproportionate amount of the regional innovation system. Such a pattern hinders competitiveness of smaller regions or towns. The flows of internal migration also

have a pronounced centripetal character, which restricts the growth of innovation processes in the periphery.

SWOT analysis

Based on the results of the series of interviews and discussions with representatives from major stakeholder and target groups – municipalities, research institutions and private companies that are active in the fields of economy addressed by the Smart Specialization Strategy of Latvia, the projects team in cooperation with external consultants from a local company "Fidea", Ltd, carried out a typical SWOT (strengths, weaknesses, opportunities and threats) analysis in order to crystallise the most promising fields of specialisation for each national and regional centre (cities or towns) that are located within the territory of Riga Planning region in an attempt to compare these results with the development programmes of the respective municipalities and equip them with quality information on the implementation of the national RIS3 on a regional or local level of the territorial hierarchy.

National Cities (Riga and Jurmala) and regional centres (Sigulda, Ogre, Limbaži, Tukums)

Strengths	*Weaknesses*
- Possibility to develop innovation clusters; - Riga as the ICT and financial centre of RPR; - Jurmala: a city with developed tourism, recreation, real estate market segments; - Education institutions and industry representatives are actively participating in EU funding programs; - Labour force has higher salaries, opportunities to work for international enterprises, acquire new knowledge and improve personal competitiveness; and as residents they have favourable residency declaration opportunities; - Proximity of higher and vocational education establishments provides various possibilities for lifelong learning.	- Lack of co-creation space, especially in industries related to smart materials, engineering systems, smart energetics; - Science institute collaboration with industry is quite slow-moving, which is possibly caused by a lack of mutual collaboration platforms; - In Jurmala and regional centres - relatively weak horizontal impact smart specialization areas - ICT and smart energetics. - Lack of well-managed and interval-based public transportation flow
Opportunities	*Threats*
- For Riga: to build the focus on smart specialization areas connected with the already strong ICT area, as well as smart energetics; - Use free territories for smart material, technology and engineering systems infrastructure development; - For Jurmala and other regional centres: focus smart specialization activities towards knowledge intensive bioeconomy and biomedicine, which	- Disagreements and disparities between Smart specialization areas' decision makers could impede successful development of the specific area; - Lack of consistency in policy makers' decision-making may be a threat for further development.

are not yet sufficiently developed in these areas.	

Other municipalities in the Riga Planning Region (24 local centres)

Strengths	*Weaknesses*
- Separate municipalities have developed specialized vocational and lifelong learning opportunities to create a new labour force or/and provide retraining possibilities for the existing labour force; - Some municipalities take great care of residents declaring possibilities and possible real estate tax reliefs.	- Aging of labour force and personnel of municipality administration; - Separate municipalities have high territory management expenses; - Lack of professional project management capacity. - Lack of well-managed and interval-based public transportation flow
Opportunities	*Threats*
- Wide territories of forests and agricultural lands are also available along with access to natural resources useful for development of knowledge intensive bioeconomy areas.	- Fragmented decision making of the responsible bodies that impede development; - Lack of consistency in policy makers' decision-making may be a threat for further development.

Best practice

Selection of best practice companies or excellence drivers is based on following indicators (in line with industry characteristics): stable turnover growth, stable export growth, high added value per employee, positive development correlation with R&D investments, including involvement in EU funding programs in 2014-2020. Selected municipalities are demonstrating public administration example providing solid grounds for development. Positive and result-oriented synergy between people, infrastructure and industry is also important.

This smart specialization map (click on the link) contains a set of best practice enterprises and municipalities.

5. Key findings and recommendations for further Implementation of Smart Specialization Strategy in Riga Planning Region

As an economic entity, Riga Planning Region, is instrumental to leading smart specialization strategy implementation in Latvia. Today's focus should be on uncovering and optimizing existing resources and opening new routes of smart specialization.

1) It is crucial to strengthen cooperation and synergy of the organizations through national research centres (NRC), competence centres (CC), technology development infrastructure and online co-working platforms. It is important to be a proactive leader and to lead market approach by investing or/and lowering the administrative burden to stimulate open future technology and industry development, attracting concentrated world-class knowledge.

2) Development of interval-based transportation system in the RPR can be another important solution to facilitate an effective knowledge transfer along with human resources flow.
3) Investment in the future workforce plays an important role and should be directed towards its concentrating locations i.e. schools, mainly improving STEM infrastructure and meaningful and applicable education of natural sciences, biology, chemistry, physics, economics, mathematics, computer sciences, not only in formal education but also through extra curriculum lessons and interest activities like programming, robotics, modelling, mechanical and machine engineering, aeronautics, etc.
4) The competence centre (CC) support program has a significant impact on future development and must be sustainably maintained. Methodical planning of high technology park infrastructure in the Riga Planning Region is recommended. Such infrastructure will most definitely stimulate interdisciplinary and cross-functional cooperation for development of innovative methods and effective learning and knowledge transfer. ERDF financing is vital to the fulfilment of the technological needs of SMEs, especially in ICT, often used to optimize internal processes, as well as to accumulate, process, expand knowledge for industry growth on a national scale.
5) Innovation in the context of Smart Specialization strategy in Latvia is seen not only as new invention, but also as an effective and efficient way to overcome internal and external constraints. Successful market restructuring, which is already happening in Latvia at national and regional level, requires effective communication, cooperation and constant objective-result monitoring. These are crucial conditions for the implementation of the strategy in real life as planned.
6) Another important factor in monitoring strategy realization progress is to account for R&D&I investments on a micro (enterprise level). Regular investment efficiency monitoring at all three levels – human resources, infrastructure and non-material resources – is a strong basis for making timely business decisions.
7) Relief of the administrative burden for project implementing organizations is recommended (if necessary, other quality monitoring tools can be developed). Cooperation between organizations administering projects and organizations implementing projects should be strengthened.
8) Vocational education should be improved in the Riga Planning Region, especially in the realms of bioeconomy, biomedicine, smart materials development, which are vital educational areas albeit ones occupying specific niches.

Recommended Solutions for Policy Makers by Smart Specialization Area

<u>Knowledge intensive bioeconomy</u>

- The knowledge intensive bioeconomy is the most widespread smart specialization area in Riga Planning Region. It is crucial to stimulate its development through municipalities which territories are greatly covered with forest and agricultural lands;
- There are municipalities in the Region like Jurmala, Sigulda, Aloja, Tukums which have well-developed knowledge intensive bioeconomy area, but it is crucial to think of products with higher added value (e.g. patented products) that might not be suitable for direct manufacturing but are highly sought after in EU and globally and are maximally energy efficient.

<u>Biomedicine, medicine technologies, bio-pharmacy and biotechnology</u>

- Proceed with already successfully initiated development of NRCs and CCs, support entrepreneurs in this area with tax and other administrative burden reliefs;

- Some municipalities need to rethink maintenance costs of their healthcare institutions.

Smart materials, technology and engineering systems

- In Riga and Pieriga districts like Ogre, Mārupe, Jūrmala, high tech parks should be established where professionals of the area could meet and create interdisciplinary cooperation to elaborate innovative products with high export potential;
- Vocational education and fiscal politics require restructuring to favour development of higher added-value products and development of such producers in the RPR.

Information and communication technologies

- Participation of large enterprises in development of human capital of this area should be stimulated. Since the biggest companies are located in Riga it means that the capital city is central to develop the area not only in the RPR but overall in Latvia;
- Remote the RPR municipalities should contact ICT companies directly and involve them in development of local knowledge centres such as schools through investments in infrastructure or participation in learning process (e.g. digital learning tools, extracurricular activities in programming, logics, building algorithms);
- Riga Planning Region should rethink reducing of ICT centralization in Riga and systematic expansion to other RPR municipalities through business incubators, creative and youth centres through ICT niches not connected to development of infrastructure and those that have low entrepreneurship start-up expenses.

Smart energetics

- A smart energetics (or renewable energy technology) transfer centre should be established in Riga along with contact points in other RPR municipalities;
- Coastal municipalities should be more actively involved in smart energetics movement by highlighting possibilities for renewable energy generation;

Regional municipal policies should be oriented to energy saving; a separate review of energy consumption structure should be conducted; the main consumption points should be identified, sand energy efficiency solutions obtained in cooperation with local entrepreneurs. Some districts in the RPR have already found such solutions – it is crucial to ensure horizontal knowledge and best practice transfer via the relevant networks.

6. Annexes

Annex 1. Maps of Smart specialization area participants in Riga Planning Region

During the implementation of EmpInno, Riga Planning Region has for the first time compiled a list of major participants of the respective smart specialization areas in the region and mapped to get a spatial picture of all ecosystems. It is hoped that these maps will be systematically renewed and the processes of change monitored over the time, even after the implementation of the EmpInno project is completed. These maps, when put in a dynamic frame, help to better understand the process of change and develop new recommendations or encourage some reaction from major stakeholders. This monitoring process, although tedious and require manual input of data, can does not require specific knowledge and skills and can be done in a routine procedure by RIS3 specialists on both regional and local levels.

1) The locations of the main participants of the Smart specialization ecosystem area "Knowledge intensive bioeconomy" are shown on smart specialization map.

2) The locations of the main participants of the Smart specialization ecosystem area "Biomedicine, medical technologies, bio-pharmacy and biotechnologies are shown on smart specialization map.

3) The locations of the main participants of the Smart specialization ecosystem area "Smart materials, technologies and engineering" are shown on smart specialization map.

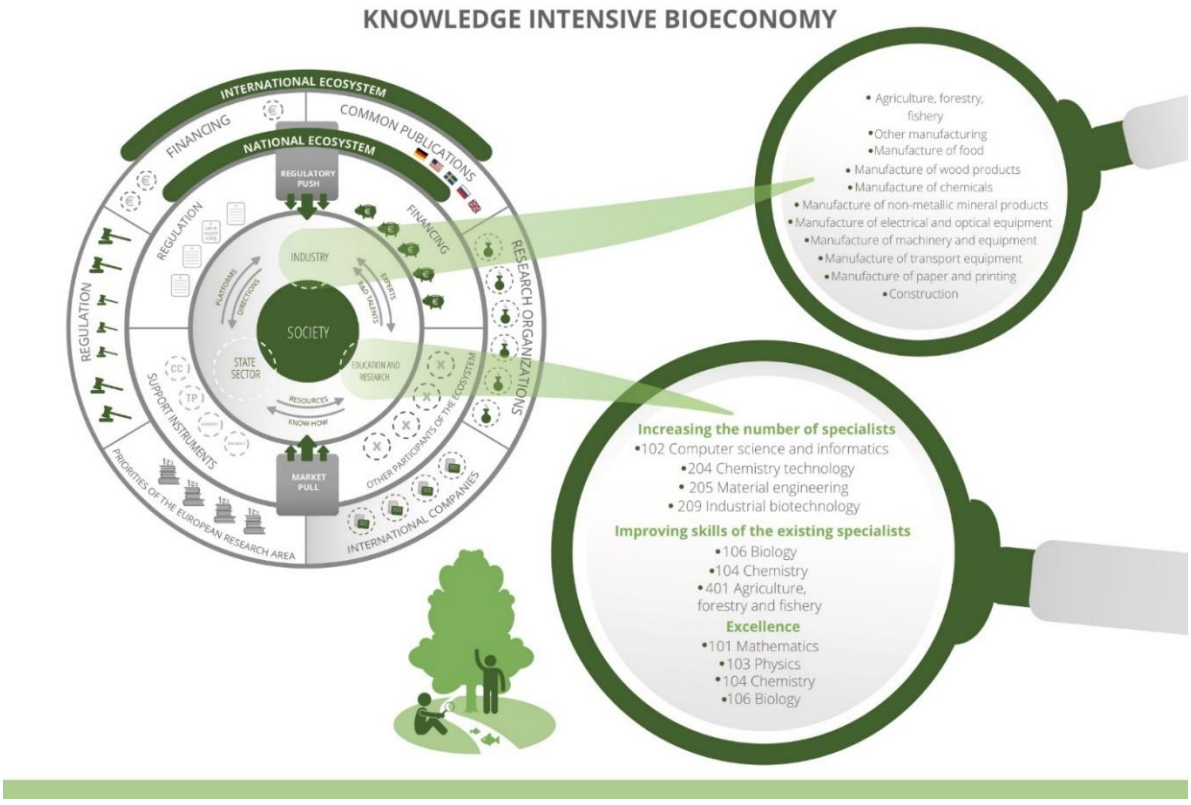
4) The locations of the main participants of the Smart specialization ecosystem area "Information and communication technologies" are shown on smart specialization map.

5) The locations of the main participants of the Smart specialization ecosystem area "Smart energetics" are shown on smart specialization map.

Annex 2. Smart Specialization Strategy Ecosystems in Riga Planning Region - Relevant Smart Specialization knowledge areas

*Smart Specialization area – Bioeconomy**

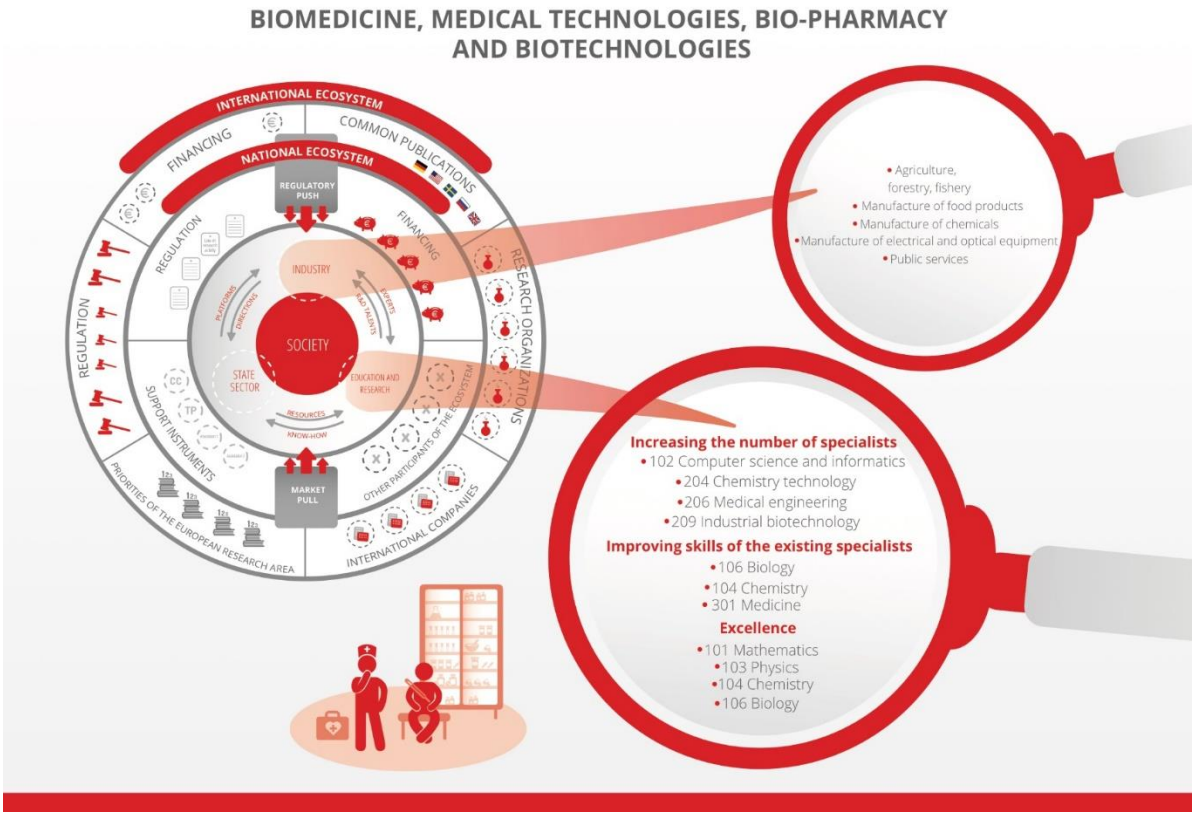
Objective	Relevant field of expertise (numbered by field of science and technology or FOS)
Individual innovative applied research improvement for overall industrial progress	102 Computer science and informatics (school level and higher) 204 Chemistry technology (vocational and higher education) 205 Material engineering (vocational and higher education) 209 Industrial biotechnology (higher education)
Excellence groups of bioeconomy – multiplication & succession of skills and competences in the research	106 Biology (school level and higher) 104 Chemistry (school level and higher) 401Agriculture, forestry and fishery (vocational and higher educ.)
Superiority of fundamental research (creation of exemplary research groups and practices)	101 Mathematics (school level and higher) 103 Physics (school level and higher) 104 Chemistry (school level and higher) 106 Biology (school level and higher)



Graph courtesy of consulting company "Fidea", Ltd, 2018

*Smart Specialization area biomedicine, medicine technologies, bio-pharmacy and biotechnologies**

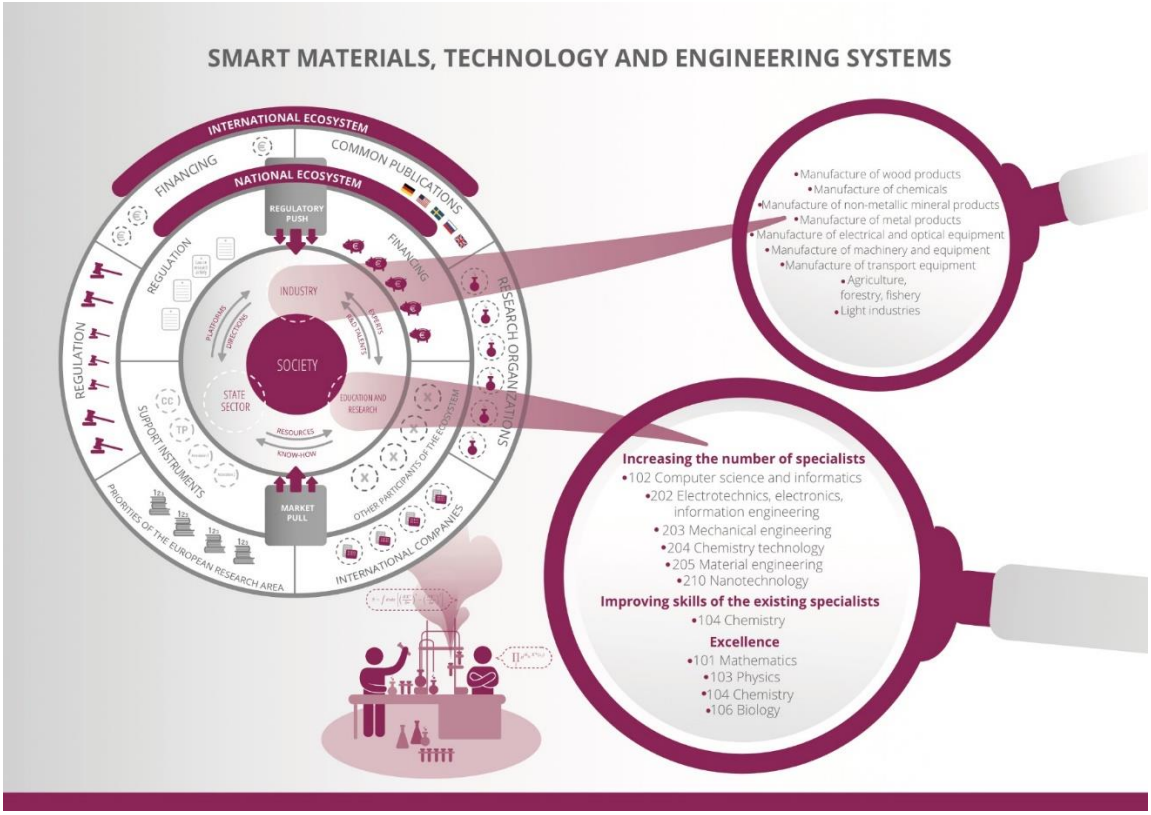
Objective	Relevant field of expertise (numbered by field of science and technology or FOS)
Individual innovative applied research improvement for overall industrial progress	102 Computer science and informatics (school level and higher) 204 Chemistry technology (vocational and higher education) 206 Medical engineering (vocational and higher education) 209 Industrial biotechnology (higher education)
Excellence groups of biomedicine, medicine technologies, bio-pharmacy and biotechnologies – multiplication & succession of skills and competences in the research	104 Chemistry (school level and higher) 106 Biology (school level and higher) 301 Medicine (vocational and higher education)
Superiority of fundamental research (creation of exemplary research groups and practices)	101 Mathematics (school level and higher) 103 Physics (school level and higher) 104 Chemistry (school level and higher) 106 Biology (school level and higher)



Graph courtesy of consulting company "Fidea", Ltd, 2018

*Smart Specialization area - smart materials, technologies and engineering systems**

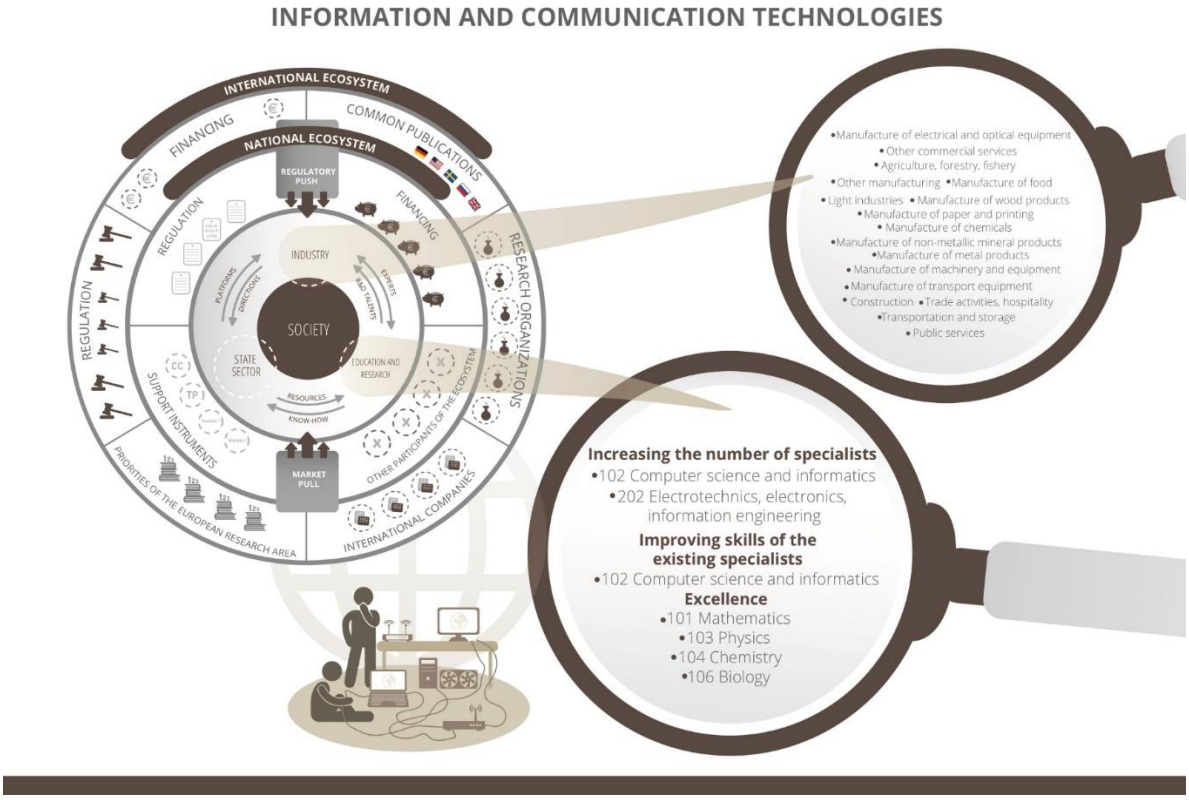
Objective	Relevant field of expertise (numbered by field of science and technology or FOS)
Individual innovative applied research improvement for overall industrial progress	102 Computer science and informatics (school level and higher) 202 Electrotechnics, information engineering (vocational and higher education) 203 Mechanical engineering (vocational and higher education) 204 Chemistry technology (vocational and higher education) 205 Material engineering (vocational and higher education) 210 Nanotechnology (higher education)
Excellence groups of smart materials, technology and engineering systems – multiplication & succession of skills and competences in the research	104 Chemistry (school level and higher)
Superiority of fundamental research (creation of exemplary research groups and practices)	101 Mathematics (school level and higher) 103 Physics (school level and higher) 104 Chemistry (school level and higher) 106 Biology (school level and higher)



Graph courtesy of consulting company "Fidea", Ltd, 2018

*Smart Specialization area: Information and communication technologies**

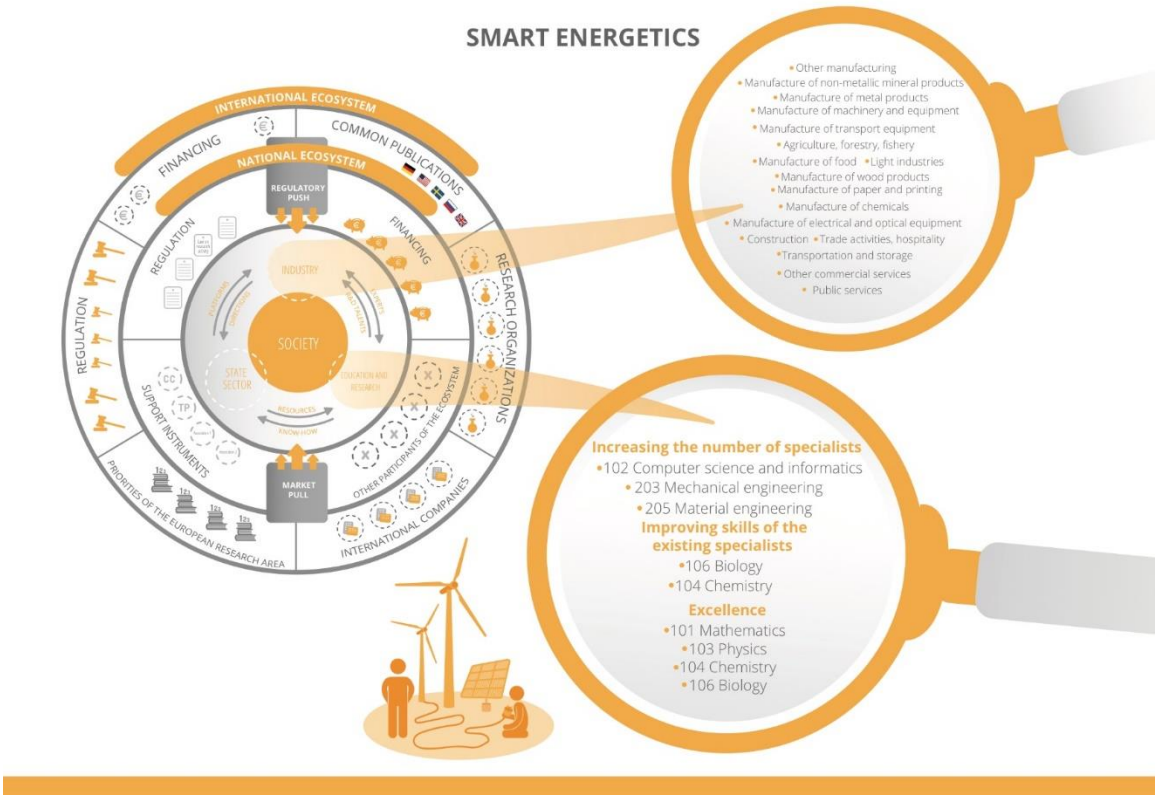
Objective	Relevant field of expertise (numbered by field of science and technology)
Individual innovative applied research improvement for overall industrial progress	102 Computer science and informatics (school level and higher) 202 Electrotechnics, electronics, information engineering (vocation and higher education)
Excellence groups of ICT – multiplication & succession of skills and competences in the research	102 Computer science and informatics (school level and higher)
Superiority of fundamental research (creation of exemplary research groups and practices)	101 Mathematics (school level and higher) 103 Physics (school level and higher) 104 Chemistry (school level and higher) 106 Biology (school level and higher)



Graph courtesy of consulting company "Fidea", Ltd, 2018

*Smart Specialization area: smart energetics**

Objective	Relevant areas of expertise (numbered by field of science and technology)
Individual innovative applied research improvement for overall industrial progress	102 Computer science and informatics (school level and higher) 203 Mechanical engineering (vocational and higher educ.) 205 Material engineering (vocational and higher educ.)
Excellence groups of smart energetics – multiplication & succession of skills and competences in the research	106 Biology (school level and higher) 104 Chemistry (school level and higher)
Superiority of fundamental research (creation of exemplary research groups and practices)	101 Mathematics (school level and higher) 103 Physics (school level and higher) 104 Chemistry (school level and higher) 106 Biology (school level and higher)



Graph courtesy of consulting company "Fidea", Ltd, 2018

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