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Laying grounds for an enhanced macro-regional science-business cooperation

Edited by Zane Šime

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EUROPEAN REGIONAL DEVELOPMENT FUND

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Edited by Zane Šime[1] , Communication & Research Coordinator, Council of the Baltic Sea States Secretariat

Baltic Tram in brief

Baltic TRAM (Transnational Research Access in Macro-Region) establishes structures to serve as interface between analytical research institutes and companies, so called Industrial Research Centres (IRECs). Invited companies are offered consultations and access to research facilities to test their ideas.The Baltic TRAM project offers companies free access to state-of-the-art analytical research facilities across the Baltic Sea Region, providing technical and scientific expertise to help solve challenges associated with deve-loping new products or services. The overall objective is to boost innovation, secure the implementation of smart specialisation strategies, and encourage entrepreneurship by supporting small and medium size enterprises – thus contributing to the re-gional effort of making the Baltic Sea Region innovative, sustainable and competitive. To achieve this, Baltic TRAM also feeds into the transnational research and innovation agenda. It performs benchmarking analysis on national roadmaps for research infrastructures and smart specialisation strategies, and provides recommendations to policy makers.

Baltic TRAM builds on the findings of Science Link, an initiative which received EU project funding 2012-2014. Science Link is currently operated as a network. The purpose of Science Link is to encourage innovation and entrepreneurship in the Baltic Sea Region, to strengthen the region's competitiveness in a global context. It supports industrial research with synchrotron radiation and neutrons at research facilities in northern Europe. The aim is to create awareness of the possibi-lities offered at research facilities in the region and to show how research and development at these sites can contribute to innovation within European industry.

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The project runs from March 2016 until the beginning of 2019.

Baltic TRAM website: www.baltic-tram.eu

Keywords

Innovation, smart specialisation, Baltic Sea Region, transnational cooperation.

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1   Disclaimer: Views presented in this BSR Policy Briefing do not necessarily reflect those of Centrum Balticum Foundation, Council of the Baltic Sea States or either of the institutions represented by the authors. Hence, authors are exclusively responsible for the content of their article. In order to preserve complete neutrality Centrum Balticum Foundation has even shifted proofreading of their articles to the authors.

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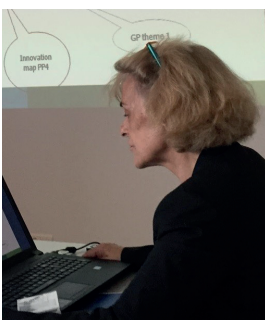
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Introduction

Zane Šime

On 16 June 2016, the first Council of the Baltic Sea States (CBSS) Science Ministerial took place in Kraków. It was a special gathering of CBSS Member States due to the fact that for the first time the CBSS Member States engaged in an extensive discussion on science, research and innovation matters with a focus on the particularities and challenges faced by the Baltic Sea Region (BSR). This notable event took place thanks to the CBSS Polish Chairmanship´s efforts in promoting the CBSS long-term priority "Sustainable & Prosperous Region". Namely, one of the three CBSS Polish Presidency´s 2015-2016 priorities "Sustainability" encompassed support towards internationalisation of the BSR´s science cooperation by striving to establish a joint research and innovation strategy for the region.

During the concluding phase of the CBSS Polish Presidency these aspirations were successfully cemented in the Polish Chair´s Conclusions "Baltic Science: Renewing the Commitment to Science/Research Joint Actions in the Baltic Sea Region" which outlined the Interreg Vb Baltic Sea Region Programme-funded project Baltic TRAM (Transnational Access in Macro-Region) as one of the two key projects which embody the practical steps towards advancing the transnational cooperation in science and innovation policy.

The CBSS Secretariat has the pleasure to implement the guidance enshrined in the 2016 CBSS Polish Chair´s Conclusions, including the implementation of Baltic TRAM project through coordination of the High Level Group – an advisory body assembling distinguished experts of analytical facilities and representatives of national managing authorities of science and innovation policies, including one of the Policy Area Innovation Coordinators of the EU Strategy for the Baltic Sea Region.

In order to lay thorough grounds for the development of transnational policy guidelines related to an enhanced science and business cooperation in the macro-region, this BSR Policy Briefing elaborates on the particularities of national innovation and smart specialisation frameworks, as well as explains how the participation of a number of CBSS Member States in the Baltic TRAM project helps to advance nationally and regionally-set milestones. Thereby, this publication serves as a concise guide for anyone interested in finding out the existing smart specialisation and innovation governance frameworks and their supporting implementation structures in a number of BSR countries. Likewise, this overview summarises the common thematic strands of research, innovation and smart specialisation priorities defined on the national and regional level across the BSR.

Consequently, this policy brief does not aim to provide specific conclusions and recommendations for further action. These items remain on the to-do-list of the High Level Group. However, the added value of the policy analysis presented in this BSR Policy Briefing is that it has greatly facilitated the overall understanding among the project partners and Baltic TRAM High Level Group members regarding the national commonalities and differences in innovation and smart specialisation governance, as well as provided an outline how these challenges are being addressed in each national setting. Moreover, the publication serves to further the awareness of wider audiences about the activities undertaken by Baltic TRAM beyond the Baltic TRAM Opening Conference held in October 2016 in Hamburg and the first Baltic Sea Science Day held in February 2017 in St Petersburg.

Last but not least, this BSR Policy Briefing also serves as a contribution to this year´s celebration of the 10 years´ anniversary of Centrum Balticum. Baltic TRAM partnership appreciates the enduring efforts of Centrum Balticum in advancing the BSR-wide cooperation and is honoured to provide further impetus for enhanced transnational dialogue and collaboration during the upcoming decade.

Abbreviations

ARI	Analytical Research Infrastructure
BSR	Baltic Sea Region
CBSS	Council of the Baltic Sea States
CORDIS	Community Research and Development Information Service
CPR	Common Provisions Regulation (No 1303/2013, 17.12.2013)
DG REGIO	Directorate-General for Regional and Urban Policy
DG RTD	Directorate-General for Research and Innovation
ECEI	European Cluster Excellence Initiative
EMFF	European Maritime and Fisheries Fund
ERA	European Research Area
ESFRI	European Strategy Forum on Research Infrastructures
ESI Funds	European Structural and Investment Funds
EU	European Union
EUSBSR	EU Strategy for the Baltic Sea Region
ICT	Information and Communication Technologies
INKA	Innovative Cities
JRC	Joint Research Centre
KET	Key Enabling Technologies
FP9	Framework Programme 9 (post-2020 period)
Growth Strategy	Estonian Entrepreneurship Growth Strategy 2014–2020
NCM	Nordic Council of Ministers
OECD	Organisation for Economic Co-operation and Development
OP	Operational Programme
PA	(EUSBSR) Policy Area
PA Education	(EUSBSR) Policy Area Education, Research and Employability
PA Innovation	(EUSBSR) Policy Area Research and Innovation
RI	Research Infrastructure
RIS	Regional Innovation Systems
RIS3	Research & Innovation Strategy for Smart Specialisation
R&I	research and innovation
R&D&I	research and development and innovation
SDG	Sustainable Development Goal
SHOK	Strategic Centres for Science, Technology and Innovation
TO	Thematic Objective
TRAM	Transnational Research Access in the Macroregion
UN	United Nations

Denmark

Zane Šime and Søren Elmer Kristensen

In 2013, in terms of strategic policy framework, Denmark launched the national **innovation strategy** *Denmark – a nation of solutions* with three focal areas supported by 27 individual policy initiatives (The Danish Government, 2012). The Danish innovation strategy is not solely introspective but also reflects on the European developments by taking into consideration innovation strategies of other countries of the BSR, such as, Germany, Finland and Sweden (The Danish Government, 2012, p. 6). The strategy also presents a realistic take on the current landscape of innovation funding. It reiterates the Community´s Research and Development Information Service (CORDIS) findings that the funding structure for science, research and innovation remains scattered among many fragmented administrative bodies (The Danish Government, 2012, p. 12). Thus, the Danish engagement in Baltic TRAM serves as one of the examples how various funding sources are pulled together to advance the Danish innovation performance.

The EU funds feed into the administrative and funding structures which support Denmark – a nation of solutions, such as government´s growth plans, the annual growth partnership agreements between the government and Regional Growth Fora, the regional growth and development strategies designed for the Regional Growth Fora, as well as National Cluster Strategy 2.0 (Grimpe & Mitchell, 2016, p. 21).

In terms of smart specialisation, supporting the investments of Cohesion Policy´s programming period 2014 – 2020 as well as other funds supporting smart specialisation implementation in Denmark, the country doesn´t have one single national innovation strategy for smart specialisation (RIS3). In addition, on the regional level there is not a single comprehensive RIS3 framework put in place. In brief, each of the five regions in Denmark prepares its own regional growth and development strategy. The strategy is being developed by the regional council and Growth Forum in close collaboration with municipalities, businesses and organisations. The strategy is a political prioritisation tool that elaborates on the strategic relationship between business initiatives and other regional development instruments. The **Southern Denmark Growth Forum´s Economic Development Strategy 2012 – 2020** serves as one of such examples focusing on health and social innovation, sustainable energy and experience economy. Further paragraphs of Denmark´s section elaborate on the national S3 framework components.

Consequently, the S3 framework of Denmark has a strong focus on the development of viable clusters and innovation networks. In 2013, the Ministry of Higher Education and Science in partnership with other ministries, all Danish regions and Local Government Denmark launched Denmark's first joint strategy which outlines Danish support for clusters and networks. In 2016, the updated joint strategy **Cluster Strategy 2.0 - *Strategy for Denmark's cluster and networking efforts from 2016 to 2018*** was published with a focus on developing innovative companies. The implementation of this strategy is further supported by the **Innovation Network** and the **Innovation Incubator Scheme** under the auspices of the Ministry of Higher Education and Science.

Furthermore, the Danish Agency for Science and Higher Education (DAFSHE) during a public consultation regarding the thematic priorities which should be included as the nationally most important research topics in the upcoming **RESEARCH2025** received "476 contributions from the business community, organisations, municipalities, regions, knowledge institutions and a broad range of other interested stakeholders" (Ministry of Higher Education and Science, 2017a). This reflection process was facilitated also by **An OECD Horizon Scan of Megatrends and Technology Trends in the Context of Future Research Policy** (OECD Directorate for Science Technology and Innovation, 2016). RESEARCH2025 is a policy document, which will replace the existing **RESEARCH2020**. The RESEARCH2025 catalogue with its four main areas – **new technological opportunities, green growth, better health, people and society** – and subsequent 19 themes was tailored to serve as a basis for further prioritisation of research investments nationally as well as in relation to the Danish engagement in international cooperation (Ministry of Higher Education and Science, 2017b). The catalogue will be a part of the considerations leading up to the allocation of strategic research funding from the Danish Finance Act 2018 and onwards.

Another relevant catalogue supporting the national innovation advancement is **INNO+** which outlines the main strategic investment areas with 21 focus areas. Moreover, INNO+ recognises that Denmark on its own can provide effective national solutions to the societal challenges faced on a European and international scale to a rather limited extent. Therefore, Denmark prioritises cooperation with the best research and knowledge environments abroad (Ministry of Science Innovation and Higher Education, 2013, p. 10).

Further efforts in advancing niche expertise are facilitated by the **Centre of Excellence programme** managed by the Danish National Research Foundation. So far the funding scheme has facilitated the establishment of 100 Centres of Excellence (Danish National Research Foundation, n.d.-a). In order to ensure further brain gain, which would advance the internationalisation and competitiveness of the Danish research, **Niels Bohr Visiting Professorships** have been established as a complementary tool to the Centre of Excellence programme (Danish National Research Foundation, n.d.-b).

Denmark recently updated its national European Strategy Forum on Research Infrastructures´ (ESFRI) roadmap called **Danish Roadmap for Research Infrastructures 2015** for the 2015 – 2020 time frame. It states eight strategic objectives which the Danish Ministry of Higher Education and Science is committed to develop:
1. "act as a catalyst for new national research infrastructures;
2. advocate increased funding for new national research infrastructures;
3. help to ensure that investments in new national research infrastructures are value adding;
4. step up Danish participation in and access to more European research infrastructures;
5. facilitate global alliances on research infrastructures with growth countries;
6. focus on the benefits of international memberships;
7. assist in securing the full benefit of investment in the European Spallation Source;
8. spot opportunities for attracting research infrastructures to Denmark" (Danish Agency of Science Technology and Innovation, 2011, p. 19).

Objectives were identified in a close dialogue with Danish universities and research institutions (Danish Agency of Science, Technology and Innovation, 2011, p. 21). Thus, the Roadmap is connected with the strategies for research infrastructures of these institutions and shows how the funding managed by the Ministry supports specific research infrastructure elements. For example, the strategic objective related to the European Spallation Source is further elaborated in the National European Spallation Source Strategy. This strategy also elaborates the expected cooperation between this most advanced facility of neutron science and Danish industry, ensuring flexible and efficient access of businesses to the European Spallation Source and lighthouse environments (Ministry of Higher Education and Science, 2015, p. 8). In addition, the Roadmap also elaborates on the need to increase Danish success rate and participation in Horizon 2020 calls (Danish Agency of Science, Technology and Innovation, 2011, p. 29).

Moving on to the relevance of analytical facilities in the context of cluster development, the overall framework of cluster governance is the **Cluster Forum**. However, it is not a highly institutionalised coordination mechanism but more of an informal platform with annual meetings called **Innovation Camps** (Danish Agency for Science, Technology and Innovation, 2013, p. 18). The platform is designed for sharing of best practices and coordination among different authorities and governance levels. Cluster Forum serves as the nodal point for eight ministries, six regions and major municipalities involved in the implementation of the Cluster Excellence Denmark. It also serves as a supporting structure to the **Cluster Excellence Denmark**, which aims at facilitating the matchmaking and networking nationally and internationally. The Cluster Excellence Denmark is co-funded by the Danish Agency for Science and Higher Education and the regions (the growth fora). The steering group consists of members from the six growth forums.

The Cluster Forum was "established in 2013 with the aim of supporting cluster development in Denmark and creating cohesion between local, regional, national and international cluster and network efforts" (Danish Agency for Science, Technology and Innovation, 2013, p. 5). Therefore, the work of the Cluster Forum is also of transnational importance, as an intermediary level between national and international governance levels. In addition, the Cluster Forum is related to the smart specialisation because it is tasked to coordinate "regional strategies for smart specialisation and ensuring cohesion with the general strategy for the cluster and network policy" (Danish Agency for Science, Technology and Innovation, 2013, p. 5).

The strength of the **Cluster Strategy 2.0** is that it recognises the diversity of clusters. For example, it does not aim to internationalise all clusters, since the Strategy clearly states, that some clusters are tailored for international cooperation tied with their research potential to the Danish industrial sector, while others are focused on the needs of the regional or national market (Danish Agency for Science, Technology and Innovation, 2013, p. 20). The transnational engagement of Danish clusters is viewed through the **BSR Innovation Express** perspective and increased bilateral cooperation with Germany, as one of the fastest growing economies in Europe (Danish Agency for Science, Technology and Innovation, 2013, p. 24). The transnational approach is furthered not solely through BSR Innovation Express but also through a number of projects, Baltic TRAM being one of such examples.

Furthermore, the European dimension is reinforced by the focus on increasing the financial return from Horizon 2020 and closer ties with the **EU-DK initiative** and active engagement in the Enterprise Europe Network (Danish Agency for Science Technology and Innovation, 2013, pp. 25-26), which is known for being the world's largest support network for small and medium sized businesses with international ambitions.

The Danish **Big Science Secretariat** serves as another example of advancing the international engagement. It is collaboration between Technical University of Denmark (DTU Physics) and the Danish Technological Institute. It aims at promoting Danish skills and know-how towards large European research infrastructures, also called Big Science organisations, and their prime contractors. Big Science Secretariat works to ensure supply contracts for Danish companies in Big Science bids.

Danish Roadmap for the European Research Area is a rather autonomous document, since it is not closely entangled with other national level documents and initiatives discussed. It refers to the importance of transnational cooperation and sets the quantitative goal of signing "three new agreements for Danish participation in new European research infrastructures within the next five years, giving Danish research infrastructures access to new data and strengthening Danish participation in European research communities" (Danish Agency of Science Technology and Innovation, 2016, p. 22). This goal has been achieved by signing three new European Research Infrastructure Consortium agreements in 2016 and 2017. The Roadmap refers to clusters by focusing on the Danish cluster engagement in transnational and European frameworks. Namely, the Roadmap recognises the role of clusters in the Horizon 2020 context, and acknowledges Danish participation in the macro-regional BSR Innovation Express, as well as takes stock of internationally and, arguably, transnationally leading Danish clusters, which have acquired the **Gold Label** of the European Cluster Excellence Initiative (ECEI) (Danish Agency of Science Technology and Innovation, 2016, p. 31, 37). The general advantage is that five Danish Golden clusters, recognised by the ECEI, also testify to the diversity of Danish research expertise, since they represent a number of different domains, such as biotechnology, health and medical science, energy and environment, as well as creative industries.

Moreover, there are many more Danish clusters approved by the ECEI in bronze and silver categories. In detail, 23 Danish clusters are currently certified with Bronze Label and three with Silver Label. In total, Denmark is engaged with 31 clusters in the ECEI which puts it on the leading positions in comparison to other BSR countries.[1]

The role of international organisations is demonstrated by the fact that the Danish innovation performance is evaluated primarily through the OECD perspective. Namely, when it comes to monitoring and evaluation, Denmark favours OECD metrics and sets its objectives and benchmarks in line with the OECD methodology (The Danish Government, 2012, p. 9). This serves as one of the most telling examples of the role played by the OECD provided expertise to the advancement of the CBSS Member States´ innovation performance.

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1   The number of certified clusters in each of the categories provided in this BSR Policy Briefing might differ from the latest information in the ECEI data base. Therefore, the readers are encouraged to consult https://www.cluster-analysis.org/ for the most up-to-date information

Estonia

Zane Šime

National smart specialisation framework

Smart specialisation is defined in two documents – the **Estonian Entrepreneurship Growth Strategy 2014–2020** (hereafter - Growth Strategy) and the **RD&I strategy for 2014-2020 "Knowledge Based Estonia 2014-2020"** which define strategic choices taken by the Ministry of Education and Research as well as the Ministry of Economic Affairs and Communications. Both strategies are accompanied by Implementation Plans, prepared for three plus one years in advance and updated annually. The Implementation Plans include overviews of planned activities together with indicators, budgets and roles of responsibility.

The smart specialisation process is led by the **Smart Specialisation Steering Committee,** which assembles representatives from ministries, academia and the private sector. The Steering Committee´s work is facilitated and coordinated by the **Department of Economic Development** within the **Ministry of Economic Affairs and Communications**, which is the key institution responsible for the management and monitoring processes of smart specialisation in Estonia. The task of the Steering Committee is to monitor progress towards the goals of smart specialisation, and where necessary, propose changes in strategy measures and activities to the ministries, **the Innovation Policy Committee and the Research Policy Committee** (Ministry of Economic Affairs and Communications, 2013, p. 27), or initiate the adjustment of strategies. The objectives and ways of measuring smart specialisation are still under consideration.

The Innovation Policy Committee is an advisory body to the Minister of Economic Affairs and Communications. The Research Policy Committee is advisory body to the Minister of Education and Research. Both committees are chaired by the corresponding minister, thus the committee is in charge of issuing policy proposals. These committees have wider responsibilities than smart specialisation, thus in Estonia the smart specialisation is not discussed in a siloed manner.

The Entrepreneurship Growth Strategy is focused on three main challenges of Estonian economy: increasing productivity, stimulating entrepreneurship and encouraging innovation. The activities aimed at developing the growth areas selected under the smart specialisation processes include advancing the start-up ecosystem, supporting cooperation through clusters and innovation through technology development centres, advancing the use of innovative public procurement, and providing tailored advice and support to companies as part of the multi-stage enterprise development programme.

The Estonian Research and Development and Innovation Strategy 2014-2020 "Knowledge-based Estonia" is focused on creating several preconditions for sustained research and innovation advancement. Firstly, Knowledge-based Estonia ensures that research in Estonia is of a high quality and considerable diversity. Secondly, the document lays grounds so that the Estonian research activities are carried on in the interests of the Estonian society and economy. Thirdly, and most importantly from the perspective of the smart specialisation strategy, research and development makes the economy more knowledge intensive and prioritises the development of the agreed growth areas. Fourthly, the policy document ensures that Estonia is active and visible in the international R&D&I cooperation in areas which help to advance the Estonian development. In comparison with the earlier Estonian R&D&I strategies, Estonia´s third strategy is more oriented towards exploiting the existing innovation and R&D ecosystem, whereas the former strategies were focusing on building up capacity of Estonian R&D potential.

Estonia´s chosen three smart specialisation growth areas are the following: **information and communications technology** (through all sectors pursued in the framework of digital growth), **health technology** with a focus on biotechnology and e-health, as well as **more efficient use of resources** which entails knowledge-based construction, materials technology and also applies to food sector.

The Growth Strategy and "Knowledge Based Estonia" should be viewed in the framework of a number of strategies, all linked to the national competitiveness plan **"Estonia 2020"**. The main goals of the aforementioned

strategies, as well as those set in the **Information Society Development Plan for 2014-2020**, the **Lifelong Learning Strategy for 2014-2020** and the **Rural Development Plan for 2014-2020** cascade down from Estonia 2020. The two top goals of Estonia 2020 are productivity and employment growth, followed by aims targeting well-educated population and cohesive society, competitive business environment, environmental-friendliness, and the sustainability and adaptiveness of the public sector and finances.

There are several strengths of the Estonian adopted approach to smart specialisation. First, the Growth Strategy explains how it is interlinked with other national policy frameworks, such as the **National Strategy on Sustainable Development "Sustainable Estonia 21", Research and Development and Innovation Strategy, the Lifelong Learning Strategy 2014–2020, the Information Society Development Plan 2014–2020**, and **Regional Development Strategy**, as well as recognises the importance to ensure that the guidelines of Horizon 2020, EU 2020 Strategy, Innovation Union, and Entrepreneurship 2020, as well as the EUSBSR are mirrored in the Growth Strategy (Ministry of Economic Affairs and Communications, 2013, pp. 7–9, 11, 14, 30). Similarly, the Estonian R&D&I Strategy refers to the role of above mentioned EU strategic frameworks (Estonian Research and Development and Innovation Strategy 2014-2020 "Knowledge-based Estonia," 2014, p. 4).

Smart specialisation implementation and monitoring structures

However, the earlier discussed smart specialisation framework has already received some sceptical feedback from the European Commission´s Joint Research Centre (JRC). Namely, the Centre argues that by having two separate framework documents it is not clear to what extent the focus of the smart specialisation strategic priorities are shared between the public research and the business sector. The Centre also refers to the Innovation Union progress report 2014 for Estonia, where little correlation between the areas of Estonia's scientific production (measured by the number of publications) and technological production (patents) was identified (Ruttas-Küttim & Stamenov, 2016, p. 8). Since the Steering Committee was established fairly recently, it is hard to judge how grounded is the initial criticism towards the framework documents. However, the regular meetings of the Steering Committee as well as weekly meetings between the Science department of the Ministry of Education and Research and the Economic Development Department of the Ministry of Economic Affairs and Communications ensure frequent communication and cooperation between the two key Ministries in charge of the Growth Strategy and "Knowledge Based Estonia", as well as ensure practical alignment of smart specialisation related activities.

One of many steps taken to advance cooperation between Estonian research institutions and the private sector is the establishment of an Estonia-wide network of leading universities and research centres in the framework of **Adapter** initiative. The entrepreneurial platform Adapter, a pioneer of its kind in the Baltic States, brings together the needs of the entrepreneurs and development potential of universities to raise the global competitiveness of Estonian companies. The solution will combine the services provided by higher education institutions, research and development cooperation, and product development and continuing education opportunities. This also creates a contact point to meet the requirements of entrepreneurs with the competence and technology possibilities of all universities. The Adapter initiative is furthered by establishing its ties to the transnational governance level in the framework of Baltic TRAM, since Adapter hosts the Estonian IREC of Baltic TRAM network.

In 2015, new activities were launched with **NUTIKAS programme** (Estonian Research Council, n.d.-a) to support applied research in the areas of smart specialisation. The support aims to contribute to the growth and research-intensity of the Estonian economy, supporting collaboration between R&D institutions and companies. Furthermore, the support will help developing the capabilities of R&D institutions to carry out applied research fit for the business needs in smart specialisation growth areas. The funding supports companies in commissioning necessary applied research or product development projects from universities or research institutions via reimbursing part of the R&D-order submitted by the companies to the universities or research infrastructures.

The methodology of measuring smart specialisation will be planned according to the objectives established in the two relevant strategies. The Ministry of Economics and Communications is in charge of setting up the overall system in cooperation with the Ministry of Education and Research and the Estonian Research

Council. However, at the moment it can be outlined that in the case of smart specialisation areas falling in the responsibility of the Ministry of Education and Research, it has opted to use two previously applied indicators, namely, proportion of private sector R&D expenditure in terms of its share of the gross domestic product, as well as survey results demonstrating what proportion of enterprises based in Estonia are cooperating with universities and higher education institutions in order to develop and produce innovative products with high added value.

European dimension

Estonia has adopted an integrated approach towards the implementation of the **ERA**. The Estonian roadmap is integrated in the third chapter of the National Implementation Plan 2016-2019 for achieving the objectives of the Estonian Research and Development and Innovation Strategy 2014-2020 "Knowledge-based Estonia", which also explains that objectives of the ERA are enshrined in a number of Estonian strategic documents. Therefore, the annual review of national ERA implementation is an integral part of the annual reporting on the progress of the Implementation Plan 2016-2020 for achieving the objectives of the Estonian Research and Development and Innovation Strategy 2014 – 2020 "Knowledge-based Estonia" (Government of Estonia, 2016, pp. 10, 18). Among the Estonian supported ERA priorities is an optimal transnational cooperation in order to jointly address the grand challenges faced by European societies as well as ensure effective investments in research infrastructures in line with the priorities of the ESFRI which would allow offering the Estonian enterprises high-technology development services (Government of Estonia, 2016, pp. 13, 14). In the same manner it should be added that Estonia has highly prioritised the allocation of ESI Funds to "increase private-sector expenditure on research and development in line with Estonia´s smart specialisation framework" (European Commission, 2016, p. 2). Consequently, the Estonian engagement in Baltic TRAM mirrors the commitment to advance its engagement and national support to ERA and ESFRI goals on a transnational level in close cooperation with other BSR countries.

The **Estonian RI Roadmap** elaborates on future steps in development of the existing RI. RI stated in the roadmap is the complete set of Estonian core infrastructure. The list of core infrastructure is also made available online (Estonian Research Council, n.d.-b) and the list of RIs and services is displayed also in the Estonian Research Information System ("Estonian Research Information System," 2017). It falls in the Baltic TRAM general classification of the regional ARI. Definition of ARI and ARI use is not separately regulated by any state acts. For the ARI classification Estonia is using ESFRI definition of RI. This is presented in national roadmap governing documents.

The Estonian RI Roadmap refers to the need for long-term budget planning in order to provide timely estimates of how much a stable functioning of the existing domestic RI will cost. The need to take into consideration the budget planning Estonia´s participation in international RI is emphasised (Leiner & Tamm, 2014, p. 74). The roadmap does not elaborate on which Estonian RI have the most long-term potential of being internationally competitive. Therefore, results of the Estonian Baltic TRAM IREC initial operation phase could potentially shed more light regarding the transnational competitiveness potential of the Estonian RI.

It should be also noted that the core Estonian infrastructure stated in the national RI roadmap is eligible for financial support for joint use with relevant cooperation partners. Further advancement towards seeking out potential cooperation partners in the Baltic States was completed in 2014 by publishing the national lists of existing R&D infrastructure online to lay further grounds for pan-Baltic cooperation initiatives (Estonian Research Council, n.d.-b).

Cluster governance and engagement in cluster development initiatives

The main document which defines the development and governance of clusters in Estonia is the **Development Programme of Clusters** run by **Enterprise Estonia**, one of the largest institutions within the national support system for entrepreneurship. However, neither this programme nor any other documents stated in the previous paragraphs provide guidance towards establishing partnership between Estonian core infrastructure elements and national or regional level industrial clusters. The cooperation is organised depending on specific needs in each separate case of a business enquiry. However, this fact should not give a misleading impression

that there are no partnerships put in place. The RI roadmap states existing cooperation partners of each of the core infrastructure elements. For example, the Estonian Centre of Analytical Chemistry has strong connections to the Federation of Estonian Chemical Industries and Estonian Space Cluster is connected to the Estonian membership in the European Space Agency. However, Development Programme of Clusters is far from being the only support measure offered by Enterprise Estonia, as it is shown in the outline below.

Technology Competence Centres "are knowledge-based organisations focused on long-term cooperation between universities and businesses, which are created with the help of the public sector." During the programming period 2014-2020 six state-financed competence centres are operating in Estonia in such domains as food and fermentation technologies, dairy products, software technology and applications, health technologies and innovative manufacturing also with ties to the corresponding clusters (Estonian Clusters, n.d.). This initiative forms one of the core elements of the implementation of smart specialisation priorities, with the Centres focusing on advancing R&D&I in the specified growth areas.

Enterprise Development Programme "aims to support well-thought-out development, improved action planning, innovation implementation and product development. In the course of the development programme, each participating enterprise will launch new products and services that are more profitable than their predecessors" (Enterprise Estonia, n.d.-b). The Programme is open to the manufacturing industry as well as companies active in the selected growth areas.

Innovation Vouchers enable "a small and medium-sized entrepreneur (SME) who is cooperating with a higher education institute, test laboratory, or intellectual property experts, to develop innovative solutions for development obstacles, carry out tests with new materials, gather knowledge on technologies, conduct studies in intellectual property databases etc" (Enterprise Estonia, n.d.-c).

Development Vouchers are "a supporting measure for preliminary research. The results of the development voucher should enable the entrepreneur to gain comprehensive knowledge on whether their development idea has the potential necessary for continuing the development process in other stages" (Enterprise Estonia, n.d.-a).

Nevertheless, in general, the cluster cooperation with RI doesn´t follow one unified pattern. It is structured differently depending on the specific needs in each case. Thus, the Entrepreneurship Growth Strategy doesn´t set a rigid framework to be followed in the cluster establishment. Enterprise Estonia has tailored its support to 12 clusters in line with the national smart specialisation priorities. The institution channels funding provided by the ERDF, in line with the main goal to support the international competitiveness of selected clusters´ partners, strengthening the export potential of Estonian small and medium sized businesses (Enterprise Estonia, 2017). Indeed, as demonstrated in the interim evaluation of the national cluster programme conducted in 2013, the main reason for engagement in a cluster on the Estonian business side is to expand its access to foreign markets, "but the clusters´ capacity for locating new contacts for enterprises on foreign markets is not particularly high yet". This is one of the reasons why clusters don´t serve as the main channels facilitating the business expansion in foreign markets (Mihkelson, Rebane, Peters, & Lember, 2013, p. 59).

Furthermore, in order to provide a better understanding about the level of maturity attained through the support incentives of the selected 12 clusters and thus the level of excellence attained in advancing the niche expertise in selected smart specialisation domains, it should be noted that one Estonian cluster (Estonian ICT Cluster) now holds the Silver Label, and that Enterprise Estonia is in the process of contracting European Secretariat for Cluster Analysis for the evaluation of the other 11 Estonian clusters.[2] Last but not least, one of the results of the on-going cluster benchmarking is evaluation of the eligibility of each cluster for the label is accompanied with a stress-test themed "Estonian Approach Conductive to Implement S3 through Clusters". The findings of this activity will help to shed further light on science-business cooperation dynamics, also of relevance to wider interpretation of the upcoming Baltic TRAM business call procession results in Estonia.

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2   The number of certified clusters in each of the categories provided in this BSR Policy Briefing might differ from the latest information in the ECEI data base. Therefore, the readers are encouraged to consult https://www.cluster-analysis.org/ for the most up-to-date information.

Estonia is continuing to take part in the transnational cluster support initiative **BSR Innovation Express**. Nevertheless, Estonia doesn´t plan to further its engagement in this transnational initiative via national funding allocation. Thus far, the Estonian participation in BSR Innovation Express has been ensured by the financial support of the NCM. In the light of the moderate cluster performance in terms of European level benchmarking and limited engagement in BSR Innovation Express, the role of Adapter initiative and its transnational extension via engagement in the Baltic TRAM IREC network shouldn´t be underestimated. On the contrary, Adapter and transnational extension via Baltic TRAM IREC is an effective response to the needs of Estonian business sector, since the 2013 interim evaluation of the national cluster programme demonstrated high appreciation from the business sector´s side of cooperation with Estonian higher education and research centres. Although this cooperation is still of a sporadic nature and cooperation is judged to progress slowly, being time-consuming, the enterprises look promisingly on increased cooperation with higher education and research institutions in future, not necessarily through clusters but with a set-up of other measures supporting country´s innovation performance (Mihkelson et al., 2013, pp. 59 - 60).

To conclude, Adapter´s engagement in the transnational network allows also furthering the research sector´s awareness of business technological development needs elsewhere in the BSR and Estonian potential to accommodate some of these needs, thus also offering a more informed support to the Estonian business side when processing their requests. The importance of such situational awareness is further increased by the fact that none of the national managing authorities are tasked with the responsibility to promote the export potential of Estonian RI. So far it has been the duty of universities and research organisations themselves, thus engagement of Adapter´s members in Baltic TRAM will strengthen the transnational competencies and knowledge of the overall BSR-wide market of innovation-related services.

Finland

Zane Šime, Ninetta Chaniotou and Sari Stenvall-Virtanen

National framework

Finland doesn´t **have one single national level S3** (Halme, Saarnivaara, & Mitchell, 2016, p. 33). Instead several documents are designed to serve as the national framework further channelled in the **subnational level RIS3 of 18 regions**. Namely, the national S3 framework relies on **Reformative Finland: Research and innovation policy review 2015-2020**, the **Finnish Government's resolution on the comprehensive reform of research institutes and research funding: deeper cooperation between higher education institutions and research institutes 2015-2017**, as well as **Finland´s Strategy and Roadmap for Research Infrastructures 2014-2020**.

The cross-cutting work in terms of smart specialisation and innovation advancement in Finland is pursued by a number of institutions of the national governance level. Coordination of the **Government Programme** is the task of Prime Minister´s office. Ministry of Economic Affairs and Employment (MEAE) is responsible for industry and innovation related issues, including regional development matters. Ministry of Interior is also involved in the regional development. Ministry of Economic Affairs and Employment led the drafting of the **Finnish Bioeconomy Strategy** (Biotalous, n.d.) as well as oversees **AIKO**, a toolkit supporting regional innovations and experiments for the 2016 – 2018 time frame. It should be noted right away that the regional councils act as decision-makers which allocate AIKO funding for activities aimed at advancing national priorities for regional development, the regional programmes and smart specialisation strategies (European Commission, n.d.-a). Last but not least, Ministry of Foreign Affairs is tasked with the transnational or BSR-wide dimension of S3 matters.

Further support to the innovation and smart specialisation implementation is facilitated by the following ministerial working groups:
- **Ministerial working group on bio-economy and clean solutions** covers sectors related to the wood processing and new products developed based on forest resources. Results of the Finnish Baltic TRAM IREC performance could provide further insight in best practices to be followed in future facilitation of cooperation between wood processing businesses and relevant analytical facilities based in Finland.
- **Ministerial working group on reform of operating practices** is responsible for digitisation of public services, support of an environment friendly to the digital business operations (Finnish Government, 2017).

The outlined working groups monitor the implementation progress from their domain specific angle and available metrics. While these groups are subjects for a change, depending on the priorities and preferences of each government, **Research and Innovation Council** represents enduring fora. It is chaired by the Prime Minister and is responsible for the strategic development of Finnish science and innovation policy.

TEKES was the managing authority working with six **Strategic Centres for Science, Technology and Innovation (SHOK** in Finnish) which operated as limited companies, being on average 40% private funded (Research and Innovation Policy Council of Finland, 2014, p. 22). Over the last years SHOKs served as the major drivers behind the Finnish reinvigorated innovation policy (European Commission, 2014, p. 6). Several of these centres embody the practical implementation of the Finnish smart specialisation priorities, since SHOKs are dedicated to bio-economy, health and well-being, as well as information and communication among other thematic areas (TEKES, 2017b). Their further operation is planned by the assistance of the European level funding or national funds operated by other authorities than TEKES (Research and Innovation Policy Council of Finland, 2014, p. 22).

The Academy of Finland contributed to the operations of SHOK by supporting leading-edge research carried out within the centres. The Academy worked in close cooperation with Tekes to develop, fund and monitor the operations of the centres. In accordance with the strategic priorities in the current Government Programme (2015), the funding for Strategic Centres for Science, Technology and Innovation will be gradually phased out. In practice, this will mean that Tekes' funding instrument for such centres will be discontinued. Those applying

for funding from the Academy of Finland will no longer be required to declare their affiliation with strategic centres.

Key project 5 of the Government Programme aims at intensified cooperation between higher education and business life to commercialise innovations. To support this goal, the Academy of Finland has launched its own key project funding instrument Forging Ahead With Research (Academy of Finland, 2016).

The implementation of S3 in Finland is monitored in the same way that the implementation of the structural funds is monitored. Benchmarking and evaluation of S3 performance relies on existing monitoring tools chosen in accordance with the angle that in the specific evaluation case is put to the fore. The implementation pace of S3 throughout Finland has started together with the implementation of the ESIF 2014-2020. Usually there are no separate calls for RIS3, but they are rather additional provisions in the project funding criteria.

Regional smart specialisation governance

Over the past twenty years Finland has developed a strong national and regional innovation policy. This has meant that the formal process for developing the regional smart specialisation strategies (RIS3) introduced by the European Commission has not been viewed as an exercise that would add great value to current practices in the regions. Instead, S3s are articulated more as part of the new Regional Strategies and the provisions of the Structural Funds Programme of Finland[3] (Vallance, 2016, p. 45).

The nationally pre-defined priorities of Finnish regional S3 strategies are **bioeconomy, cleantech, digital economy** and the **health sector**, as well as **intangible value creation** (Research and Innovation Policy Council of Finland, 2014, p. 20). All Finnish regions have currently defined RIS3 of which a number, such as Kainuu (Smart Specialisation Platform, n.d.-a) and Southwest Finland (Smart Specialisation Platform, n.d.-b), are accessible on the Smart Specialisation Platform. It should be noted that these RIS3 are reviewed for adjustments during spring 2017.

In terms of content, some regions, such as Southwest Finland, Uusimaa / Helsinki Region and South Ostrobothnia Region have also defined their S3 priorities in their respective programmes and implementation plans, affiliating such innovation initiatives as **Demola, Protomo** and **Urban Mill** to the implementation of their respective regional RIS3s.

The joint municipal authorities Regional Councils develop the regional strategies. Their implementation is given form through other existing innovation programmes and policy instruments in the regions. Thus, S3, to date, do not rely on new or nation-wide unified policy instruments. Instead they reflect the existing mix of innovation programmes and support to the regions tailored in accordance with the local development challenges (European Commission, n.d.-b). It is implemented based on adjusted criteria for funding projects which are aligned or contributing to RIS3 advancement. To outline some of the best practices of pooled resources please consult the Turku, Kainuu and Uusimaa examples below.

Turku example of implementing AIKO supported activities
The Growth Agreement of Turku for the 2016 – 2018 time frame include strategic investments in blue and green economy (including maritime cluster), bio-economy, clean technologies, digital economy and health sector.

Kainuu example of pooled resources for RIS3 implementation
EU funds:
    1. TOs of the ESIF 2014-2020 (TO1 - Strengthening research, technological development and innovation & TO3 Enhancing the competitiveness of SMEs);
    2. agriculture (Rural Development Fund);
    3. fisheries and aquafarming (EMFF);
National funds:
    4. Aiko funding (Regional innovations and experimentations funding).

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3   More detailed information regarding the Structural Funds Programme for Finland is accessible on the European Commission website. (European Commission, 2017)

All in all, the Finnish priorities enshrined in RIS3 serve to confirm further support to the existing choices of niche excellence development. The policy drafting process helped to explain from the multi-level governance perspective the responsibilities and roles of partners across the governance layers (Van den Brande, 2014, p. 17).

The context of RIS3 and research infrastructures in Finland

As elaborated in the earlier paragraphs, smart specialisation is not a separate, independent activity. It is a means to reach the impacts of research and innovation policy, and it is embedded into the regional development schemes of each region. Thus, some of ERDF and ESF funding is targeted to support national and regional policies, including smart specialisation. However, at the very start of this paragraph it should be noted that research infrastructure policy is part of a much wider policy discussion than RIS3, thus, this section touches solely on one specific strand of the innovation governance.

Finland´s Strategy and Roadmap for Research Infrastructures 2014-2020 presents a multi-level understanding of the RI governance, since it refers to the dialogues taking place at:
* the OECD´s Global Science Forum, which represents the international governance level;
* the ESFRI, which represents the European governance level;
* the NCM NordForsk, which represents the transnational governance level;
* as well as national governance level Finnish Research Infrastructure Committee (also known by the FIRI abbreviation) (Academy of Finland, 2013, p. 9).

Furthermore, Finland´s Strategy and Roadmap for Research Infrastructures is designed following five goals:
    1. Long-term development of all research infrastructures;
    2. Improvements to the access to and collaborative use of research infrastructures;
    3. Shoring up of the funding base of research infrastructures;
    4. Provision of a firm basis, by the roadmap, for the methodical development of research infrastructures;
    5. Evaluation of the significance and impact of research infrastructures.

Finland, through its national position paper **Finland as a part of the ERA: Finland´s national ERA actions**, has adopted a synergetic approach to the ERA implementation. Namely, it combines European level policy guidelines with OECD monitoring instruments (Ministry of Education and Culture, 2016, p. 4).

Coming back to the earlier discussed Government Programme, it should be noted that it comprises Key Projects (also termed as Spearhead Projects), among which several are aimed at strengthening the R&D&I work at higher education institutions and improve the collaboration between higher education institutions and industries.

In alignment with the Government Programme, the regional efforts are reinforced by universities and universities of applied sciences profiling in their thematic focus areas of research to increase their world-wide competence. Furthermore, Finland has prioritised its ESI Fund investments in R&D domain in line with selected smart specialisation fields in order to feed into innovative commercial products and services (European Commission, 2016c, p. 2). The timeliness of these efforts is mirrored in the recent findings of OECD, stating that "there is an acute need to build competitive advantages in new areas of business and to diversify Finland´s pattern of trade" (OECD 2017, p. 20).

Besides previously discussed responsibilities of TEKES, the agency manages other funding and development instruments specifically devoted to encourage higher education institutes to cooperate with companies and intensify the impact and efforts to commercialise the research findings among which at least **New knowledge and business from research ideas**[4] and **Challenge Finland** should be mentioned as they are or were linking together research infrastructures, universities and businesses.

The INKA programme will be finished by the end of 2017 and no similar programme has been introduced yet to continue the operations. INKA is noteworthy due to its contribution to the advancement of national smart specialisation priorities:
• bio economy advancement is pursued by Joensuu partnering with Jyväskylä, Seinäjoki;
• cybersecurity in line with the digital economy advancement is explored by Jyväskylä;
• new solutions in the health sector are being developed in Oulu, Helsinki Metropolitan area, Kuopio, Tampere, Turku;
• new solutions for developing renewable energy are pursued in Tampere, Helsinki Metropolitan area, Lahti, Oulu, Turku;
• sustainable energy solutions are being developed in Vaasa, Lappeenranta and Pori (TEKES, 2017a).

In terms of cluster development, thus far the overall trend in Finland has been to develop clusters according to the regional and local needs, less so towards transnational competitiveness. Consequently, it should not come as a big surprise that Finnish clusters are not represented in the BSR Innovation Express and are not registered in great numbers on the classification lists of the European Secretariat for Cluster Analysis. Namely, out of former 12 Bronze Label clusters, only Energy Vaasa cluster, also a member of the INKA initiative, has maintained this title.[5] Further insight on the role of clusters in advancing the innovation performance and economic growth of Finnish regions is elaborated in the concluding subsection of the Finland´s county specific part.

Interactions between RIS3, clusters and research infrastructures

RIS3 literature foresees interregional connectivity among its key principles[6] and the structural funds regulation (CPR) the period 2014 -2020, article 70 (European Parliament and The Council, 2013, p. 347), foresees interregional spending beyond the programme area and beyond the Interreg programmes. These provisions facilitate the (needed) macro-regional approach in accessing research services. On the other hand, the political awareness and qualified intermediaries are of vital importance. Finnish aspirations to increase the competitiveness of the business sector by closer cooperation with analytical facilities, thus paving way for more applied activities, experimentation and reinforced partnerships with industry. Baltic TRAM´s generated activities hold the potential to support the goal of Finland´s Strategy and Roadmap for Research Infrastructures aiming at improved access and collaborative use of research infrastructures.

Moreover, Baltic TRAM´s enhanced science-business partnership can pave the way for further exploration how the interregional ties are developed with specific examples of processed business enquiries. To put the interregional dimension in a wider context, it should be added that in the Finnish case, there is an essential and strategic coherence between RIS3 and traditional regional innovation governance. It is due to several factors. Firstly, the bottom up development tradition in Finland plays a major role. Secondly, the triple helix approach encourages the interaction between clusters, industries and research-infrastructures. Thirdly, the framework RIS3 provisions (CPR) are of relevance. Furthermore, in Finland cooperation between cohesion (like ESIF) and innovation funds (like Horizon 2020, CPR´s Annex I) is emphasized outlining both:
a) **"upstream actions"** to prepare regional R&I players to participate in Horizon 2020 ("stairways to excellence");
b) **"downstream actions"** to provide the means to exploit and diffuse R&I results, stemming from Horizon 2020 and preceding programmes, into the market with emphasis on creating an innovation-friendly environment for industries in line with the regional S3.

4　　　Application round was in the beginning of 2017.
5　　　The number of certified clusters in each of the categories provided in this BSR Policy Briefing might differ from the latest information in the ECEI data base. Therefore, the readers are encouraged to consult https://www.cluster-analysis.org/ for the most up-to-date information
6　　　Please consult "The four Cs of smart specialisation" section "Connectivity and Clusters" (Foray et al., 2012, p. 17)

However, RIS3 and traditional regional development approaches also differ due to RIS3 having a role of a change agent. It builds on place-based actions to reach out towards global demand. To this end, it acknowledges feasibility preconditions of any regional innovation effort, and among them critical mass and connectivity. Regional triple helixes, however, often do not address such feasibility factors. Nevertheless, today, it is generally understood that for most regions, addressing innovative growth requires interregional solutions. There are many reasons for this. One of them, especially relevant in peripheral areas, is that in certain cases traditional economic systems are out-dated because of radical change. For example, through economic evolution formerly thriving businesses have been closed or relocated. In such case, a new economic base must be then introduced to renew the economic growth of the region. In such context, it should not be forgotten that due to these major shifts, the industrial system which once supported a dynamic business has become obsolete, thus, also leaving the employees, specialisation research units and locally tailored educational programmes just as obsolete. To renew the economy of such a region, one solution is to strengthen ties with higher education and research units located outside the region, since local generation of new areas of expertise might take too much time to generate the very much needed new economic growth process.

Another reason for closer interregional ties is the mutual exchange of acquired expertise, which is relevant to advanced but not too large economies (for example, many regions in southern Finland) due to being a financially, human resources and time-wise cost-efficient approach in niche expertise development. Advanced research produces new types of knowledge, as well as new types of research orientations of potential practical relevance not just for the region where it has been generated, but also to other regions with similar innovation and smart specialisation orientations encompassing KETs, industry 4.0, creative industries, etc. Thus, Baltic TRAM in the Finnish setting, holds the potential of providing further impetus to these interregional innovation spill-over effects which serve as much needed boosters for the overall benefit of regional economies.

Latvia

Zane Šime, Inga Jēkabsone and Lauma Muižniece

The **Guidelines for Science, Technology Development and Innovation 2014–2020** and the **Guidelines for National Industrial Policy 2014–2020** define the R&D&I strategy of Latvia. The **National Smart Specialisation Strategy** serves as a basis for a number of documents, such as the Guidelines for National Industrial Policy 2014–2020. RIS3 priorities selected by Latvia are high **value-added products, productive innovation system, energy efficiency, information and communication technologies** (in line with the digital growth), **innovative education system, knowledge based economy**[7] and **polycentric development**.

The smart specialisation in Latvia is tailored according to five thematic areas which should spur the economic transformation:
*   knowledge-based bio-economy;
*   biomedicine, medical appliances, bio-pharmacy and bio-technology;
*   advanced materials technologies and engineering systems;
*   smart energy;
*   information and communication technologies.

According to the national assessment, a sufficient knowledge base for further advancement has been identified in a number of domains related to:
*   the natural sciences, such as solid state physics, organic chemistry, bio-chemistry and molecular biology, as well as in computer sciences;
*   engineering sciences, such as, electrical engineering and electronics, ceramics and composite material sciences, mechanics and biotechnologies;
*   medicine, such as, pharmacy, bio-medicine and medical technologies;
*   agriculture sciences, such as, agronomy and gardening, forestry and food technologies.

Latvia's Smart Specialisation Strategy is an economic development strategy aimed at restructuring of economic development and purposeful focusing of research and innovation resources in areas where the state has comparative advantages or it has assets at its disposal based on which such comparative advantages can be created. Smart specialisation in Latvia is seen in close parallels with education and training, which is aligned to the needs of successful smart specialisation implementation. The fertile grounds for smart specialisation advancement are based on the country being classified as an overall Moderate Innovator in the European context, which excelled on the 2016 scoreboard as the EU´s fastest growing innovator (European Commission, 2016a, p. 17).

Science, technology and innovation policy governance is characterised by an ad-hoc co-ordination between the Ministry of Education and Science, the Ministry of Economy and other line ministries. The involvement of other line ministries is related to the fact that the previously stated core national smart specialisation and innovation policy documents are also linked to the **National Development Plan for 2014- 2020, Guidelines on National Industrial Policy of Latvia, Regional Policy Guidelines 2013-2019, Education Development Guidelines 2014-2020, Information Society Development Guidelines 2014-2020, Latvian Tourism Development Guidelines 2014-2020, Cultural Policy Guidelines 2014-2020 "Creative Latvia"** and **Intellectual Property Rights Protection and Enforcement Guidelines 2014-2018**. The **National Reform Programme 2015** is aligned with the Smart Specialisation Strategy, since it covers R&D matters stating the challenges Latvia faces and indicates the financial contribution earmarked in order to tackle these issues.

Ministry of Education and Science is the main responsible authority for S3. The institution works in close cooperation with the Ministry of Economics to co-ordinate the implementation of RIS3 strategy. Regular impact assessments and elaboration of progress reports is foreseen to be developed in the forthcoming years: in 2017, in 2019, in 2021 and in 2023. The 2017 report is in a preparatory stage. These reports will be drafted by the Ministry of Education and Science in collaboration with the Ministry of Economics and will be submitted

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7   Knowledge-based economy production and services are based on knowledge-intense activities that contribute to an accelerated pace of technical and scientific advance.

to the **Latvian Science and Innovation Strategic Council** chaired by the Prime Minister which, if necessary, will initiate strategic changes, will provide recommendations for line ministries to improve RIS3 programmes' implementation.

It has been already acknowledged that "Latvian science is still in the phase of development and growth, with the majority of research institutes still operating under the wing of universities or other higher education institutions and remaining to be providers of lecture courses, contributors to theoretical developments" (Latvian Academy of Sciences, 2014, p. 6). In contrast, the **Guidelines for National Industrial Policy 2014–2020** under the section analysing potential institutional failures does not identify that competitiveness of Latvian companies would be hampered by the incompatibility between the focus of Latvian research centres and business needs (Ministry of Economics, 2013, p. 22). However, this policy document also shares the opinion held by the Latvian academic leadership that there are rather limited and underdeveloped ties between the research and business community (Ministry of Economics, 2013, p. 24). Therefore, it introduces quantitative set of criteria which should be reached until 2020 (Ministry of Economics, 2013, pp. 85–86).

"Latvian government has identified knowledge and innovation driven productivity growth as a crucial prerequisite for sustainable long-term economic development" (Ministry of Education and Science, 2013, p. 3). Therefore, the engagement of the University of Latvia in Baltic TRAM, by setting up the IREC helps to further complement aspirations to reach the defined quantitative goals with a qualitative growth dimension. Namely, engagement in a transnational network wouldn´t automatically translate in an exponential increase in a number of processed business sector enquiries by analytical facilities based in Latvia but would shed further light on the competitiveness of Latvian analytical facilities´ offered services in a BSR-wide setting and what further steps should be taken in order to advance the transnational competitiveness of Latvian analytical facilities and position in international supply chains.

Such findings on transnational competitiveness potential would be of special importance due to the fact that, in comparison to similar sized countries, such as Estonia, Latvia has defined a rather lengthy list and wide array of smart specialisation priorities. Consequently, it could be concluded that this trend of the existing European funding period highlights the path dependency emanating from previous situation, when Latvia faced serious funding shortage for innovation advancement, adopted a catch-all approach of widening priorities up to such a general manner "that almost everyone can get a little funding" (Arnold et al., 2014, p. 26). Finding the niche of comparative advantage would be of special importance to reduce in future the catch-all approach and start slimming down the national range of smart specialisation.

Latvia has joined OECD in June 2016, thus the OECD Innovation Strategy 2015 has not yet been formally translated into national legal acts. However, the existing legislation related to RIS3 implementation is in line with the priorities set out in the OECD Innovation Strategy. The purpose of S3 is to increase Latvia's national economy's innovation capacity and to create such innovation system which facilitates and supports technological progress in national economy.

Latvian National Development Plan 2014 – 2020 foresees up to 1.5% GDP funding for research and development, with half of the investments coming from the private sector. The mission of science, technology and innovation policy is the development of Latvia's knowledge base and innovation capacity as well as innovations system's coordination. Infrastructure for technology transfer and innovation (technology development centres, incubators, parks, prototyping labs, experimental production units) is necessary for new technology development and research result commercialisation. These national activities feed into Latvia´s commitment towards advancing the UN SDG 9 and its particular target 9.5.

Latvia has not yet developed its national ESFRI roadmap (Kulikovskis et al., 2016, p. 60). However, some groundwork has already been laid out. A preliminary position on Latvia´s engagement in ESFRI projects was formulated in 2013 and stated nine European level projects with relevant ERDF-supported national research centres which could be involved in these projects (Latvian Academy of Sciences, 2013, p. 11). The research centres of national significance might be considered as formally established infrastructure clusters, however, the infrastructure is scattered territorially.

Furthermore, in 2015 a report was commissioned to serve as basis for ESFRI development (Kulikovskis et al., 2016, p. 60). As a further promising step towards smooth advancement in drafting the national ESFRI roadmap serves the fact that Latvia has already joined five European Research Infrastructure Consortiums[8] and three European research platforms which have acquired the status of a European Research Consortium[9]. Thus, scientists based in Latvia are eligible to use these infrastructures, as well as participate in their set-up process (Cabinet of Ministers, 2016). The implementation of ERA in Latvia is analysed in the informative report "On the Implementation of Structural Reforms of Science in Latvia until 1 July 2015" (Ministry of Economics, 2016, p. 15).

Latvia´s framework for the cluster development is the **Cluster programme** which is structured under the EU funds 2014 – 2020 management as the Activity 3.2.1.1. It is tailored to promote new collaboration cases between research centres and businesses, since Latvia has started engaging in cluster promotion rather recently. Namely, in 2011, separate clusters were created, e.g., in the areas of electronics, as well as in chemistry and pharmacy, in space technologies' and logistics branches. The major branches of cluster development are the traditionally export-wise dominant wood-processing, agriculture, food, metal industry and mechanical engineering (Arnold et al., 2014, p. 8). Therefore, the Cluster programme is tailored to improve the competitiveness of enterprises, increase their export volumes, and promote introduction of innovative products or services (Kulikovskis, Petraityte, & Stamenov, 2016, p. 9). However, the overall assessment is that Latvia at the moment is in a rather nascent phase of its industrial cluster formation in terms of advancing niche expertise and competitiveness (Arnold et al., 2014, p. 5). Consequently, it doesn´t come as a surprise that thus far Latvia has had no major engagement in transnational and European cluster initiatives. None of the Latvian clusters are certified by the ECEI.[10] Latvia does not take part in the BSR Innovation Express.

Since the Latvian national level framework does not contain elaborate guidelines on how to ensure closer cooperation between the research and business communities, then Latvia could use the transnational cooperation strategies[11] and strategic guide[12] as points of departure for elaborating a national vision on this matter. The Baltic TRAM transnational strategy could serve as a springboard to advance the goals of domestic cluster implementation structure (Activity 3.2.1.1.) towards a broader international outreach.

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8 Namely, Biobanking and Biomolecular Resources Research Infrastructure, Common Language Resources and Technology Infrastructure, European Spallation Source, Joint Institute for VLBI, EATRIS – European Infrastructure for Transnational Medicine,

9 Namely, European high-capacity screening network (EU OPENSCREEN), Instruct, Microbiologgical Resource Research Infrastructure (MIRRI).

10 The number of certified clusters in each of the categories provided in this BSR Policy Briefing might differ from the latest information in the ECEI data base. Therefore, the readers are encouraged to consult https://www.cluster-analysis.org/ for the most up-to-date information.

11 Such as elaborated in the framework of Baltic TRAM.

12 Such as elaborated by the EUSBSR PA Innovation.

Lithuania

Zane Šime and Artūras Mickus

Lithuanian R&I governance is embedded in several policy documents. The **National Progress Strategy ´Lithuania 2030´** is an overall umbrella framework. This national strategy document is based on results of extensive public consultations involving such actors as non-governmental organisations and pro-active citizens. In terms of its science- and innovation-specific contents, Lithuania 2030 aims at attracting top researchers and scientists (State Progress Council, 2012, p. 13). The document also calls for a closer cooperation among business, research sectors and government (State Progress Council, 2012, p. 24). The ESI Funds are allocated in accordance with this position (European Commission, 2016c, p. 2). The envisaged closer partnership should ultimately lead to more active engagement in the Nordic-Baltic cooperation (State Progress Council, 2012, p. 16).

Other policy documents defining the Lithuanian R&I sector is the **National Progress Programme for Lithuania 2014–2020**, the **Programme for Development of Studies and R&D for 2013-2020**, the updated **Concept of the Establishment and Development of Integrated Science, Studies and Business Centres** (Valleys), the **Lithuanian Innovation Development Programme for 2014-2020** and the **Programme on the Implementation of the R&D&I Priority Areas** and Their Priorities which comes together with separate Action Plans for each priority" (Paliokaitė et al., 2016, p. 18).

The Lithuanian national RIS3 is the **Programme on the Implementation of the Priority Areas of Research and (Socio-Cultural) Development and Innovation (Smart Specialisation)**. The strategic goal of the Programme is to increase the impact of high value added and knowledge-intensive economic activities on the GDP. Likewise, the Programme aims at unleashing structural changes of the economy by means of tailored R&D and innovation decisions.

The Programme is aligned with the following two objectives. Firstly, it is tailored to create innovative technologies, products, processes and/or methods which would help to respond to long-term national challenges. Secondly, it is modelled to increase competitiveness of the Lithuanian legal entities and their opportunities for establishing themselves in the global markets. In more specific terms, such establishment means commercialisation of knowledge created in the implementation of the R&D and innovation priorities, as well as exploiting the full potential of synergies arising from the collaboration of science and businesses, economic entities and other public and private sector entities.

The Lithuanian set up of smart specialisation has an advantage of having a clear link between the strategic policy papers, their implementation plans and structures. Namely, smart specialisation in Lithuania revolves around a "list of 6 R&I policy priority areas, with 20 specific priorities […] identified within them. […] The list of R&I priorities will be used as a background for practical implementation of national R&I and industrial policies. The 'policy roadmaps' developed for each specific priority describes targets (technologies to be developed), policy measures, technology development stages, etc. These roadmaps became the basis for thematic R&I priority development programmes" approved in 2015 (Paliokaitė et al., 2016, p. 20).

The R&D&I Priority Areas and their priorities, approved by the Government Lithuania, are as follows:
* **Energy and a sustainable environment priorities;**
* **Inclusive and creative society priorities;**
* **Agro-innovation and food technologies´ priorities;**
* **New production processes, materials and technologies´ priorities;**
* **Health technologies and biotechnologies´ priorities;**
* **Transport, logistic and information and communication technologies´ priorities** (Government of the Republic of Lithuania, 2014).

The implementation of the Programme on the Implementation of the Priority Areas of Research and (Socio-Cultural) Development and Innovation (Smart Specialisation) is managed by a **Group for the Coordination of Implementation of the Research and Development and Innovation Priorities** formed by a joint order of

the Minister of Education and Science and the Minister of the Economy. The Coordination Group is formed of representatives of the governmental offices, business representatives and other socio-economic partners.

On a more panoramic level the R&D&I policy is coordinated by the **Strategic Council for R&D&I**. It is presided by the Prime Minister and assembles ministries interested in the R&D&I development, institutions implementing R&D&I measures, research and higher education institutions, business and representatives of other social partners. The Council functions as a government commission and regularly convenes to deal with strategic R&D&I issues. The Council represents a top-level platform for discussions covering matters concerning R&D&I development, such as smart specialisation, prospects of integrated research, higher education and business centres (valleys), creation of innovation-friendly environment, to name a few.

On day-to-day basis, the **Agency for Science, Innovation and Technology** (MITA) is responsible for implementation RIS3 and promoting the collaboration between businesses and science and study institutions. The monitoring and assessment of the implementation of the Programme, the R&D&I priorities and the R&D&I priority action plans is organised by the **Centre for Research and Higher Education Monitoring and Analysis** (MOSTA).

The existing governance structures are facing several challenges. For example, in earlier assessments it has been suggested that the current set-up is characterised by an unbalanced policy mix, ignoring the different maturity of the priorities in terms of representing well established business sectors versus the aspiring innovation fields. The latter ones require more support in terms networking and human capacity building (Visionary Analytics, 2016). The engagement of Kaunas Science and Technology Park in Baltic TRAM project serves as one of examples how the Lithuanian research centres are building closer ties with their peers in the BSR in a joint pursuit to enhance science-business cooperation.

The national ESFRI roadmap is called the **Roadmap for Research Infrastructures of Lithuania** providing basic information on major RI elements in Lithuania. Lithuania´s engagement in ERA is defined in an Action Plan. Namely, ERA Roadmap is directly reflected in the current **2016–2018 Action Plan for the National Programme for the Development of Studies, Research and Experimental (Social and Cultural) Development for 2013– 2020**. In more detail, the implementation details corresponding to each of the ERA priorities are outlined in the interface document (Minsitry of Education and Science, 2017).

Five valleys identified within the **General Concept of Initiation and Development of Integrated Research, Education and Business/Industrial Centers** (Ministry of Education and Science, 2011, p. 7) are formed as clusters. These centres are tailored to enable cooperation between research institutions and businesses "with respective research infrastructure and supporting services". These valleys serve as testbeds for solving existing obstacles which hamper enhanced cooperation between universities and businesses (European Commission, 2013, pp. 6-7).

Open R&D Lithuania network is a newly launched platform of cooperation between open access R&D centres or laboratories of 14 Lithuanian universities, 13 public research institutes as well as eight science and technology parks. All these institutions united their R&D intellectual potential, infrastructure and resources in order to provide scientifically based solutions to the problems raised by business and society. In order to simplify the access to the information about R&D services and other available resources, the e-science gateway platform was launched by the Agency for Science, Innovation and Technology.

The national governing framework of clusters is the **Lithuania Clusters Development Concept** approved by the Ministry of Economy in 2014. At present time, there are approximately 50 cluster initiatives in Lithuania. Some of them are still at an embryonic stage since a considerable number of these clusters have been established rather recently. At present, not all clusters represent a long-term cooperation perspective based on an ambition to expand their share in the market and, thus, strengthen the development of cluster enterprise.

However, to a large extent the future progress of the Lithuanian innovation performance is dependent on attracting more funding, as it is depicted in the bottleneck scheme displayed in the Annex. In order not to overexaggerate the gravity of the challenges stated in the annex it should be noted that in 2017 Lithuania

emerges in the leading positions in the European Innovation Scoreboard among the fastest growing innovators (Hollanders & Es-Sadki, 2017, p. 7).

As regards to the European initiatives, three Lithuanian clusters bear the Bronze Label of the **ECEI**.[13] Those are Wellness Cluster iVita, Lithuanian Medical Tourism Cluster LitCare and Lithuanian Prefabricated Wooden Houses Cluster PrefabLT. In addition, Lithuania participates in the **BSR Innovation Express**. Engagement in Baltic TRAM sheds further light on the competitiveness of the services offered by clusters in a transnational setting.

All in all, the Lithuanian smart specialisation is characterised by coherence between strategic framework and its implementation structures. Since through its valleys initiative, Lithuania is in process of resolving domestic hurdles for closer cooperation between research and business community, it is understandable why so far there has been very limited Lithuanian engagement in transnational and European cluster policies. Future engagement in these initiatives could provide further boost in the competitiveness of solutions and products designed by Lithuanian clusters.

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13   The number of certified clusters in each of the categories provided in this BSR Policy Briefing might differ from the latest information in the ECEI data base. Therefore, the readers are encouraged to consult https://www.cluster-analysis.org/ for the most up-to-date information

Poland

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From the very beginning of defining smart specialisation in Poland it has been shaped in a cross-cutting way by the Ministry of Development through its **Technology Foresight for Polish Industry – InSight 2030** and the Ministry of Science and Higher Education which is leading the **National Research Programme**. Furthermore, the Ministry of Economic Development has drafted and the Council of Ministers approved the Strategy for Responsible Development which is an extension and operationalisation of the „Plan for Responsible Development". The Strategy for Responsible Development is an updated variant of the medium-term development strategy - **National Development Strategy 2020**. Consequently, the documents dependent on the National Development Strategy 2020 are also under evaluation and will be matched to the results of the evaluation.

The **Strategy for Responsible Development** (Polish Ministry of Development, 2016) builds on the accomplishments of several policy documents and non-policy analytical documents, including in the area of operationalising smart specialisation, whether this refers to designing government funded programmes or prioritising certain sectors of the economy with the view to achieving long-term economic goals. One of the first of these documents, the **Economy Innovation and Effectiveness Strategy: Dynamic Poland 2020** (SIEE), drafted by the then Ministry of Economy and approved by the Council of Ministers in 2013, paved the way for elaborating a Polish smart specialisation framework, stating which documents have and will contribute to arriving at a narrower list of smart specialisations. These were the **Polish Roadmap for Research Infrastructures, National Research Programme**, and the results of foresight projects, e.g., **Industry Technology Foresight – InSight 2030**.

The **Polish Roadmap for Research Infrastructures** was established in 2011 and updated in 2014. At present it includes 53 projects, among which 30 are national projects and 23 are international ones, while 20 are already in their implementation phase. Both establishing and updating the Roadmap was a fully bottom-up process which covered all scientific domains.

The purpose of the Roadmap is to guide the development of future research infrastructure initiatives of a national and international scale in a long-term. At the same time, it corresponds to the European approach of linking national research strategies with the European ones under the auspices of the ESFRI. In more practical terms, there is also a clear link between being included in the Roadmap and having a possibility to apply for the EU structural funds under new financial perspective 2014-2020.

The **National Research Programme**: *Assumptions for the Science & Technology and Innovation Policy of the State* (Council of Ministers, 2011) was adopted by the Polish government in 2011. It comprises seven strategic, interdisciplinary R&D directions:
1. New energy-related technologies,
2. Diseases of affluence, new medicines and regenerative medicine,
3. Advanced information, telecommunications and mechatronic technologies,
4. New materials technologies,
5. Natural environment, agriculture and forestry,
6. Poland's social and economic development in the context of globalizing markets,
7. State security and defense.

The programme trickles down, or in other words, is implemented through **Strategic Research Programmes** (National Centre for Research and Development, n.d.), e.g.:
* Advanced Technologies for Energy Generation;
* Interdisciplinary System for Interactive Scientific and Scientific Technical Information;
* Civilization diseases, new medicines and regenerative medicine (STRATEGMED);
* Environment, agriculture and forestry (BIOSTRATEG);
* Safe Nuclear Power Engineering Development Technologies;
* Integrated System for Reducing Energy Consumption in the Maintenance of Buildings;
* Work Safety Optimization in Mines.

InSight 2030 "focuses primarily on Polish industry, and it is a study that aims to inform policy makers in decision-making process surrounding funding for the branches of industry or technologies that demonstrate the highest socio-economic potential". This document states "10 research areas, 99 key technologies and 33 priority technologies of key significance for the strategic development of Polish industry over the next two decades" (Piatkowski et al., 2014, p. 19). This seminal document created the starting point for identifying and classifying smart specialisations. It was also a basis for cross-referencing with National Smart Specialisation, a list of 20 prioritised R&I areas, which is an integral part of the **Enterprise Development Programme**.

The **Enterprise Development Programme** (adopted in 2014), was formulated to set up specific policy & funding instruments which will be used to carry out the measures proposed by Dynamic Poland 2020. Amongst the most important instruments proposed within the priority area of "Strengthening of ties between business and scientific community" are:
*   Creating the position of an SME assistant (as part of a competitive call, companies apply to receive funding to hire researchers to join their companies to optimise business R&D process). Likewise, funding programmes which would send personnel from business to university/research centre for the purpose of introducing smart innovation processes;
*   Co-funding services provided by innovation brokers (technology transfer, intellectual property, licensing consultations);
*   Innovation vouchers (R&D projects submitted by companies, carried out by research teams at universities/research centres);
*   Setting up a Technology Reserve similar to the ones being established in Finland and Denmark. The aim is to give businesses in exchange for a fixed subscription fee-access to know-how and expertise housed by the leading companies, especially in the area of intellectual property protection and commercialisation.

The **Strategy for Innovation and Efficiency of the Economy Dynamic Poland 2020** defines few objectives, including:
- stimulating innovation through increase in knowledge and work efficiency;
- more efficient use of natural resources and raw materials;
- greater internationalisation of Polish economy.

It is assumed that the implementation of the Strategy for Innovation and Efficiency of the Economy Dynamic Poland 2020 will enable reaching the level of expenditures on R&D of 1.7 of GDP in 2020.

Strategy for Innovation and Efficiency of the Economy Dynamic Poland 2020 executive document is the **Enterprise Development Programme** which defines tools for enterprise support in Poland with an emphasis on the enforcement of innovation. Enterprise Development Programme includes a document defining the idea of smart specialisation on the national level.

Analysis of these documents and current situation are reflected in **Smart Growth Operational Programme 2014-2020** which constitutes tools aimed directly at increasing innovation and competitiveness of Polish economy. Support is orientated at actions on linking the research sector with economy, e. g., by commercialization of research results and reorientation of support mechanisms towards the demand side and more incentives for private investments in R&D. Smart Growth Operational Programme is concentrated on two Thematic Objectives described in Partnership Agreement for programming of the 2014-2020 financial perspective (TO 1 - Strengthening research, technological development and innovation, TO 3 – Enhancing the competitiveness of SMEs). The condition for support under TO 1 is compliance with National Smart Specialisation.

The **National Smart Specialisation** list as such isn't a strategic policy document and does not contain any guidance on implementation or monitoring of progress of operationalising smart specialisation. Such an approach has been praised in the previous analysis for being embedded in a broader R&I strategic framework (Klincewicz & Szkuta, 2016, p. 34). The document elaborates on setting up a unit within an existing government institution, namely, the **Polish Enterprise Development Agency,** to aid in the creation of innovation using public funds, which – inter alia – would have under its purview the monitoring of the implementation of smart specialisations nationwide. The document also lists a number of funding incentives for businesses and other

applicants to align their work with the smart specialisation priorities, including public funding to support the development of critical clusters, as well as diffusion of information and communication technologies as a growth factor in each of these domains.

Strategy for Responsible Development endorses five strengths of the Polish development, i.e. reindustrialization; development of innovative companies; capital for development; foreign expansion; social and regional development. NIS-3/RIS-3 are included as enablers for reindustrialisation in order to identify national and regional market-related niches and competitive advantages for global markets.

The 20 national intelligent specialisations are defined within the following branches: **healthy society; agri-food, timber and environmental sectors; sustainable energy; natural resources and waste management; innovative technologies** and **industrial processes.**

Thus, industrial specialisations reflect the set of examples of branches where Poland may be competitive and have a leading role in the global economy: **aviation; arms industry; car components; shipbuilding industry; information technologies; chemical industry; furniture; food processing**.

The majority of the 16 NUTS II[14] regions represented by 16 regional governments (voivodships) are the authors of their own strategic documents elaborating the smart specialisation priorities set on the regional level. The national and regional level documents were drafted separately, thus from the very beginning these shouldn't be considered as a unified and closely interlinked set of documents. Partly national smart specialisation is directly linked to regional smart specialisations. However, there are some national specialisations which do not have a counterpart at the regional level. It suggests a distributed nature of specialisations and that their critical mass and international potential were identified at national level.

This nuance is also mirrored in the fact that the regional drafting of S3 is at different stages of advancement. Furthermore, each region has its own smart specialisation and system of monitoring which is led by individually set-up bodies such as: groups, teams, observatories. In each region and at the national level, there is body which is responsible for defining trends and evaluation of developing potential of Smart Partnerships.

In more detail, this governance structure entails several programme documents, which do not, however, have the de jure status of national strategies, namely, **National Research Programme, Large R&D Infrastructure Roadmap**. The set-up also includes "**the Eastern Poland Development Strategy** […] with a separate operational program attached (**Eastern Poland Operational Program**)." One of the goals of the last stated strategy will be to develop innovation within the five regions of eastern Poland in need of further support in advancing the local economy (Piatkowski et al., 2014, p. 15).

Three main sources of funding for smart specialisation implementation in Poland are nation-wide funded initiatives run by the **National Centre for Research and Development** and by the **Polish Agency for Enterprise Development**, as well as the nation-wide EU-funded operational programmes deriving from the **Smart Growth Operational Programme 2014-2020**.

As earlier briefly discussed, on the regional level 16 Polish regions have defined their regional smart specialisation strategies as part of their consultation on the Regional OPs for ESI Funds under the framework of the OP "Smart Growth". These strategies vary in quality, some of them being focused, while others are characterised by a rather general approach. The generalist programmes were designed in order to avoid possible technology lock-ins, as the planning horizon was spanning until 2020 (Klincewicz & Szkuta, 2016, p. 35). However, the World Bank acknowledges that considerable efforts should be made in future in order to implement smart specialisation in its true nature, in order to ensure qualitative advancement in the selected niche areas which is a considerable step further beyond Poland's already demonstrated good track record of EU fund absorption (Piatkowski et al., 2014, pp. 2, 55). Polish engagement in Baltic TRAM serves as one of the further steps in advancing the quality dimension of smart specialisation implementation in close cooperation with partners across the BSR.

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14   Nomenclature of territorial units for statistics

The advantage of the Polish national framework is that it facilitates the cooperation between research and business sectors. "The existing legal framework does not prevent foreign researchers from using the RIs in Poland", which also contributes in decreasing the one-way mobility trend (DG RTD, 2014, p. 26; European Commission, 2013b, p. 3). The OP Smart Growth "includes measures which would help optimise the use of existing RIs for applied research and development, especially jointly with business enterprises and international partners" (European Commission, 2013b, p. 3). Further on, this position is supported by ESI Funds, since one of the investment priorities is to "improve the innovativeness and competitiveness of the economy and strengthen the links between R&I and industrial policies" (European Commission, 2016d, p. 2). The importance of making further investments in technology-intensive industries is also outlined in previous evaluations, highlighting the positive spill-over effects on other sectors: "The innovative research and design that drives competition in specialised industries such as pharmaceuticals or aeronautics can indirectly contribute to positive developments in other industries, such as chemicals and basic materials" (Bogdan, Boniecki, Labaye, Marciniak, & Nowacki, 2015, p. 27). Poland's Baltic TRAM IREC operational phase would serve as one of the examples, how these facilitated ties between analytical facilities and businesses are further advanced in practical terms.

Polish participation in clusters is outlined as the way forward in order to overcome the general lack of scale of individual Polish manufacturers. In earlier assessments, it has been judged as the most viable option for Poland to ensure its position in niche markets or the global market (Bogdan et al., 2015, p. 29). The 2015 inventory of clusters carried out by the Polish Agency for Enterprise Development showed a total number of 134 regional-level clusters. Seven of these have been designated as Key National Clusters in a competition organised by the Polish Agency for Enterprise Development, in collaboration with the Ministry of Economy and external experts. In line with one of the criteria of a Key National Cluster, the seven designated clusters conduct activities which have nationwide or even international impact.

Poland is currently not taking fully part in the **BSR Innovation Express**. Nonetheless, Polish Agency for Enterprise Development was an observer agency in the past years and co-organised Cluster2Cluster Matchmaking Event for BSR Innovation Express (BSR Stars, n.d.). However, a good basis for further advancement of its clusters is marked by the fact that Poland already has 17 **Bronze Label** clusters, and three **Silver Label** clusters under the ECEI.[15] Given that the majority of clusters in Poland are business-driven clusters and not research-driven clusters, it is the case that very few clusters are associated with a specific analytical facility. Thus, Poland's Baltic TRAM IREC activities would serve to bridge closer ties among Polish clusters and analytical facilities.

The Ministry of Science and Higher Education devised a **National Action Plan for the European Research Area** (ERA National Action Plan), which details actions to be undertaken with respect to each of the ERA priorities, such as, increasing the effectiveness of national research systems, optimisation of transnational collaboration and competition, optimisation of flow and exchange of scientific knowledge, access thereto and transfer thereof, including via the digital ERA, opening of the labour market for scientists, promotion of gender equality and consideration of this aspect in the area of scientific research. Poland's engagement in the Baltic TRAM network and establishment of its IREC contributes to two priorities. Firstly, it is in line with the priority of increasing the effectiveness of national research systems, following the advancement of science-business ties discussed in the previous paragraph. Secondly, Poland's participation in Baltic TRAM facilitates the optimisation of transnational cooperation by continuing engagement with the EUSBSR flagship Science Link partners in subsequent macro-regionally tailored initiative.

The Strategy for Responsible Development translates the Polish way forward in implementing the internationally agreed commitments defined in the OECD Innovation Strategy 2015. In brief, the strategy treats innovation as a central component of government policy and as a tool for developing and strengthening the Polish economy.

Although not making specific references to the UN SDG 9 and its relevant target 9.5, all discussed documents are concentrated on increasing the level of expenditures on R&D. The Smart Growth Operational Programme is orientated at actions on linking the research sector with the economy by commercialisation of research

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15   The number of certified clusters in each of the categories provided in this BSR Policy Briefing might differ from the latest information in the ECEI data base. Therefore, the readers are encouraged to consult https://www.cluster-analysis.org/ for the most up-to-date information.

results, reorientation of support mechanisms towards the demand side and creating more incentives for private investments in R&D.

The Strategy for Responsible Development also offers tools for increasing the share of expenditure on R&D in GDP, such as, a new law on innovation, the **Start In Poland** programme. It is aimed at supporting an intelligent public procurement and creating a start-up friendly ecosystem of support services, ranging from the incubation phase all the way to expansion of activities abroad, as well as encouraging foreign enterprises to set up their start-ups in Poland. It also includes actions concerning reindustrialisation which should be based on innovations, environmental friendly technologies, ICT and supported by education and training policies. All these incentives are tailored to support the overarching goals enshrined in the target 9.5 of the UN SDG 9.

Conclusion

The joint work of Baltic TRAM partners and members of the Baltic TRAM High Level Group mirrored in this report will serve as promising basis for further joint work in exploring in more detail the following three strands of innovation and smart specialisation governance in the BSR.

Firstly, it sets good grounds for further exploration how governance frameworks and tools set and implemented on the regional and national level feed into the advancement of transnational, European, international and global innovation governance frameworks. This work will be mirrored in the subsequent CBSS report on multi-level governance of innovation and smart specialisation, which will give a panoramic view not solely of BSR-wide trends but also allows to take a comparative look on research and innovation agendas pursued by all Four Regional Councils of the North (namely, Arctic Council, Barents Euro-Arctic Council, CBSS, NCM). Both the BSR Policy Briefing and the subsequent CBSS report together will provide an outstanding elaboration on the multi-level governance of innovation and smart specialisation with a focus on how the existing frameworks help to advance science-business cooperation on each governance level and how these efforts serve as multipliers to the visions and strategic milestones set on the upper levels of governance. It is worth noting that the first glimpses of the role international organisations play in evaluating the national innovation and smart specialisation performance were already depicted in the Danish and Finnish country specific parts, where the important role of OECD developed monitoring metrics was outlined. Likewise, the Finland´s country specific part also explains how the national governance framework is enriched by findings and discussions taking place at the transnational level, namely, NCM NordForsk, European level, namely, ESFRI, and international level – the OECD Global Science Forum.

To elaborate in more detail on the transnational governance level, this overview serves as a further building block towards implementation of **Realising the Vision: Baltic 2030 Action Plan**, which was recently endorsed by the Foreign Ministers and high-level representatives during the CBSS Reykjavík Ministerial as an important step in the implementation of Agenda 2030. Therefore, this brief also mirrors Baltic TRAM´s commitment to advance one of the six priority focus areas of Baltic 2030 Action Plan themed "Transition to sustainable economy".

Secondly, this publication also serves as the first more voluminous milestone in the context of advocating the contribution of Baltic TRAM to the policy-making audiences. It should be noted that over the first year of its implementation Baltic TRAM was actively building wider awareness about its multi-faceted work by individual partner contributions as well as joint engagement in the "Public Consultation on Smart Specialisation: A Fresh Approach to the European Growth and Jobs Through Regional Innovation Strategies" organised by the DG REGIO, as well as the public consultation organised by the CBSS Baltic 2030 Unit ahead of drafting of Baltic 2030 Action Plan.

Thirdly, this report outlines which smart specialisation strands are most frequently articulated on the regional and national level in the countries situated on the shores of the Baltic Sea Region. As the country specific parts show, **health sector** is prioritised by a number of countries and regions, such as, Estonia, Finland, Lithuania, Poland and regional areas such as Southern Denmark, which is further complemented by the interest in facilitating further development of **bio technologies** in pharmaceutical sectors in such countries as Latvia and Lithuania. Another prominent common thread of smart specialisation is related to the **digital growth** translated in support for **ICT**, which is prioritised in Estonia, Finland, Latvia, Lithuania and Poland. Furthermore, **sustainable energy** production also features prominently in the national and regional smart specialisation frameworks of Estonia, Latvia, Lithuania, Poland and Southern Denmark.

However, this briefly painted smart specialisation priority landscape doesn´t lead to Baltic TRAM´s hasty conclusions of the overall topicality of these exact areas in the transnational science-business cooperation context. Therefore, these briefing´s findings will be further used to compare with the thematic priorities shown by Baltic TRAM results once the bulk of enquiries submitted by businesses interested in accessing free analytical research has been concluded. The findings of three BSR-wide transnational priorities in smart specialisation showcased in this report will serve as a source of a more elaborate comparison, whether these or other nationally and regionally outlined RIS3 priorities are of importance to the businesses located both within the BSR, as well as EU-wide.

Lithuania: Bottlenecks and gaps in funding R&D for industries (Viešosios politikos ir vadybos institutas, 2014, p. 19)
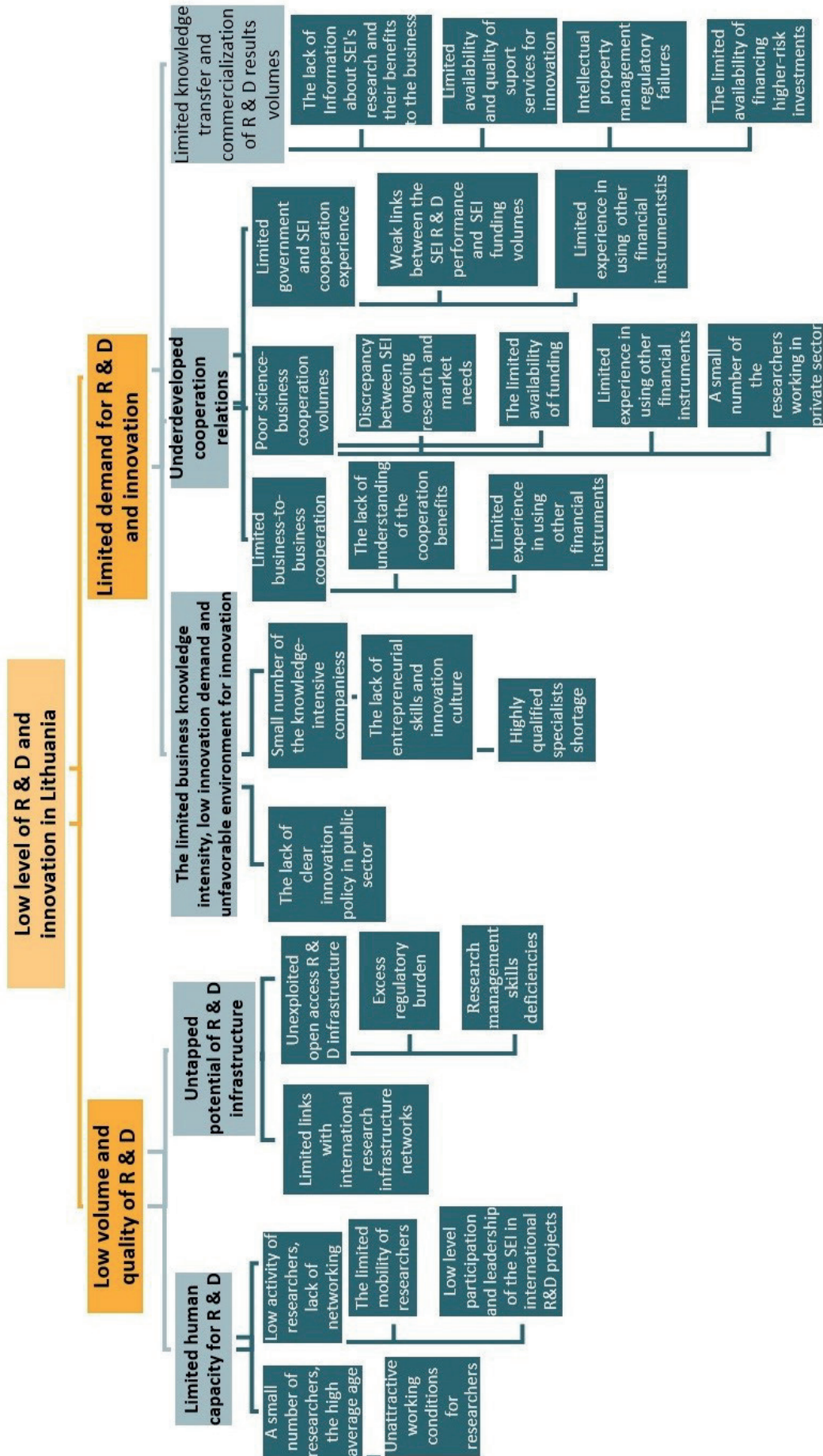
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